MIDIRS Search Pack

Search Pack P11

Diabetes

General articles on care and management in pregnancy and labour of women with diabetes who become pregnant. Includes neonatal outcome. Excludes breastfeeding (PN129), macrosomia (P129), glucose tolerance tests (P84) and gestational diabetes (P12). Contains records from 2015 to present; for earlier material see Search Packs P11 (2009-2014) and P11 (1993-2008).

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P11 - Diabetes

(735)

2026-14500

Epicardial fat thickness in infants of diabetic mothers. Vela-Huerta MM, Amador-Licona N, Domínguez-Damián R, et al (2022), Journal of Neonatal-Perinatal Medicine vol 15, no 1, January 2022, pp 75-80

BACKGROUND:

Epicardial fat thickness (EFT) in adults and children has been related to the metabolic syndrome and other cardiovascular risk factors; however, scarce studies have evaluated it in infants of diabetic mothers (IDM) in whom, alterations in the thickness of the interventricular septum have been reported. This study compares the EFT in IDM versus infants of non-diabetic mothers (INDM) and its association with others echocardiographic parameters.

METHODS:

We performed a cross sectional study in 93 infants (64 IDM and 29 INDM). To evaluate EFT dimensions, an echocardiogram was performed within the first 24h of extrauterine life in both groups. In diabetic mothers, HbA1c was also determined.

RESULTS:

There was no significant difference in birth weight between the groups although gestational age was lower in IDM. The EFT (3.6 vs. 2.5 mm, $p < 0.0001$), the interventricular septum thickness (IVST) (6.2 vs. 5.2 mm, $p < 0.0001$) and the IVST / left ventricle posterior wall (1.3 vs. 1.1, $p = 0.001$) were higher in the IDM; while the left ventricular expulsion fraction [LVFE] (71.1 vs. 77.8; $p < 0.0001$) was lower than in the INDM, respectively. We found a positive correlation between EFT with IVST ($r = 0.577$; $p = 0.0001$), LVPW ($r = 0.262$; $p = 0.011$), IVST/LVPW index ($r = 0.353$; $p = 0.001$), and mitral integral early velocity ($r = 0.313$; $p = 0.002$), while a negative correlation with LVFE was observed ($r = –0.376$; $p = 0.0001$).

CONCLUSIONS:

The EFT is higher in IDM than in INDM. It was positively related with echocardiographic parameters of left ventricular thickness and negatively with left ventricular ejection function.

2026-14499

Maternal diabetes and fetal cardiac output. Narasimhan SL, Eid A, Bhatia A, et al (2022), Journal of Neonatal-Perinatal Medicine vol 15, no 1, January 2022, pp 69-74

BACKGROUND:

The intrauterine environment is a key determinant for long-term health outcomes. Adverse fetal environments, such as maternal diabetes, obesity and placental insufficiency are strongly associated with long-term health risks in children. Little is known about differences in fetal cardiac output hemodynamics of diabetic mothers (DM) vs. non-diabetic mothers (NDM). Our study aims to investigate the left-sided, right-sided, and combined cardiac output (CCO) in fetuses of DM vs. NDM.

METHODS:

Retrospective data were collected in fetuses of DM ($N = 532$) and NDM (103) at mean gestational age 24 weeks. Examination included 2D echo and pulse wave Doppler. Wilcoxon rank sum tests and Chi-square tests were used to test for distribution difference of maternal and fetal continuous and categorical measures respectively between DM and NDM. Intraclass correlation coefficients were calculated to assess intra-observer reliability of fetal cardiac measurements.

RESULTS:

DM mothers had higher mean weight (89.7±22.2 kg) than NDM (76.8±19.8 kg), $p < 0.0001$ and higher mean BMI (33.4±7.5) than NDM (28.3±5.8), $p < 0.0001$. C-section delivery occurred in 66% of DM vs. 35% of NDM fetuses. Fetuses of DM mothers had significantly larger semilunar valve diameter, higher left ventricular (LV) output, higher combined cardiac output and lower right ventricle /left ventricle ratio compared to NDM.

CONCLUSION:

The greater CCO (adjusted for fetal weight), left sided cardiac output in the fetuses of DM, compared to NDM, represent differences in cardiac adaptation to the diabetic environment.

2026-14249

The Influence of Maternal Diabetes on Placental Function and Fetal Brain Development: A Review of Advanced Imaging Methods. Gold SL, Sonny SR, Downs SG, et al (2026), American Journal of Perinatology 14 August 2026, online

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Diabetes mellitus (DM) is one of the most common medical complications of pregnancy and is associated with increased maternal and fetal morbidity and mortality. The placenta has a unique role as a transient organ that can profoundly influence the lifelong health of both mother and child. In pregnancies complicated by diabetes, the placenta plays a central role in bridging maternal vascular, hormonal and metabolic effects on fetal neurodevelopment. The objective of this study is to review the current literature on in vivo placental and fetal neurodevelopment in pregnant women with DM. We present a narrative literature review detailing human studies of placental and fetal neurodevelopment in pregnant persons with DM, along with promising new avenues of in vivo placental assessments. Advances in imaging, particularly sonography and magnetic resonance imaging, provide novel insights on placental structure and function, as well as fetal brain development in pregnant women with DM. Improving our understanding of the in vivo consequences of maternal DM may provide new opportunities to intervene and mitigate adverse pregnancy outcomes in future.

2026-13853

Subclinical respiratory dysfunction in neonates born to diabetic mothers and its association with cord blood adipokines. Bese SA, Tuncerler G, Sahin C, et al (2026), Pediatric Allergy and Immunology vol 37, no 6, June 2026, e70383

Background

Maternal diabetes disrupts fetal lung development. This study aimed to compare cord blood adipokines and neonatal respiratory function tests (RFTs) in healthy neonates of diabetic mothers versus controls.

Methods

This prospective cohort study involved term, healthy newborns born to diabetic mothers (NDM group, n = 37) and sex- and age-matched healthy controls (NHC group, n = 40). RFTs were performed at 48 h of life using tidal breath analysis (TBA). The assessed parameters included time to peak tidal expiratory flow (TPTEF), the ratio of TPTEF to total expiratory time (TPTEF/TE), the ratio of volume to peak expiratory flow to total expiratory volume (VPTEF/VE), reflecting early airway mechanics. Low respiratory function was defined as TPTEF/TE below 35%. Cord blood adipokines including leptin, ghrelin, and adiponectin levels were measured by ELISA.

Results

The NDM group exhibited lower TPTEF, TPTEF/TE, and VPTEF/VE ratio TBA parameters ($p < .001$ for all). Cord blood leptin levels were higher in the NDM group, while ghrelin and adiponectin levels were lower ($p = .002$, $p < .001$ and $p < .001$ respectively). Ghrelin levels were positively correlated with TPTEF ($\rho = 0.231$, $p = .043$), TPTEF/TE ($\rho = 0.264$, $p = .020$), and VPTEF/VE ($\rho = 0.236$, $p = .038$). Decision tree analysis identified ghrelin as the primary discriminator of low RFTs, with an accuracy of 74%.

Conclusion

Clinically healthy term infants born to diabetic mothers exhibit measurable impairments in RFTs at birth, accompanied by altered cord blood adipokine profiles, suggesting a potential role for adipokines as early biomarkers of respiratory vulnerability.

Full URL: https://doi.org/10.1111/pai.70383

2026-13220

Breastfeeding and optimal health outcomes for women: Type 2 diabetes. Tawia S (2024), Breastfeeding Review vol 32, no 2, July 2024, pp 36-40

The third and final paper in a series written by the author to illustrate the improvement in population health outcomes for women who breastfeed, with particular emphasis on women who breastfeed for 12 months or longer. This paper presents evidence that the risk of developing type 2 diabetes is reduced by breastfeeding. (JSM)

2026-12606

Is Routine Monitoring for Hypoglycemia Required in Intramural Asymptomatic Infant of Diabetic Mother? An Audit in a Tertiary Care Hospital. Khandare J, DS M, Ananthan A, et al (2020), Journal of Tropical Pediatrics vol 66, no 2, April 2020, pp 194–200

Aims

This retrospective audit aimed to analyze whether routine frequent monitoring for hypoglycemia is required in asymptomatic infant of diabetic mother born in tertiary care hospital.

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Methods
The study analyzed the blood sugar level of 196 infants of diabetic mothers.

Results
The overall incidence of hypoglycemia from 196 study participants was 9.18% (N = 18). The incidence of hypoglycemia at 2 h of life was maximum (83.33%) and it was significant when compared to 3, 6, 9 and 12 h ($p < 0.0001$). Blood glucose levels were significantly more at 6 ($p = 0.0002$)), 9 ($p = 0.0001$) and 12 h ($p = 0.0001$) when compared to glucose level at 2 h except at 3 h of life ($p = 0.062$). Similarly blood glucose at 9 ($p = 0.0001$) and 12 h of life ($p = 0.0002$) were significantly more than at 3 h of life. Blood glucose at 9 h was significantly more than at 6 h of life (0.032) and at 12 hours of life ($p = 0.0237$) was significantly higher than at 6 h of life.

Conclusion
The frequent blood glucose monitoring for hypoglycemia in infant of diabetic mother as per American Academy of Pediatrics may be reduced as per the findings in our study. However, this needs to be confirmed by a properly designed observational study/adequately powered randomized controlled trial.

2026-12536

The impact of remote care on the quality of care of pregnant women with diabetes: a systematic review and meta-analysis. Sousi S, Lammila-Escalera E, Glynou SP, et al (2026), EClinicalMedicine vol 99, September 2026, 104147

Background: Diabetes during pregnancy, whether gestational (GDM) or pre-existing, is associated with increased maternal and neonatal risks. Remote care has shown promise in diabetes management, however, its impact on antenatal diabetes care remains unclear. This review evaluates its impact compared with usual care for pregnant women with diabetes, using the Institute of Medicine's healthcare quality framework: effectiveness, safety, efficiency, timeliness, patient-centredness, and equity.

Methods: A systematic review and meta-analysis was conducted. Seven electronic databases (MEDLINE, EMBASE, CINAHL, MIDIRS, Scopus, Cochrane, and Global Health) were searched for studies published between January 01, 2005 and April 30, 2026, with no geographic or language restrictions. Two independent reviewers screened studies and assessed quality using Cochrane tools. A narrative synthesis and meta-analyses were performed. This review was registered with PROSPERO (CRD420251024685).

Findings: Of 1106 unique studies retrieved, 45 were included (n = 26,562), comprising 20 randomised controlled trials (RCTs) and 25 non-randomised studies. Most studies focused on GDM only (n = 37), with the remainder including mixed GDM and pre-gestational diabetes (n = 6) or pre-gestational diabetes only (n = 2). Remote care was generally comparable to usual care across most effectiveness and safety outcomes. In non-randomised studies, remote care was associated with lower unspecified caesarean section rates (relative risk [RR] 0.95, 95% CI 0.91-0.99), postpartum HbA1c (MD -0.08%, 95% CI -0.15 to -0.01), and postpartum 2-h post-prandial glucose levels (MD -1.04 mmol/L, 95% CI -1.59 to -0.48). In RCTs, remote care was associated with reduced emergency caesarean section (RR 0.59, 95% CI 0.38-0.92) and neonatal intensive care unit (NICU) admission (RR 0.73, 95% CI 0.57-0.92). For patient-centredness, patient satisfaction was consistently high. Efficiency findings (cost savings and appointment frequency) were mixed. Three studies assessed timeliness, with no differences observed. Equity outcomes were rarely quantified, though several interventions incorporated cultural, linguistic, or technological adaptations to improve accessibility.

Interpretation: Remote care is a safe and effective alternative to usual care for pregnant women with diabetes, with safety advantages including reduced emergency caesarean sections and NICU admissions. Further research is required to evaluate long-term postpartum outcomes and equitable adoption across diverse populations.

Funding: This study was supported by the National Institute for Health and Care Research (NIHR) North West London Patient Safety Research Collaboration (NIHR NWL PSRC, NIHR204292).

Keywords: Diabetes in pregnancy; Gestational diabetes mellitus; Quality of care; Remote care; Virtual care; mHealth.
Full URL: https://doi.org/10.1016/j.eclinm.2026.104147

2026-12243

Pregnancy-Associated Diabetes Mellitus and Stillbirths by Race and Ethnicity among Hospitalized Pregnant Women in the United States. Atkinson J, Dongarwar D, Mercado-Evans V, et al (2022), Southern Medical Journal vol 115, no 7, July 2022, pp

405–413

Objectives

Racial disparities in preexisting diabetes mellitus (PDM) and gestational diabetes mellitus (GDM) remain largely unexplored. We examined national PDM and GDM prevalence trends by race/ethnicity and the association between these conditions and fetal death.

Methods

This was a retrospective cross-sectional analysis of 69,539,875 pregnancy-related hospitalizations from 2002 to 2017 including 674,040 women with PDM (1.0%) and 2,960,797 (4.3%) with GDM from the US Nationwide Inpatient Sample Survey. Joinpoint regression was used to evaluate trends in prevalence. Survey logistic regression was used to evaluate the association between exposures (PDM and GDM) and outcome.

Results

Overall, the average annual increase in prevalence was 5.2% (95% confidence interval [CI] 4.2–6.2) for GDM and 1.0% (95% CI −0.1 to 2.0) for PDM, during the study period. Hispanic (average annual percentage change 5.3, 95% CI 3.6 − 7.1) and non-Hispanic Black (average annual percentage change 0.9, 95% CI 0.1 − 1.7) women had the highest average annual percentage increase in the prevalence of GDM and PDM, respectively. After adjustment, the odds of stillbirth were highest for Hispanic women with PDM (odds ratio 2.41, 95% CI 2.23–2.60) and decreased for women with GDM (odds ratio 0.51, 95% CI 0.50–0.53), irrespective of race/ethnicity.

Conclusions

PDM and GDM prevalence is increasing in the United States, with the highest average annual percentage changes seen among minority women. Furthermore, the reasons for the variation in the occurrence of stillbirths among mothers with PDM and GDM by race/ethnicity are not clear and warrant additional research.

2026-11999

Racial and Ethnic Disparities in Health Care and Health Outcomes for Pregnant Women With Diabetes. Phonyiam R, Berry DC (2021), Nursing for Women's Health vol 25, no 6, December 2021, pp 437-449

This article summarizes the current literature on racial and ethnic differences among women with diabetes in pregnancy. The PubMed, Scopus, CINAHL, and Embase databases were searched for original qualitative or quantitative studies published in English from January 1, 2009, to May 31, 2020. Consensus statements were excluded. Results of this synthesis indicate that racial and ethnic differences exist among pregnant women with diabetes, including social determinants of health, disparities in maternity care and perinatal care, and maternal and neonatal health outcomes. Health care providers should implement tailored interventions that specifically target racial and ethnic disparities in maternal and neonatal health to promote health equity in pregnant women with diabetes and their offspring, including later in life.

Keywords: diabetes; disparities; equity; ethnic; gestational diabetes; literature review; perinatal; postpartum; pregnant; prenatal; racial.

Full URL: https://doi.org/10.1016/j.nwh.2021.09.003

2026-11581

Social determinants of health and postnatal wellbeing among women with type 2 diabetes in Thailand: An explanatory sequential mixed-methods study protocol. Phonyiam R, Srichalerm T, Sawatpanich A, et al (2026), PLoS ONE vol 21, no 7, July 2026, e0354735

Introduction: Type 2 diabetes mellitus affects pregnancy and can lead to maternal complications. Women affected by diabetes during pregnancy have ongoing physical, psychological, and social needs until birth preparation and after childbirth. The Social Determinants of Health (SDoH) can have a greater impact on health outcomes than healthcare services or personal lifestyle choices alone. To date, no study has explored how women with type 2 diabetes experience life after childbirth. To help close this knowledge gap, the proposed study aims to: 1) Culturally adapt and translate the Postnatal Well-being in Transition scale into Thai. 2) Quantitatively describe the SDoH and postnatal well-being during the diabetes transition among Thai women with T2DM. 3) Explore Thai women's experiences regarding their SDoH, based on the mean scores of their postnatal well-being during the diabetes transition. And 4) Explore and analyze the impact of postnatal care on women with T2DM using a mixed-methods approach.

Methods: This is an explanatory sequential mixed-methods study protocol with two distinct phases. The first phase

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involves the translation of the study instrument, while the second phase focuses on data collection for the mixed-methods study. Data will be collected from 50 postnatal women with type 2 diabetes mellitus who have delivered a baby within the past six weeks. Participants will provide data on demographics, social determinants of health, and their postnatal well-being in transition. From this group, 12 women will be selected to participate in semi-structured, one-on-one interviews to gain a deeper understanding of their experiences. The study will use triangulation to integrate and validate the findings from both the quantitative and qualitative data sources.

Ethics and dissemination: Human Research Ethics Committee approval has been received from the Faculty of Medicine Ramathibodi Hospital, Mahidol University. The study findings will be reported in international journals.

Full URL: https://doi.org/10.1371/journal.pone.0354735

2026-11465

From peril to new reality: scientific advances transform pregestational diabetes in pregnancy care and outcomes. Drummond RF, Seif KE, Reece EA (2026), American Journal of Obstetrics & Gynecology (AJOG) vol 235, no 5, November 2026, pp 1003-1023

For hundreds of years, pregestational diabetes mellitus was a life-limiting, devastating diagnosis managed by extreme caloric restriction, but with the inevitable outcome of wasting and death within months to a few years. The maternal mortality rate was unacceptably high (over 50%), and although many women desired to have children, or even the chance despite the extremely high rates of pregnancy loss, fetal death, and neonatal death, women were universally discouraged from pregnancy due to high maternal risk. This was accompanied by depression and even suicide in some instances. When insulin was discovered in 1921, pregnancy became possible but associated with high maternal and perinatal morbidity and mortality. Over the past several decades, remarkable discoveries in the pathophysiology of diabetes and innovations in management have been made. The discovery of hyperglycemia as a teratogen, and thus blood glucose levels as a modifiable risk factor for congenital anomalies, has highlighted the importance of preconception care. Advances in fetal ultrasound and echocardiography have led directly to improved neonatal care and a reduction in perinatal mortality. Continuous glucose monitoring and automated insulin delivery systems have improved maternal glycemic stability, subsequently decreasing rates of large for gestational age infants, neonatal intensive care unit admissions, and neonatal hypoglycemia. However, risks remain, including preeclampsia, preterm birth, large for gestational age infants, congenital anomalies, caesarean delivery, neonatal morbidity, and long-term offspring health consequences. While ongoing advances in prenatal imaging and screening protocols continue to improve diagnosis and management, disparities in access to preconception care and diabetes technologies remain major obstacles to optimal outcomes worldwide. We review the scientific discoveries and clinical advances that have shaped modern care and discuss the persistent challenges and future directions in the management of pregestational diabetes in pregnancy.

2026-11463

The role of the diabetes specialist midwife. Jones C (2024), Journal of Diabetes Nursing vol 28, no 6, 21 November 2024, p 356

In the first of an occasional series to highlight the variety of roles involved in delivering diabetes care and how they influence services, Cathy Campbell profiles the broad and challenging work of the diabetes specialist midwife, and outlines how to embark on this career.

Full URL: https://diabetesonthenet.com/journal-diabetes-nursing/diabetes-specialist-midwife/

2026-11229

The impact of prepregnancy BMI and family history of diabetes on the prevalence of gestational diabetes mellitus among Bulgarian women. Hristova I, Galeva S, Ibryam I, et al (2026), BMC Pregnancy and Childbirth vol 26, no 1, 14 May 2026, 726

Introduction

To assess the impact of prepregnancy body mass index (P-BMI) and family history (FH) of diabetes on the prevalence of gestational diabetes mellitus (GDM) among Bulgarian women.

Methods

446 women were tested by 75 g OGTT (WHO 2013 criteria) in a prospective observational study. The prevalence of GDM was calculated in groups with high (≥ 25 kg/m2) and normal P-BMI, positive and negative FH, and in subgroups with different combinations between them. The ORs for GDM were calculated for the factors studied. Descriptive analysis, Student's t-test, Chi-Square test, binary regression analysis were applied; $P < 0.05$ indicated significant differences.

Results
GDM was present in 7.6% of the women with normal P-BMI, in 39% of the ones with high P-BMI, in 15.1% - if FH was negative and in 39% - if FH was positive. Among women with normal P-BMI the prevalence of GDM was 3.85% if FH was negative and 16.42% - if positive. Among women with high P-BMI, the prevalence of GDM was 27.94% if FH was negative and 56.32% - if positive. The differences between the main groups and the four subgroups were statistically significant. High P-BMI, positive FH and the combination of both increased the risk for GDM 3.7, 2.6 and 5.12 times, respectively.

Conclusion
High prepregnancy BMI and FH of diabetes were independent risk factors for GDM in our population. Screening for GDM has to be recommended to all women with either one or both of these risk factors.
Full URL: https://doi.org/10.1186/s12884-026-09243-6

2026-10456

Prevalence of Pre-Pregnancy and Gestational Diabetes in the Province of Trento-North Italy: Trend 2012-2019. Silvano P, Rizzello R, Massimo O, et al (2021), Journal of Pregnancy and Child Health vol 4, no 1, 2021, 117

Introduction: Pre-Pregnancy Diabetes (PPD) affects 03-05/100 and Gestational Diabetes (GDM) affects 7/100 pregnancies. The prevalence estimates show, for both conditions, a wide range of variability in relation to the characteristics of the populations and the diagnostic criteria used. In recent years there has been a significant increase in pregnancies in women with both type 1 and type 2 PPD. Similar increases are also reported for the GDM. The study reports the trend of the prevalence of PPD and GDM in pregnant women assisted at the maternity units of the province of Trento (North East Italy) from 2012 to 2019.

Material and Methods: The criteria for monitoring blood glucose during pregnancy are based on the recommendations by the International Association of Diabetes and Pregnancy Study Groups. The glycemic monitoring data are recorded in the province of Trento, on the personal obstetric guide of each pregnant woman, which is updated on the occasion of periodic checks and therefore in all pregnant women on the occasion of registration of data in the Birth Attendance Certificate (BAC) on a specific computer support operating at each maternity unit. The cases recorded in the BAC were compared with those collected by the provincial register of type 1 diabetes mellitus and with the hospital discharge archive. Based on the integrated data, the birth cohorts 2012-2019 were retrospectively analyzed. The temporal trend of the prevalence of PPD and GDM was calculated, considering the citizenship, the age group and the educational qualification of the pregnant women. Prevalence estimates are provided by 95% confidence intervals.

Results: Between 01.01.2012 and 12.31.2019, 33,577 pregnant women received care at hospital maternity units of the province of Trento. 158 cases of PPD (20 cases per year) and 1,950 cases of GDM (244 cases per year) were recorded. 1 case of GDM and one case of PDD had escaped the BAC. The mean period prevalence for PPD in all pregnant women is 0.44/100 (95% CI 0.37-0.50), in Italian women is 0.39/100 (95% CI 0, 31-0.46) while in foreign women it is 0.57/100 (95% CI 0.42-0.72). The average period prevalence of GDM for all pregnant women is 5.5/100 (95% CI 5.27-7.73), in Italian women is 4.3/100 (95% CI 4.06- 4.54), while in foreign women it is 8.8/100 (95% CI 8.23-9.37). The prevalence of PPD overall shows a slight increase over time, this appears substantially stable in the Italians and increasing in the foreigners. In the case of the GDM, there is an increase over time in both population groups, greater in foreigners than in Italians. The prevalence of PPD and GDM in foreign women is higher than in Italian women. Women coming from African and Asian countries show the highest values. The prevalence of PPD and GDM grows linearly with age and with the reduction in the level of education of women.

Discussion: The information flow of the BAC, as organized in the province of Trento, can be considered a reliable source in the recovery and registration of the frequency of PPD and GDM. The prevalence estimates of PPD and GDM reported in the present study increase over the course of subsequent birth cohorts, in agreement with what is reported in the international literature. Overall, for both forms of diabetes, we report in the period under study a prevalence of about 6/100 pregnancies. The increase of prevalence according to the birth cohorts is evident above all in foreigners. Foreign women, especially from Asia and Africa and women with childbirth age over 35, and with low educational qualifications represent a significant share of PPD and GDM cases and therefore of subpopulations at greater risk to be considered as a priority in public health action.
Full URL: https://www.gavinpublishers.com/assets/articles_pdf/1618821144article_pdf1869227836.pdf?_gl=1*1ulrmug*_up*MQ..*_ga*MzM3Mzk4MzE4LjE3ODc2NDgxMDQ.*_ga_H3L5D4V9XX*czE3ODc2NTA1MjMkbzIkZzAkdDE3ODc2NTA1MjMkajYwJGwwJGgyMDY0NTk5ODg4

2026-10100

Management of Diabetic Ketoacidosis in Pregnancy. Spencer NR, Clark SM, Harirah HM (2023), Clinical Obstetrics and Gynecology vol 66, no 1, March 2023, pp 186-195

Diabetic ketoacidosis (DKA) is a rare, but potentially life-threatening complication of diabetes. Certain physiological changes during pregnancy predispose pregnant individuals to developing DKA. Early recognition and aggressive treatment are essential to avoid maternal and fetal morbidity and mortality. Although laboratory values can help to support, pregnant patients with DKA may not meet the usual criteria and the diagnosis can be made clinically. The key components to treatment include volume replacement, insulin infusion, correction of serum potassium, and fetal monitoring. With appropriate treatment, maternal mortality is low. After recovery, steps should be taken to avoid recurrence.

2026-09973

Diabesity and Pregnancy: How Do We Get Our Patients Moving?. Kogutt BK, Szymanski LM (2021), Clinical Obstetrics and Gynecology vol 64, no 1, March 2021, pp 185-195

Obesity and diabetes are 2 commonly encountered complications in pregnancy that adversely affect pregnancy outcomes, maternal health, and the health of the offspring, both short-term and long-term. It is well established that physical activity provides numerous health benefits, both during and outside of pregnancy. By participating in physical activity, many of the negative consequences of both obesity and diabetes may be mitigated. Physical activity guidelines recommend that all adults, including pregnant women, perform at least 150 minutes of moderate-intensity exercise weekly in order to obtain health benefits. More physical activity may be needed to achieve weight management goals.

2026-09972

Group Prenatal Care as a Strategy to Address Diabesity. Huysman BC, Mazzoni S, Carter EB (2021), Clinical Obstetrics and Gynecology vol 64, no 1, March 2021, pp 174-184

Group prenatal care is a health care delivery model that utilizes shared medical appointments to place greater focus on patient education, mutual support, and increased time with the clinician to promote a healthy pregnancy. Several studies suggest that medically low-risk women participating in group prenatal care have improved pregnancy outcomes, but the same tenants can likely be used to help women with diabetes and obesity achieve healthy outcomes during pregnancy and throughout their life course. This chapter will review the background, care model, and evidence regarding group medical visits for pregnant women with diabetes and obesity.

2026-09971

A Pragmatic Approach to the Treatment of Women With Type 2 Diabetes in Pregnancy. Bender W, Durnwald C (2021), Clinical Obstetrics and Gynecology vol 64, no 1, March 2021, pp 159-173

Type 2 diabetes mellitus (DM) is a growing problem among reproductive-aged women. Contemporary trends in obesity and delayed child-bearing are expected to result in an increasing number of pregnancies affected by type 2 DM. Women with known type 2 DM can greatly benefit from preconception care as improved periconception glycemic control and weight loss can decrease the neonatal and maternal risks associated with type 2 DM and pregnancy. Antenatal mainstays of management include frequent blood glucose monitoring, insulin therapy, optimization of coexisting medical conditions, and fetal surveillance. Careful attention to postpartum glucose control, infant feeding choices, and contraceptive counseling are important aspects of immediate postpartum care.

2026-09970

Ultrasound for the Pregnant Person With Diabesity. Mei JY, Han CS (2021), Clinical Obstetrics and Gynecology vol 64, no 1, March 2021, pp 144-158

Diabetes and obesity increase the risk of congenital anomalies, but the putative mechanisms of this increased risk are not fully elucidated. In this chapter, we delve into sonographic characteristics associated with diabetes and obesity, including fetal structural anomalies, functional cardiac alterations, and growth abnormalities. We will also discuss the technical challenges of imaging in the patient with diabesity and propose methodologies for optimizing imaging. Lastly, we will address the prevention of workplace-associated musculoskeletal disorders injury for sonographers.

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2026-09969

Screening for Aneuploidy in the Patient With Diabesity: Pearls and Pitfalls. Hopkins MK, Dugoff L (2021), Clinical Obstetrics and Gynecology vol 64, no 1, March 2021, pp 136-143

The American College of Obstetrics & Gynecology (ACOG) recommends offering aneuploidy screening to all pregnant women. Obesity and diabetes are not associated with an increased risk of aneuploidy; however, they can complicate and compromise testing options. As the prevalence of obesity and diabetes, or “diabesity” increases, counseling women regarding potential limitations in testing performance of aneuploidy screening is of paramount importance. This chapter reviews options for aneuploidy screening for women with diabesity including sonography/nuchal translucency, serum analyte screening, and cell-free DNA. Potential challenges associated with diagnostic testing with amniocentesis and chorionic villus sampling in women with obesity are also discussed.

2026-09929

Early gestational diabetes mellitus and type 2 diabetes: do they differ in perinatal outcome– a retrospective analysis. Gladych-Macioszek A, Mantaj U, Tobola-Wrobel K, et al (2026), BMC Pregnancy and Childbirth vol 26, no 1, 11 March 2026, 423

Background

The rise in type 2 diabetes (T2D) during pregnancy is mainly due to increasing obesity and metabolic disorders. Early gestational diabetes mellitus (eGDM), diagnosed before 20 weeks, is also becoming more common and often may explain underlying metabolic problems. This study compares perinatal and neonatal outcomes in patients with T2D and eGDM.

Methods

This retrospective study included 141 pregnant women (70 with T2D and 71 with eGDM) and their singleton term neonates born between 2020 and 2025. The women attended at least one follow-up visit per trimester. eGDM was diagnosed before 20 weeks of gestation based on an oral 75 g glucose tolerance test according to Polish recommendations. Each patient had their HbA1c levels measured at the time of diagnosis and then in each trimester of pregnancy. As a comparator, we used our university hospital growth charts and calculated neonatal growth data from healthy women who delivered at the same hospital between 2017 and 2022. Statistical analysis was performed using PQStat, with p-values < 0.05 considered statistically significant.

Results

Pre-pregnancy obesity was more common in the eGDM group (94.4% vs. 77.1%,$p < 0.05$). Women with T2D gained more weight ($p < 0.005$) and had higher HbA1c levels throughout pregnancy ($p < 0.005$) than those with eGDM. Insulin was required more often in women with T2D (98.6% vs. 63.4%, $p < 0.05$) and started earlier in T2D (9 vs. 15 weeks, $p < 0.005$). Preterm birth rates were similar in the T2D and eGDM groups 12.7% vs. 15.7%), as were cesarean section rates (62.9% vs. 60.6%), LGA (15.7% vs. 26.8% according to local growth charts) and SGA (20% vs. 26.8% according to local growth charts). Neonatal jaundice was less frequent in the T2D group (21.4% vs. 36.8%, $p < 0.05$). Congenital defects occurred at a similar frequency in both groups (T2D: 5.6% vs. eGDM: 8.6%).

Conclusions

The study groups differed significantly in weight gain during pregnancy, the need for and onset of insulin administration, and the incidence of jaundice in newborns. Prepregnancy obesity in the eGDM group may be the main factor predisposing to the trend to a higher percentage of LGA babies in this group. The frequency of congenital malformations in both groups reinforces the need for pre-conception counselling for their prevention.

Full URL: https://doi.org/10.1186/s12884-026-08927-3

2026-09821

Evaluation of Urine Nephrin:Creatinine Ratio Longitudinally in Pregnancy for the Detection of Preeclampsia and Kidney Damage in Women With Pre-Existing Diabetes. Zhang K, Alahakoon TI, Shaw A, et al (2026), The Journal of Obstetrics and Gynaecology Research vol 52, no 5, May 2026, e70278

Aims

(i) To evaluate longitudinal changes in urine nephrin to creatinine ratio (NCR) throughout gestation in women with pre-existing diabetes; (ii) To evaluate the association of NCR with diabetic nephropathy and pregnancy outcomes including preeclampsia.

Methods

A prospective cohort study of 158 pregnant women with pre-existing diabetes was conducted. Changes in urinary

nephrin, protein, albumin and creatinine were assessed serially during pregnancy at four time points. The association with diabetic nephropathy and pregnancy outcomes was investigated by linear mixed effects models. Spearman's rank correlation was used to assess the correlation of NCR with protein/albumin to creatinine ratio (PCR/ACR).

Results
NCR increased from early to late pregnancy ($p < 0.05$); however, there was no significant difference in NCR between those with and without preeclampsia irrespective of gestational age. Women with diabetic nephropathy had 3.48 times greater [1.38–8.77] NCR at 14 weeks compared to those without ($p < 0.01$), although this was not sustained in late pregnancy. NCR was positively associated with PCR through pregnancy ($p < 0.01$) and with ACR at 14 and 30 weeks ($p < 0.05$); however, the associations were weak.

Conclusions
While all women with diabetes show a gradual increase in NCR during pregnancy, it was not a useful marker in predicting preeclampsia. However, higher NCR was indicative of kidney damage in the first trimester and could potentially be useful for monitoring diabetic nephropathy. [Erratum: The Journal of Obstetrics and Gynaecology Research, vol 52, no 5, May 2026, e70321. https://doi.org/10.1111/jog.70321]

2026-09704

Association between maternal prepregnancy diabetes mellitus and preconception folic acid supplement use by Hispanic ethnicity: Findings from Georgia, New York City, and Puerto Rico PRAMS 2016–2018. Guzman IA, Kramer MR, Kancherla V (2022), Birth Defects Research vol 114, no 15, September 2022, pp 873-884

Background
Maternal ethnicity, prepregnancy diabetes, and preconception folic acid intake, are all associated with increased risk of neural tube defects in the United States. We assessed the association between prepregnancy diabetes and preconception folic acid use by Hispanic ethnicity.

Methods
We used population-based, cross-sectional survey data from New York City, Georgia and Puerto Rico's 2016–2018 Pregnancy Risk Assessment Monitoring System (PRAMS). Prepregnancy Type 1 or Type 2 diabetes was self-reported. Adequate preconception folic acid intake was defined as intake of a multivitamin, a prenatal vitamin, or a folic acid vitamin 4–7 times/week during the month before pregnancy. Multivariable logistic regression was used to calculate adjusted prevalence odds ratio (aPORs) and 95% confidence intervals (CI), stratified by Hispanic ethnicity.

Results
Prepregnancy diabetes was reported by 2.9% of Hispanic and 3.6% of non-Hispanic participants. Adequate preconception folic acid use was reported by 25.9% and 39.9% of Hispanics and non-Hispanics, respectively. There was an inverse association between prepregnancy diabetes and preconception folic acid use among Hispanics (aPOR = 0.75; 95% CI = 0.31, 1.81), while the association was positive among non-Hispanics (aPOR = 1.26; 95% CI = 0.70, 2.26); however, the 95% confidence intervals for both groups contained the null value.

Conclusions
The association between prepregnancy diabetes and folic acid intake varied by Hispanic ethnicity. Our hypothesis that reproductive-aged women with prepregnancy diabetes may receive timely diabetic care, including health counseling to take preconception folic acid, was not supported by our study data. Future studies should examine the association in additional PRAMS sites. Preconception health screening, and folic acid intake among Hispanics, should be strengthened.

2026-09361

Implementation of a protocol for postpartum diabetes medication management: effect on inpatient efficiency and glycemic outcomes. Hensel D, Massa K, Williams K, et al (2026), American Journal of Obstetrics & Gynecology MFM vol 8, no 7, July 2026, 101970

Background
Pregnancy is a state of insulin resistance. After delivery, insulin sensitivity rapidly increases, and total insulin requirements decline dramatically. This leaves obstetric clinicians with the difficult task of insulin dose reduction immediately following delivery. If postpartum insulin doses are not reduced sufficiently postpartum, then patients are at high-risk of hypoglycemia. These complex medical decisions can lead to delays in postpartum transfers. From

February 2023 to February 2024, our institution observed increasing rates of delayed postpartum transfers and hypoglycemic events in postpartum patients due to overaggressive insulin regimens. In response to these observations, a postpartum medication protocol was designed to aid clinicians in the creation of postpartum insulin plans for patients with diabetes.

Objective
The objective of this study was to evaluate whether a postpartum medication protocol improved efficiency in postpartum patient transfers, inpatient glycemic control, and outpatient follow up rates for patients with diabetes.

Study Design
This was a 2-cohort pre postintervention study with time series analysis at a tertiary-care academic hospital. The study included all delivering patients with pre-existing diabetes separated into 2 cohorts: pre- (February 2023–February 2024) and post- (April 2024–April 2025) protocol implementation. The primary outcome was delayed postpartum transfer, defined as postpartum transfer time exceeding one SD above the mean postpartum transfer time for our unit (postdelivery time on Labor and Delivery > 3.66 hours). To account for possible temporal variation within our data, an interrupted time series analysis was performed. Outcomes were compared between cohorts using bivariate analyses and logistic regression. Multivariable logistic regression with a backward stepwise selection was used to adjust for confounding variables.

Results
There were 124 patients in each cohort, with 31% of patients in each cohort having type 1 diabetes. The time series analysis demonstrated an immediate decrease in the number of delayed postpartum transfers following protocol implementation (p-value .04). The postprotocol implementation cohort had decreased odds of delayed postpartum transfer compared to the preprotocol implementation cohort after adjusting for automatic insulin delivery (AID) system use (OR: 0.65 [0.37–1.13], aOR: 0.50 [0.27–0.93]).

Conclusion
Through this protocol implementation, we were able to improve efficiency of patient care delivery and improve patient outcomes in the postpartum period. This protocol serves as a model for other practices to potentially adopt or adapt to improve inpatient efficiency and to better serve their patients with diabetes.

2026-09194

Fetal abdominal circumference and adverse perinatal outcomes in pregnant individuals with pregestational diabetes.

Champion ML, Ye Y, Padgett CE, et al (2026), American Journal of Obstetrics & Gynecology MFM vol 8, no 9, September 2026, 102042

Background
Disturbances in fetal growth (ie, growth restriction and macrosomia) are associated with increased risk of perinatal morbidity and mortality. Although fetal abdominal circumference (AC) was recently added to the definition of fetal growth restriction, less is known about the performance of small AC specifically among pregnant individuals with diabetes as well as the clinical utility of large AC. Thus, we aimed to evaluate the association between fetal AC and adverse outcomes in pregnant individuals with pregestational DM.

Study Design
This was a retrospective cohort study of pregnant individuals with pregestational DM who delivered a non-anomalous, singleton gestation at a tertiary care center from January 2012-January 2022. Pregnant individuals without fetal AC measurement within 4 weeks of delivery were excluded. The primary outcome was composite perinatal morbidity including 1 or more of: neonatal hypoglycemia, neonatal hyperbilirubinemia, preterm birth, shoulder dystocia, stillbirth or neonatal death. Baseline characteristics and outcomes were compared by fetal AC percentile on last ultrasound before delivery: <10th percentile (small), 10-90th percentile (normal), and >90th percentile (large) for gestational age. Multivariable regression estimated the association between small and large AC and outcomes, compared with normal AC. Sensitivity analyses were performed defining AC using <5th and >95th percentile cutoffs and separately restricting the population to only those with normal EFW on ultrasound to evaluate the effect of isolated small and large AC.

Results
Of 1,178 pregnant individuals included: 127 (11%) had small AC, 704 (60%) had normal AC, and 347 (29%) had large AC. Composite perinatal morbidity occurred more often in pregnant individuals with small AC (72%) and large AC (71%), compared with those with normal AC (60%), p<.001). Large AC was associated with higher adjusted odds of composite perinatal morbidity (aOR 1.80, 95% CI 1.32−2.45), compared with normal AC. Small AC was not significantly associated

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with composite morbidity (aOR 1.22; 95% CI 0.76−1.97) but was associated with higher odds of preterm birth, severe perinatal morbidity, mechanical ventilation, stillbirth and SGA. Large AC was also associated with higher odds of neonatal hypoglycemia, NICU admission, cesarean and LGA. In sensitivity analyses using AC definitions <5th and >95th, the findings were similar with greater magnitude of association. When evaluating only individuals with normal EFW, isolated large AC >90th was associated with higher odds of perinatal morbidity and shoulder dystocia, whereas isolated small AC <10th was only associated with cesarean and SGA.

Conclusion

Abnormal fetal AC was consistently associated with higher odds of perinatal morbidity and mortality regardless of fetal AC definition and overall EFW, suggesting that fetal AC may provide additional important clinical information about the developing fetus. Future studies are needed to determine if abnormal fetal AC should be used to guide management in pregnant individuals with pregestational DM.

2026-09054

Is Fetal Sex Associated with Maternal Diabetes 10 to 14 Years after Delivery?. Field C, Wu J, Scholtens DM, et al (2026), American Journal of Perinatology 4 June 2026, online

Objective

We examined the association between fetal sex and the risk of maternal prediabetes or diabetes 10 to 14 years after delivery. Secondarily, we assessed whether this association varied by gestational diabetes mellitus (GDM) status and whether measures of maternal insulin sensitivity and resistance varied by fetal sex.

Study Design

This is a secondary analysis from the prospective, international Hyperglycemia and Adverse Pregnancy Outcome Follow-Up Study (HAPO FUS). The exposure was assigned fetal sex at birth (female as the reference). The primary outcome was prediabetes or diabetes assessed 10 to 14 years after the index pregnancy. The effect modifier was GDM per the International Association of Diabetes and Pregnancy Study Group criteria. Modified Poisson regression models were used and adjusted for baseline covariates at enrollment and time from enrollment to follow-up. We secondarily assessed whether the association between fetal sex and prediabetes or diabetes varied by GDM and whether maternal insulin sensitivity at pregnancy enrollment and insulin resistance at 10- to 14-year follow-up differed by fetal sex.

Results

Of 4,609 individuals in the analytic sample, 48.9% of infants were assigned female sex at birth, which was 47.1% with GDM and 49.2% without GDM (p = 0.3). At a median of 11.6 years after delivery, 22.4% postpartum individuals developed prediabetes, and 2.9% developed diabetes. The risk of prediabetes or diabetes did not differ by fetal sex (female vs. male: 24.7 vs. 24.6%; adjusted risk ratio: 1.00, 95% CI: 0.89, 1.12). This association was similar regardless of GDM status (interaction p = 0.6). There was no association between fetal sex and insulin sensitivity at enrollment or insulin resistance at follow-up.

Conclusion

In the prospective HAPO FUS cohort, there was no association between fetal sex and the risk of maternal prediabetes or diabetes 10 to 14 years after delivery. Further research is needed to better understand the possible impact of fetal sex on peripartum glucose homeostasis.

Key Points

Fetal sex was not associated with maternal prediabetes/diabetes 10 to 14 years postdelivery.

Associations did not vary according to GDM status.

Further research is needed to understand the impact of fetal sex on peripartum glucose homeostasis.

2026-08334

Medications for Managing Preexisting and Gestational Diabetes in Pregnancy. Rickert ME, Caughey AB, Valent AM (2023),

Obstetrics and Gynecology Clinics of North America vol 50, no 1, March 2023, pp 121-136
No abstract available.

2026-08029

Adverse pregnancy outcomes in women with type 1 diabetes: A nationwide, population-based study, 1999–2021.
Stalheim AM, Nilsen RM, Vangen S, et al (2026), Acta Obstetricia et Gynecologica Scandinavica vol 105, no 8, August 2026, pp 1502-1514

Introduction

For the total population and for groups of non-immigrant and immigrant women, we examined the associations of maternal type 1 diabetes with adverse pregnancy outcomes among women who gave birth in Norway from 1999 to 2021. Further, we examined the associations between the two time periods 1999–2014 and 2015–2021 and adverse pregnancy outcomes, and whether these associations differed in women with or without type 1 diabetes.

Material and Methods

In this nationwide population-based observational study, with data from the Medical Birth Registry of Norway and Statistics Norway 1999–2021, we used logistic regression to examine the associations between type 1 diabetes and adverse pregnancy outcomes. Moreover, differences in ORs for adverse pregnancy outcomes between those with and without type 1 diabetes were compared for the two time periods 1999–2014 and 2015–2021 using interaction analyses. Analyses were performed for the overall population, as well as separately for non-immigrant (n = 964 542) and immigrant women (n = 257 409).

Results

Women with type 1 diabetes (non-immigrant women n = 5067 and immigrant women n = 619) had higher ORs for almost all adverse pregnancy outcomes (OR 1.41–11.04) compared to women without diabetes in the period 1999–2021. In the time period 2015–2021, compared to 1999–2014, women with type 1 diabetes had a notably reduced OR of congenital malformations compared to those without diabetes (p interaction: 0.006). Immigrant women with type 1 diabetes had a higher OR in 2015–2021 vs. 1999–2014 of having large for gestational age infants (p interaction: 0.003).

Conclusions

Women with type 1 diabetes had higher odds of most of the examined adverse pregnancy outcomes, though improvements were observed from 2015 to 2021 compared to 1999–2014, particularly a reduction in congenital malformations. In contrast, immigrants had higher odds of large for gestational age. These findings highlight the continued need for targeted interventions to reduce the burden of adverse outcomes in all women with type 1 diabetes.

Full URL: https://doi.org/10.1111/aogs.70215

2026-07753

A study on the correlation among sleep quality in pregnant women, type 2 diabetes risk scores based on FINDRISC, and pregnancy-related anxiety. Liu S, Wang J, Ma C, et al (2026), BMC Pregnancy and Childbirth vol 26, no 1, 6 April 2026, 533

Background

Pregnancy-related anxiety is a common mental health issue during pregnancy, affecting at least 10% of expectant mothers. Although psychological and social factors are considered as one of the contributing factors for such situations, the potential association between the risk of type 2 diabetes and pregnancy-related anxiety has not been fully investigated. This study aims to explore the associations among sleep quality, type 2 diabetes risk scores (based on FINDRISC), and pregnancy-related anxiety in pregnant women.

Methods

This cross-sectional study was conducted from March to December 2024 using convenience sampling to survey 469 pregnant women at a tertiary hospital in Jinzhou City. Data collection utilized demographic data questionnaires, the Pregnancy-Related Anxiety Questionnaire (PRAQ), the Finnish Diabetes Risk Score (FINDRISC), and the Pittsburgh Sleep Quality Index (PSQI). The relationships among the variables were analyzed using SPSS 27.0 and AMOS software.

Results

The mean ± SD scores for type 2 diabetes risk, sleep quality, and pregnancy-related anxiety were 9.047 ± 7.410, 7.719 ± 5.066, and 31.508 ± 8.170, respectively. Significant differences in pregnancy-related anxiety scores were observed

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across age groups, gestational weeks, parity, and history of adverse pregnancy and childbirth (all P < 0.05). Higher PSQI scores, indicating greater sleep disturbance, were positively associated with type 2 diabetes risk scores (r = 0.423, P < 0.01) and pregnancy-related anxiety (r = 0.340, P < 0.01). Sleep quality partially mediated the association between type 2 diabetes risk scores and pregnancy-related anxiety (indirect effect β = 0.103, 95% CI [0.057, 0.162]).

Conclusion

These findings suggest that screening for type 2 diabetes risk, assessment of sleep quality, and monitoring of pregnancy-related anxiety may be integrated in clinical practice, as these factors may contribute to a comprehensive evaluation of the physical and mental health of pregnant women.

Full URL: https://doi.org/10.1186/s12884-026-09038-9

2026-07434

Relationship between continuous maternal intrapartum and postpartum glucose monitoring metrics and neonatal outcomes and postpartum glucose metabolism in individuals with gestational diabetes. Elkind-Hirsch KE, Armatta M, Veillon E, et al (2026), BMC Pregnancy and Childbirth vol 26, no 1, 16 March 2026, 450

Background

Continuous glucose monitoring (CGM) improves maternal and neonatal outcomes in pregnancies complicated by preconception diabetes. CGM measurements may help optimize intrapartum and postpartum glycemic management in pregnant women with GDM. We investigated the use of blinded CGM-derived metrics during labor, delivery, and postpartum supplementary to normally monitored glucose measures in women with GDM to study neonatal outcomes and postpartum glucose metabolism.

Methods

This prospective observational study evaluated 60 pregnant women with gestational diabetes mellitus (GDM) during the peripartum and postpartum periods. Of these, 35% were managed with diet alone, while 65% required pharmacologic therapy (insulin, metformin, or both). Participants wore a blinded continuous glucose monitor (Dexcom G6 Pro) for 10 days, beginning 1–3 days before delivery. At 6–18 weeks postpartum, all underwent a 75-g oral glucose tolerance test (OGTT), with a subset (n = 28) also using blinded CGM. Univariate and logistic regression analyses assessed associations between CGM metrics in the 24 h preceding delivery and neonatal hypoglycemia or NICU admission.

Results

Infants of women having an induced vaginal or unplanned caesarean delivery (C-section) were significantly more likely than infants delivered by repeat C-section to have neonatal hypoglycemia (p = 0.005). No significant correlations between maternal CGM-derived metrics and postnatal adaptation in the newborn were found and none of the models trained to predict neonatal hypoglycemia or intensive unit (NICU) admission showed satisfactory power. While only modest associations between postdelivery CGM metrics and postpartum OGTT values were observed, there were strong correlations between postpartum CGM metrics and OGTT-derived values.

Conclusion

In GDM, intrapartum CGM-based metrics were not associated with adverse neonatal outcomes. Future investigations with a larger cohort are needed to assess intra-and postpartum CGM-metrics in women with GDM and their association with neonatal outcomes and OGTT results.

Trial registration

ClinicalTrials.gov, NCT05067075 (initiation 11/1/2021).

Full URL: https://doi.org/10.1186/s12884-026-08944-2

2026-07108

Factors associated with healthcare professionals' use of stigmatizing language in individuals with diabetes in pregnancy. Gwan A, Ortiz IB, Tessier KM, et al (2026), BMC Pregnancy and Childbirth vol 26, no 1, 3 March 2026, 389

Background

Clinicians' language can influence patient perception and engagement in care. Use of stigmatizing language, including terms such as "noncompliant", "refused", "failed", and "unmotivated", has been found to contribute to distress among individuals with diabetes in pregnancy. However, it is unclear how often healthcare professionals use stigmatizing language in the electronic health record (EHR) and the clinical factors associated with its use among

birthing individuals with diabetes.

Methods
A retrospective cohort study was conducted from 2018 to 2019, focusing on individuals with singleton, non-anomalous pregnancies diagnosed with pre-existing or gestational diabetes. We utilized an academic-community obstetric outcomes database, employing a Natural Language Processing (NLP) algorithm to identify stigmatizing terms in electronic health records, including variations of terms such as “failed,” “refused,” “unwilling,” “unmotivated,” “noncompliant,” and “non-adherent.” We then compared the clinical characteristics, outcomes, and glycemic markers of individuals with and without documented stigmatizing language. Unadjusted and adjusted logistic regression models assessed the association of clinical factors on the utilization of stigmatizing language.

Results
Out of 1,433 birthing individuals who met criteria, 128 (8.9%) exhibited stigmatizing language in their records. The most common terms were related to “noncompliant” (47%) and “refused” (42%), primarily used by physicians and nurses. Birthing individuals of color were about four times more likely to have stigmatizing language used in their EHR compared to White individuals (aOR 3.87, 95% CI 2.55–5.99, $p < 0.001$). Those speaking languages other than English and Spanish were three times more likely to have stigmatizing terms documented (aOR 3.18, 95% CI 1.98–5.01, $p < 0.001$). Finally, individuals using public insurance were nearly five times more likely to receive stigmatizing descriptions compared to those with private insurance (aOR 4.95, 95% CI 3.26–7.73, $p < 0.001$). No differences were seen in NICU admission after controlling for diabetes type, and few objective markers of glycemia were identified in the EHR.

Conclusion
Birthing individuals of color, non-English/non-Spanish speakers, and those on public insurance diagnosed with diabetes in pregnancy were significantly more likely to have stigmatizing language documented within their medical records. Clinicians’ use of stigmatizing language appears disconnected from glycemic concerns. (© 2026, The Author(s))
Full URL: https://doi.org/10.1186/s12884-026-08891-y

2026-06935

GLP-1 drugs show early promise for improving fertility in males and females. Morales-Brown P (2026), Medical News Today 18 June 2026

An early analysis from the ongoing RESTORE trial suggests semaglutide may improve fertility-related outcomes in females with polyendocrine metabolic ovarian syndrome (PMOS), formerly known as PCOS.
A review also suggests that GLP-1 drugs may support male reproductive health in those with obesity by improving testosterone levels, reproductive hormones, and sperm quality while also improving metabolic health.
The findings support the idea that treating obesity and metabolic dysfunction with GLP-1 drugs could help restore hormonal balance and reproductive function in both women and men. However, larger, longer-term studies are necessary to confirm these effects.
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Full URL: https://www.medicalnewstoday.com/articles/glp-1-drugs-show-promise-improving-fertility-males-females?utm_term=feedcontent&utm_source=Sailthru%20Email&utm_medium=Email&utm_campaign=MNT%20Daily%20News&utm_content=2026-06-18&apid=&rvid=0ed62c4ea77d8ecdf2ab839e181ba2f04874f5148781ac73afcf67fb282f01c3

2026-06858

The Making of Vulnerability. An ethnographic study exploring vulnerability in specialized outpatient care for pregnant persons with diabetes in Denmark.. Schlütter MM, Maindal HT, Henriksen TB, et al (2026), Social Science and Medicine vol 400, July 2026, 119315

This article examines how vulnerability is enacted in specialized outpatient care for pregnant persons with diabetes in Denmark. The analysis draws on ten months of ethnographic fieldwork, including observations of 79 consultations with 33 pregnant persons and around 20 health professionals. Rather than treating vulnerability as a stable trait or individual circumstance, we approach it as something done through administrative classifications, psychiatric histories, insulin thresholds, anticipatory reasoning, and cross-sectoral coordination. We trace how institutional formats shape which concerns become legible, actionable, or stalled, with uneven consequences for care, including intensified surveillance, delayed transfer, early induction, and fragmented follow-up. By shifting attention from who is vulnerable to how vulnerability is made actionable, the study contributes to debates in medical anthropology and

critical public health on inequity, arguing that equity depends on sustaining adaptable, revisable institutional practices rather than fixed solutions.
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Full URL: https://doi.org/10.1016/j.socscimed.2026.119315

2026-06752

The experience of women with diabetes in pre-pregnancy, antenatal and postpartum period in Australia. Lau HWR, Longfield MSG, Shackel R, et al (2026), Journal of Reproductive and Infant Psychology 17 April 2026, online

Aims/Background
Diabetes in pregnancy is considered high-risk due to the increased risks of adverse perinatal outcomes. It was reported that women with type 1 diabetes (T1D) or gestational diabetes (GDM) have fears of complications and lack of psychological support. The purpose of this study was to explore the experiences of women with T1D and GDM during the pre-pregnancy, antenatal, and postpartum periods, compared to women without diabetes.

Design/Methods
Participants who attended the antenatal clinic at the Royal North Shore Hospital were contacted via email. The interviews were semi-structured and one-on-one via phone calls. Transcripts were analysed using an inductive and descriptive coding approach.

Results
Seventeen women (6 T1D, 8 GDM, and 3 control) were interviewed. Five main topics were identified: (1) Concerns before conception, (2) Challenges of antenatal diabetes management, (3) Experience in postpartum period, (4) Interactions with healthcare staff, and (5) Supportive family network. Women with T1D had more concerns prior to pregnancy than women with GDM, whereas women with GDM found antenatal diabetes management more challenging than women with T1D. The support received during recovery in hospital after birth was limited due to lack of healthcare staff.

Conclusion
These findings shed light on the extra burden of pre-pregnancy and antenatal care in women with T1D and GDM. Healthcare systems should adjust models of care accordingly to provide necessary support and alleviate concerns specific to women's pregnancy experiences. Better patient handover between hospitals should be prioritised to improve continuation of care for all women in the postpartum period.

KEYWORDS:

Diabetes, gestational diabetes mellitus, type 1, pregnancy, prenatal care, antenatal care
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Full URL: https://doi.org/10.1080/02646838.2026.2655979

2026-06687

Bridging the confidence gap in maternity services: midwives and the rollout of diabetes technology. Williams A, Fletcher-Salt T, Kelly B (2026), British Journal of Midwifery vol 34, no 6, June 2026, pp 342–348

Management of type 1 diabetes in pregnancy is one of the most clinically demanding areas in maternity care, requiring tight glycaemic management to reduce the risk of serious maternal and neonatal complications. The introduction of continuous glucose monitoring and hybrid closed loop systems offers significant clinical benefits, but their successful implementation depends on the preparedness of the maternity workforce. This article discusses findings from a national service evaluation exploring the confidence, training and support needs of diabetes specialist midwives in relation to continuous glucose monitoring and hybrid closed loop systems use during pregnancy. The data suggest a critical mismatch between national policy and frontline readiness. To address this, the authors are calling for targeted investment in structured training pathways, multidisciplinary antenatal protocols and maternity-specific clinical leadership roles. Without such action, the transformative potential of diabetes technology in pregnancy care risks being undermined, particularly for patients from marginalised or digitally excluded groups. (© MA Healthcare Limited.)

2026-06571

Pre-Pregnancy Body Mass Index, Diabetes Status, and Gestational Age-Specific Stillbirth Risk: A Nationwide Retrospective Cohort Study. Bone JN, Joseph KS, Magee L, et al (2026), BJOG: An International Journal of Obstetrics and Gynaecology vol 133, no 10, September 2026, pp 1916-1925

Objective
To quantify and compare the gestational age (GA)-specific risks of stillbirth across pre-pregnancy body mass index (BMI) categories, stratified by pre-pregnancy diabetes status:

Design
Retrospective population-based cohort study.

Setting
United States from 2022 to 2023.

Population or Sample
Singleton live and stillbirths between 20 and 43 weeks' gestation.

Methods
Data were obtained from the live birth and fetal death certificates available from the National Center for Health Statistics. We used Piecewise Additive Mixed Models to assess the GA-specific relationship between pre-pregnancy BMI and stillbirth in women with and without pre-pregnancy diabetes mellitus adjusted for confounders. Results were expressed as gestational age-specific adjusted hazard ratios (aHR), and weekly risk estimates from 37 to 40 weeks' gestation.

Main Outcome Measures
Stillbirth.

Results
A total of 6 923 146 women were included of which 187 734 (2.7%) were underweight, 2 631 390 (38.0%) had normal BMI, 1 915 636 (27.7%) were overweight, and 1 169 109 (16.9%), 591 078 (8.5%), and 428 199 (6.1%) had obesity class I, II and III, respectively. Overall, stillbirth rates increased with increasing BMI and were higher in women with pre-pregnancy diabetes (16.6 per 1 000 total births) than those without these conditions (4.4 per 1 000 total births). The gestational age-specific associations between elevated BMI and stillbirth differed depending on the presence of pre-pregnancy diabetes across all gestational weeks. For example, at 31 weeks' gestation, the aHR for women with a BMI of 40 kg/m2 vs. 20 kg/m2 and diabetes was 0.68 (95% CI = 0.54 to 0.85), while the same aHR for a non-diabetic pregnancy was 1.22 (95% CI = 1.13, 1.33). Absolute risks were highest in diabetic women with class III obesity.

Conclusions
Among obese women, the optimal gestational age for delivery depends on the presence of other risk factors such as pre-pregnancy diabetes. (© 2026 The Author(s). BJOG: An International Journal of Obstetrics and Gynaecology published by John Wiley & Sons Ltd.)
Full URL: https://doi.org/10.1111/1471-0528.70247

2026-06382

The Effect of Delivery Timing on Cesarean Delivery Rate in Pregnancies Complicated by Pregestational Diabetes and Large-for-Gestational-Age Neonate. Ward H, Khanuja K, McLaren R Jr, et al (2026), American Journal of Perinatology vol 43, no 8, June 2026, pp 1066-1071

Objective
The Big Baby Trial found that early induction in patients with suspected large-for-gestational-age (LGA) fetuses reduced shoulder dystocia and prelabor cesarean rates. However, it excluded patients with pregestational diabetes mellitus (PGDM), who are at increased risk of adverse outcomes. We sought to evaluate delivery outcomes by gestational week in patients with PGDM and LGA fetuses.

Study Design
This was a population-based cohort study of nulliparous, nonanomalous, singleton, live births complicated by PGDM and LGA between 360/7 and 416/7 weeks using the U.S. Natality Vital Statistics Database from 2015 to 2023. Births following a prior cesarean delivery were excluded. Planned delivery group included births at each completed week

from 36 to 40 weeks that underwent labor induction or scheduled cesarean delivery, excluding spontaneous labor. Expectant management group included all births that delivered in subsequent weeks (e.g., planned birth 360/7–366/7 compared with all births ≥370/7 weeks). The primary outcome was cesarean delivery rate and the secondary outcome was a composite of adverse neonatal outcomes (5-min Apgar score < 7, assisted neonatal ventilation > 6 hours, neonatal seizures, 10-min Apgar score of 0, and neonatal death). Outcomes were compared between groups at each week using multivariable logistic regression.

Results
There were 9,805 births analyzed. Cesarean delivery rate ranged from 77 to 87%. After adjusting for baseline differences between groups, planned delivery at 39 weeks was associated with decreased odds of cesarean delivery than expectantly managed pregnancies. After 38 weeks, planned delivery and expectant management had similar odds of cesarean delivery and neonatal morbidity.

Conclusion
In pregnancies complicated by PGDM and LGA, planned delivery after 39 weeks was associated with lower odds of cesarean delivery compared with expectant management. Planned delivery at 38 weeks had similar odds of cesarean delivery and neonatal morbidity. These data suggest that providers should be cautious expectantly managing these pregnancies past 38 weeks.

Key Points
Pregnancies complicated by PGDM and LGA are associated with higher risk of cesarean delivery.

Across all gestational ages, planned delivery group was more likely to deliver by cesarean delivery than those expectantly managed.

Planned delivery after 39 weeks was associated with lower odds of cesarean delivery compared with expectant management.

Planned delivery prior to 38 weeks (36–37 weeks) is associated with increased cesarean delivery rates and higher neonatal morbidity.

Keywords
complications - psychosocial factors - macrovascular complications - microvascular complications
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2026-06377

A Practical Approach to Insulin Pump, Continuous Glucose Monitoring, and Automated Insulin Delivery in the Management of Type 1 Diabetes in Pregnancy. Wong M, Maayeh MG, Saade GR, et al (2026), American Journal of Perinatology vol 43, no 8, June 2026, pp 1072-1081

Objective
The objective of this study is to provide clinicians with practical, pregnancy-specific guidance for initiating and optimizing continuous subcutaneous insulin infusion (CSII), continuous glucose monitoring (CGM), and automated insulin delivery (AID) in pregnancies complicated by Type 1 diabetes (T1D).

Study Design
Narrative review of key trials and device labeling, paired with pragmatic algorithms for antepartum titration, intrapartum management, and postpartum dose reduction.

Results
CGM improves glycemic metrics and neonatal outcomes in T1D pregnancy. Continuation of CSII during labor is safe and achieves similar or improved glycemic control compared with intravenous insulin strategies. Hybrid closed-loop AID

increases time in the pregnancy target range of 60 to 140 mg/dL and reduces time above range without increasing severe hypoglycemia. Because the majority of AID systems are used off-label in pregnancy, clinicians need explicit protocols for pump failure, ketone monitoring, steroid exposure, and prevention of euglycemic diabetic ketoacidosis.

Conclusion
With frequent review and clear escalation pathways, diabetes technology can help achieve pregnancy glycemic targets across gestation, labor, and the early postpartum period.

Key Points
Technology optimization: in order to adapt standard pump algorithms to strict pregnancy-specific glycemic targets, clinicians must employ “off-label” strategies, such as lowering active insulin time.

Dynamic dosing: insulin requirements fluctuate significantly by gestational age, peaking at 1.0 μ/kg in late pregnancy before requiring an immediate 50% reduction postpartum to prevent severe hypoglycemia.

Intrapartum safety: continuing insulin pump therapy during labor is safe and often results in improved glycemic control and patient satisfaction compared with switching to intravenous insulin.

Keywords
type 1 diabetes mellitus - pregnancy - continuous glucose monitoring - CSII - automated insulin delivery
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2026-06375

Antenatal Corticosteroids in Preterm Pregnancies Complicated by Diabetes: A Review and Clinical Commentary. Higgs A, Meeks K, Reece EA, et al (2026), American Journal of Perinatology vol 43, no 8, June 2026, pp 1098-1103

Objective
This study aimed to review the biologic mechanisms, clinical evidence, and therapeutic considerations surrounding antenatal corticosteroid (ACS) use in preterm pregnancies complicated by gestational and pregestational diabetes, with a particular focus on the late preterm period and associated neonatal outcomes.

Study Design
Narrative review of randomized trials, observational studies, and mechanistic investigations evaluating fetal lung development, ACS exposure, and neonatal respiratory outcomes in diabetic pregnancies.

Results
Diabetes disrupts fetal lung maturation through fetal hyperinsulinemia and delayed surfactant synthesis, resulting in increased neonatal respiratory morbidity extending into the late preterm period. While late preterm ACS reduce the need for neonatal respiratory support, including transient tachypnea of the newborn, in non-diabetic populations, pregestational diabetic pregnancies were excluded from pivotal trials. Emerging observational and randomized data suggest similar respiratory benefit in diabetic pregnancies, though accompanied by predictable metabolic effects, including maternal hyperglycemia, which are modifiable with anticipatory clinical management.

Conclusion
Available biologic and clinical evidence supports consideration of late preterm ACS in pregnancies complicated by diabetes when delivery is anticipated within 7 days. With proactive metabolic management, respiratory benefits can be achieved while minimizing maternal and neonatal risks.

Key Points
Diabetes delays fetal lung maturation.

Late preterm respiratory risk remains high.

Antenatal corticosteroids (ACS) may reduce respiratory morbidity.

Metabolic effects are predictable and modifiable.

Individualized care optimizes outcomes.

Keywords
diabetes - antenatal corticosteroids - preterm - respiratory distress syndrome
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2026-06374

Long-Term Effects of Maternal Glycemic Measures in Pregnancy and Offspring Adverse Glycemic Outcomes: Results from the TEAM Study. Bowers K, Bhoopathy K, Szczesniak R, et al (2026), American Journal of Perinatology vol 43, no 8, June 2026, pp 1082-1090

Objective
In utero exposure to maternal prepregnancy diabetes is associated with an increased risk for abnormal glycemic outcomes in children, including impaired glucose tolerance, insulin resistance, and type 2 diabetes. Our objective was to evaluate the timing of exposure to maternal dysglycemia and whether the effects persist into adulthood.

Study Design
The Transgenerational Effects on Adult Morbidity (TEAM) Study followed offspring of mothers with prepregnancy insulin-dependent diabetes mellitus (IDDM), who participated in a Program Project Grant (PPG) between 1978 and 1995. These women had a detailed characterization of glycemic measures across pregnancy and comprehensive obstetric and delivery data. Offspring participated in a complete clinical exam, which included an oral glucose tolerance test (OGTT). Multiple regression methods were used to identify associations between trimester-specific maternal hemoglobin A1 (HbA1) standard deviation (HbA1SD) and maternal glucose profiles with offspring glycemic outcomes, adjusting for covariates.

Results
Among 161 offspring up to 42 years of age (mean age, 32.3 years), first trimester HbA1SD was associated with increased offspring fasting plasma glucose and HbA1c ≥6.5% after adjusting for maternal age, family history of diabetes, presence of microvascular disease, and body mass index (BMI) at the last menstrual period. Both second- and third-trimester maternal HbA1SD were positively associated with offspring HbA1c and inversely associated with the acute insulin response to glucose (AIRg), defined as the rapid, first-phase release of insulin from pancreatic beta-cells within 10 minutes of the OGTT.

Conclusion
Our findings add to the current literature showing that the association between trimester-specific gestational maternal glycemic status and offspring adverse glycemic outcome persists into adulthood in the offspring.

Key Points
Exposure to maternal IDDM is associated with offspring glycemic outcomes.

Maternal glycohemoglobin, particularly in the first trimester, is associated with HbA1c and fasting glucose.

Mid–late pregnancy hyperglycemia was associated with reduced offspring acute insulin response.

Keywords
maternal diabetes - offspring - transgenerational - trimester-specific glycemia
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2026-06371

Laterality Spectrum Disorders in the Prenatal Era: Outcomes Across the Severity Spectrum and Associations with Pregestational Diabetes. Tanaka K, Seger L, Tieu K, et al (2026), American Journal of Perinatology vol 43, no 8, June 2026, pp 1051-1058

Objective

This study aimed to describe severity-stratified early outcomes in pregnancies with prenatally suspected laterality spectrum disorders (LSD), defined as abnormalities of left–right body patterning affecting thoracoabdominal situs and associated cardiovascular and visceral structures, and to explore phenotype patterns associated with pregestational diabetes mellitus (PDM).

Study Design

Retrospective cohort study of pregnancies evaluated at a tertiary fetal care and fetal cardiology referral center (2010–2026). LSD subtype was assigned using a prespecified operational framework. Cardiac severity was classified as major versus nonmajor congenital heart disease (CHD). Outcomes included termination, intrauterine fetal demise (IUFD), neonatal survival (≤28 days), infant survival (28 days–1 year), cardiac surgery, and gastrointestinal morbidity.

Results

Seventy-eight pregnancies were included; 16/78 (20.5%) had PDM. Major CHD was present in 49/78 (62.8%). Pregnancy outcomes included live birth in 62/78 (79.5%), IUFD in 5/78 (6.4%), and termination in 11/78 (14.1%); all terminations occurred among major CHD cases. Among live births, neonatal survival was 59/62 (95.2%), and infant survival among neonatal survivors was 46/53 (86.8%). In major CHD live births (n = 33), neonatal survival was 30/33 (90.9%) and infant survival among neonatal survivors with available follow-up was 20/27 (74.1%). Cardiac surgery occurred in 22/62 (35.5%) and was more common in major versus nonmajor CHD (63.6 vs. 3.4%). Intestinal malrotation occurred in 18/62 (29.0%). Abdominal situs inversus was more frequent in PDM pregnancies (37.5 vs. 8.1%).

Conclusion

In LSD, major CHD drives pregnancy termination, surgical intervention, and early mortality concentrated during infancy. PDM was associated with a higher frequency of abdominal situs phenotypes, supporting deliberate postnatal gastrointestinal surveillance planning.

Key Points

In LSD, infant outcomes vary with CHD severity.

Major CHD drives termination/surgery.

PDM occurs across the LSD spectrum.

Keywords

laterality - heterotaxy - situs inversus - isomerism - outcomes - fetal echocardiography - pregestational diabetes - congenital heart disease

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2026-06327

Reduction in insulin requirements in second trimester in a woman with type 2 diabetes mellitus associated with anti-insulin antibodies: A case of exogenous insulin autoimmune syndrome?. Morton A, Raghunath V, He J (2026), Obstetric Medicine 2 February 2026, online

Falling insulin requirements during pregnancy in women with diabetes mellitus in pregnancy raise concerns regarding placental insufficiency and adverse pregnancy outcome. A case of a rapid fall in insulin requirements in a woman with type 2 diabetes mellitus, obesity, hypertension and chronic kidney disease at 23 weeks' gestation with high titres of insulin antibodies is presented. The possibility of exogenous insulin autoimmune syndrome as a cause for hypoglycaemia and reduction in insulin requirements is discussed. (© The Author(s) 2026.)

2026-05454

Healthcare for People With Diabetes in Pregnancy: A National Survey Comparing Metropolitan and Rural Care Delivery in Australia. Payne E, Heaney S, Collins C, et al (2026), Australian and New Zealand Journal of Obstetrics and Gynaecology (ANZJOG) vol 66, no 2, April 2026, e70109

Background

Management of diabetes in pregnancy requires input from multiple health professionals throughout the course of an individual's pregnancy. Implementing healthcare delivery that suits the local context of a metropolitan or rural region may contribute to improvements in care delivery and pregnancy and birthing outcomes.

Aims

To compare healthcare delivery for people with diabetes in pregnancy in metropolitan and rural areas of Australia.

Materials and Methods

A cross-sectional survey was conducted, with questions focused on healthcare delivery for women with diabetes in pregnancy, including the multidisciplinary care provided. Data were collected via a nationwide survey of health professionals currently involved in the healthcare management of people with diabetes in pregnancy in Australia. Survey data were analysed using descriptive and inferential statistics.

Results

The main aspects of healthcare delivery were similar between metropolitan and rural respondents. The proportion of health professionals offering face-to-face services was greater in rural areas (n = 38, 100%) compared to metropolitan (n = 34, 71%). Rural respondents (21%) reported they were collocated with an endocrinologist and 48% with an obstetrician. This was compared to 71% of metropolitan respondents reporting being collocated with an endocrinologist, and 63% with an obstetrician.

Conclusions

This research offers direction as to potential considerations when planning and implementing models of care in rural areas. Additional research confirming the priorities within the rural context is needed to support the development of optimal care delivery for pregnant people with diabetes living in rural regions. (© 2026 The Author(s). Australian and New Zealand Journal of Obstetrics and Gynaecology published by John Wiley & Sons Australia, Ltd on behalf of Royal Australian and New Zealand College of Obstetricians and Gynaecologists.)

Full URL: https://doi.org/10.1111/ajo.70109

2026-05440

Association of Prepregnancy Obesity and Excessive Gestational Weight Gain with Perinatal Outcomes among Patients with Pregestational Diabetes. Markovic ES, Ward H, Khanuja K, et al (2026), American Journal of Perinatology vol 43, no 8, June 2026, pp 1025-1030

Objective

Prepregnancy obesity, excessive gestational weight gain (GWG), and pregestational diabetes (PGDM) are individually associated with adverse maternal and neonatal outcomes. However, little is known about the intersection of these comorbidities. This study aimed to determine if patients with PGDM and excessive GWG or prepregnancy obesity had worse obstetric outcomes.

Study Design

This was a population-based cohort study using data from the 2021 to 2023 National Vital Statistics System of singleton, nonanomalous, live births at 230/7 to 416/7 weeks with a history of maternal PGDM. Births were divided into four groups based on prepregnancy body mass index (pBMI) and GWG: (1) normal pBMI and GWG, (2) normal pBMI and excessive GWG; (3) obese pBMI and normal GWG, and (4) obese pBMI and excessive GWG. The primary outcome, a composite of maternal and neonatal adverse outcomes, was compared with group 1 (births from parents with normal pBMI and GWG) as the referent using logistic regression to adjust for confounders.

Results

Of the 53,631 births that met the inclusion criteria, 6.3, 15.1, 21.5, 57.0% were in groups 1 to 4, respectively. After adjusting for maternal age, nulliparity, chronic hypertension, and previous preterm birth, compared with group 1

(normal pBMI–normal GWG), births in groups 2 (normal pBMI–excess GWG; adjusted odds ratio [aOR]: 1.93, 95% confidence interval [CI]: 1.77–2.09), 3 (obese pBMI–normal GWG; aOR: 1.63, 95% CI: 1.51–1.77), and 4 (obese pBMI–excess GWG aOR: 2.54, 95% CI: 2.36–2.73) had higher odds of composite adverse pregnancy outcomes.

Conclusion
Both prepregnancy obesity and excessive GWG are associated with adverse perinatal outcomes in pregnancies complicated by PGDM. Excessive GWG was a stronger driver of these outcomes. These findings highlight the importance of prepregnancy weight optimization and gestational weight management to reduce associated risks.

Key Points
Prepregnancy obesity and excessive GWG are associated with adverse perinatal outcomes in pregnancies complicated by PGDM.

Excessive GWG and obese BMI had the worst perinatal outcomes.

Excessive GWG was a stronger predictor of adverse perinatal outcomes than obese prepregnancy BMI.

Class III prepregnancy obesity (BMI ≥ 40) with normal GWG had similar rates of composite adverse pregnancy outcomes as those with normal BMI and excessive GWG.

Keywords
diabetes - obesity - gestational weight gain
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2026-05384

Aortic isthmus Doppler hemodynamics and ımpacts on perinatal outcomes in pregestational and gestational diabetes mellitus. Seyhanli Z, Karabay G, Filiz AA, et al (2026), Archives of Gynecology and Obstetrics vol 313, no 1, 19 March 2026, 133

Background/Aim
To assess the sensitivity of the fetal aortic isthmus (AoI) Doppler changes in predicting the adverse perinatal outcome with pregestational and gestational diabetes mellitus compared with other Doppler parameters.

Materials and methods
This prospective case–control study was undertaken between Agust 2023 and May 2024 in Ankara Etlik City Hospital perinatology department. Maternal age, gravidity, parity, maternal body mass index (BMI), gestational age at ultrasonographic examination, fetal AoI, umbilical artery (UA), middle cerebral artery (MCA), and uterine artery (UtA) Doppler parameters were compared between four groups: Pregestational diabetes mellitus (PGDM) (n = 30), diet-regulated gestational diabetes mellitus (DRGDM) (n = 30), insulin-regulated GDM (IRGDM) (n = 30), and controls (n = 75). HbA1c values were evaluated only in pregnancies complicated by diabetes mellitus. The composite adverse perinatal outcomes (CAPO) was defined as Apgar score at 5 min < 7, cord blood pH < 7, sepsis, phototherapy for neonates, respiratory distress syndrome (RDS), mechanical ventilation, neonatal intensive care unit (NICU) admission, hypoglycemia.

Results
Maternal age and BMI levels were significantly higher in the PGDM group ($p < 0.001$). HbA1c levels were significantly higher in the PGDM group compared to other diabetic groups ($p < 0.001$). While most Doppler parameters were similar across groups, PGDM cases had higher rates of prematurity (40%), cesarean delivery (90%), NICU admission (60%), and CAPO (63.3%) compared to controls ($p < 0.01$ for all). HbA1c was positively correlated with MCA S/D, AoI-PSV, and AoI S/D ($p < 0.05$). ROC analysis showed that AoI Ta-max and EDV had modest predictive value for CAPO (AUC = 0.627 and 0.638, respectively; $p < 0.05$).

Conclusions
The AoI Doppler flow measurements may serve as a potential adjunctive marker in the assessment of adverse perinatal outcomes in pregnancies complicated by diabetes mellitus. However, further large-scale prospective studies are warranted to validate its clinical applicability and establish its role in routine obstetric practice. (© 2026, The

Author(s))
Full URL: https://doi.org/10.1007/s00404-026-08378-3

2026-05335

Diabetes in Pregnancy, Neonatal Morbidities, and Early Growth in Moderate or Late Preterm Infants. Buck CO, Shabanova V, Clark RH, et al (2023), Pediatrics vol 152, no 6, December 2023, e2023061285

OBJECTIVES

To compare differences in short term morbidities and early growth among moderate and late preterm infants of mothers with and without diabetes (DM) in pregnancy.

METHODS

In a longitudinal analysis using data from the Pediatrix Clinical Data Warehouse of preterm infants (born 32 0/7 to 36 6/7 weeks) discharged from neonatal intensive care units from 2008 to 2019, health characteristics were compared between DM exposure groups. Change in growth from birth to discharge were compared using linear mixed effects modeling.

RESULTS

Among 301 499 moderate and late preterm infants in the analysis, 14% (N = 42 519) were exposed to DM in pregnancy. Incidence of congenital anomalies, hypoglycemia, and hyperbilirubinemia were higher in DM-group (P < .001), and DM-group was more likely to need respiratory support in the first postnatal days (P = .02). Percent weight change from birth differed by gestational age, such that 36-week DM-group infants remained on average 2% (95% confidence interval [CI]: 1.57 to 2.41) below birth weight on day 14, whereas 32-week DM-group infants were on average 2.1% (95% CI: 1.69 to 2.51) above birth weight on day 14. In the regression analysis, DM-group had faster weight loss in the first postnatal week when stratified by gestational age. The adjusted difference in weight velocity (g per day) from days 0 to 3 was −4.5 (95% CI: −5.1 to −3.9), −6.5 (95% CI: −7.4 to −5.7), and -7.2 (95% CI: −8.2 to −6.2) for infants born 34-, 35-, and 36-weeks, respectively.

CONCLUSIONS

In moderate or late preterm infants, diabetes in pregnancy is associated with common neonatal morbidities. Examination of intensive care nutritional practices may identify reasons for observed differences in weight trajectories by gestational age and diabetes exposure.

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Full URL: https://doi.org/10.1542/peds.2023-061285

2026-05109

Time in range achieved with continuous glucose monitoring in pregnant patients with type 2 diabetes and barriers to achieving high time in range. Alexander A, Sanders A, McIlwraith C, et al (2026), American Journal of Obstetrics & Gynecology MFM vol 8, no 4, April 2026, 101856

Our objectives were to evaluate the time in range (TIR) achieved before delivery and identify patient characteristics associated with achieving TIR>70% in pregnant patients with type 2 diabetes (T2D). (© 2026 Elsevier Inc. All rights are reserved, including those for text and data mining, AI training, and similar technologies.)

2026-04969

Hydroxychloroquine as an adjunct therapy in the management of type 2 diabetes in pregnancy: study protocol for a randomised controlled trial. Basri NI, A Wahab N, Mohammed Nawi A, et al (2026), BMJ Open vol 16, no 1, January 2026, e106653

Introduction The increasing incidence of type 2 diabetes mellitus (T2DM) among women of reproductive age poses significant health risks for both mothers and their fetuses. Optimising blood glucose levels during pregnancy is particularly challenging, even with a combination of oral antidiabetic agents and insulin therapy. Hydroxychloroquine (HCQ) has been shown to lower glucose levels in non-pregnant populations and has demonstrated safety in pregnant women with systemic lupus erythematosus and rheumatoid diseases. In addition to its glucose-lowering effects, HCQ also exhibits immunomodulatory, antioxidant and anti-inflammatory properties. Given that both T2DM and pregnancy are pro-inflammatory states, inadequate glycaemic control may exacerbate adverse pregnancy outcomes. We hypothesise that adjunctive treatment with HCQ in this cohort could improve glycaemic control, reduce systemic inflammation and subsequently lower the risk of adverse pregnancy outcomes.

Methods and analysis This is a prospective, open-label, randomised controlled trial involving 56 pregnant women diagnosed with T2DM. Participants will be randomly allocated, using computerised randomisation software, into either a control group receiving standard care or an intervention group receiving standard care with HCQ 200 mg daily. The primary outcomes will be the difference in glycaemic parameters and inflammatory markers. Secondary outcomes include the assessment of pregnancy outcomes between the groups, such as gestational age at delivery, postpartum haemorrhage, fetal macrosomia and shoulder dystocia.

Ethics and dissemination This protocol has been approved by the National University of Malaysia Ethics Committee (JEP-2023–866). Study findings will be disseminated via presentations at academic conferences, publications in peer-reviewed journals and professional training and meetings to healthcare professionals.

Trial registration number This study was registered in ClinicalTrials.gov (NCT06319560) on 23 January 2024.

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Full URL: https://doi.org/10.1136/bmjopen-2025-106653

2026-04334

'I didn't think I needed to be here' says woman with diabetes and depression. Edmunds T, Glyn G (2026), BBC News 17 April 2026

A woman with type 1 diabetes says she was left feeling as though her two young daughters "would be fine if they didn't have me" during her struggle with depression. (© 2026 BBC.)
Full URL: https://www.bbc.co.uk/news/articles/c3wlpw3l03qo

2026-03525

Mobile health applications in the management of hyperglycemia in pregnancy: a mini-review of current tools and future perspectives. Valsecchi F, Giancaterini A, Pedone E, et al (2026), Frontiers in Clinical Diabetes and Healthcare 2 March 2026, online

Hyperglycemia in pregnancy (HIP), encompassing gestational diabetes mellitus (GDM) and pre-gestational diabetes mellitus (PGDM), constitutes a growing clinical challenge, impacting approximately 23 million live births annually worldwide and conferring substantial maternal and fetal risks. This mini-review evaluates mobile health (mHealth) applications for HIP management, focusing on glycemic monitoring, nutritional interventions, physical activity promotion, insulin dose titration, and postpartum surveillance. Reviewed applications facilitate data collection from glucometers and continuous glucose monitoring systems, deliver graphical analytics, tailored recommendations, artificial intelligence-driven coaching, and secure remote data exchange with healthcare professionals, thereby increasing patient adherence, glycemic regulation, and perinatal outcomes, including reductions in HbA1c, neonatal birthweight, and caesarean section rates. Key benefits include enhanced patient empowerment, streamlined telemedicine, and psychosocial support, supported by trials demonstrating superior glycemic indices and reduced hyperglycemic excursions. Nonetheless, challenges persist, including heterogeneous clinical validation, socioeconomic-digital disparities, data security imperatives, and the absence of comprehensive integrated platforms. Future perspectives focus on developing digital systems that combine sensors, artificial intelligence, and online clinics. These systems aim to improve coordinated care for women with HIP, make treatment more effective, enhance user satisfaction, and help healthcare providers use resources efficiently.

(© 2026 Valsecchi, Giancaterini, Pedone and Caretto).
Full URL: https://doi.org/10.3389/fcdhc.2026.1761584

2026-03474

Infants exposed to maternal type 1 diabetes: intrauterine epigenetic modifications and neurological development. González-González NL, González-Dávila E, Castro-Conde JR, et al (2026), Frontiers in Endocrinology 10 February 2026, online

Background:

The relationship between the neurodevelopment in infants exposed to maternal Type-1 diabetes and changes in fetal DNA methylation has not yet been investigated.

Aim:

This hypothesis-generating study, we aimed to determine whether neurodevelopmental outcomes in offspring from mothers with Type-1 diabetes are associated with intrauterine epigenetic changes in fetal DNA.

Material and methods:
We conducted a prospective, pilot case-control study, comparing infants exposed to maternal Type-1-diabetes with control infants. Cord blood DNA samples were analyzed using the TruSeq-Methyl-Capture-EPIC-Kit, covering over 3.3 million CpGs. The Bayley-III Scales were used to assess infant neurodevelopment, and the scores were correlated with the newborn DNA methylation data.

Results:
In infants exposed to maternal diabetes, we identified 108 differentially methylated genes enriched in pathways crucial for neurodevelopment: Vocal, Imitative and Observational Learning, Synapse Organization, and Neurogenesis. The greatest methylation differences were observed in differentially methylated regions (DMRs) annotated to key neurological genes: MYT1L (21.61%, q=1.97E-07), NRXN1 (12.30%, q=5.04E-75), SHANK3 (11.62%, q=9.81E-06) and KIRREL3 (7.35%, q= 1.53E-23). Both, NRXN1 and SHANK3, were enriched across all identified neurodevelopmental pathways. At two years of age, the infants exposed to maternal Type-1 diabetes scored significantly lower on the Bayley-III Scales across the cognitive, language, and motor domains. Methylation values across loci annotated to ten neurodevelopment-associated genes were linked to Bayley-III cognitive, language, and/or motor domain scores-with MYT1L and NRXN1 showing significant correlation with the Bayley-III language domain score.

Conclusions:
While further confirmation is needed, we provide the first results supporting the hypothesis that neurodevelopmental alterations observed in offspring of mothers with Type-1 diabetes are potentially associated with DNA methylation changes during intrauterine life which can be identified at birth.

(© 2026 González-González, González-Dávila, Castro-Conde, González-Campos, Orribo-Morales, Flores, Lorenzo-Salazar, González-Montelongo, Muñoz-Barrera, Padrón-Pérez, Villalba-Martín, Acevedo-Arozena, Tascón-Padrón and Armas-González).
Full URL: https://doi.org/10.3389/fendo.2026.1759949

2026-03307

Maternal Diabetes and Risk of Epilepsy in Offspring. Driollet B, Ahmed AM, Hutcheon JA, et al (2026), Pediatrics vol 157, no 3, March 2026, e2025071138

BACKGROUND
Evidence on the association between maternal diabetes and neurodevelopmental disorders in offspring, particularly epilepsy, remains limited and heterogeneous. Moreover, most studies have not distinguished among diabetes subtypes—type 1 (T1DM), type 2 (T2DM), and gestational diabetes mellitus (GDM)—which have distinct etiologies. This study examines the association among these diabetes subtypes and epilepsy in offspring.

METHODS
In a retrospective birth cohort of all in-hospital live births between 2002 and 2018 in Ontario, Canada's most populous province, linked with population maternal and child health records up until March 2020, we estimated the crude and adjusted association among T1DM, T2DM, and GDM and epilepsy in children aged younger than 18 years using Cox proportional hazards models. We examined the robustness of results using quantitative bias analyses.

RESULTS
Among 2 105 553 children, 160 644 (7.6%) were exposed to maternal diabetes (0.3% T1DM, 1.2% T2DM, and 6.1% GDM). Over a median follow-up of 10.2 years, 17 853 epilepsy cases were diagnosed. After adjusting for maternal socioeconomic and clinical characteristics, children exposed to maternal diabetes had an increased risk of epilepsy in all subcategories of diabetes compared with those unexposed (adjusted HR [aHR] for T2DM, 1.40; 95% CI, 1.24–1.58; aHR for T1DM, 1.32; 95% CI, 1.03–1.69; and aHR for GDM, 1.14; 95% CI, 1.07–1.22). A longer duration of T1DM or T2DM was associated with an increased risk. These results were consistent in our quantitative bias analyses.

CONCLUSION
Maternal diabetes, particularly T1DM and T2DM, is associated with an increased epilepsy risk in offspring, with longer disease duration not significantly amplifying this risk. These findings suggest that prenatal metabolic and

inflammatory exposures may contribute to the development of epilepsy. (© 2026 by the American Academy of Pediatrics.)

2026-02901

Temporal Trends in Pregnancy Outcomes Among Parents With Type 1 Diabetes: A Nationwide Register-Based Study.

Gundersen TW, Knorr S, Ringholm L, et al (2026), BJOG: An International Journal of Obstetrics and Gynaecology 3 February 2026, online

Objective

To assess temporal trends in outcomes of pregnancies with maternal or paternal type 1 diabetes compared to the general population.

Design

Register-based study.

Setting

Denmark.

Population

1 551 893 pregnancies from 1997 to 2021, hereof 5478 with maternal and 8072 with paternal type 1 diabetes.

Methods

Crude and adjusted logistic regression analyses allowing for interaction between diabetes and time compared outcomes of pregnancies with maternal or paternal type 1 diabetes to the general population and evaluated temporal trends over a 25-year period.

Main Outcome Measures

Hypertensive disorders of pregnancy, caesarean delivery, preterm delivery (< 37-week gestation), very preterm delivery (< 34-week gestation), large for gestational age (LGA) (birth weight > 90th percentile) and extreme LGA (birth weight > 97.5th percentile).

Results

We observed an increasing prevalence of maternal (0.3%–0.4%) and paternal (0.5%–0.6%) diabetes during the study period. From 1997–2001 to 2017–2021, pregnancies with maternal diabetes had decreasing odds of preterm delivery (aOR 0.62, 95% CI 0.51;0.74), very preterm delivery (aOR 0.62, 95% CI 0.44;0.87) and extreme LGA (aOR 0.73, 95% CI 0.61;0.88) but remained associated with higher odds of each considered pregnancy outcome in both first and last period (aOR 3.59–18.86) compared to the general population. Pregnancies exposed to paternal diabetes were comparable to the general population.

Conclusions

Despite a decline in adverse outcomes in pregnancies with maternal type 1 diabetes over the last 25 years, the odds remain greatly increased. These findings support a predominant role of maternal diabetes management rather than parental diabetes genes for pregnancy outcomes. (© 2026 The Author(s). BJOG: An International Journal of Obstetrics and Gynaecology published by John Wiley & Sons Ltd.)

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2026-02890

The Impact of Offspring Sex on Pregnancy and Neonatal Outcomes in Individuals with Pregestational Diabetes.

Delgado A, James KE, Hsu S, et al (2026), American Journal of Perinatology vol 43, no 11, August 2026, pp 1427-1432

Objective

Pregestational diabetes mellitus (PGDM) is increasing in prevalence among pregnant individuals and is associated with adverse outcomes. Prior work suggests that offspring sex influences placental responses and may impact risk for adverse outcomes. We sought to assess the impact of offspring sex on adverse pregnancy and neonatal outcomes in individuals with PGDM.

Study Design

We conducted a retrospective cohort study of 503 pregnant individuals with PGDM and known offspring sex with care at a major urban academic center between 1998 and 2016. We assessed two co-primary composite outcomes: (1) a composite adverse pregnancy outcome of small for gestational age (SGA), hypertensive disorder of pregnancy (HDP), and stillbirth and (2) a composite adverse neonatal outcome of large for gestational age (LGA), hypoglycemia, hyperbilirubinemia, shoulder dystocia, and respiratory distress syndrome (RDS). Secondary outcomes of spontaneous preterm birth (PTB) and admission to the neonatal intensive care unit (NICU) were assessed. Mixed effects logistic regression models, accounting for multiple pregnancies and adjusting for first trimester body mass index (BMI), insurance, parity, and maternal race/ethnicity, were analyzed.

Results

Of the 503 pregnant individuals with PGDM, 67% had a diagnosis of type 2 DM and 33% had type 1 DM. The composite adverse pregnancy outcome occurred in 79 of 258 (31%) pregnancies with a female fetus and 76 of 245 (31%) pregnancies with a male fetus. The composite neonatal outcome occurred in 163 of 245 males (67%) and 154 of 258 females (60%). Male infants had significantly higher odds of requiring admission to the NICU (adjusted odds ratio 1.79 [95% confidence interval: 1.13, 2.80], p = 0.01). There were no observed sex differences in the incidence of spontaneous PTB.

Conclusion

We identified high rates of both composite outcomes in pregnancies with PGDM, regardless of fetal sex. The significantly higher rate of NICU admission among males suggests an increased risk of neonatal morbidity in males exposed to PGDM. (© 2026. Thieme. All rights reserved.)

2026-02886

Pregnancy Outcomes in Patients with Type 1 Diabetes Using Continuous Glucose Monitoring. McCloskey SM, Biggio JR, Morgan JA, et al (2026), American Journal of Perinatology vol 43, no 11, August 2026, pp 1419-1426

Objective

Continuous glucose monitoring (CGM) use among patients with type 1 diabetes mellitus (T1DM) has been associated with improved glycemic control, though improvement in non-glycemic outcomes is less consistent. We hypothesize that CGM use in patients with T1DM in a real-world clinical setting is associated with both improved glycemic and clinical outcomes.

Study Design

This was a retrospective cohort study of patients with T1DM receiving care at a large health system from 2016 to 2023. Primary outcomes included (1) glycemic control and (2) a composite comprising severe maternal morbidity, preeclampsia with severe features, delivery prior to 34 weeks, and admission for diabetic ketoacidosis. Primary glycemic outcome was hemoglobin A1c (HbA1c) <6% in the second trimester. We compared patients using CGM, our exposure group, to patients using traditional blood glucose monitoring (TBGM). During initial data abstraction, we noted variation in CGM target blood glucose settings. A subgroup analysis was performed in which patients using CGM were evaluated by device setting, with those set to targets consistent with American Diabetes Association (ADA) recommendations compared with those with more permissive goals. Adjusted odds ratios were calculated using multivariable logistic regression to adjust for potential confounding variables.

Results

Among 288 patients with T1DM, there were 145 deliveries in the CGM group and 143 in the traditional capillary blood glucose monitoring group. Midtrimester on-target glycemic control was improved in the CGM group compared with traditional monitoring (40.7 vs. 17.5%, adjusted odds ratio [aOR] = 2.32; 95% confidence interval [CI]: 1.21–4.12). There was no difference in the rate of the composite outcome (CGM: 42.8% vs. TBGM: 49.0%, aOR = 0.70; 95% CI: 0.40–1.22), nor was there a difference in secondary outcomes. In patients using CGM, those with stricter targets had improved glycemic control as well as reduced rates of preterm delivery prior to 37 weeks (18.8 vs. 56.9%, aOR = 0.16, 95% CI: 0.05–0.48) and neonatal intensive care unit admission (37.5 vs. 60.0%, aOR = 0.37, 95% CI: 0.14–0.96).

Conclusion
CGM use in T1DM is associated with improved glycemic control throughout pregnancy; however, this does not uniformly translate to improved clinical outcomes. Lack of adherence to ADA blood glucose targets may contribute to these findings. (© 2026. Thieme. All rights reserved.)

2026-02813

My experience of physiology-informed maternity care as a pregnant woman living with diabetes. Furness J (2025), AIMS Journal vol 37, no 2, June 2025

Jane Furness, who lives with type 1 diabetes, describes the home birth of her second baby. (© AIMS 2025)

Full URL: https://www.aims.org.uk/journal/item/home-birth-diabetes

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2026-02673

Safety and efficacy of insulin detemir vs. insulin NPH in pregnant women with diabetes: a systematic review and meta-analysis. Fatima K, Siddiqi AK, Shakil S, et al (2024), Minerva Obstetrics and Gynecology vol 76, no 6, December 2024, pp 578-589

Introduction: The relative efficacy and safety of insulin neutral protamine Hagedorn (NPH) and detemir (IDet), in the management of diabetes in pregnancy remains unclear. We sought to conduct an updated systematic review and meta-analysis to study the effect of NPH versus IDet during pregnancy on clinically relevant maternal and fetal outcomes.

Evidence acquisition: MEDLINE and Google Scholar were queried from inception till September 2022 for original studies comparing NPH with IDet for management of diabetes during pregnancy. Data was pooled using a random-effects model, to generate risk ratios (RR) for dichotomous outcomes and weighted mean differences (WMDs) for continuous outcomes, along with 95% confidence intervals (CIs). I2 test was used to assess the magnitude of heterogeneity. Sensitivity analysis was conducted to explore the potential source of heterogeneity. As less than ten studies were included in our analysis, funnel plots were not made to evaluate publication bias. A P value of ≤0.05 was considered significant in all cases.

Evidence synthesis: Our search of the literature yielded 1087 articles initially, of which seven articles comprising 1396 patients, were included in our analysis. All included articles were of reasonably high methodological quality. Our pooled analysis demonstrates no statistically significant difference between the efficacy of insulin Detemir and insulin NPH as assessed by the HbA1c values from baseline. For safety outcomes, insulin detemir was significantly associated with a greater gestational age at delivery (WMD=0.39, 95%CI: 0.07 to 0.71, P=0.02) and lower incidence of hypoglycemic events (RR=0.64, 95%CI: 0.48 to 0.86, P=0.003) in-contrast to insulin NPH.

Conclusions: Our findings demonstrate that both, insulin IDet and insulin NPH have a similar efficacy in reducing HbA1c from baseline. However, insulin detemir was associated with lesser incidence of maternal hypoglycemic events and greater gestational age at delivery, compared to NPH.

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2026-01959

Comparing perinatal outcomes in gestational and cystic-fibrosis related diabetes. Clifton B, Osman B, Tessier KM, et al (2026), International Journal of Gynecology & Obstetrics vol 173, no 2, May 2026, pp 1139-1141

This study examines pregnancy outcomes in people with cystic fibrosis by comparing those with cystic fibrosis–related diabetes (CFRD) to those who develop gestational diabetes (GDM). It uses a retrospective review of all eligible CF pregnancies from 2011–2023 to identify differences in clinical needs and perinatal outcomes between the two groups. (AS)

Full URL: https://doi.org/10.1002/ijgo.70615

2026-01863

Diabetes technology for pregnant women with hyperglycemia in pregnancy: An opportunity to address global inequity. Papageorghiou AT, Divakar H, McAuliffe FM, et al (2026), International Journal of Gynecology & Obstetrics vol 172, no 3, March 2026, pp 1305-1307

The editorial argues that while new clinical guidelines for managing pre existing diabetes in pregnancy are

comprehensive, they overlook the far greater burden of hyperglycaemia in pregnancy in low‐ and middle‐income countries. It highlights the lack of context‐specific implementation strategies, raising concerns about global relevance, equity and applicability of the recommendations. (AS)

Full URL: https://doi.org/10.1002/ijgo.70794

2026-00934

Preexisting Diabetes and Pregnancy: An Endocrine Society and European Society of Endocrinology Joint Clinical Practice Guideline. Wyckoff JA, Lapolla A, Asias-Dinh BD, et al (2025), The Journal of Clinical Endocrinology and Metabolism vol 110, no 9, September 2025, pp 2405–2452

Background

Preexisting diabetes (PDM) increases the risk of maternal and perinatal mortality and morbidity. Reduction of maternal hyperglycemia prior to and during pregnancy can reduce these risks. Despite compelling evidence that preconception care (PCC), which includes achieving strict glycemic goals, reduces the risk of congenital malformations and other adverse pregnancy outcomes, only a minority of individuals receive PCC. Suboptimal pregnancy outcomes demonstrated in real-world data highlight the need to further optimize prenatal glycemia. New evolving technology shows promise in helping to achieve that goal. Dysglycemia is not the only driver of poor pregnancy outcomes in PDM. The increasing impact of obesity on pregnancy outcomes underscores the importance of optimal nutrition and management of insulin sensitizing medications during prenatal care for PDM.

Objective

To provide recommendations for the care of individuals with PDM that lead to a reduction in maternal and neonatal adverse outcomes.

Methods

The Guideline Development Panel (GDP) composed of a multidisciplinary panel of clinical experts, along with experts in guideline methodology and systematic literature review, identified and prioritized 10 clinically relevant questions related to the care of individuals with diabetes before, during and after pregnancy. The GDP prioritized randomized controlled trials (RCTs) evaluating the effects of different interventions (eg, PCC, nutrition, treatment options, delivery) during the reproductive life cycle of individuals with diabetes, including type 1 diabetes mellitus (T1DM) and type 2 diabetes mellitus (T2DM). Systematic reviews queried electronic databases for publications related to these 10 clinical questions. The Grading of Recommendations, Assessment, Development, and Evaluation (GRADE) methodology was used to assess the certainty of evidence and develop recommendations. The approach incorporated perspectives from 2 patient representatives and considered patient values, costs and resources required, acceptability and feasibility, and impact on health equity of the proposed recommendations.

Results

In individuals with diabetes mellitus who have the possibility of becoming pregnant, we suggest asking a screening question about pregnancy intention at every reproductive, diabetes, and primary care visit. Screening for pregnancy intent is also suggested at urgent care/emergency room visits when clinically appropriate (2 | ⊕OOO). This was suggested based on indirect evidence demonstrating a strong association between PCC and both reduced glycated hemoglobin (HbA1c) at the first prenatal visit and congenital malformations.

In individuals with diabetes mellitus who have the possibility of becoming pregnant, we suggest use of contraception when pregnancy is not desired (2 | ⊕⊕OO). This was suggested based on indirect evidence in women with diabetes, where PCC—including contraception as a key component—showed a clinically significant association with improvements in first-trimester HbA1c and the rate of congenital malformations, together with indirect evidence from the general population regarding the reduction of unplanned pregnancies and pregnancy terminations with the use of contraception.

In individuals with T2DM, we suggest discontinuation of glucagon-like peptide-1 receptor agonist (GLP-1RA) before conception rather than discontinuation between the start of pregnancy and the end of the first trimester (2 | ⊕OOO). This was suggested based on limited data on risk of exposure to GLP-1RA receptor agonists during pregnancy.

In pregnant individuals with T2DM already on insulin, we suggest against routine addition of metformin (2 | ⊕OOO). This was suggested based on the GDP judgment that the benefit of adding metformin to insulin to achieve decrease in rates of large for gestational age infants did not outweigh the potential harm of increasing the risk of small for

gestational age infants or adverse childhood outcomes related to changes in body composition.

In individuals with PDM, we suggest either a carbohydrate-restricted diet (<175 g/day) or usual diet (>175 g/day) during pregnancy (2 | ⍰OOO). This was suggested based on the GDP judgment that the available evidence was limited and very indirect, resulting in significant uncertainty about the net benefits or harms. As such, the evidence was insufficient to support a recommendation either for or against a carbohydrate intake cutoff of 175 g/day.

In pregnant individuals with T2DM, we suggest either the use of a continuous glucose monitor (CGM) or self-monitoring of blood glucose (SMBG) (2 | ⍰OOO). There is lack of direct evidence supporting superiority of CGM use over SMBG for T2DM during pregnancy. There is indirect evidence supporting improved glucometrics with the use of CGM for individuals with T2DM outside of pregnancy, substantial improvements in neonatal outcomes for individuals with T1DM using CGM during pregnancy and the potential for decreasing adverse pregnancy outcomes with improved glucometrics in individuals with T2DM.

In individuals with PDM using a CGM, we suggest against the use of a single 24-hour CGM target <140 mg/dL (7.8 mmol/L) in place of standard-of-care pregnancy glucose targets of fasting <95 mg/dL (5.3 mmol/L), 1-hour postprandial <140 mg/dL (7.8 mmol/L), and 2-hour postprandial < 120 mg/dL (6.7 mmol/L) (2 | ⍰OOO). This was suggested based on indirect evidence that associated adverse pregnancy outcomes with a fasting glucose > 126 mg/dL (7 mmol/L).

In individuals with T1DM who are pregnant, we suggest the use of a hybrid closed-loop pump (pump adjusting automatically based on CGM) rather than an insulin pump with CGM (without an algorithm) or multiple daily insulin injections with CGM (2 | ⍰OOO). This was suggested based on a meta-analysis of RCTs which demonstrated improvement in glucometrics with increased time in range (MD +3.81%; CI −4.24 to 11.86) and reduced time below range (MD −0.88%; 95% CI: −2.04 to 0.27) with the use of hybrid closed-loop pump technology.

In individuals with PDM, we suggest early delivery based on risk assessment rather than expectant management (2 | ⍰OOO). This was suggested based on indirect evidence that risks may outweigh benefits of expectant management beyond 38 weeks gestation and that risk assessment criteria may be useful to inform ideal delivery timing.

In individuals with PDM (including those with pregnancy loss or termination), we suggest postpartum endocrine care (diabetes management), in addition to usual obstetric care (2 | ⍰OOO). As the postpartum period frequently overlaps with preconception, this was suggested based on indirect evidence demonstrating a strong association between PCC and both reduced HbA1c at the first prenatal visit and congenital malformations.

Conclusion
The data supporting these recommendations were of very low to low certainty, highlighting the urgent need for research designed to provide high certainty evidence to support the care of individuals with diabetes before, during, and after pregnancy. Investment in implementation science for PCC is crucial to prevent significant mortality and morbidity for individuals with PDM and their children. RCTs to further define glycemic targets in pregnancy and refinement of emerging technology to achieve those targets can lead to significant reduction of harm and in the burden of diabetes care. Data on optimal nutrition and obesity management in pregnancy are lacking. More research on timing of delivery in women with PDM is also needed. (© This article has been co-published with permission in The Journal of Clinical Endocrinology & Metabolism and European Journal of Endocrinology. © The Authors 2025. Published by Oxford University Press on behalf of the Endocrine Society.) [Erratum: The Journal of Clinical Endocrinology & Metabolism, vol 110, no 11, November 2025, p e3932. https://doi.org/10.1210/clinem/dgaf494]
Full URL: https://doi.org/10.1210/clinem/dgaf288

2026-00779

Diagnosis of preeclampsia in women with diabetic kidney disease. Kornacki J, Boroń D, Gutaj P, et al (2021), Hypertension in Pregnancy vol 40, no 4, November 2021, pp 312-321

Objective:
Assessing the incidence of preeclampisa (PE) in women with diabetic kidney disease (DKD) and analyzing the significance of clinical characteristics and changes in laboratory findings throughout the pregnancy on the onset of PE.

Methods:
The study included 79 patients with DKD. All patients had elevated urinary protein loss (30–299 mg/24 h) or proteinuria

(≥300 mg/24 h) in the first trimester of pregnancy. PE was diagnosed in 22,8% patients with DKD.

Results:
Women with proteinuria and/or proliferative retinopathy at the admission developed preeclampsia significantly more frequently than those without these findings. The degree of proteinuria was significantly associated with the risk of PE development in each trimester of pregnancy. Patients with chronic hypertension developed PE significantly more frequently than those who had no chronic hypertension.

Conclusion:
Chronic hypertension and the degree of primary kidney injury and dysfunction are crucial determinants of PE development in women with DKD. Proteinuria seems to be the best renal predictive factors of PE.

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2026-00687

Nutritional and inflammatory indices in gestational and pregestational diabetes: emphasis on the Controlling Nutritional Status (CONUT) score. Ozler MR, Saglam E, Yalcin S, et al (2025), BMC Pregnancy and Childbirth vol 25, no 1, 22 November 2025, 1364

Objective
To comparatively evaluate the prognostic value of nutritional and inflammatory indices in gestational diabetes mellitus (GDM) and pregestational diabetes mellitus (PGDM), and to determine their association with adverse perinatal outcomes.

Methods
This retrospective study included 280 pregnant women followed at a tertiary care center between January 2020 and December 2024. Participants were categorized into three groups: GDM (n = 90), PGDM (n = 80), and healthy controls (n = 110). Nutritional status was assessed using the Controlling Nutritional Status (CONUT) and Prognostic Nutritional Index (PNI) scores. Inflammatory indices including NLR, SII, SIRI, PIV, and others were calculated. Perinatal outcomes such as preterm birth, NICU admission, and Composite Adverse Perinatal Outcomes (CAPO) were recorded. ROC analysis was used to determine the predictive power of the biomarkers.

Results
The PGDM group demonstrated significantly higher CONUT scores and lower PNI scores compared to the other groups ($p < 0.001$). Among inflammatory markers, NLR, SII, SIRI, and PIV were significantly elevated in PGDM cases. ROC analyses revealed that the CONUT score had strong discriminative ability in differentiating diabetic (GDM and PGDM) from non-diabetic pregnancies (AUC = 0.787; specificity = 89.1%), while the PNI score showed limited discriminative capacity (AUC = 0.291). Inflammatory indices also demonstrated moderate predictive value, particularly among PGDM cases. Higher CONUT and inflammatory scores were associated with increased rates of preterm birth, NICU admission, and CAPO ($p < 0.001$).

Conclusion
Nutritional and inflammatory disturbances are more prominent in PGDM than in GDM. The CONUT score and selected inflammatory indices may serve as valuable tools for early risk stratification in diabetic pregnancies. Integration of these parameters into clinical decision-making may improve perinatal outcomes, particularly in high-risk groups such as PGDM. (© 2025, The Author(s))
Full URL: https://doi.org/10.1186/s12884-025-08516-w

2026-00677

Real-world use of non-pregnancy-specific automated insulin delivery systems during gestation and delivery: a case series. Carrieri F, Baldassarre MPA, Coluzzi S, et al (2025), BMC Pregnancy and Childbirth vol 25, no 1, 27 November 2025, 1356

Background
Maintaining optimal glycemic control in pregnant women with type 1 diabetes (T1D) remains a clinical challenge despite advancements in technology. Although not all automated insulin delivery (AID) systems are approved for gestational use, their use has increased in clinical practice. Limited real-world data exists on their effectiveness and safety throughout pregnancy as well as delivery.

Methods

Retrospective case series including ten women with T1D who used AID systems (MiniMed 780G or Control-IQ) from preconception or early pregnancy through delivery at a single Italian Diabetes and Pregnancy Clinic between January 2020 and March 2025. Glucose metrics were analyzed from data-sharing portals across five time points (preconception, each trimester and delivery). Anthropometric data, safety and pregnancy outcomes were also evaluated.

Results

Mean preconception HbA1c was 7.2 ± 1.0% and improved to 6.2 ± 0.3% by the third trimester. Time in range rose progressively, averaging 70.7 ± 11.2% in late pregnancy, with 5/10 individuals achieving the > 70% target. Coefficient of variation and time above range decreased with no severe hypoglycemia. Most women maintained AID mode during labor; mean TIRp at delivery was 70.1 ± 14.6%. Neonatal outcomes were generally favorable, with no stillbirths or neonatal deaths.

Conclusions

AID systems can efficiently and safely support glycemic control during pregnancy and delivery in women with T1D when guided by expert teams and specific protocols. Although not currently approved for use during pregnancy, these systems may represent a viable alternative to pregnancy-specific algorithms. (© 2025, The Author(s))

Full URL: https://doi.org/10.1186/s12884-025-08420-3

2026-00673

First-trimester atherogenic index of plasma and triglyceride–glucose indices in pregestational diabetes mellitus: associations with adverse pregnancy outcomes. Yalcin SE, Nerez N, Yalcin Y, et al (2025), BMC Pregnancy and Childbirth vol 25, no 1, 22 November 2025, 1351

Background

Pregestational diabetes mellitus (PREGDM) confers a high risk of maternal and perinatal morbidity. Identifying early, reliable biomarkers is critical for risk stratification. The atherogenic index of plasma (AIP) and triglyceride–glucose (TyG) index are inexpensive metabolic markers reflecting dyslipidemia and insulin resistance, but their role in PREGDM remains underexplored.

Methods

In this retrospective cohort study, medical records of 628 women (314 with PREGDM, 314 controls) delivering at a tertiary referral center were reviewed. First-trimester fasting blood samples were analyzed to calculate AIP [$\log_{10}$(TG/HDL-C)] and TyG [ln(TG×glucose/2)]. Maternal and perinatal outcomes assessed included preeclampsia, preterm birth, macrosomia, fetal growth restriction (FGR), NICU admission, Apgar < 7 at 1 and 5 min, and a composite adverse perinatal outcome (CAPO). Logistic regression adjusted for age, BMI, parity, smoking, HbA1c, and fasting glucose; predictive ability was evaluated by ROC analysis.

Results

Compared with controls, women with PREGDM had significantly higher AIP (0.171 ± 0.207 vs. 0.148 ± 0.029, $p < 0.001$) and TyG (9.33 ± 0.65 vs. 8.90 ± 0.10, $p < 0.001$). PREGDM was associated with higher rates of preeclampsia (13.1% vs. 4.5%), preterm birth (21.7% vs. 10.8%), macrosomia (13.4% vs. 5.7%), FGR (8.3% vs. 3.8%), NICU admission (23.6% vs. 8.9%), and CAPO (29.3% vs. 9.9%) (all $p < 0.01$). In multivariate models, TyG independently predicted preterm birth (OR 1.62, 95% CI 1.28–2.04), macrosomia (OR 1.48, 95% CI 1.10–1.99), CAPO (OR 1.78, 95% CI 1.35–2.33), and low Apgar at 1 min (OR 1.84, 95% CI 1.40–2.42). AIP was inversely associated with FGR (OR 0.68, 95% CI 0.51–0.92). ROC analysis showed high accuracy of TyG for predicting low Apgar at 1 min (AUC 0.88) and NICU admission (AUC 0.76).

Conclusions

Both AIP and TyG are elevated in PREGDM compared with controls. TyG is a robust predictor of preterm birth, macrosomia, neonatal compromise, and CAPO, whereas AIP provides complementary insight into vascular dysfunction and FGR in PREGDM group. These indices, easily derived from routine first-trimester tests, may offer practical tools for early obstetric risk stratification. (© 2025, The Author(s))

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2026-00530

Impact of nutrition counseling on dietary improvements, glycemic control, and neonatal outcomes in pregnant women with pregestational diabetes mellitus: an electronic medical charts analysis study in a tertiary medical center.

Wang YL, Chen CM, Chung CC, et al (2025), BMC Pregnancy and Childbirth vol 25, no 1, 11 November 2025, 1193

Background

Pregnant women with pregestational diabetes mellitus (PDM) are at higher risk of adverse maternal and neonatal outcomes, including preterm birth and macrosomia. Nutrition counselling plays a critical role in improving glycemic control; however, its effectiveness in pregnant women with PDM in Taiwan has not been fully evaluated. This study aims to evaluate the effects of nutrition counselling on dietary intake, glycemic control, gestational weight gain (GWG), and neonatal outcomes in pregnant women with PDM.

Methods

We conducted a retrospective review of electronic medical records from 2012 to 2022 at a tertiary medical centre in Taiwan. A total of 106 pregnant women with type 1 or type 2 diabetes were included, of whom 48 received nutrition counselling (NC group) and 58 did not (Non-NC group). Dietary records, blood glucose, and pregnancy outcomes were analyzed.

Results

There were no significant differences between the groups with and without nutrition counselling in terms of gestational weight gain, preterm birth rate, or the incidence of macrosomia. Nutrition counselling significantly increased the intake of fruits and whole grains and improved dietary fiber consumption ($p < 0.001$). After the intervention, the proportion of women consuming < 175 g of carbohydrates decreased from 55.3% to 34.2%. Among 24 participants with pre- and post-intervention blood glucose data, fasting glucose and HbA1c levels decreased significantly ($p < 0.001$ and $p = 0.001$, respectively). Greater improvements were observed in those receiving multiple counselling sessions.

Conclusions

Nutrition counsellng enhanced fiber intake by increasing the consumption of fruits, vegetables, and whole grains. Repeated counselling sessions significantly improved glycemic control, although no significant changes were observed in pregnancy outcomes. These findings underscore the clinical value of integrating structured nutrition counselling into routine prenatal care and highlight the need for larger prospective studies to confirm its impact on pregnancy outcomes.

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Full URL: https://doi.org/10.1186/s12884-025-08403-4

2026-00342

The impact of continuous glucose monitoring on glycated hemoglobin in pregnant women with type 1 diabetes: an integrative review. Waraphok S, Gary F, Griggs S (2025), The Journal of Maternal-Fetal & Neonatal Medicine vol 38, no 1, 2025, 2582947

Background

Pregnancy in women with type 1 diabetes (T1D) is associated with increased risk of adverse outcomes, including preeclampsia and macrosomia. Normalizing glycated hemoglobin (A1C) helps minimize these risks. Previous evidence suggests that continuous glucose monitoring (CGM) improves treatment decisions and glycemic control. However, no synthesized evidence currently assesses whether CGM use is associated with improved A1C levels in this population.

Objective

The aim of this integrative review is to compare A1C levels during pregnancy between women with T1D who use CGM and those who do not use CGM (e.g. intermittent blood glucose monitoring only).

Methods

An integrative review was conducted in accordance with Whittemore and Knafl's guidelines. Three databases (CINAHL, PubMed, and Web of Science) were searched on 5 June 2024. Studies were included if they involved pregnant women with T1D and reported pregnancy A1C levels for both CGM users and non-users, enabling pooled analysis using sample size as a weighting factor. Study quality was assessed using the Mixed Methods Appraisal Tool (version 2018).

Results

Of 300 screened articles, nine met the inclusion criteria. CGM users consistently demonstrated lower pooled mean A1C levels than non-users across all trimesters: first trimester (6.55% vs. 6.82%; SD = 0.72 vs. 0.93), second trimester

(5.89% vs. 6.11%; SD = 0.55 vs. 0.63), and third trimester (6.07% vs. 6.24%; SD = 0.53 vs. 0.61). Overall, CGM users had a lower average pooled mean A1C throughout pregnancy (6.19% vs. 6.40%; SD = 0.61 vs. 0.74).

Conclusions

CGM use in pregnant women with T1D may support better glycemic target achievement by providing real-time glucose data that informs insulin dosing and dietary adjustment. These findings support further investigation in larger controlled studies. (© 2025 The Author(s). Published by Informa UK Limited, trading as Taylor & Francis Group)

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2026-00225

Pregnancy Outcomes of Maternal Periconceptional Exposure to Glucagon-Like Peptide-1 Receptor Agonists: A Scoping Review of Evidence and Reporting Trends. Lee IO, Ghiasi M, Wong K, et al (2026), JOGC [Journal of Obstetrics and Gynaecology Canada] vol 48, no 1, January 2026, 103191

Background

Glucagon-like peptide-1 receptor agonists (GLP-1 RAs) have recently gained dramatic popularity and utilization in treating type 2 diabetes mellitus (T2D) and obesity. Although reports of accidental periconceptional exposure to these drugs have emerged and are expected to increase, the limited evidence of their impact during pregnancy makes informed decision-making difficult. This scoping review aims to identify and comprehensively report available evidence regarding the periconceptional use of GLP-1 RAs and their effects on pregnancy outcomes.

Methods

The review was conducted following the Joanna Briggs Institute (JBI) methodology. All levels of evidence and types of reports regarding pregnancy outcomes after periconceptional exposure to GLP-1 RAs of individuals with T2D or obesity were included. Databases including MEDLINE, Embase, Scopus, and open-access clinical trial registries were searched from January 01, 2005, to March 12, 2025. ProQuest Dissertations & Theses Global and medRxiv were also screened during the same period to include the most current reports. Studies were screened in duplicate at the abstract level, then at the full-text level by two independent reviewers, with disagreements resolved through consensus. The included articles were charted, and the data were summarized narratively and presented in tables.

Results

After eliminating duplicates, 881 articles were screened, and 13 articles, 10 case reports and 3 cohort studies, met eligibility criteria for inclusion. Minor pregnancy complications reported in the case reports included emergency cesarean delivery, preeclampsia, macrosomia, shoulder dystocia, and transient neonatal hypoglycemia. However, all studies did not find an increased risk of major congenital malformations. Pregnancy losses and elective termination of pregnancy were not reported in any study.

Conclusions

Accidental periconceptional exposure to GLP-1 RAs may not be associated with an increased risk of adverse pregnancy outcomes, particularly major congenital malformations and pregnancy loss. More high-level evidence will be warranted to confirm these findings and guide clinical decision-making. (© 2026 The Society of Obstetricians and Gynaecologists of Canada/La Société des obstétriciens et gynécologues du Canada. Published by Elsevier Inc.)

2025-15270

Adherence to the recommended diabetic retinopathy screening guidelines in pregnant women with pregestational diabetes: a cross-sectional survey study. Widyaputri F, Rogers SL, Nankervis AJ, et al (2025), BMJ Open vol 15, no 9, September 2025, e099917

Objective Diabetic retinopathy (DR) in pregnancy can cause blindness. National guidelines recommend at least one eye examination in early pregnancy, then ideally 3-monthly, through to the postpartum for pregnant women with pregestational diabetes. Here we examined adherence rates, barriers and enablers to recommended DR screening guidelines.

Design Cross-sectional survey study, as part of a larger prospective cohort study.

Setting Participants were recruited from two tertiary maternity hospitals in Melbourne, Australia.

Participants Of the 173 pregnant women with type 1 (T1D) or type 2 diabetes (T2D) in the main cohort study, with an additional four who participated solely in this survey study, 130 (74.3%) completed the survey.

Primary and secondary outcome measures This study calculated rates of adherence to guideline-recommended DR

screening schedules and collected data on the enablers and barriers to attendance using a modified Compliance with Annual Diabetic Eye Exams Survey. Each of the 5-point Likert-scale survey items was compared between adherent and non-adherent participants using the Wilcoxon rank-sum test and logistic regression models were constructed to quantify associations as ORs.

Results A retinal assessment was undertaken at least once during pregnancy in 86.3% of participants, but only 40.9% attended during their first trimester and only 21.2% attended the recommended number of examinations. Competing priorities were the main barriers to adherence, with eye examinations ranked as the fourth priority (IQR 4th–5th) among other health appointments during pregnancy. Meanwhile, knowledge of the benefits of eye screening examinations, eye-check reminders and support from relatives was identified as enablers.

Conclusions Despite the risk of worsening DR during pregnancy, less than half of the participants adhered to recommended screening guidelines, suggesting that eye health is not a priority. Proactive measures to integrate care are needed to prevent visual loss in this growing population. (© 2025, The Author(s). Published by BMJ Publishing Group Ltd.)

Full URL: https://doi.org/10.1136/bmjopen-2025-099917

2025-15115

Stiff person syndrome and type 1 diabetes in pregnancy. Narula K, Singh Curry V, Munro K, et al (2025), Obstetric Medicine 8 October 2025, online

Stiff Person Syndrome (SPS) is a rare autoimmune neurological disorder linked to anti-GAD antibodies, marked by muscle rigidity, spasms, and heightened sensitivity to stimuli, predominantly affecting axial muscles. Managing SPS during pregnancy is complex and necessitates a multidisciplinary approach. This case report details the management of a 32-year-old pregnant woman with SPS and type 1 diabetes mellitus. Diagnosed 10 years prior to pregnancy, her SPS was managed with intravenous immunoglobulin, diazepam, and baclofen. During pregnancy, adjustments were made to minimise potential risks; diazepam was replaced with clonazepam near delivery to support breastfeeding, and IVIG dosing was modified based on symptoms. Her type 1 diabetes remained well controlled with an insulin pump. Delivery planning addressed risks of SPS spasms, shoulder dystocia, and caesarean recovery. This case highlights the importance of individualised care and collaboration among specialists in managing pregnancy with SPS. (© The Author(s) 2025.)

2025-14993

Type 1 diabetes diagnosed during pregnancy—an unusual but important challenge: a case series and review of literature. Caretto A, Pedone E, Laurenzi A, et al (2025), Frontiers in Medicine 12 September 2025, online

Hyperglycemia diagnosed during pregnancy is most commonly due to gestational diabetes mellitus (GDM), while a minority of cases are attributable to previously unrecognized type 2 diabetes mellitus (T2DM) or, more rarely, type 1 diabetes mellitus (T1DM). Although T1DM has traditionally been associated with onset during childhood or adolescence, recent evidence shows that nearly 40% of new T1DM cases occur after the age of 30 years, coinciding with the age at which many women in Europe begin pregnancy. This highlights the importance of considering T1DM in the differential diagnosis of hyperglycemia during pregnancy, given the relevant implications for the management and outcomes of these pregnancies. Diabetes-related autoantibodies have been detected in pregnancies complicated by GDM, with prevalence varying widely (from less than 1% to up to 18%), depending on population risk, assay, and antibody type. The most commonly detected autoantibodies in GDM are islet cell antibodies (ICA) and anti-glutamic acid decarboxylase antibodies (GADA), while the presence of multiple autoantibodies is much rarer. Women with hyperglycemia and diabetes-related autoimmunity display a peculiar clinical profile: they usually have a normal pre-pregnancy BMI, low insulin resistance, and require insulin therapy more often than antibody-negative patients with hyperglycemia. They are typically younger and are likely to have a family history of diabetes or other autoimmune diseases. Importantly, the presence, and especially the number, of positive autoantibodies is associated with an increased risk of progression to T1DM after pregnancy. Therefore, identifying autoimmune markers of beta-cell damage in pregnant women with hyperglycemia is critical for prognosis, tailored management, and appropriate follow-up.

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2025-14951

Placental Growth Factor (PlGF) Between 12 + 0–20 + 6 Weeks' Gestation and Perinatal Outcomes in a High Prevalent Diabetes Population: A Retrospective Cohort Study. Dietrich GM, Souza Lira AP, Ramadan E, et al (2026), BJOG: An International Journal of Obstetrics and Gynaecology vol 133, no 4, March 2026, pp 845-848

The authors aimed to evaluate maternal placental growth factor (PlGF) at 12 + 0–20 + 6 weeks' gestation in relation to pre-eclampsia, preterm birth and low birthweight, using gestational age adjusted centiles rather than fixed thresholds. (© 2025 The Author(s). BJOG: An International Journal of Obstetrics and Gynaecology published by John Wiley & Sons Ltd.)

Full URL: https://doi.org/10.1111/1471-0528.70076

2025-14866

A Retrospective, Cross-Sectional Study of Geographic Food Environment and Diabetes in Pregnancy. McClain S, Clinton T, Joseph J, et al (2026), American Journal of Perinatology vol 43, no 9, July 2026, pp 1189-1194

Objective

Insufficient access to healthy food has been linked to poor health outcomes in under-resourced communities. The relationship between neighborhood-level food insecurity and diabetes in pregnancy remains understudied, with previous studies reporting inconsistent results. This study examined the association between living in a low-income, low access (LILA) census tract and the prevalence of pregestational type 2 diabetes (T2D) and gestational diabetes (GDM) among pregnant individuals.

Study Design

This cross-sectional study included patients who delivered a singleton pregnancy at ≥20 weeks' gestation at Henry Ford Hospital between January 2014 and December 2019 and resided within Detroit city limits at the time of delivery. Residence in a LILA census tract, as designated by the USDA Food Access Research Atlas, was the exposure, and prevalences of pregestational T2D and GDM were the outcomes, which were collected retrospectively from patient records. A total of 117 census tracts were designated as LILA. Covariates that were adjusted for included maternal age at delivery, race, body mass index (BMI), insurance status, and substance use during pregnancy (drug, alcohol, and tobacco). Multivariate logistic regression models were used to analyze the data.

Results

Of the 3,897 patients included in this study, 1,377 (35.3%) resided in LILA tracts and 2,520 (64.7%) resided in non-LILA tracts. When individuals residing in LILA and non-LILA tracts were compared, there were no significant differences in the prevalences of pregestational T2D (4.8 vs. 4.6%, adjusted prevalence odds ratio [aPOR] = 1.00, 95% CI: 0.72–1.38, p = 0.99) and GDM (11.3 vs. 13.7%, aPOR = 0.96, 95% CI: 0.78–1.20, p = 0.74). Maternal age at delivery, maternal BMI, race, and insurance status were all significantly associated with the prevalences of GDM and pregestational T2D.

Conclusion

Our results suggest that a LILA tract is not significantly associated with the prevalences of T2D and GDM during pregnancy. (© 2025. Thieme. All rights reserved.)

2025-14614

Risk factors and adverse pregnancy outcomes associated with large for gestational age infants in pregnant women with type 2 diabetes mellitus. Yan X, Zhang L, Zheng W, et al (2025), BMC Pregnancy and Childbirth vol 25, no 1, 29 September 2025, 950

Objective

To investigate the risk factors for delivering large for gestational age (LGA) infants in patients with type 2 diabetes mellitus (T2DM) and their pregnancy outcomes.

Methods

This was a retrospective cohort study of T2DM patients who registered for regular prenatal care and delivered at the Beijing Obstetrics and Gynecology Hospital from January 1, 2012, to December 31, 2020. Patients were divided into the LGA and non-LGA groups to explore the risk factors and pregnancy outcomes associated with delivering LGA infants in

T2DM patients.

Results
(1)A total of 691 T2DM patients were included, of which 257 delivered LGA infants, accounting for 37.19%. (2) Pre-pregnancy body mass index (OR: 1.067, 95%CI: 1.026–1.109), multiparity (OR: 2.455, 95%CI: 1.704–3.538), history of polycystic ovary syndrome (PCOS) (OR: 2.211, 95%CI: 1.283–3.810), late pregnancy glycosylated hemoglobin (HbA1c) (OR: 2.168, 95%CI: 1.567–3.001), gestational weight gain (OR: 1.073, 95%CI: 1.034–1.114), and female newborns (OR: 1.571, 95%CI: 1.109–2.225) were independent risk factors for delivering LGA infants in T2DM patients. (3) After adjusting for pre-pregnancy BMI, multiparity, history of PCOS, gestational weight gain, and late pregnancy HbA1c, delivering LGA infants in T2DM patients increased the risk of postpartum hemorrhage (OR: 1.872, 95%CI: 1.171–2.992), shoulder dystocia (OR: 6.046, 95%CI: 1.767–20.681), admission to the neonatal intensive care unit (OR: 1.542, 95%CI: 1.061–2.242), and neonatal hypoglycemia (OR: 1.991, 95%CI: 1.250–3.170).

Conclusion
Strengthening the identification of risk factors, improving pre-pregnancy weight management, ensuring adequate weight gain during pregnancy, and maintaining good glycemic control are important measures for T2DM patients to avoid delivering LGA infants and adverse pregnancy outcomes.

(© 2025, The Author(s).)
Full URL: https://doi.org/10.1186/s12884-025-08032-x

2025-14432

WHO recommendations on care for women with diabetes during pregnancy. World Health Organization (2025), World Health Organization, Geneva, 14 November 2025. 76 pages

WHO maternal and perinatal health guidelines are relevant to those providing care and support during pregnancy, labour, childbirth and postnatal periods, in any health-care setting.

The primary audience for this guideline includes policy-makers or service providers who are responsible for developing national and local health-care protocols and policies related to care during pregnancy, childbirth and the postnatal period, and those directly providing care to women during pregnancy, including obstetricians, midwives, endocrinologists, nurses, general practitioners, dietitians and diabetes educators, and managers of maternal and child health programmes, in all settings.

The guideline will also be useful for developing clinical tools for pre- and in-service training of health workers and health-system strengthening efforts to enhance their delivery of clinical care. It is expected that the guideline will be of interest to professional societies involved in the care of pregnant women; nongovernmental organizations concerned with the promotion of woman-centered maternal care; and implementers of maternal and child health programmes. (© World Health Organization 2025)
Full URL: https://www.who.int/publications/i/item/9789240117044

2025-14219

Gestational and Pregestational Diabetes Screening Changes in Early Pregnancy and Perinatal Outcomes. Greenberg M, Zhu Y, Shan J, et al (2026), Obstetrics & Gynecology vol 147, no 2, February 2026, pp 209-220

OBJECTIVE:
To evaluate an initiative to decrease gestational diabetes (GDM) screening rates before 24 weeks of gestation and to increase early-pregnancy hemoglobin A1C (Hb A1C) testing for undiagnosed pregestational diabetes and the association of this change with perinatal complications.

METHODS:
All patients with live births and without overt diabetes who delivered between 2018 and 2022 were included. We performed an interrupted time series analysis to examine perinatal outcomes associated with the recommended changes. To reflect the level of exposure to recommended changes that started April 2020, delivery dates were categorized into three time periods: T1, unexposed (January 1, 2018–March 31, 2020); T2, partially exposed (April 1–December 31, 2020); and T3, fully exposed (January 1, 2021–December 31, 2022). The primary outcome was a composite including large-for-gestational-age birth weight, cesarean delivery, preeclampsia, severe maternal morbidity, preterm birth, shoulder dystocia, neonatal hypoglycemia, and neonatal intensive care unit admission.

RESULTS:
Among 221,068 delivering individuals, early GDM screening rates decreased from 31.1% in T1 to 20.6% in T2 and 4.3% in T3 (standardized mean difference [SMD] T3 vs T1, −0.75), and Hb A1C testing increased from 12.3% to 23–35.2% (SMD T3 vs T1, 0.56). There was no change in the prevalence of the composite primary outcome: 43.1% in T1, 44.2% in T2, and 45.2% in T3 (SMD T3 vs T1, 0.04). Interrupted time series analysis adjusted for covariates showed no change in risk of the composite outcome during T1 (percent change/4 weeks, 0.06 [95% CI, −0.01 to 0.13]), T2 (0.02 [95% CI, −0.21 to 0.25]), or T3 (−0.02 [95% CI, −0.26 to 0.23]).

CONCLUSION:
A decrease in early GDM screening accompanied by increased early Hb A1C testing did not influence perinatal outcomes. (© 2025 by the American College of Obstetricians & Gynecologists. Published by Wolters Kluwer Health, Inc. All rights reserved.)

2025-14201

Closed-Loop Insulin Delivery in Type 1 Diabetes in Pregnancy The CIRCUIT Randomized Clinical Trial. Donovan LE, Lemieux P, Dunlop AD, et al (2025), JAMA (Journal of the American Medical Association) vol 334, no 24, December 2025, pp 2176-2185

Importance Hyperglycemia-related pregnancy complications occur in 50% of pregnant women with type 1 diabetes. Closed-loop insulin systems improve glycemia outside of pregnancy but have had limited testing in pregnancy.

Objective To assess the efficacy of a closed-loop system in pregnancy.

Design, Setting, and Participants Open-label trial enrolling pregnant women with type 1 diabetes at 14 clinical centers in Canada and Australia before 14 weeks' gestation with follow-up until 6 weeks postpartum. Enrollment occurred between June 2021 and July 2024 and follow-up was completed in March 2025.

Interventions Participants were randomized 1:1 to closed-loop therapy (n = 46) or standard care (insulin pump or multiple daily insulin injections) (n = 45) with continuous glucose monitoring.

Main Outcomes and Measures The primary outcome was the percentage of time spent in the pregnancy-specific glucose range (63-140 mg/dL), measured by continuous glucose monitoring from 16 to 34 weeks' gestation.

Results Among 94 enrolled participants, 3 experienced pregnancy loss prior to randomization, 91 were randomized (mean age, 31.7 [SD, 5.2] years; early pregnancy hemoglobin A1c, 7.4% [SD, 1.0%]), and 88 were included in the primary analysis. The mean percentage of time spent in the pregnancy-specific glucose range from 16 to 34 weeks' gestation was 65.4% in the closed-loop group and 50.3% in the standard care group (mean adjusted difference, 12.5 [95% CI, 9.5-15.6] percentage points; P < .001). There was 1 episode of severe hypoglycemia in the closed-loop group, and there were 2 episodes of diabetic ketoacidosis in the closed-loop group and 1 in the standard care group.

Conclusion and Relevance Pregnant women with type 1 diabetes using a closed-loop system spent significantly more time in the pregnancy-specific glucose range than those receiving standard care. These findings support the use of this closed-loop system in pregnant women with type 1 diabetes.

Trial Registration ClinicalTrials.gov Identifier: NCT04902378 (© 2025, American Medical Association)

2025-13609

Diabetes mellitus and pregnancy in Wolfram syndrome type 1: a case report with review of clinical and pathophysiological aspects. Caretto A, Scarascia Mugnozza F, Valsecchi F, et al (2025), Frontiers in Medicine 8 September 2025, online

Wolfram syndrome type 1 (WS1) is a rare genetic disorder characterized primarily by non-autoimmune diabetes mellitus, optic atrophy, deafness, and diabetes insipidus. It may include other endocrine, urological, psychiatric, and neurological disorders. The syndrome arises from mutations in the WFS1 gene, which encodes the Wolframin protein, a key regulator of endoplasmic reticulum (ER) function in pancreatic beta-cells and other tissues. Diabetes in WS1 typically has an early-onset, progresses slowly, and is characterized by insulin deficiency, low insulin requirement, and a lower incidence of chronic complications compared to type 1 autoimmune diabetes. Nowadays, there is no cure

for WS1, and management relies on the treatment of the different associated conditions. Fertility can be compromised due to hypogonadism, although cases of successful pregnancy have been reported. These are high-risk pregnancies due not only to hyperglycemia, but also to the other comorbidities of the WS1. This review discusses the peculiarities of diabetes associated with WS1 and the reproductive outcomes in WS1, reporting a case of successful pregnancy in a woman with WS1 treated with a hybrid closed-loop insulin pump.

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Full URL: https://doi.org/10.3389/fmed.2025.1639884

2025-13505

Ponderal Index Increases With Maternal Glucose, but Large for Gestational Age Better Predicts Infant Morbidity in Type 1 Diabetes Pregnancies. Barikan J, Hagman A, Bohlin L, et al (2026), Acta Paediatrica vol 115, no 2, February 2026, pp 428-435

Aim

Large for gestational age (LGA) is commonly used to identify newborns at risk, but many infants born LGA are healthy. This study examines associations between ponderal index (PI) and maternal glucose, and it evaluates PI and LGA as predictors for infant morbidity in type 1 diabetes pregnancies.

Method

This study is a secondary analysis of retrospective data collected between 2014 and 2020 from a cohort study examining glucose markers in women with type 1 diabetes at four hospitals in Sweden. Associations between glucose variables from continuous glucose monitoring, PI, and negative neonatal outcomes were assessed using logistic regression.

Results

Data was collected from 118 women. Higher glycated haemoglobin in the first trimester and higher glucose levels in the second and third trimester increased the risk of delivering an infant with a high PI. However, no associations were found between PI and infant morbidity. LGA was associated with a fourfold increased risk of infant morbidity and a doubled risk of neonatal hypoglycaemia.

Conclusion

Higher glucose levels during pregnancy in women with type 1 diabetes increase the risk of delivering an infant with high PI. However, LGA remains a better measure than PI for predicting infant morbidity. (© 2025 The Author(s). Acta Paediatrica published by John Wiley & Sons Ltd on behalf of Foundation Acta Paediatrica.)

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2025-12796

Diabetes management during and after Ramadan among pregnant women in Saudi Arabia: exploring self-efficacy, self-care, and glycemic control. Alamri OM, Raposo A, Alshaikh AA, et al (2025), Frontiers in Nutrition 18 August, online

Background: Fasting during Ramadan poses distinct challenges for individuals with diabetes, especially pregnant women, due to increased metabolic demands and the heightened risk of hypoglycemia, hyperglycemia, and dehydration. Although medical guidelines often advise against fasting in this group, many women still choose to observe the fast. This study aims to explore diabetes self-efficacy and self-care behaviors during and after Ramadan among pregnant women.

Methods: This cross-sectional study was conducted during and after Ramadan 2025 at Abha Maternity Hospital in Aseer region in Saudi Arabia. Pregnant women with gestational or pre-existing diabetes were recruited. Data were collected using validated Arabic versions of the Diabetes Self-Efficacy Scale and the Summary of Diabetes Self-Care Activities questionnaire. Paired t-tests and correlation analyses were used to examine changes and relationships.

Results: A total of 162 pregnant women with diabetes participated in this study. Self-efficacy scores remained stable during and after Ramadan (mean 4.8 vs. 4.9, p = 0.2), while self-care scores declined significantly post-Ramadan (32.5 to 29.8, p = 0.001). HbA1c distribution shifted slightly, with fewer participants in the <5.7% range after Ramadan and more in the 5.7–6.4% range. Most managed diabetes using oral drugs with diet and exercise (42%). Medical education

was linked to higher self-care scores ($p < 0.001$), while trial fasting improved self-efficacy ($p = 0.001$). Perceived glycemic control improved post-Ramadan (difficulty decreased from 72.8 to 65.4%, $p = 0.001$). Hypoglycemia caused 26.5% of fast-breaking episodes, though "other reasons" were more common. Older age and higher pregnancy order correlated with lower self-care and self-efficacy, while education and perceived health showed positive correlation.

Conclusion: This study underscores the need for culturally sensitive, pregnancy-specific interventions to support safe fasting. Sustained education, individualized care, and preparation before Ramadan were linked to better outcomes, highlighting the importance of ongoing support beyond the fasting period for optimal diabetes management.

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Full URL: https://doi.org/10.3389/fnut.2025.1643107

2025-12468

Glucagon-Like Peptide-1 Receptor Agonists among Pregnancies with Pregestational Diabetes and Its Relationship with Congenital Malformations. Lewin Z, Snow S, Lee JA, et al (2026), American Journal of Perinatology vol 43, no 7, May 2026, pp 984-988

Objective

Pregestational diabetes is a common complication seen in pregnancy, with significant increase seen in the use of glucagon-like peptide-1 receptor agonists (GLP-1 RA) for diabetes management in reproductive-age individuals. The objective of this study was to describe the perinatal outcomes and prevalence of congenital malformations associated with the use of GLP-1 RA in individuals with pregestational diabetes using a national dataset.

Study Design

This study was a retrospective cohort study of patients with pregestational diabetes and pregnancies using data obtained from the Epic Cosmos database between May 1, 2022 and April 30, 2025. Demographics, perinatal outcomes, and prevalence of congenital malformations were compared by GLP-1 RA exposure in pregnancy. Categorical variables were compared with Chi-square and continuous variables were compared using student t-tests for two comparisons. No individual level data were available, so covariate adjustment was not performed.

Results

The total sample population was 143,593 patients with pregestational diabetes, with 24.4% (n = 35,083) of patients using a GLP-1 RA at some time point in pregnancy. Patients with GLP-1 RA usage were more likely to develop pre-eclampsia (13.1% versus 11.9%, $p < 0.00001$), have a cesarean delivery (44.4 vs. 38.9%, $p < 0.0001$), have a first trimester pregnancy loss/termination (9.8 vs. 7.5%, $p < 0.00001$), and a preterm delivery (23.1 vs. 20.8%, $p < 0.0001$) when compared with patients without GLP-1 RA use. There was no statistically significant difference in the overall rate of any congenial malformation by GLP-1 RA use (3.3% in both groups, $p = 0.63$). However, patients with GLP-1 RA usage were more likely to have fetuses with genital malformations (0.7 vs. 0.6%, $p = 0.02$) and urinary malformations (0.5 vs. 0.4%, $p = 0.01$) compared with patients without GLP-1 RA use.

Conclusion

GLP-1 RA therapy in a large cohort of pregnant patients with pregestational diabetes was associated with an overall low rate of malformations but found to have a possible increase in genital and urinary malformations. Counseling of patients prior to use of this medication in the preconception period is required. (© 2025. Thieme. All rights reserved.)

2025-11965

We always have a choice, no matter how much we are made to feel otherwise. Wolfe R (2024), AIMS Journal vol 36, no 3, September 2024

Rachel Wolfe bitterly regrets her unquestioning obedience of the midwives and doctors when she gave birth to her first baby. In this article she explains why she wished she had trusted herself. (© AIMS)

Full URL: https://www.aims.org.uk/journal/item/trustdisobedience-birth

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2025-11782

Glycaemic Control in Women With Type 1 Diabetes and Preeclampsia Risk: A Nationwide Cohort Study. Holowko N, Roos N, Pasternak B, et al (2026), BJOG: An International Journal of Obstetrics and Gynaecology vol 133, no 1, January 2026, pp 95-105

Objective

No large-scale studies exist investigating glycaemic control around conception and preeclampsia risk.

Design

Population-based nationwide cohort study using the National Diabetes Register and other health registers.

Setting

Sweden.

Population

Singleton pregnancies between 2003 and 2019 (N = 1 689 301); 4429 with type 1 diabetes (T1DM) and 1 684 872 without.

Methods

The main exposure was having a pre-gestational diagnosis of T1DM (first diagnosis anytime ≤ 91 days after conception and ≥ 1value of glycated haemoglobin (HbA1c) within ±90 days from conception). Peri-conceptional glycaemic control was categorised using the most recent HbA1c measurement (mmol/mol: < 48; 48–61; 62–75; ≥ 76). Unexposed were women without any diabetes diagnosis (≤ 91 days after conception).

Main Outcome Measures

Preeclampsia was defined using ICD codes and further categorised according to completed gestational weeks at delivery with preeclampsia diagnosis: early preterm preeclampsia (< 34 + 0), late preterm preeclampsia (34 + 0 to 36 + 6), or term preeclampsia (≥ 37 + 0).

Results

16.8% of women with T1DM developed preeclampsia, compared to 2.9% of women without diabetes (adjusted RR [aRR] 4.7, 95% CI 4.4–5.0). Preeclampsia risk increased with peri-conceptional HbA1c, from 11.6% in women with HbA1c < 48 mmol/mol to 23.3% in women with HbA1c ≥ 76 mmol/mol. Compared to unexposed women, there was a dose–response relationship between HbA1c and preeclampsia in women with T1DM (HbA1c < 48 mmol/mol aRR 3.4 (2.9–4.0); HbA1c 48–61 mmol/mol aRR 4.6 (4.2–5.1); HbA1c 62–75 mmol/mol aRR 5.7 (5.0–6.5): HbA1c ≥ 76 mmol/mol aRR 6.3 (CI 5.3–7.7)). Compared to unexposed women, the aRR of term preeclampsia was 3.5 times higher (3.1–3.9) in women with T1DM, while the aRR was much higher for early preterm preeclampsia (aRR 7.2: 6.1–8.5) and late preterm preeclampsia (aRR 9.9: 8.8–11.1).

Conclusions

Women with T1DM had a higher risk of preeclampsia, which increased in a dose–response manner with poorer peri-conceptional glycaemic control. (© 2025 The Author(s). BJOG: An International Journal of Obstetrics and Gynaecology published by John Wiley & Sons Ltd.)

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2025-11625

Anti-Müllerian hormone, sex steroids, and metabolic profile in cord blood of pregnancies with type 2 diabetes and gestational diabetes. Villarroel C, López P, Henriquez S, et al (2025), Frontiers in Endocrinology 28 July 2025, online

Context: The prevalence of type 2 diabetes (T2D) and gestational diabetes (GD)among women of reproductive age has increased in recent decades, making it the most common pregnancy complication. Many studies have examined pregnancy complications in women with diabetes; however, the impact of diabetes on the intrauterine environment, specifically ovarian markers and metabolic profiles in very preterm infants at birth, has not been studied. This study aimed to investigate AMH, sex steroid levels, and the metabolic profile in venous cord blood (VCB) in gestations affected by type 2 diabetes (T2D) and gestational diabetes (GD).

Material and methods: Hormonal profile was evaluated in VCB of pregnancies with T2D (n=24), GD (n=26), and pregnancies without diabetes (C, n=25). Only pregnancies carrying a female offspring were included. AMH, sex steroids, and metabolic function biomarkers, including glucose, insulin, IGF-1, and adiponectin (APN) were measured.

Clinical and anthropometric data were assessed in the mothers and offspring.

Results: AMH VCB levels were significantly higher in T2D than in GD and C pregnancies (P<0.01 and P<0.005, respectively). Dehydroepiandrosterone sulfate (DHEAS) and sex hormone-binding globulin (SHBG) VCB levels were lower in T2D pregnancies than in GD and C (P < 0.01, P < 0.0001, respectively). APN levels were lower in T2D pregnancies than in C (P < 0.05). Additionally, higher insulin and IGF-1 VCB levels and HOMA-IR index were observed in T2D than in C and GD (P < 0.001, P<0.05, and P<0.05, respectively). No significant correlations were observed between maternal and AMH, insulin, IGF-1, and androgen VCB levels.

Discussion: T2D disrupts the intrauterine environment, leading to increased insulin, IGF-1, HOMA-IR, and AMH concentrations and decreased adiponectin levels in VCB. These findings describe the impact that maternal T2D may have on the health and development of their offspring.

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Full URL: https://doi.org/10.3389/fendo.2025.1589541

2025-11588

Diabetes in pregnancy and major new advances in diabetes care using long-acting and ultralong-acting insulins. Drummond RF, Seif KE, Higgs AJ, et al (2026), American Journal of Obstetrics & Gynecology (AJOG) vol 234, no 2, February 2026, pp 297-309

Pregestational diabetes complicates 1% to 2% of all pregnancies. Achievement of euglycemia prevents adverse maternal, fetal, and neonatal outcomes. Insulin is the first line and the backbone of diabetes treatment in and out of pregnancy, but the delicate balance between stringent control and hypoglycemia, along with the complexity and interruption of multiple injections per day, continues to make glycemic control challenging. The ideal basal insulin has a flat pharmacodynamic profile with minimal variability and is relatively easy for patients and clinicians to use. Insulin analogs, such as insulins glargine and detemir, are the most common basal insulins used in pregnancy at this time, but insulin degludec, which has advantages like prolonged duration of action in the nonpregnant population, was recently shown to be equally as effective as detemir in pregnancy. The ease of a once-daily injection without an increased risk of hypoglycemia is attractive to patients and clinicians who wish to simplify insulin regimens. Furthermore, there are current clinical trials evaluating once-weekly basal insulin regimens in the general population. This would decrease basal injections from a minimum of 365 per year to 52 per year, potentially increasing adherence and improving glycemic control. This review will discuss the evidence for insulin degludec in pregnancy as well as discuss the potential benefits and drawbacks of once-weekly ultralong-acting basal insulins in pregnancy. (© 2025 Elsevier Inc. All rights are reserved, including those for text and data mining, AI training, and similar technologies.)

2025-11571

Association of Early Pregnancy HbA1c Levels with Perinatal and Postpartum Outcomes in Type 2 Diabetes. Izewski JM, Peña A, Tang R, et al (2026), American Journal of Perinatology vol 43, no 6, April 2026, pp 761-767

Objective

Many pregnancies are unexpected. We therefore assessed the impact of an early pregnancy HbA1c above or below non-pregnant targets on perinatal outcomes and HbA1c trajectories throughout pregnancy and 12 months postpartum among individuals with type 2 diabetes (T2D).

Study Design

We conducted a retrospective cohort study of pregnant individuals with T2D. Outcomes and HbA1c trajectories were compared among those who had an HbA1c <7 versus ≥7% at <20 weeks' gestation. Data were analyzed using logistic regression for perinatal outcomes and linear mixed models to assess trajectories of HbA1c during pregnancy and the postpartum period.

Results

HbA1c was <7% in 128/281 (46%) and ≥7% in 153/281 (54%) individuals. HbA1c ≥7% was associated with risk for preterm birth (adjusted odds ratio [aOR] = 2.3, 95% confidence interval [CI]: 1.3–4.0), cesarean delivery (aOR = 1.7, 95% CI:

1.1–2.9), and neonatal intensive care admission (aOR = 2.9, 95% CI: 1.7–4.9). HbA1c values decreased during pregnancy in both groups but returned to early pregnancy values by the postpartum period.

Conclusion
Adverse perinatal outcomes are high among individuals with type 2 diabetes mellitus regardless of early pregnancy glucose levels, and strategies are needed to improve maternal glucose levels in the postpartum period. (© 2025. Thieme. All rights reserved.)

2025-11214

Pregnancy outcomes following first trimester exposure to semaglutide. Morton A, He J (2025), Obstetric Medicine 4 June 2025, online

Background and objective
To review pregnancy outcomes in women exposed to semaglutide during early pregnancy.
Methods
A retrospective review of an obstetric database at a tertiary obstetric hospital in Brisbane, Australia.
Results
Thirteen women were exposed to semaglutide in first trimester. One infant had significant cardiac anomalies in the setting of very poor maternal glycaemic control in first trimester, as well as maternal obesity and hypertension.
Conclusion
This study adds to the growing literature suggesting there is no increased risk of major congenital anomalies following first trimester exposure to semaglutide, however, until larger studies are available to confirm these findings, reproductive-age women using semaglutide should practice effective contraceptive methods. Preconception counselling of all women with diabetes mellitus is critical to avoid adverse pregnancy outcomes. (© 2025, Sage Publications)
Full URL: https://doi.org/10.1177/1753495X251346330

2025-11091

Global, regional, and national burden of diabetes in women of childbearing age, 1990–2021: a systematic analysis from the global burden of disease study 2021. Guo Z, Ji W, Yan M, et al (2025), Frontiers in Global Women's Health 15 July 2025, online

Introduction: Diabetes may have long-term adverse health effects on both women of childbearing age (WCBA) and their future generations. The objective of this study is to provide up-to-date epidemiologic information on the global burden of diabetes in WCBA to inform the development of targeted public health policies.

Methods: The data on the burden of diabetes among WCBA from 1990 to 2021 at the global, regional, and national levels were extracted from the Global Burden of Disease 2021 database. The estimated annual percentage change (EAPC) and Bayesian age–period–cohort models were used to assess and predict time burden trends. The slope index and concentration index were used to assess health inequalities associated with the sociodemographic index (SDI).

Results: In 2021, approximately 79.04 million WCBA aged 15–49 years were living with diabetes, resulting in approximately 7.82 million disability-adjusted life years (DALYs). From 1990 to 2021, the age-standardized prevalence rate (ASPR) increased from 1960.8 to 3942.2 per 100,000 WCBA, with an EAPC of 2.25%. The ASPR and age-standardized DALY rate were highest in the low-middle SDI region, at 4,107.0 and 472.3 per 100,000, respectively. DALYs and deaths are concentrated in low SDI countries. By 2040, the global burden of diabetes in WCBA will increase further.

Conclusion: The global burden of diabetes among WCBA has increased over the past three decades. This burden is concentrated in low- and middle-income countries. Diabetes care policies for WCBA urgently need to be improved and popularized. (©Author)
Full URL: https://doi.org/10.3389/fgwh.2025.1528661

2025-10990

The effect of zinc supplementation on improving sperm parameters in infertile diabetic men. Akbari H, Elyasi L, Khaleghi AA, et al (2023), Journal of Obstetrics and Gynecology of India vol 73, no 4, August 2023, pp 316-321

Background and aims

Diabetes mellitus (DM) may have different adverse effects on the male reproductive system. Zinc (Zn) is one of the necessary elements in the human and mammalian diet that plays an important role in scavenging reactive oxygen species (ROS) by providing antioxidant and anti-apoptotic properties. The aim of this study was to determine the protective effects of zinc supplements on sperm chromatin and the evaluation of sperm deoxyribonucleic acid (DNA) integrity in diabetic men.

Methods

In this interventional study, 43 infertile Iranian men in diabetic and non-diabetic groups were included. They were then randomly divided into two subgroups: normal saline intake and zinc sulfate intake (25 mg orally for 64 days each). Different indices of sperm analysis (number, morphology and motility) and testosterone levels were evaluated in four groups. Protamine deficiency and DNA fragmentation were assessed using chromomycin A3 (CMA3) and sperm chromatin dispersion (SCD) methods, respectively.

Results

Zinc supplementation reduced the deformity of neck and head of sperms ($p < 0.05$), as well as deformity of sperm tail in infertile diabetic men. Zinc administration ameliorated sperm motility types A, B and C ($p < 0.05$). Moreover, zinc administration reduced abnormal morphology and DNA fragmentation of sperms, which increased the SCD1 and SCD2 and reduced the SCD3 and SCD4 in both treated groups.

Conclusion

Zinc supplementation, as a powerful complement, is able to balance the effect of diabetes on sperm parameters, sperm chromatin and DNA integrity. Consequently, zinc supplementation can probably be considered a supportive compound in the diet of diabetic infertile men.

(© Federation of Obstetric & Gynecological Societies of India 2023.)

2025-10911

Type 1 diabetes - given my time again: Victoria's story. Rixon V (2024), AIMS Journal vol 36, no 2, June 2024

The author, a former midwife who was diagnosed with type 1 diabetes during her fourth pregnancy, recalls how receiving mixed-messages, inaccurate information and lack of support left her feeling isolated and traumatised. She had been told her baby son would be stillborn but he was born alive following induction of labour at 37 weeks, and is now five years old. (JSM)

Full URL: https://www.aims.org.uk/journal/item/diabetes-scare-mongering-care

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2025-10877

Type 1 diabetes and maternity care: Jane's story. Furness J (2024), AIMS Journal vol 36, no 2, June 2024

The author, who has type 1 diabetes, describes how her research and determination ensured she had the best birth possible for her and her baby, and has become an active member of the Maternity Voices Partnership to help forge changes in the maternity care system. (JSM)

2025-10533

Impact of maternal body mass index above 30 kg/m2 on adverse pregnancy outcomes in women with and without gestational diabetes mellitus in southeastern Sweden. Stogianni A, Jönsson A, Penna M, et al (2025), Acta Obstetricia et Gynecologica Scandinavica vol 104, no 11, November 2025, pp 2093-2101

Introduction

Our objective was to evaluate the association of early-pregnancy body mass index (BMI) in women with gestational diabetes mellitus (GDM) with maternal, delivery, and child outcomes, and compare with pregnancies without diabetes in southeastern Sweden, including after a surge of non-European immigration.

Material and Methods

A retrospective population-based observational study of all 401 singleton pregnancies with GDM in the Kronoberg and southern Kalmar regions, 2013–2018, and 377 pregnancies without diabetes, matched by date of delivery. Data were collected by chart review. Women with early-pregnancy BMI <30 kg/m2/≥30 kg/m2 were compared. Main outcomes were gestational weight gain (GWG), continuous and dichotomized <8 kg/≥8 kg, preeclampsia, cesarean section (CS), and large-for-gestational-age (LGA). Maternal age, ethnicity, parity, smoking, physical activity, delivery type and

week, birthweight, and the APGAR5min score were also registered.

Results
Obese women with GDM had lower mean GWG (9.2 ± 6.8 vs. 11.7 ± 6.1 kg); fewer reached ≥8 kg (54% vs. 75%), more had preeclampsia (13% vs. 2.6%), and infants weighed 200 g less than those of nonobese women with GDM all $p < 0.001$ and those of obese women without GDM (11.2 ± 5.8 kg, $p < 0.001$; 68%, $p = 0.05$, 3.1%, $p = 0.03$). APGAR5min scores were high in all groups, 9.4–9.8. All women with GDM had a higher prevalence of LGA infants than controls without diabetes; obese 24% versus 12% ($p = 0.03$) and nonobese 11% versus 6% ($p = 0.05$). Obese women with GDM delivered more LGA infants than nonobese women with GDM, $p = 0.001$. The combination of GDM and obesity increased risk of LGA, OR 5.3 (2.76–10.1); preeclampsia OR 4.3 (1.83–10.23); and CS OR 1.9 (1.26–2.97) and decreased odds of GWG ≥8 kg, OR 0.25 (0.16–0.38), compared to the reference group of nonobese women without GDM. All results remained unchanged in a sensitivity analysis using the BMI obesity limit ≥27.5 kg/m2 for Asians, who were overrepresented in the group of women with GDM.

Conclusions
Women with GDM and obesity, especially in combination, had a greater risk for preeclampsia, CS, and delivering LGA infants; their lower GWG and high APGAR5min scores in all groups, compared to earlier studies, suggested successful care interventions. Efforts to lower the levels of early-pregnancy obesity and strict glucose control in women with GDM are recommended to reduce adverse outcomes. (© 2025 The Author(s). Acta Obstetricia et Gynecologica Scandinavica published by John Wiley & Sons Ltd on behalf of Nordic Federation of Societies of Obstetrics and Gynecology (NFOG).)
Full URL: https://doi.org/10.1111/aogs.70040

2025-10046

Maternal Birth Weight From Maternal and Child Health Handbooks Predicts LGA Neonates Better Than Maternal Parameters in Pregnancy. Dateoka K, Mabuchi S, Nagamine Y, et al (2025), Journal of Pregnancy 16 February 2025, online

Objective: This study is aimed at evaluating maternal birth weight, recorded in Japan's Maternal and Child Health Handbooks, as a predictor for large for gestational age (LGA) neonates compared to traditional pregnancy factors.

Methods: In this retrospective study, we analyzed maternal and neonatal data from 374 singleton, full-term pregnancies at Keiju General Hospital (2017–2020). Maternal birth weight was obtained from Japan's Maternal Child Health Handbooks, and fasting plasma glucose was measured during the 75-g oral glucose tolerance test (OGTT). Logistic regression models assessed the predictive contributions of maternal birth weight and fasting plasma glucose, adjusted for maternal and pregnancy factors.

Results: Among 374 patients, 9.8% of neonates were classified as LGA. This group had a higher proportion of a family history of diabetes ($p = 0.04$) and greater maternal height ($p = 0.01$), pre-pregnancy weight ($p = 0.004$), weight before delivery ($p = 0.03$), and maternal birth weight ($p = 0.001$) than the non-LGA group. Multivariate analysis showed that maternal birth weight remained a significant predictor of neonatal birth weight after adjusting for other risk factors (odds ratios: 2.92 for maternal birth weight between 3500 and 3999 g and 4.77 for birth weight ≥ 4000 g).

Conclusion: This study suggests the potential of incorporating maternal birth weight to improve LGA risk prediction. These findings provide foundational data for further research into the integration of maternal birth weight in risk assessment models and its potential clinical applications.

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Full URL: https://doi.org/10.1155/jp/4500495

2025-09876

Differential Effects of First and Third Trimester HbA1c Levels on Neonatal Weight and Placental Mediation in Type 1 Diabetes. Bashir M, Khan A, Ata F, et al (2025), Frontiers in Endocrinology 16 June 2025, online

Context: In women with type 1 diabetes (T1D), the effects of glycaemic control on neonatal weight and the role of the placenta are not fully understood.

Objective: This study explores the relationship between glycaemic control, neonatal weight, and placental weight.

Design: A retrospective observational longitudinal study of pregnant women with T1DM.

Setting: The study included 265 women with T1D. The target for the first A1c was set at ≤ 7.0%, while the target for the last A1c was ≤ 6.5%. The cohort was divided into four groups based on whether they achieved their target A1c (T) or had levels higher than the target (H) at each end. These groups were classified as Target-Target (T-T), Target-High (T-H), High-Target (H-T), and High-High (H-H). For the secondary objective, we included 154 women for whom placental weight data were available.

Main outcome: We assessed the association between firstA1c, lastA1c, and neonatal weight, examining the mediation effect of the placenta.

Results: The mean age of the participants was 29.4 years (SD 4.6), and the mean T1DM duration was 14.1 years (SD 7.1). The median neonatal weight was highest in the T-H group (3.56 kg) and lowest in the H-T group (3.20 kg) (p=0.009). FirstA1c was negatively correlated with neonatal weight (β-coefficient -150.9, $p < 0.01$), whereas lastA1c positively correlated (β-coefficient 162.5, $p < 0.01$). The association with firstA1c disappeared when correcting for placental weight, while lastA1c remained significant. The placenta mediates 65% of the impact of firstA1c on neonatal weight

Conclusions: Poor glycaemic control early in pregnancy is linked to lower neonatal birth weight, while poor control in the third trimester is associated with higher birth weight. These findings emphasize the importance of maintaining adequate glycaemic control before and during early pregnancy for better health outcomes.

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Full URL: https://doi.org/10.3389/fendo.2025.1595584

2025-09846

NHS rolls out new generation 'artificial pancreas' to help pregnant diabetic women. NHS England (2025), NHS England 5 September 2025

Thousands of mums-to be in England living with type 1 diabetes are to receive a pregnancy-specific, 'artificial pancreas' from the NHS to protect mothers and babies' health. (© Author)

Full URL: https://www.england.nhs.uk/2025/09/nhs-rolls-out-new-generation-artificial-pancreas-to-help-pregnant-diabetic-women/

2025-09756

Optimal Timing of Delivery in Pregnant Individuals with Pregestational Diabetes Mellitus. Russell RF, Jauk VC, Champion ML, et al (2026), American Journal of Perinatology vol 43, no 5, April 2026, pp 579-586

Objective

The Society for Maternal–Fetal Medicine and American College of Obstetricians and Gynecologists recommend delivery of gravidae with pregestational diabetes at 36 to 396/7 weeks based on glycemic control and vascular complications. The optimal gestational age within this wide range is unknown. Our objective was to evaluate the risk of adverse outcomes with delivery versus expectant management at increasing gestational ages.

Study Design

Retrospective cohort study of gravidae with pregestational diabetes who delivered a nonanomalous singleton at ≥36 weeks (2012–2022). The primary outcome was composite neonatal morbidity: hypoglycemia, hyperbilirubinemia, shoulder dystocia, and perinatal death. Secondary outcomes included composite components, composite severe neonatal morbidity, large-for-gestational-age, small-for-gestational-age (SGA), NICU admission, and cesarean. Poisson regression with robust error variance estimated the association between delivery at 36, 37, and 38 weeks and outcomes, compared with expectant management.

Results

Eight hundred forty-three gravidae met inclusion criteria: 235 (28%) type 1 diabetes and 602 (71%) type 2 diabetes.

Overall, 146 (17%) delivered at 36 weeks, 283 (34%) at 37 weeks, 217 (26%) at 38 weeks, and 197 (23%) at ≥39 weeks. Compared with expectant management, delivery at 36 weeks was associated with higher odds of composite morbidity (adjusted risk ratio: 1.31; 95% confidence interval: 1.11–1.55) as well as hypoglycemia, hyperbilirubinemia, SGA, and NICU admission. At 37 and 38 weeks, there was no significant difference in composite morbidity among those delivered versus expectantly managed. However, delivery at 37 weeks was associated with higher odds of hyperbilirubinemia, compared with expectant management. No other outcomes differed between delivery versus expectant management at 37 or 38 weeks. Few associations differed by diabetes type.

Conclusion

Based on these results and supporting literature, elective delivery at 36 weeks should be avoided unless necessary. Although the data are inconclusive regarding delivery at 37 weeks, delivery at 38 weeks should be evaluated further for gravidae with pregestational diabetes. Confirmation in a large, contemporary cohort or a randomized trial is needed. (© 2025. Thieme. All rights reserved.)

2025-09605

Women who give birth before 21 are at higher risk of these conditions. Boucher H (2025), Independent 20 August 2025

News item reporting the main findings of a study which found that women who give birth under the age of 21 are twice as likely to develop type 2 diabetes, obesity, and heart failure, and are also at increased risk of severe metabolic disorders. The study also concluded that the same risks apply to girls who reach puberty before the age of 11. (JSM)

Full URL: https://www.independent.co.uk/news/health/women-early-birth-diabetes-obesity-heart-failure-b2810973.html

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2025-09074

Analysis glycemic variability in pregnant women with various type of hyperglycemia. Zhou X, Zhang R, Jiang S, et al (2025), BMC Pregnancy and Childbirth vol 25, no 1, 16 April 2025, 454

Objective

The study primarily aims to compare alterations in the daily patterns of glucose fluctuations across individuals with different kinds of diabetes in pregnancy and secondly investigate influencing factors that may react with glucose variations.

Methods

We conducted a retrospective cohort study of 776 pregnant women in Shanghai General Hospital. We grouped participants who were exposed to gestational hyperglycemia into 5 sub-groups [Type 1 diabetes (T1DM), Type 2 diabetes (T2DM), Overt diabetes, Gestational diabetes (GDMA1 and GDMA2). Demographic variables and GV parameters were compared among 5 groups through ANOVA-test and Chi-square test. We estimated odd ratios (ORs) for the association between glucose coefficient of variation (CV) and possible influencing variables.

Results

A final total of 776 pregnant women were analyzed. The proportion of pregnant women with pre-gestational diabetes was 31.83% (T1DM: 3.35%,T2DM: 28.48%), ODM 26.68%, and GDM was 41.49% (GDMA1:18.04%, GDMA2: 23.45%). T1DM group performed greatest glucose fluctuations with a CV value 35.02% whereas the number in all the other groups was no more than 22.82% (ODM group). In terms of achieving glycemic control target, only 57.70% participants hit the goal while all the other groups achieved the standard with at least a percentage of 94.20% (ODM group). Other parameters (GMI < 6.0%, GA < 15.70% and HbA1c < 6.0%) showed similar trends in each group. On multivariate logistic regression analysis of possible factors influencing CV, only body mass index (BMI) (OR: 0.754, 95% CI: 0.585–0.971; P = 0.029), HOMA- β (OR:0.969, 95%CI: 0.959–0.976; P = 0.037) and fasting plasma glucose (FPG) (OR: 1.832, 95% CI: 1.170–2.870; P = 0.008) reached statistical significance.

Conclusions

Pregnant women with type 1 or type 2 diabetes exhibit significantly greater glycemic variability compared to those with gestational diabetes, with the ODM group showing intermediate variability, and BMI, HOMA-β, and FPG identified as independent risk factors for unstable glucose variability. (© 2025, The Author(s))

Full URL: https://doi.org/10.1186/s12884-025-07513-3

2025-08933

Diabetes Technology Use in Pregnancies with Type 1 Diabetes in the United States from 2009 to 2020. Sobhani NC, Huang Y, Venkatesh KK, et al (2026), American Journal of Perinatology vol 43, no 4, March 2026, pp 453-460

Objective

The use of continuous glucose monitors (CGM) and insulin pumps has revolutionized the care of patients with type 1 diabetes (T1D). Few data are available regarding the use of diabetes technology use in the pregnant T1D population. This study was conducted to evaluate temporal trends of diabetes technology use and predictors of use among pregnant individuals with TID in the United States from 2009 to 2020.

Study Design

MarketScan Research Databases from 2009 to 2020 were used to identify pregnant individuals with T1D who were and were not using CGM and/or insulin pumps. Joinpoint regression analysis was used to estimate the average annual percent change (AAPC) in diabetes technology use over time. Unadjusted and adjusted log-linear Poisson regression models were developed to assess the associations between the outcomes of CGM and insulin pump use and demographic and clinical predictors. Associations were reported as adjusted risk ratios (ARR) with 95% confidence intervals (CI).

Results

Among 9,201 pregnancies with T1D, CGM use increased from 2.3% in 2009 to 13.7% in 2020 (AAPC: 13.9%; 95% CI: 11.7–17.1), while insulin pump use remained unchanged from 10.9% in 2009 to 11.8% in 2020 (AAPC: −2.4%; 95% CI: −4.4 to 0.4). Medicaid insurance and obesity were associated with a lower likelihood of CGM use and insulin pump use, while a high obstetric comorbidity index score was associated with a higher likelihood of insulin pump use (ARR: 1.26; 95% CI: 1.05–1.51).

Conclusion

From 2009 to 2020, CGM use among pregnant individuals with T1D increased, while insulin pump use remained unchanged. Use varied by patient demographic and clinical factors, most notable for lower likelihood of CGM use and insulin pump use with Medicaid insurance. Although CGM use increased over time, overall CGM use remained lower than expected despite the known benefits of CGM use in improving neonatal outcomes in pregnancies complicated by T1D. (© 2025. Thieme. All rights reserved.)

2025-08929

Late Preterm Antenatal Corticosteroids in Pregestational and Gestational Diabetic Pregnancies. Haizler-Cohen L, Alzamora MC, Legro NR, et al (2025), American Journal of Perinatology vol 42, no 14, October 2025, pp 1798-1808

Objective

This study aims to evaluate the association between late preterm antenatal corticosteroids (ACS) administration and the incidence of hypoglycemia and respiratory complications in neonates born to individuals with pregestational diabetes mellitus (PGDM) and gestational diabetes mellitus (GDM).

Study Design

Multi-center retrospective cohort study between 2016 and 2022. Pregnant people with PGDM or GDM who presented in the late preterm period with concern for preterm delivery were included. The indication for admission was classified as preterm labor, preterm prelabor rupture of membranes, poorly controlled diabetes, or other maternal/fetal indications. Exclusion criteria included multifetal gestations, fetal anomalies, stillbirths, prior course of ACS, or no anticipation for delivery in the next 7 days. The primary outcome was neonatal hypoglycemia. Secondary outcomes included composite respiratory morbidity, composite nonrespiratory morbidity, neonatal intensive care unit (NICU) admission, length of NICU stay, and neonatal death. Multivariable regression models were used to calculate the odds ratio and 95% confidence intervals for the outcomes after adjusting for an indication for admission, gestational age at delivery, and neonatal birth weight. Outcome data were then stratified by diabetes type (PGDM vs. GDM) and completion status of the ACS course (partial vs. complete). For PGDM pregnancies, outcome data were additionally stratified by glycemic control.

Results

In the study period, 453 patients (126 with PGDM and 327 with GDM) were included. Of those, 265 (58.5%) received ACS, and 188 (41.5%) did not. There were no significant differences in neonatal hypoglycemia and composite respiratory morbidity between the ACS and non-ACS groups, including in the subgroup analysis of PGDM and GDM pregnancies. However, late preterm ACS was associated with reductions in supplemental oxygen use, mechanical ventilation, and respiratory distress syndrome when a complete course of ACS was administered. In PGDM pregnancies, neonatal outcomes did not differ between the ACS and non-ACS groups, regardless of glycemic control.

Conclusion

Late preterm ACS administration in diabetic pregnancies was not associated with increased neonatal hypoglycemia or improvements in composite respiratory morbidity. (© 2025. Thieme. All rights reserved.)

2025-08899

Neonatal Outcomes Among Neonates of Women With and Without Type 1 Diabetes in Sweden From 2010 to 2022.

Goldberg A, Wiberg-Itzel E, Tingström J, et al (2025), Acta Paediatrica vol 114, no 12, December 2025, pp 3191-3198

Aim

This register-based study aimed to investigate differences in adverse neonatal outcomes between neonates born to mothers with and without type 1 diabetes in Sweden.

Methods

A nationwide cohort study was conducted using the Swedish Medical Birth Register, including all singleton births from 22 gestational weeks between 2010 and 2022. The neonatal outcomes among neonates of women with and without type 1 diabetes were studied with descriptive statistics and logistic regressions. Adjusted odds ratios (aORs) with 95% confidence intervals are presented.

Results

The study consisted of 1 402 394 neonates, and 0.5% had a mother with type 1 diabetes. Neonates of mothers with type 1 diabetes had increased odds of stillbirth (aOR 2.54; 95% CI 1.98–3.28), congenital malformations (aOR 1.66; 95% CI 1.50–1.84), preterm birth (aOR 3.80; 95% CI 3.41–4.23), large for gestational age (aOR 22.0; 95% CI 20.9–23.1), hypoglycaemia (aOR 45.85; 95% CI 43.60–48.22), and neonatal death (aOR 4.1; 95% CI 3.00–5.83).

Conclusion

Neonates of mothers with type 1 diabetes continue to experience poorer neonatal outcomes, highlighting the need for more research on the causes and how care can be improved for their mothers during pregnancy. (© 2025 The Author(s). Acta Paediatrica published by John Wiley & Sons Ltd on behalf of Foundation Acta Paediatrica.)

Full URL: https://doi.org/10.1111/apa.70230

2025-08749

Prevalence of congenital anomalies in pregnancies complicated by type 2 diabetes: Systematic review and meta-analysis. Oppermann MLR, Campos MAA, Guerra GL, et al (2026), International Journal of Gynecology & Obstetrics vol 172, no 1, January 2026, pp 196-209

Objective

The prevalence of congenital anomalies in pregnancies affected by type 2 diabetes remains uncertain. This study systematically reviews the literature and assesses the prevalence and potential risk factors associated with congenital anomalies in this population.

Method

We searched MEDLINE, Embase, Cochrane, LILACS, and Web of Science for studies published between January 1990 and May 2025 reporting on congenital anomalies in pregnancies complicated by pregestational type 2 or overt diabetes (diabetes first diagnosed at any time during pregnancy). The search included terms such as “congenital anomaly,” “birth defect,” “pregnancy outcome,” “type 2 diabetes,” and “non-insulin dependent diabetes mellitus.” We included studies with at least 40 pregnancy outcomes, in any language (if minimally translatable), excluding case reports, congress abstracts, and studies focused on chromosomal or genetic syndromes. Search strategies were developed and executed by two librarians. Titles and abstracts were screened, and data were extracted from full-text articles by at least two authors. Analyses were conducted using SPSS v25 and PERSyst-MA (R package meta, v7.0–0).

Reporting followed the MOOSE and PRISMA statements.

Results
Of 2316 records, 68 studies met inclusion criteria, representing 102 963 pregnancies and 96 015 outcomes (90 450 with pregestational type 2 diabetes; 5565 with overt diabetes). The overall prevalence of congenital anomalies was 6.1% (95% confidence interval: 5.1%–7.3%; prediction interval: 1.5%–21.6%; I2 = 97%). Cardiac anomalies were most common (21.6%). Subgroup analyses did not yield significant findings; however, meta-regression revealed an inverse association between maternal age and the prevalence of congenital anomalies and a direct association with HbA1c levels.

Conclusion
Type 2 diabetes in pregnancy was associated with a relevant prevalence of congenital anomalies. Lower maternal age and, as expected, higher HbA1c levels increased the risk of congenital anomalies. Regarding the inverse association between congenital anomalies and maternal age, further confirmatory studies are necessary. (© 2025 International Federation of Gynecology and Obstetrics.)

2025-08593

Pregestational Diabetes and Duration of Active Labour Compared With Non-Diabetic Women: A Population-Based Cohort Study. Nevander S, Carlhäll S, Källén K, et al (2025), BJOG: An International Journal of Obstetrics and Gynaecology vol 132, no 11, October 2025, pp 1635-1643

Objective
To evaluate the impact of pregestational diabetes on duration of active labour (DAL) in induced and spontaneous labour and to compare caesarean section (CS) rates and indications between women with and without diabetes.

Design
A population-based cohort study.

Setting
Sweden.

Population
243 537 nulliparous women, registered in the Swedish Pregnancy Register, who delivered a singleton fetus at ≥ 34+0 gestational weeks + days between 2014 and 2020. Women with gestational diabetes mellitus were excluded.

Methods
DAL was compared between women with pregestational diabetes and those without diabetes using Kaplan-Meier survival analysis and Cox regression analysis.

Main Outcome Measures
DAL. Rates and indications for CS.

Results
Women with pregestational diabetes had longer active labour and a reduced chance of vaginal delivery at a given time-point compared to women without diabetes, adjusted hazard ratio 0.65 (95% CI: 0.60–0.70, $p < 0.001$). Among those with spontaneous labour, median DAL in diabetic vs. non-diabetic women was 9.60 h versus 8.75 h, difference 0.85 h (95% CI 0.20–1.50), $p < 0.001$. Corresponding numbers for induced labours were 8.92 h versus 7.20 h, difference 1.72 h (95% CI 0.94–2.49), $p < 0.001$.

Elective and emergency CS rates were higher in women with pregestational diabetes than non-diabetic women (7.4% and 29.4% vs. 2.6% and 7.1% respectively), with suspected macrosomia (50.4%) and fetal distress (31.9%) being the most common indications for CS among women with pregestational diabetes.

Conclusions
The prolonged labour duration in women with pregestational diabetes highlights the importance of the labour ward staff's support and patience in managing diabetic parturients, potentially allowing more time before diagnosing labour dystocia. Extended labour duration may also influence women's birth experience. (© 2025 The Author(s). BJOG: An

2025-07838

Pregnancy outcomes following diabetic ketoacidosis: a systematic review. Cozzi-Glaser GD, Davis AM, Bell M, et al (2025), American Journal of Obstetrics & Gynecology MFM vol 7, no 8, August 2025, 101711

OBJECTIVE

The primary objective of this systematic review was to evaluate pregnancy outcomes following at least 1 episode of diabetic ketoacidosis in patients with gestational or pregestational diabetes mellitus.

DATA SOURCES

An electronic search of English-language publications in PubMed, Embase, Web of Science, and Google Scholar covered the period from January 1990 to June 2023.

STUDY ELIGIBILITY CRITERIA

The eligibility criteria included randomized clinical trials or observational studies (ie, cohort studies, case–control studies) of patients with diabetic ketoacidosis in pregnancy and evaluation of maternal or neonatal outcomes. Systematic reviews, expert reviews, case reports, case series, animal studies, non–peer-reviewed publications, abstract-only publications, and publications without available full-text articles were excluded.

METHODS

Each study was reviewed in detail by 2 coauthors. The quality of each study was appraised using the Cochrane RoB 2 risk-of-bias tool for randomized trials and the JBI Critical Appraisal tools for cohort and case–control analyses.

RESULTS

Of the 1313 studies identified through data search, 7 met the final inclusion criteria. Study heterogeneity precluded any meta-analysis. High rates of adverse maternal and neonatal outcomes were found among those with at least 1 episode of diabetic ketoacidosis in pregnancy, with the following incidence rates: 7% to 35% for stillbirth, 49% to 64% for cesarean delivery, 25% to 83% for preterm birth, and 40% to 65% for neonatal intensive care unit admission. The most recent studies note a stillbirth rate of 7% to 31%, with most analyses finding a rate <17%.

CONCLUSION

There is a paucity of well-designed studies evaluating pregnancy outcomes associated with diabetic ketoacidosis. Maternal and fetal outcomes following diabetic ketoacidosis remain poor, although stillbirth may be incrementally decreasing over time. As diabetes care and diabetic ketoacidosis management advance, future retrospective and prospective analyses should evaluate the management and outcomes of diabetic ketoacidosis. (© 2025 Elsevier Inc. All rights are reserved, including those for text and data mining, AI training, and similar technologies.)

2025-07512

New diagnosis of diabetes and severe hyperlipidemia at 3 months postpartum presenting as florid diabetic retinopathy and eruptive xanthomas. Zhen XM, Lee KL, Sullivan D, et al (2022), Journal of Obstetrics and Gynaecology Research vol 48, no 2, February 2022, pp 482-491

A 33-year-old woman presented to the Emergency Department at 3 months postpartum with a 2-day history of a partial left sixth cranial nerve palsy, and several weeks' history of bilateral blurred vision and papular skin lesions. Brain imaging and ultrasound of the carotid and vertebral arteries were all normal. Investigations revealed severe hyperlipidemia and a venous blood glucose level of 19.6 mmol/L despite a negative result on a 75-g oral glucose tolerance test at 32 weeks of pregnancy. Fundus photography demonstrated bilateral severe proliferative diabetic retinopathy with lipemia retinalis. The skin lesions were consistent with xanthomas on biopsy. The partial left sixth cranial nerve palsy and the bilateral rapidly progressive diabetic retinopathy were likely secondary to peripheral ischemia from serum hyperviscosity and displacement due to severe hyperlipidemia. The rapid progression of symptoms was likely triggered by a postpartum diet high in saturated fats in the context of presumed genetic predisposition. (© 1999-2025 John Wiley & Sons, Inc or related companies)

2025-07247

A retrospective study on the impact of the timing of diabetes diagnosis on maternal and fetal outcomes. Zhou K, Chen W, Wu S, et al (2025), Archives of Gynecology and Obstetrics vol 312, no 3, September 2025, pp 781 - 789

Purpose

This study aimed to evaluate the impact of the timing of diabetes diagnosis on maternal and fetal outcomes.

Methods

The data were collected from pregnant women diagnosed with pregestational diabetes mellitus (PGDM) who were hospitalized at Dongguan People's Hospital between June 2016 and December 2023. Based on the timing of diagnosis, women were categorized into two groups: those diagnosed before pregnancy and those diagnosed during pregnancy. General clinical characteristics, glycemic control, pregnancy complications, and maternal and fetal outcomes were compared between the two groups to assess the influence of diagnosis timing on pregnancy outcomes.

Results

Between 2016 and 2023, a total of 415 pregnant women with PGDM were included in this study. Among them, 242 (58.31%) were diagnosed before pregnancy, while 173 (41.69%) were diagnosed during pregnancy, resulting in a preconception diabetes awareness rate of 58.31%. Education level was significantly associated with the timing of diabetes diagnosis (P = 0.002). In addition, women diagnosed during pregnancy had significantly higher HbA1c levels before delivery when compared with those diagnosed before pregnancy (6.70% vs. 6.20%, P < 0.001), indicating more severe glycemic dysregulation. Consequently, this group also exhibited a higher rate of diabetes-related hospitalizations during pregnancy (42.77% vs. 22.73%, P < 0.001) and an increased risk of macrosomia (20.23% vs. 10.74%, P = 0.007).

Conclusion

Pregnant women diagnosed with diabetes during pregnancy exhibited more severe perinatal glucose metabolism disorders and a higher rate of macrosomia. Early diagnosis and management of diabetes—especially before conception—helped improve perinatal glycemic control, potentially reducing healthcare burdens and the incidence of macrosomia. (© 2025, The Author(s))

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2025-07121

Congenital malformation and hemoglobin A1c in the first trimester among Japanese women with pregestational diabetes. Nakanishi K, Kanagawa T, Fujikawa K, et al (2021), Journal of Obstetrics and Gynaecology Research vol 47, no 12, December 2021, pp 4164-4170

Aim

To investigate the incidence of major congenital malformations in Japanese women with pregestational diabetes, and to determine the cutoff value of hemoglobin A1c (HbA1c) in the first trimester associated with congenital malformations.

Methods

This retrospective cohort study included singleton pregnancies in Japanese women with pregestational diabetes, including type 1 and type 2 diabetes, and specific types of diabetes due to other causes. The primary outcome was the incidence of major congenital malformations. The secondary outcome was the incidence of all congenital malformations. The cutoff value of HbA1c for congenital malformations was calculated using receiver operating characteristic curve analysis. The adjusted odds ratios (aOR) of major congenital malformations were calculated using multiple logistic regression analyses.

Results

This study enrolled 292 patients, including 132 (45.2%) with type 1 diabetes, 156 (53.4%) with type 2 diabetes, and 4 (1.4%) with other specific types. The incidence rates of major congenital malformations and all congenital malformations were 7.2% (21/292) and 12.7% (37/292), respectively. The cutoff value of HbA1c in the first trimester for major malformations and for all congenital malformations was 6.5%. HbA1c ≥ 6.5% was significantly associated with major malformations (aOR 3.5; 95% confidence interval: 1.2–12.6; p = 0.018).

Conclusion

The incidence of major congenital malformations significantly increased in pregnant Japanese women with HbA1c values of 6.5% or higher. The recommended HbA1c value during the first trimester used in other countries can be applied to pregnant Japanese women. (© Author)

2025-06129

Comparison Between Antenatal and Postnatal Colostrum From Women With and Without Type 1 Diabetes. Goldberg A, Pettersson H, Ekéus C, et al (2025), Journal of Human Lactation vol 41, no 2, May 2025, pp 254–262

Background

Supplementary feeding, colostrum or, in some countries, commercial milk formula, is given to newborns of women with Type 1 diabetes to prevent neonatal hypoglycemia. Few studies have explored the content of colostrum from women with Type 1 diabetes.
Research Aims
This study aimed to investigate the macronutrients in colostrum collected during pregnancy and in the early postpartum period to compare colostrum contents in women with and without Type 1 diabetes.
Methods
In this cohort study, we collected colostrum among 20 women, 10 with and 10 without Type 1 diabetes, at 10 different time points in gestational weeks 36–40 and postpartum Days 1–5. We measured carbohydrates, protein, fat, and kilocalories in colostrum using a human milk analyzer; and we analyzed data using linear mixed models. In a follow-up analysis, we compared the content of colostrum from Day 1 with the nutritional values provided on the commercial milk formula, using a one-sample t test.
Results
There were no mean differences in carbohydrates (6.6 g/100 ml; 95% CI [6.3, 6.9] vs. 6.7 g/100 ml; 95% CI [6.4, 7.0] p = 0.29); kilocalories (71.1 kcal/100 ml; 95% CI [62.9, 79.3] vs. 85.3 kcal/100 ml; 95% CI [77.2, 93.3] p = 0.21], and fat (2.7 g/100 ml; 95% CI [1.8, 3.6] vs. 2.3 g/100 ml; 95% CI [1.4, 3.2] p = 0.55) in colostrum when comparing women with and without Type 1 diabetes. However, antenatal protein differed at all timepoints tested (p = 0.01). Colostrum macronutrients on Day 1 differed from that of commercial milk formula and all other colostrum time points, except Gestational Week 38.
Conclusions
Our study provides insights into antenatal and postnatal colostrum macronutrients among women with and without Type 1 diabetes. Further studies are needed to understand the effects of supplementary feeding using antenatal or postnatal colostrum or commercial milk formula on neonatal hypoglycemia. (© Author)
Full URL: https://doi.org/10.1177/08903344251318285

2025-05825

Parental Transmission of Type 2 Diabetes Risk in Offspring: A Prospective Family-Based Cohort Study in Northern China. Peng H, Wang M, Guo H, et al (2025), Nutrients vol 17, no 8, April 2025, p 1361

Background: While parental type 2 diabetes (T2D) is a known risk factor for offspring T2D, the differential impact of maternal versus paternal transmission remains debated. Methods: This prospective family-based cohort study enrolled 4508 diabetes-free adults from Northern China with a median 7.32-year follow-up. Using Cox proportional hazards models, we examined parent-of-origin effects on T2D incidence, adjusting for lifestyle, adiposity, and metabolic covariates. Results: Parental T2D conferred elevated offspring risk (adjusted HR = 1.82, 95% CI:1.44–2.30), and was predominantly driven by maternal transmission. Maternal T2D was robustly associated with offspring risk (HR = 1.89, 95% CI: 1.47–2.43), whereas paternal T2D showed no significant effect (HR = 1.27, 95% CI: 0.88–1.84). Offspring with only maternal T2D history exhibited the highest risk (HR = 2.55, 95% CI: 1.87–3.50; p = 4.70 × 10−9), persisting after full adjustment, while no significant association was observed for paternal diabetes. Lifestyle modified this association: healthy diet (diet score > 2 vs. ≤2: HR = 1.34 vs. 2.76; pinteraction = 9.10 × 10−4) and regular exercise (regular vs. unregular: HR = 1.13 vs. 2.10; pinteraction = 4.20 × 10−2) attenuated maternal transmission. Conclusions: Maternal T2D confers greater intergenerational risk than paternal T2D, with modifiable lifestyle factors mitigating this association. These findings highlight the importance of integrating maternal diabetes history into clinical risk stratification tools and prioritizing lifestyle interventions in the offspring of affected mothers to mitigate inherited risk. (© Author)
Full URL: https://doi.org/10.3390/nu17081361

2025-05727

Proactive Insulin Escalation for Antenatal Betamethasone-Induced Hyperglycaemia in Women With Diabetes: A Prospective Cohort Study. Jones A, Gong JY, Lee IL, et al (2025), Australian and New Zealand Journal of Obstetrics and Gynaecology (ANZJOG) vol 65, no 6, December 2025, pp 752-758

Background
In patients with diabetes, antenatal glucocorticoids can induce transient maternal hyperglycaemia for approximately 72 h. This may be associated with adverse outcomes, including neonatal hypoglycaemia, prompting recommendations for prophylactic increases in insulin by some expert groups; however, there are no validated protocols. A review of our institutional practice of empiric dose escalation (Day 1:25%, Day 2–3:40%, Day 4:20%, Day 5:10%) determined it was inadequate to prevent hyperglycaemia.

Aim
To investigate the efficacy of an intensified insulin escalation protocol in achieving time in target range (3.9–7.8 mmol/L) following antenatal betamethasone.

Materials and Methods
Following implementation of the intensified insulin escalation protocol at Western Health (Day 1 and 2: 50% increase, Day 3:30% increase), a prospective cohort study was conducted for women with gestational diabetes or type 2 diabetes managed with insulin requiring betamethasone. Data was collected from the electronic medical record and expressed as mean ± SD or median (IQR).

Results
29 women (82.8% GDM, 17.2% T2DM) were included with median gestation 33 + 2 (31–34+4) weeks and median BMI 30 kg/m2 (27-38IQR). In the 72 h post first-dose betamethasone, the proportion of readings in target range (< 5.1 mmol/L fasting and < 6.8 mmol/L post prandial) was 35.3%. There was no maternal hypoglycaemia. Median increase in insulin requirement was 50% (22.6%–100% IQR) on Day 1, 106% on Day 2 (33%–297% IQR) and 133% on Day 3 (23%–543% IQR).

Conclusions
A significant increase in insulin requirement, exceeding current guideline recommendations, occurs following antenatal betamethasone in women with diabetes, and further prospective evaluation of optimal dosing is required. (© Author)
Full URL: https://doi.org/10.1111/ajo.70029

2025-05467

Hybrid closed loop insulin therapy versus standard therapy in pregnant women with type 1 diabetes: A systematic review and meta-analysis of randomized controlled trials. Tahir S, Naeem S, Nayyab I, et al (2025), European Journal of Obstetrics & Gynecology and Reproductive Biology vol 310, June 2025, 113969

Objective
We aimed to explore the efficacy and safety of hybrid closed loop (HCL) systems compared to standard care (SC) in pregnant women with Type 1 Diabetes Mellitus (T1DM), pooling results from randomized controlled trials (RCTs).
Data sources
We searched through multiple databases like PubMed, Cochrane, Embase, Web of Science, and Clinicaltrials.gov etc. from inception to September 2024 and found six relevant studies after screening.
Study eligibility criteria
We included studies that were (1) RCTs; with patient population (2) pregnant patients with type 1 diabetes; intervention group receiving (3) HCL and control group receiving (4) SC; while reporting (5) outcomes of interest (endpoints). We pooled results pertaining to primary outcomes; time in range (TIR), nocturnal time in range (nTIR), and HbA1c; and relevant secondary outcomes.
Study appraisal and synthesis methods
We used Rob 2: A revised Cochrane risk-of-bias tool for randomized trials for quality assessment of the included RCTs. We employed the DerSimonian-Laird random effects model using review manager 5.4 to analyze the pooled estimates and reported results as risk ratio; for dichotomous outcomes; or mean difference; for continuous outcomes.
Results
Five RCTs (n = 274) with disparate populations were narrowed down for analysis. Pooled estimates for TIR (MD 4.95 %;−0.56 to 10.49)and HbA1c% (MD 0.09; −0.44 to 0.63) were statistically non-significant, while estimates for nTIR (MD 11.16 %; 7.15 to 15.15), % time < 63 mg/dL (MD –0.78; −1.36 to −0.20), % of time < 54 mg/dL (MD –0.22; −0.40 to −0.03), low blood glucose index (LBGI) (MD –0.30; −0.54 to −0.06), and glucose standard deviation (MD −3.05; −6.06 to −0.04) favored HCL over SC. No significant between-group differences were found in other secondary outcomes: % of time >140 mg/dL, % of time >180 mg/dL, mean glucose level, rate of serious adverse events, cesarian delivery, and severe hypoglycemia.
Conclusions
HCL systems can improve glycemic control in pregnant women with T1DM with a tolerable adverse event profile, however more research is needed to draw a definitive conclusion. (© Author)

2025-05395

Trends of Large for Gestational Age and Macrosomia and Their Mediating Effect on the Association Between Diabetes Mellitus and Obstetric Hemorrhage. Chen P, Mu Y, Xie Y, et al (2025), Maternal & Child Nutrition vol 21, no 3, July 2025, e70000

This study aimed to determine the prevalence of large for gestational age (LGA) and macrosomia in China from 2012 to 2021 and explore if LGA and macrosomia mediate the relationship between diabetes mellitus in pregnancy (DIP) and obstetric haemorrhage. The overall annual change rate (ACR) was calculated, and stratification analysis was performed. Mediation analysis assessed the influence of LGA and macrosomia in the association between DIP and obstetric haemorrhage. The nationwide prevalence of LGA and macrosomia was 15.8% and 6.8%, respectively. The ACR for LGA was 0.71% (95% CI, 0.66%–0.76%); pre-2016, −0.44% (95% CI, −0.63% to −0.25%); post-2016, −0.29% (95% CI, −0.39% to −0.19%). The ACR for macrosomia was −1.17% (95% CI, −1.24% to −1.09%); pre-2016, −0.73% (95% CI, −1.03% to −0.43%); post-2016, −2.42% (95% CI, −2.59% to −2.26%). In western and rural area, the ACR for LGA was 1.94% (95% CI, 1.84%–2.05%) and 1.81% (95% CI, 1.73%–1.89%), and LGA was increasing among these women in the post-2016 period. About 7.0% of pregnant women had DIP, and the LGA and macrosomia prevalences among women with DIP were 23.7% and 10.0%, respectively. In the mediation analysis, the total excess risk associated with DIP on obstetric haemorrhage was approximately 0.21 and the proportion mediated by LGA and macrosomia was 12.10% and 11.81%, respectively. In rural areas, the proportion mediated by LGA and macrosomia was amplified to 18.34% and 16.40%. Macrosomia rates declined steadily, but LGA rates increased slightly in disadvantaged areas. LGA and macrosomia mediated the association between DIP and obstetric haemorrhage, and the mediating effect intensified in rural regions. Addressing LGA warrants management for at-risk fetuses. (© Author)

Full URL: https://doi.org/10.1111/mcn.70000

2025-04805

Glucose time in range trajectories during pregnancy and association with adverse perinatal outcomes: a joint latent-class trajectory modeling approach. Sauer SM, Fulcher I, Sanusi A, et al (2025), American Journal of Obstetrics & Gynecology MFM vol 7, no 6, June 2025, 101669

Background

While time in range (TIR) summarized over pregnancy is associated with adverse outcomes among individuals with preexisting type 1 or 2 diabetes, the impact of TIR trajectories with advancing gestation is unknown.

Objective

To identify glucose TIR trajectories across pregnancy and evaluate their association with perinatal outcomes among patients with preexisting diabetes.

Study Design

Retrospective, single-center cohort study of pregnant patients with type 1 or 2 diabetes who used continuous glucose monitoring (CGM) and delivered in 2019 to 2023. Weekly TIR (65-140 mg/dL) was computed starting at 10 weeks' gestation, and joint latent-class trajectory modeling identified discrete TIR trajectory groups. Patients were classified into groups, and multivariable logistic regression estimated the associations between groups and perinatal outcomes.

Results

Of 179 pregnant patients, 91 had type 1 and 88 had type 2 diabetes. We identified four TIR trajectory groups using data from over 5.1 million CGM measurements: (1) good control, stable (n=48), (2) moderate control, initial improvement, and late decline (n=22), (3) moderate control, late improvement (n=63), and (4) poor control, initial worsening and late improvement (n=46). All perinatal outcomes differed by TIR trajectory. Groups 2, 3, and 4 with suboptimal control in early pregnancy were associated with higher odds of preterm birth, indicated preterm birth, and NICU admission, compared to group 1. Groups 3 and 4, which had the lowest TIR during second and early third trimesters, were associated with higher odds of large-for-gestational-age (LGA). Only group 4 was associated with higher odds of preeclampsia and neonatal hypoglycemia.

Conclusion

Achieving glycemic control in the second and early third trimesters during fetal and placental growth and development is important to reduce the risk of adverse pregnancy outcomes, particularly LGA. Third-trimester TIR decline may impact risk of preterm birth and NICU admission. (Author)

2025-03856

Optimizing Diabetes-in-Pregnancy Outcomes Requires a Care Continuum. Huang AM, Miodovnik M, Reece EA (2025), American Journal of Perinatology vol 42, no 13, October 2025, pp 1704-1713

This study aimed to assess the strengths, limitations, opportunities, and threats presented by diabetes-in-pregnancy. We review the improvements in maternal and fetal mortality since the advent of insulin therapy, evaluate current health challenges, and identify opportunities for preventing increased mortality due to diabetes-in-pregnancy. Prior to 1922, women with type 1 diabetes mellitus (T1DM) of childbearing age were discouraged from becoming pregnant as the maternal and fetal/neonatal mortality rates were extremely high. Starvation-level dietary restriction was the only "treatment," with limited success in managing the disease. The discovery of insulin coupled with careful clinical

management presented the possibility of successful pregnancies for women with T1dm. Over the course of the next half-century, maternal survival increased from 54 to 97%. However, the gains made in reducing adverse outcomes of diabetes in pregnancy are eroding due to modern challenges. The global obesity epidemic has led to an increase in type 2 and gestational diabetes mellitus (DM). T1DM also is on the rise. Together, the rise in the prevalence of pregestational diabetes has increased the risks for adverse outcomes. Here we review the ongoing challenges as well as opportunities for research to improve outcomes. We suggest that overweight, obesity, and diabetes management must be coupled with preconception counseling and education and must include, in addition to, Ob/Gyns, primary care, nutrition, weight management, and other experts to ensure that those at risk of pregnancy complications due to diabetes have the best possible outcomes.

Key Points

Diabetes in pregnancy is affecting more people.

The obesity epidemic is fueling an increase in pregestational diabetes.

Research is needed to reduce inequities in diabetes in pregnancy outcomes.

Blood glucose control should start prior to pregnancy. (Author)

2025-03835

Type 1 Diabetes Mellitus and Thromboembolism in Pregnancy. Thomas J, Brewerton C, Holmgren C, et al (2025), American Journal of Perinatology vol 42, no 12, September 2025, pp 1588-1593

Objective The impact of type 1 DM (T1DM) on thromboembolism in pregnancy is uncertain. We hypothesized that T1DM is associated with higher rates of thrombotic events during pregnancy and the postpartum period.

Study Design This is a retrospective cohort study utilizing the National Inpatient Sample database from HCUP/AHRQ for 2017–2019. Pregnant and postpartum patients with a history of T1DM were compared to those without. The primary outcome was a composite diagnosis of any thrombotic disease (pulmonary embolism [PE], deep vein thrombosis [DVT], cerebral vascular thrombosis [CVT], or other thromboses). Secondary outcomes were the diagnosis of each individual type of thromboembolic event. Groups were compared via student's test, chi-squared, and logistic regression analyses, controlling for confounders including age, race, obesity, tobacco use, cHTN, asthma, anemia, and cesarean section.

Results A total of 2,361,711 subjects met the criteria. Patients with T1DM encompassed 0.4% of subjects (n = 9,983). T1DM subjects were more likely to be younger, non-Hispanic white, obese, tobacco users, chronic hypertensive, asthmatic, and have a history of cesarean (all $p < 0.001$). They were less likely to be in the top income quartile. Thromboembolic events occurred more frequently in those with T1DM (0.45% vs. 0.20%, $p < 0.001$). DVT was the most common event (0.25%). After controlling for confounders, T1DM remained independently associated with any thromboembolic event in pregnancy (adjusted odds ratio [aOR] = 2.19, 95% confidence interval [CI]: 1.49–3.23), PE (aOR = 3.59, 95% CI: 1.65–7.82), and DVT (aOR = 2.43, 95% CI: 1.43–4.14).

Conclusion T1DM is associated with an increased risk of thromboembolic events in pregnancy.

Key Points

T1DM is independently associated with VTE.

PE and DVT are the most common events.

T1DM has an impact on VTE similar to obesity. (Author)

2025-03826

Comparisons of the Accuracy of Fetal Weight Estimation between Various Ultrasound Models and Clinical Assessments in Term Pregnancies Complicated by Diabetes Mellitus. Thongnok P, Tongsong T, Jatavan P (2019), Journal of the Medical Association of Thailand vol 102, no 11, November 2019, pp 1222-1228

Objective: To compare the accuracy of fetal weight estimation on admission before delivery between subjective assessment, objective clinical assessment, and 2D-ultrasonography (2D-US) assessment in pregnancy with diabetes mellitus (DM).
Materials and Methods: Pregnancy with DM admitted for delivery at Maharaj Nakorn Chiang Mai Hospital between March 24, 2017 and August 7, 2018, were prospectively recruited. Inclusion criteria were a term, singleton pregnancy with overt or gestational DM without other underlying diseases, no smoking, and no emergency condition for immediate delivery. Fetal weight estimation by subjective assessment (physical examination), objective assessment (a formula using multiple parameters including BMI, fundal height, maternal abdominal circumference, and parity), and 2D-US were performed on admission for delivery. Actual birth weight (BW) was measured within 30 minutes after birth. Accuracy in predicting actual BW by various methods was calculated and expressed as intra-class correlation coefficient (ICC), mean error, mean percentage error, and percentage of estimate within 10% of the actual BW.
Results: Ninety-six women (gestational DM 92 and overt DM 4) were recruited. The 2D-US (Hadlock 4) was most accurate for estimation (ICC 0.896) and conversely objective assessment was least accurate (ICC 0.610). In predicting actual BW (±10%), 2D-US and subjective assessment were significantly superior to objective assessment (p=0.001 and p=0.017; respectively), whereas the accuracy of 2D-US and subjective assessment was comparable (76.4% versus 66.7%; p=0.151).
Conclusion: In singleton pregnancy with DM, the fetal weight estimation with 2D-US (Hadlock 4) had more accuracy than subjective assessment (in terms of ICC), but no significant difference of accuracy between the two methods. The authors suggest using 2D-US as an adjunct in estimation of fetal weight among pregnancies with DM.

Keywords : Pregnancy, Diabetes mellitus, Estimate fetal weight, Ultrasound, Physical examination (Author)
Full URL: http://jmatonline.com/view.php?id=2293

2025-03575

Prevention and remission of type 2 diabetes. Scottish Intercollegiate Guidelines Network (2025), Scottish Intercollegiate Guidelines Network, Edinburgh, SIGN 172, March 2025. 45 pages

This guideline provides recommendations on the prevention, early detection, and early non-pharmacological and pharmacological treatment to reduce the risk of type 2 diabetes. It includes adults who are: at risk of developing type 2 diabetes, clinically diagnosed with prediabetes, impaired glucose tolerance, impaired fasting hyperglycaemia or previous gestational diabetes, recently diagnosed with type 2 diabetes. It excludes children and the not-at-risk general population. (Author)
Full URL: https://www.sign.ac.uk/media/2357/20251103-type-2-diabetes-prevention-gl-publication-v4.pdf

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2025-03404

Maternal Fetal Health [Oral abstracts]. Various (2020), Journal of Obstetrics and Gynaecology Research vol 46, suppl 1, August 2020, pp. 25-41

Oral abstracts from the 26th Asia and Oceania Federation of Obstetrics and Gynecology Congress, 10–14 November 2019, Philippine International Convention Center, Pasay, Philippines the focus of which was maternal fetal health.
1. Prevalence of congenital anomalies in neonates and associated risk factors in a Tertiary Care Hospital in Ulaanbaatar, Mongolia by Jargalsaikhan Badarch, Oyunkhand Enkhtaivan, Tsengel Batsuuri, Dulamsuren Nergui, Oyunomin Teskhuyag, Budzaya Enkbayar, Amarzaya Ikhagvasuren, Tegshjargal Sereenendorj;
2. Prevalence of perinatal vertical transmission of hepatitis anti-HCV antibody, Amgalan Maternity Hospital, Mongolia by Jargalsaikhan Badarch, Khonchinkhuu Mandakhtsetsen, Batsukh Enkhjargal, Oyun-Erdene Ariunbold, Lkhamnorov Battur, Erdenesuvd Damdinsuren;
3. Risk factors for adverse outcomes among teenage pregnancies delivered in a Tertiary Center from 2007–2016: A retrospective cohort study by Trinilisa E. Bagalso, MD, Maria Estrella Y. Flores, MD;
4. Violence against women in Bangladesh by Prof Laila Arjumand Banu;
5. Globally child birth intervention going overboard by Professor Dr. Rowshon Ara Begum, Ex-President, OGSB, Vice President-FSSB, Vice President-GOSB, Vice President-GOESB, Chairman- SRH (AOFOG);
6. Comparison of perinatal outcomes of adolescent and non-adolescent primigravids admitted in a Tertiary Government Hospital by Margaret Rose C. Bocaya, MD, Precious DC Diaz MD;
7. Pregnancy outcomes following different types of bariatric surgery: National cohort study by Katie Cornthwaite, MD, Chetan Prajapati PhD, Erik Lenguerrand PhD, Natalie Blencowe PhD, Andrew Johnson MD, Dimitrios Siassakos MD;
8. A retrospective review of neonatal outcomes of inborn and outborn preterm neonatal admissions based on perinatal profiles at a Tertiary Referral Perinatal Center in Quezon City from January 2012 to December 2016 by Katleen R. Del Prado, MD, Edward N. Padilla, MD;

9. A retrospective review of neonatal outcomes of inborn and outborn preterm neonatal admissions based on perinatal profiles at a Tertiary Referral Perinatal Center in Quezon City from January 2012 to December 2016 by Katleen R. Del Prado, MD, Edward N. Padilla, MD;
10. Implement of post-partum intrauterine device project in Bangladesh: Strengths and challenges by Dr. Farhana Dewan, Dr. Jobaida Sultana, Dr. Alpona Adhikary;
11. Long term prognosis of EXIT procedure for delivering babies with fetal airway obstruction: Novel insights from a multicenter retrospective study by Satoshi Dohi, MD, PhD;
12. Dutta's scoring technique for early detection and management of uterine atony during emergency LSCS: A randomized trial by Indranil Dutta, MD, Dilip Kumar Dutta MD;
13. Role of colposcopy in unexplained infertility by Indranil Dutta;
14. Evaluation of gestational weight gain and its correlation with maternal and neonatal outcome in women of normal early pregnancy body mass index by Roli Gautam, MD, Abhilasha Jain MD;
15. Introducing the new method: Role of amnioinfusion using CVP set in the management of PPROM with oligohydramnios in pregnancy by Herlambang Herlambang, Muhammad Alamsyah Aziz, Amelia Dwi Fitri
16. Maternal and neonatal outcomes of women with chronic kidney disease by Romelyn April P. Imperio-Onglao, MD, Luwalhati Ordillo Lim MD, Cristina Pelaez Crisologo MD, Coralie D Dimacali MD;
17. Management of hyperglycemia for women with twin pregnancies and risk of small-for-date weights: A single-center 13-year study by Yuko Irie, MD, Liangcheng Wang PhD, Isao Horiuchi PhD, Kenro Chikazawa PhD, Tomoyuki Kuwata PhD, Kenjiro Takagi PhD;
18. Maternal and fetal outcomes in pregnancy with chronic kidney disease depending on the stages by GFR by Chan-Mi Lim, MD, Suk-Young Kim MD, Eun-young Woo MD, Sun-young Jung MD, Ryoon-sun Lee MD;
19. Diagnostic utility of urine gram stain versus urinalysis in asymptomatic bacteriuria among pregnant patients by Suzanne C. Lucero, MD, Marie Faith B. Villaruz MD, Ramela O. Contrevida MD, Geraldine L. Gubatina MD, Eileen M. Granada MD, Gertrude Emilie P. Gelito MD;
20. Performance of a first trimester preeclampsia screening program and effectiveness of aspirin in reducing the development of preeclampsia: A five-year Philippine experience by Michelle Martin, MD, Zarinah Gonzaga, MD;
21. Pre-pregnancy transabdominal cervical cerclage in women with recurrent preterm birth or late miscarriage: A case series report by An Mai Nguyen, MD, Anh My To MD, Xuyen Thi Ha Le MD, Trung Thien Ly MD, Minh Ngoc Chau MD, Vinh Quang Dang MD;
22. Evaluating abnormal fetal cardiotocogram by J. Oyuntsetseg, O. Altanzul, Ts. Ankhzaya,N. Bayasgalan, B. Tsengelmaa, E. Mandkhai, D.Gereltuya, B. Zulaa, E. Ouynkhand;
23. Prediction of preeclampsia and intrauterine growth restriction in low-risk pregnancies in East Avenue Medical Center using uterine artery Doppler velocimetry by Shiela Mae D. Putol, MD, Ma. Bernadette R. Octavio MD;
24. A comparative study of the efficacy of misoprostol administered by oral, sublingual and vaginal route for induction of labor at term by Priyankur Roy, MD;
25. Pregnancy outcome in women with polycystic ovary syndrome by Haritha Sagili, MD, Amandeep Mann MD, Murali Subbaiah MD;
26. Association of serum C-reactive protein and selected coagulation marker in preeclampsia and its impact on fetomaternal outcome by Shahanaj Sharmin, MD, Shahanara Chowdhury MD, Didarul Alam MD, Nasreen Banu MD, Shirin Akter Khanam MD, Fahmida Rashid MD;
27. The correlation between perineal body length and obstetric perineal laceration among Filipino Primigravid patients in a Tertiary Hospital by Iris A. Soria, MD, Kareen N. Reforma MD;
28. Predicting HELLP syndrome in preeclampsia cases and determining fetal outcomes by Ali Sungkar, MD, Rima Irwinda, MD, Raymond Surya, MD;
29. Factors affecting compliance to voluntary HIV screening among pregnant women seeking prenatal care in the outpatient Department of a Tertiary Government Hospital by Victoria May H. Velasco, MD, Analyn Fuentes Fallarme MD;
30. Effectiveness of prophylactic vaginal micronized progesterone in prevention of preterm birth among high risk women seen at the Tertiary Government Hospital outpatient department: A randomized controlled trial by Mae Marecel Villalba, MD, Rose Joy D. Vallega MD, Maria Jenina M. Soyao MD;
31. Preeclampsia in the era of universal screening and aspirin prophylaxis in Sarawak: An observational multicentre study by Hian Yan Voon, MD, Soon Leong Yong MD, Aini Nabilah Abdul Raub MD, Ming Cheng Chai MD, Ching Mun Ng MD, Freddie Atuk MD and
32. Prediction of preterm birth using cervical length, hsCRP, and fetal fibronectin (fFN) by Eun-young Woo, Suk-Young Kim, Chan-Mi Lim, Sun-Young Jung, Sun-Young Jung, Min-Jung Choi. (EA)

Full URL: https://doi.org/10.1111/jog.14284

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2025-03347

Differential effects of type 2 diabetes and gestational diabetes on maternal and cord blood adipokines and newborn weight. Gruber BL, Rawal Y, Irabor P, et al (2025), BMC Pregnancy and Childbirth vol 25, no 238, March 2025

Background

Dysregulated adipokine levels are associated with type 2 diabetes and gestational diabetes. Adiponectin and leptin are involved in nutrient transport, thereby affecting fetal growth and metabolism. We aimed to determine whether type 2 diabetes and gestational diabetes were associated different levels of serum and cord blood adiponectin, leptin, insulin and offspring birthweight.

Methods

Serum, cord blood, gestational age and birthweight were collected for First Nations mothers and infants who were enrolled in the Next Generation Cohort Study. A total of 173 maternal and 188 neonatal samples were available for analysis. Of those, 136 were matched maternal infant dyads that we used for paired mother-infant analyses. Pairs were sorted into groups based on maternal diagnoses of pre-existing type 2 diabetes, gestational diabetes or no diabetes (control). Adiponectin and leptin were measured by enzyme linked immunosorbent assay.

Results

Mothers with gestational diabetes had lower serum adiponectin (6.48 ± 3.64 μg/mL) in the third trimester relative to mothers with type 2 diabetes (8.55 ± 5.24 μg/mL, $p < 0.05$) or no diabetes (7.73 ± 3.47 μg/mL). However, cord blood adiponectin was lower only in normal weight pregnancies complicated by type 2 diabetes. Cord blood glucose, insulin and leptin were increased in infants of type 2 diabetes mothers and increased leptin was positively correlated with maternal leptin and birth weight. Female infants exposed to pregestational type 2 diabetes had a significantly higher birthweight z-score than female control infants.

Conclusions

In this study, exposure to type 2 diabetes, but not gestational diabetes, impacted cord blood levels of glucose, insulin and leptin and birthweight. Collectively, these factors may contribute to the greater impact of pregestational type 2 diabetes exposure on offspring health relative to gestational diabetes. (Author)

Full URL: https://doi.org/10.1186/s12884-025-07169-z

2025-02955

Population-Level Screening for Diabetes and Dyslipidemia After Pregnancies Complicated by Hypertension or Diabetes. Yu AYX, Auger N, Fu L, et al (2025), Circulation vol 151, no 7, 18 February 2025

We conducted a population-based cohort study using linked administrative data in Ontario, Canada, where residents have publicly funded universal health care access, and compared post-partum screening for diabetes and dyslipidemia among patients with and those without hypertensive disorders of pregnancy or gestational diabetes. (Author, edited)

Full URL: https://doi.org/10.1161/CIRCULATIONAHA.124.072067

2025-02543

Reduced fetal ductus venosus shunt fraction is associated with adverse perinatal outcomes in pregnancy with pregestational diabetes mellitus. Kopteeva E, Shelaeva E, Alekseenkova E, et al (2025), Archives of Gynecology and Obstetrics vol 311, no 3, March 2025, pp 621 - 631

Purpose

We aimed to determine fetal liver perfusion in PGDM and GDM pregnancies and to assess the relation of ductus venosus (DV) shunt fraction with adverse pregnancy outcomes.

Methods

We conducted a prospective longitudinal observational study including 188 pregnant women: group I—patients with pregestational DM (PGDM, n = 86), group II—patients with gestational DM (GDM, n = 44), group III—control (n = 58). The patients included in the study underwent ultrasound examination at 30+0–40+0 weeks of pregnancy. We evaluated volumetric blood flow adjusted to EFW (Q, ml/min/kg) for umbilical vein, DV, left and main portal vein. The relative risk was calculated for adverse pregnancy outcomes.

Results

In PGDM pregnancies, umbilical blood flow was redistributed to the fetal liver, increasing left portal and total liver volumetric blood flow ($p < 0.001$) compared with GDM and control groups. Pathological reduction in the DV shunt fraction (≤ 16.5%) was associated with an increased relative risk of preterm delivery (3.61 [95%CI 1.68; 7.71]), LGA-birth (1.64 [95% CI 1.26; 2.12]), neonatal adiposity (1.53 [95%CI 1.18; 1.98]), fetal hypoxia (3.47 [95%CI 1.34; 9.05]), emergency cesarean Sect. (1.93 [95%CI 1.26; 2.97]), and neonatal intensive care unit stay of more than 5 days (1.78 [95%CI 1.08; 2.93]).

Conclusion
Decreased DV shunt fraction reflects changes in fetal hemodynamics in PGDM-pregnancies and associated with an increased risk of adverse perinatal outcomes. (Author)
Full URL: https://doi.org/10.1007/s00404-024-07903-6

2025-02508

How can more women with pre-existing type 1 and type 2 diabetes be supported to prepare for pregnancy after a baby loss? A qualitative exploration of lived experiences in the UK. Dyer E, Bell R, Graham R, et al (2025), BMJ Open vol 15, no 1, January 2025, e083192

Objectives Explore, understand and analyse how women with pre-existing diabetes can be better supported during the inter-pregnancy interval—the time after a baby loss and before a subsequent pregnancy.

Design Qualitative, semi-structured online interviews took place between November 2020 and July 2021. Data were analysed using Reflexive Thematic Analysis.

Setting Participants reflected on care received at primary and secondary centres across the UK.

Participants Twelve predominantly White, British women with type 1 (n=9) and type 2 (n=3) diabetes with experience of baby loss and subsequent pregnancy were recruited through social media.

Results Three interrelated themes: (1) decisions around becoming pregnant after baby loss, (2) the triple burden of baby loss, diabetes and preparing for pregnancy, (3) gaps in the inter-pregnancy interval. Most (n=10) participants wanted to become pregnant again as soon as possible. The short inter-pregnancy interval (median=7 months) highlights a potentially small window of opportunity to support women to grieve and prepare for pregnancy. Providing timely access to care and support in the inter-pregnancy interval without overburdening women might be challenging due to structural issues in services and gaps in referral pathways.

Conclusion Women with pre-existing diabetes may experience challenges in accessing appropriate pre-pregnancy care in the inter-pregnancy interval. Our findings suggest that one-size-fits-all approaches are likely to be less effective in meeting diverse needs of this group and that more personalised, targeted support is needed. All healthcare professionals across the different parts of the care provision structure need greater awareness of the issues faced by this group to maximise timely access to the appropriate pre-pregnancy care and support. (Author)
Full URL: https://doi.org/10.1136/bmjopen-2023-083192

2025-02333

Pre-Existing and Gestational Diabetes and Risk of Maternal Venous Thromboembolism: A Systematic Review and Meta-Analysis of Observational Studies. Orrin M, Barber E, Grainge MJ (2025), BJOG: An International Journal of Obstetrics and Gynaecology vol 132, no 8, July 2025, pp 1076-1085

Background
Women who are pregnant are at increased risk of venous thromboembolism (VTE), which persists for up to 3 months following childbirth. Diabetes is known to increase the risk of serious cardiovascular outcomes.

Objective
To comprehensively review literature on the extent to which pre-existing or gestational diabetes influences the risk of VTE in both pregnancy and postpartum.

Search Strategy
We used Medline, Embase and Google Scholar to identify observational studies published up to 2 November 2023.

Selection Criteria
Studies which quantified the relationship between diabetes on antepartum and/or postpartum VTE, and which provide separate data for pre-existing and gestational diabetes.

Data Collection and Analysis
Results were pooled, where appropriate, using random-effects meta-analysis.

Main Results
Twenty one studies from Europe, the United States and Asia were included. There was an increased risk of antepartum VTE in women with gestational diabetes (RR = 2.48, 95% CI 1.47 – 4.16, I2= 45%, 4 studies) but not pre-existing diabetes (RR = 1.71, 0.43 – 6.77, I2= 68%, 2 studies). For postpartum VTE, there was no clear association with either pre-existing (RR = 1.28, 0.73 – 2.24, I2= 73%, 6 studies) or gestational (RR = 1.39, 0.77 – 2.51, I2= 70%, 10 studies) diabetes.

Conclusions
Our results will provide some reassurance for pregnant women with pre-existing or gestational diabetes, owing to no clear evidence of an increased risk of maternal VTE. While some studies report a raised risk of VTE during antepartum specifically, results must be interpreted in light of high levels of heterogeneity. (Author)
Full URL: https://doi.org/10.1111/1471-0528.18043

2025-01611

Exploring glycemic variability and time in range: Emerging indicators of at-risk pregnancy in type 2 diabetes mellitus. Khurana V, Nigam A, De A (2025), International Journal of Gynecology & Obstetrics vol 169, no 2, May 2025, pp 728-734

Objective
This study compares ambulatory glycemic profile and glycemic variability between pregnant women diagnosed with type 2 diabetes mellitus (T2DM) receiving pharmacotherapy and healthy pregnant women without diabetes and assesses their correlation with fetal outcome.

Method
This was a case–control study involving 60 pregnant women (40 with T2DM and 20 healthy controls) in the third trimester of pregnancy. A flash glucose monitor device was applied over the upper arm to obtain the ambulatory glucose profile. Various glycemic parameters were analyzed and correlated with fetal outcomes among the two groups.

Results
A total of 720 days of glucose data, comprising 69 120 data points, were analyzed. This included 46 080 glucose values from the T2DM group and 23 040 from the healthy control group. Mean glucose levels in the T2DM group were 23.75% higher compared to the controls. All measures of glycemic variability were significantly elevated in the T2DM group, including mean amplitude of glycemic excursions (MAGE) (52.85 mg/dL vs. 35.72 mg/dL, P = 0.036) and standard deviation (22.84 mg/dL vs. 14.00 mg/dL, P = 0.029). A MAGE >55 mg/dL was associated with adverse fetal outcomes, such as large-for-gestational-age (LGA) infants, neonatal hypoglycemia, and stillbirth. In the T2DM group, poor outcomes were also linked to a higher time above range (TAR) (13.39% vs. 2.5%, P = 0.0001). The LGA subgroup exhibited an elevated TAR (15.2%) compared to those with normal outcomes.

Conclusion
Pregnant women with T2DM exhibit higher glycemic variability compared to healthy pregnant women. A MAGE >55 mg/dL was associated with adverse fetal outcomes, and elevated TAR significantly influenced these outcomes. (Author)

2025-01474

Association between pre-gestational diabetes in women with polycystic ovary syndrome and adverse obstetric outcomes. Hincapie MA, Badeghiesh A, Baghlaf H, et al (2025), European Journal of Obstetrics & Gynecology and Reproductive Biology vol 304, January 2025, pp 109-114

Objective
To evaluate the effect of pregestational diabetes mellitus (DM) on the likelihood of experiencing adverse pregnancy, delivery, and neonatal outcomes in pregnant women with polycystic ovary syndrome (PCOS).

Study design
A retrospective population-based study using data from the Healthcare Cost and Utilization Project Nationwide Inpatient Sample (HCUP-NIS) database was performed. All deliveries between 2004 and 2014, inclusively, were studied using ICD-9 codes. Within the study period, 14,882 women had a diagnosis of PCOS, of which 673 (4.7%) had a diagnosis of pregestational diabetes. Chi-squared tests were used for comparison of demographics. Multivariate logistic regression analysis was performed to calculate unadjusted and adjusted odds ratios (aORs) and corresponding 95% confidence intervals (CI), controlling for confounding effects. IRB approval was not required, given data was anonymous and publicly available.
Results
Women with PCOS and pre-gestational DM were more likely to develop pregnancy complications, including pregnancy induced hypertension (aOR 1.55; CI 1.25–1.92), preeclampsia (aOR 1.45; CI 1.04–2.02), preeclampsia or eclampsia superimposed on pre-existing hypertension (aOR 1.85; CI 1.29–2.66), and placenta previa (aOR 2.53; CI 1.06–6.01), after controlling for confounding demographics. Women with PCOS who had pregestational diabetes were at increased risk of preterm delivery (aOR 1.40; CI 1.09–1.80), and delivery by cesarean section (aOR 1.50; CI 1.23–1.84). Results demonstrated no difference in the rate of women who gave birth to small for gestational age (SGA) infants, the rate of intrauterine fetal demises (IUFD), and the rate of infants with congenital anomalies between the two groups.
Conclusion
The impact of pre-existing DM on the relationship between PCOS and pregnancy outcomes should be considered when counselling and planning care for pregnant women affected by these conditions. This emphasizes the importance of optimal perinatal care in diabetic women with PCOS as they are at higher risk of obstetric complications. (Author)

2025-01450

Correlation of sonographically measured fetal abdominal wall thickness with birth weight in diabetes. Rauh M, Voigt M, Kappelmeyer M, et al (2024), European Journal of Obstetrics & Gynecology and Reproductive Biology vol 303, December 2024, pp 9-14

Objective
To determine the association between sonographically measured abdominal wall thickness (AWT) and birth weight of fetuses of pregnant women with diabetes.
Methods
This retrospective study included 185 pregnant women who presented to a level I perinatal centre between January 2021 and December 2022. All mothers had diabetes, and were divided into the following subgroups: diet-controlled gestational diabetes mellitus; insulin-dependent gestational diabetes mellitus; type 1 diabetes mellitus; and type 2 diabetes mellitus. At the time of admission, gestational age varied between 29 + 2 and 41 + 2 weeks (+days) of gestation. Weight estimation was performed routinely using the Hadlock I formula. Fetal AWT was determined retrospectively at the same axial level as used for the measurement of abdominal circumference. Only women with a sonographic fetal weight estimation within 5 days before delivery were included.
Results
For the whole cohort, a moderate positive correlation was found between fetal AWT and estimated fetal weight ($r = 0.411$, $p < 0.001$), a moderate correlation was found between fetal AWT and birth weight ($r = 0.493$, $p < 0.001$), a weak correlation was found between fetal AWT and body length ($r = 0.365$, $p < 0.001$), and a weak correlation was found between fetal AWT and body length percentile ($r = 0.276$, $p < 0.001$). No strong differences in parameters were found between the diabetes subgroups. Receiver operating characteristic (ROC) curve analysis was performed to identify newborns with birth weight > 4000 g (macrosomia) and birth weight > 90th percentile according to Voigt in the group with gestational age > 37 weeks. ROC curve analysis was performed to identify newborns with birth weight > 90th percentile in the whole cohort. AWT and sonographically estimated fetal weight were included in the calculation. The combination of AWT and estimated fetal weight only led to a marginal improvement compared with estimated fetal weight alone for predicting newborns with birth weight > 4000 g in the group with gestational age > 37 weeks [area under the curve (AUC) 0.857 vs 0.871], and for predicting newborns with birth weight > 90th percentile in the group with gestational age > 37 weeks (AUC 0.840 vs 0.846) and in the whole cohort (AUC 0.816 vs 0.826).
Conclusion
A sonographically measured AWT of 7.1 mm in fetuses of diabetic mothers is predictive of birth weight > 90th percentile with sensitivity of 61 %, specificity of 85 %, and AUC of 0.748. ROC curve analysis showed that estimated fetal weight determined by ultrasound (using Hadlock formula I) seems to be slightly superior for the identification of macrosomic fetuses with birth weight > 90th percentile. A threshold value for estimated fetal weight of 3774 g had sensitivity of 70 %, specificity of 86 %, and AUC of 0.816. The combination of AWT and estimated fetal weight in a single formula only yielded a marginal improvement in accuracy compared with the use of estimated fetal weight alone.

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(Author)
Full URL: https://doi.org/10.1016/j.ejogrb.2024.10.003

2025-01391

Factors associated with reported low-dose aspirin use and its association with adverse outcomes: secondary analysis of the Medical Optimization of Management of Overt Type 2 Diabetes in Pregnancy (MOMPOD) Study. Pullins MJ, Boggess KA, Battarbee AN (2025), American Journal of Obstetrics & Gynecology MFM vol 7, no 4, April 2025, 101622

Preeclampsia is a leading cause of perinatal morbidity/mortality. Preexisting diabetes is a risk factor for preeclampsia. In patients at moderate to high-risk for preeclampsia, low-dose aspirin (LDASA), typically defined as 81 mg, initiated between 12 and 16 weeks, reduces preeclampsia risk by 10-25%. There are limited data on uptake and preeclampsia risk reduction among pregnant individuals with preexisting type 2 diabetes, although some studies report aspirin resistance in those with underlying diabetes, suggesting lower efficacy. Thus, the primary objectives of this analysis were to evaluate maternal factors associated with LDASA use among pregnant patients with preexisting type 2 diabetes and to estimate the association between reported LDASA use and preeclampsia and other adverse perinatal outcomes. (Author)

2025-01211

Outcomes for women with diabetes admitted for labour care to midwifery units in the UK: a national prospective cohort study and survey of practice using the UK Midwifery Study System (UKMidSS). Morelli A, Smith L, Karia A, et al (2024), BMJ Open vol 14, no 12, December 2024, e087161

Objectives To describe outcomes in women admitted for labour care to midwifery units with gestational or pre-existing diabetes, compare outcomes with other women admitted to the same units and describe admission and care guidance in midwifery units typically admitting women with diabetes.

Design A national cohort study and a survey of practice.

Setting We used the UK Midwifery Study System to collect data from midwifery units in the UK between October 2021 and February 2023.

Participants Women with a diagnosis of diabetes admitted for labour care to a midwifery unit were compared with a cohort of women without diabetes admitted for labour care to the same units.

Primary and secondary outcome measures The primary outcome was a composite measure of maternal outcome reflecting the need for obstetric care (one or more of augmentation, instrumental birth, caesarean birth, maternal blood transfusion, third or fourth-degree perineal tear, maternal admission to higher level care). We also investigated a number of secondary maternal and neonatal outcomes.

Results Overall, 420 (0.7% (95% CI 0.67% to 0.82%) of the 56 648 women admitted to midwifery units in the study period were recorded as having diabetes, most (84%) with diet-controlled gestational diabetes. Women with diabetes were no more likely than comparison women to experience the composite primary outcome (18.7% vs 20.7%, adjusted relative risk=1.31, 95% CI 0.96 to 1.80). We found no statistically significant differences between the two groups for the secondary maternal and neonatal outcomes investigated: augmentation, postpartum haemorrhage >1.5 L, shoulder dystocia, maternal blood transfusion and maternal admission for higher level care, Apgar <7 at 5 min, initiation of breast feeding and neonatal unit admission.

Conclusions The findings of this study provide evidence that selected women with well-controlled gestational diabetes may safely plan birth in midwifery units on the same site as obstetric and neonatal services. With clear admission criteria and careful care planning, access to a midwifery unit provides an opportunity to increase choice, reduce intervention and improve outcomes for these women. (Author)
Full URL: https://doi.org/10.1136/bmjopen-2024-087161

2025-01039

Exploring the experiences of women and people with diabetes in pregnancy in metropolitan and rural Australia: a national survey. Payne E, Heaney S, Collins C, et al (2025), BMC Pregnancy and Childbirth vol 25, no 16, January 2025

Background

Women and people diagnosed with diabetes in pregnancy, are recommended to have frequent monitoring and careful management for optimal pregnancy outcomes. This health care management should be supported by a multidisciplinary healthcare team. For individuals living in rural areas, there are increased barriers to healthcare access, with subsequent worse health outcomes compared to those in metropolitan regions. Despite this, there remains a lack of research into the experiences of healthcare delivery for rural women and people with diabetes in pregnancy.

Methods
Survey invitations were sent via the National Diabetes Services Scheme email list. The survey included multiple choice and open-ended questions. Responses from the open-ended question asking participants the changes they would want made to their care delivery were interpreted using qualitative content analysis. Responses were separated into metropolitan and rural categories using the Modified Monash Model criteria.

Results
There were 668 survey responses, with 409 responding to the open-ended qualitative survey question/s. 71.6% of respondents were metropolitan and 27.6% lived rurally. A total of 31 codes were established from the open-ended responses, with the five overarching themes of 'quality of care', 'practice & communication', 'individual's experience', 'access' and 'burden of care' identified. The most frequently occurring codes irrespective of location included education or information (n = 45), frequency and timeliness of care (n = 42), no changes (n = 42) and improved health professional communication (n = 40). Local care options was the only code with more rural quotes compared to metropolitan.

Conclusions
The most frequently occurring codes had strong representation from metropolitan and rural respondents, indicating that those with previous diabetes in pregnancy had similar priorities for changes in their healthcare delivery regardless of location. Rural respondents identifying local care options as a priority for change is likely indicative of the rural healthcare landscape with limited access to care options. Recommendations from this study supported by previous research include focusing on improving health professional communication both with women and people with diabetes in pregnancy and with other relevant professionals. Recommendations for rural locations should focus on improving local care options whilst considering resource limitation, such as telehealth clinics. (Author)
Full URL: https://doi.org/10.1186/s12884-024-07093-8

2025-00881

Pregnancy outcomes in type 2 diabetes: a systematic review and meta-analysis. Clement NS, Abul A, Farrelly R, et al (2025), American Journal of Obstetrics & Gynecology (AJOG) vol 232, no 4, April 2025, pp 354-366

Objective
Type 2 diabetes (T2D) now accounts for the majority of pre-existing diabetes affecting pregnancy in the UK. Our aim was to determine its impact on pregnancy outcomes compared to type 1 diabetes (T1D), gestational diabetes (GDM), and nondiabetes pregnancies.

Data Sources
PubMed was searched 1 January 2009 to 2024.

Study Eligibility Criteria
Cohort observational studies reporting original data on at least one of the primary outcomes in ten or more T2D pregnancies were eligible for inclusion. Comparative diabetes and nondiabetes pregnancies were also collected.

Methods
Primary outcomes included congenital anomalies, stillbirths, neonatal and perinatal mortality, birthweight, rates of large for gestational age (LGA), small for gestational age (SGA), and macrosomia. PROSPERO ID CRD42023411057.

Results
Forty seven studies were analyzed. The number of pregnancies in each analysis varied depending on the available data from the outcome being analyzed but ranged from 723 to 4,469,053 pregnancies. When compared with T1D pregnancies, T2D were more likely to have SGA babies as well as greater neonatal and perinatal mortality (OR 2.29, 95% CI 1.12–4.67; OR 1.53 95% CI 1.20–1.94, and OR 1.31 95% CI 1.07–1.61, respectively). When compared with GDM, T2D were more likely to have babies with congenital anomalies (OR 1.91, 95% CI 1.04–3.50), LGA (OR 3.49, 95% CI 2.49–4.89), neonatal mortality (OR 3.96, 95% CI 3.38–4.64), and stillbirth (OR 16.55, 95% CI 5.69–48.11). In comparison to nondiabetic pregnancy, T2D were more likely to have babies with congenital anomalies (OR 1.76, 95% CI 1.11–2.79), LGA (OR 2.79, 95% CI 1.93–4.04), perinatal mortality (OR 4.18, 95% CI 2.91–6.01), and stillbirth (OR 7.27, 95% CI

3.01–17.53).

Conclusion

T2D pregnancies are associated with a greater perinatal mortality than other forms of diabetes in pregnancy. Given its increasing prevenance, greater awareness of the adverse pregnancy outcomes associated with T2D is needed, by both healthcare providers and policy makers, to improve care. (Author)

Full URL: https://doi.org/10.1016/j.ajog.2024.11.026

2025-00859

The Impact of Pregestational Diabetes on Maternal Morbidity and Mortality: Trends, Challenges, and Future Directions. Murrin EM, Saad AF, Sullivan S, et al (2024), American Journal of Perinatology vol 42, no 13, October 2025, pp 1671-1680

Maternal mortality in the United States is on the rise, demonstrating a concerning trend that stands in stark contrast to the falling rates in other developed countries. A key challenge facing the improvement of maternal care is the mounting prevalence of chronic health conditions such as hypertension and diabetes, which are often linked to poor diet and sedentary lifestyle. Pregestational diabetes now impacts 1 to 2% of pregnancies, while gestational diabetes affects another 7.8%. Both type 1 and type 2 diabetes elevate the risk of severe maternal morbidity and mortality (SMM), including severe cardiac morbidity, hypertensive disorders of pregnancy, hemorrhage, infection, and mental health conditions. The increase in diabetes is thought to account for 17% of the increase in maternal mortality between 1997 and 2012. Another critical issue facing maternal care is the significant disparity in pregnancy outcomes among populations facing greater burdens of adverse social determinants of health, including socioeconomic characteristics, chronic stress, and systemic racism. For example, non-Hispanic Black women are 2.5 times more likely to die during pregnancy and the postpartum period than non-Hispanic White women. Vulnerable populations, often minorities, are also more likely to develop risk factors for SMM, such as type 2 diabetes. As pregestational diabetes is a particularly morbid condition in pregnancy, examining its complications and evidence-based treatments could significantly impact both maternal mortality rates and disparities in pregnancy outcomes in the United States. This review explores the relationship between pregestational diabetes and SMM, how the risk of SMM can be modified by disparities, and avenues for advancing care through future research.

Key Points

Diabetes during pregnancy greatly increases the risk of SMM.

Comprehensive care can improve outcomes in high-risk pregnancies with diabetes.

Adverse social determinants of health worsen outcomes in pregnancies affected by diabetes.

Improving diabetes care in pregnancy offers an opportunity to enhance maternal outcomes. (Author)

2025-00850

A Queen City Legacy: 45 Years of Research in Pregnant Women with Insulin-Dependent Diabetes Mellitus, The Diabetes in Pregnancy Program Project Grant. Khoury JC, Miodovnik M, Mimouni FB, et al (2025), American Journal of Perinatology vol 42, no 13, October 2025, pp 1681-1703

The Diabetes in Pregnancy Program Project Grant (PPG) was a 15-year program focused on enhancing the care for women with insulin-dependent diabetes mellitus (IDDM) during pregnancy and improving the well-being of their offspring. Launched in July 1978 at the University of Cincinnati, the PPG pursued a multifaceted research agenda encompassing basic science, animal and placental studies, and maternal and neonatal clinical trials to understand the physiological and pathophysiological aspects of IDDM during pregnancy. A total of 402 singleton pregnancies in 259 women with IDDM were enrolled prior to 10 weeks gestation over the 15-year period. Of the 402 pregnancies, there were 295 live births, 1 stillbirth, 4 neonatal deaths, and 15 infants were born with major congenital malformations. Central to the program's methodology was the management of diabetes during pregnancy, involving intensive insulin therapy and meticulous monitoring using the cutting-edge technology of the time to achieve glycemic control. The extensive research of the PPG yielded profound insights into the effects of maternal diabetes on embryonic and fetal development and neonatal health. Through animal studies, notably using pregnant sheep, the program clarified the mechanisms of fetal hypoxia and metabolic disorders. Clinical trials underscored the significance of early glycemic control in mitigating the risks of spontaneous abortions, congenital malformations, and neonatal complications. The program also examined the influence of pregnancy on the progression of microvascular diseases, the role of maternal

weight and weight gain in pregnancy outcomes, and the distinctive growth patterns of fetuses in IDDM pregnancies. Furthermore, the PPG probed the incidence and underlying mechanisms of hypoglycemia during pregnancy and the heightened risk of obstetric complications in IDDM patients. Our findings established a foundation of knowledge to aid clinicians, researchers, and health care providers in best practices and ensure a lasting impact on the care of pregnant women with pregestational diabetes.

Key Points

Prepregnancy management reduces maternal, fetal, and neonatal complications in IDDM.

Strict glycemic control improves many pregnancy outcomes in IDDM.

Fetal glycemic exposure may have lifelong effects. (Author)

2025-00845

Is Pregnancy a Risk Factor for Progression of Diabetic Retinopathy and Nephropathy in Type 1 Diabetes? A Matched Cohort Study. Mimouni F, Khoury JC, Ehrlich S, et al (2025), American Journal of Perinatology vol 42, no 10, July 2025, pp 1304-1310

Objective This study aimed to test the hypothesis that the development or deterioration of nephropathy and retinopathy over time is not affected by pregnancy in women with pregestational type 1 diabetes mellitus (T1DM).

Study design Prospective, observational study of nephropathy and retinopathy follow-up during pregnancy and in a subsequent period of 2 years in a group of pregnant women with T1DM (study group) that we compared with pair-matched non-pregnant women with T1DM (control group) who underwent similar intensive follow-up.

Results The rate of renal microvascular complications was similar at entry, 17.4% (4/23) in the study group and 21.7% (5/23) in the control group. At the last visit, both groups had nephropathy rates of 17.4% (4/23) and paired p-value of 1.00. Similarly, the rate of retinal microvascular complications of any grade was similar in both groups and remained so at the last follow-up examination.

Conclusion Pregnancy per se does not appear to increase the risk for the development of, or the acceleration of the progression of retinopathy and nephropathy during a follow-up of at least 2 years in relatively healthy T1DM patients. This information is important for counseling young women with T1DM who are considering becoming pregnant.

Key Points

Retinopathy and nephropathy are major complications of T1DM.

Pregnancy per se does not appear to cause major microvascular complications in T1DM.

Pregnancy per se does not appear to aggravate retinopathy in T1DM. (Author)

2025-00836

Relationship between Intrapartum Continuous Glucose Monitoring Values and Neonatal Hypoglycemia in Individuals with Diabetes. Fishel Bartal M, Nazeer SA, Ashby Cornthwaite J, et al (2025), American Journal of Perinatology vol 42, no 10, July 2025, pp 1344-1353

Objective We aimed to evaluate the relationship between intrapartum continuous glucose monitoring (CGM) and neonatal hypoglycemia (NH) in individuals with diabetes.

Study Design a multicenter prospective study (November 2021–December 2022) of laboring individuals with pregestational or gestational diabetes at ≥34 weeks. Cohorts had a blinded CGM placed from admission through delivery and were monitored with fingerstick (FS) according to usual care. The primary outcome was NH. Secondary neonatal outcomes included neonatal intensive care unit (NICU) length of stay, need for intravenous (IV) glucose therapy, hyperbilirubinemia, respiratory distress, or respiratory distress syndrome. Time in the target range (TIR; range 70–110 mg/dL) and time above the target range (TAR; >110 mg/dL) were expressed as a percentage of all CGM readings, and mean glucose was obtained. Youden index was used to choose the cut point for TAR and prediction of

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NH.

Results Of 9,479 deliveries during the study period, 202 (2.1%) met the inclusion criteria, and 112 (56%) participants were enrolled (n = 7 did not have available CGM data). Of the study participants, 45 (40%) had pregestational diabetes, and 67 (60%) had gestational diabetes. The mean glucose in labor using a CGM was 102.6 mg/dL (interquartile range [IQR]:89.9, 113.5 mg/dL), and the average percentage of TIR was 62.1% (IQR, 36.9, 85.6). CGM and FS were poor predictors of NH, with no differences in area under the curve (AUC) of mean glucose as a predictor (0.64, 95% CI: 0.48–0.23 vs. 0.53, 95% CI: 0.4–0.6, respectively). The best cut-off for the prediction of NH was a TAR of 61%, with 23% (n = 24) being above the threshold. The rate of NH for TAR >61% versus ≤61% was 45.8 versus 25.9% (p = 0.06). Neonates born to individuals with TAR >61% were more likely to require continuous positive airway pressure after delivery and had a higher cord c-peptide level.

Conclusion In this prospective study of laboring individuals with diabetes, intrapartum CGM TAR was associated with a higher rate of NH.

Key Points

CGM use in labor is feasible with a complete glucose profile in the various stages of labor.

Best cut-off for predicting NH was a time above range (≥110 mg/dl) of >61%.

CGM and FS were poor predictors of NH. (Author)

2025-00448

Prevalence of diabetes in pregnancy and microvascular complications in native Indonesian women: The Jogjakarta diabetic retinopathy initiatives in pregnancy (Jog-DRIP). Widyaputri F, Lim LL, Utami TP, et al (2022), PLoS ONE vol 17, no 6, June 2022, e0267663

Objectives

To report the prevalence of total diabetes in pregnancy (TDP) and diabetes-related microvascular complications among Indonesian pregnant women.

Methods

We conducted a community-based cross-sectional study with multi-stage, cluster random sampling to select the participating community health centers (CHC) in Jogjakarta, Indonesia between July 2018-November 2019. All pregnant women in any trimester of pregnancy within the designated CHC catchment area were recruited. Capillary fasting blood glucose (FBG) and blood glucose (BG) at 1-hour (1-h), and 2-hour (2-h) post oral glucose tolerance test (OGTT) were measured. TDP was defined as the presence of pre-existing diabetes or diabetes in pregnancy (FBG ≥7.0 mmol/L, or 2-h OGTT ≥11.1 mmol/L, or random BG ≥11.1 mmol/L with diabetes symptoms). Disc and macula-centered retinal photographs were captured to assess diabetic retinopathy (DR). Blood pressure, HbA1c and serum creatinine levels were also measured.

Results

A total of 631/664 (95%) eligible pregnant women were included. The median age was 29 (IQR 26–34) years. The prevalence of TDP was 1.1% (95%CI 0.5, 2.3). It was more common in women with chronic hypertension (p = 0.028) and a family history of diabetes (p = 0.015). Among the TDP group, 71% had a high HbA1c, but no DR nor nephropathy were observed.

Conclusions

Although a very low prevalence of TDP and no diabetes-related microvascular complications were documented in this population, there is still a need for a screening program for diabetes in pregnancy. Once diabetes has been identified, appropriate management can then be provided to prevent adverse outcomes. (Author)

Full URL: https://doi.org/10.1371/journal.pone.0267663

2025-00422

Gestational age, birth weight, and perinatal complications in mothers with diabetes and impaired glucose tolerance: Japan Environment and Children's Study cohort. Yokomichi H, Mochizuki M, Shinohara R, et al (2022), PLoS ONE vol 17, no 6,

June 2022, e0269610

We aimed to determine the risk of perinatal complications during delivery in mothers with non-normal glucose tolerance in a large Japanese birth cohort. We analysed data of 24,295 neonate–mother pairs in the Japan Environment and Children's Study cohort between 2011 and 2014. We included 67 mothers with type 1 diabetes, 102 with type 2 diabetes (determined by questionnaire), 2,045 with gestational diabetes (determined by diagnosis), and 2,949 with plasma glucose levels ≥140 mg/dL (shown by a screening test for gestational diabetes). Gestational age, birth weight, placental weight, and proportions of preterm birth, and labour and neonatal complications at delivery in mothers with diabetes were compared with those in mothers with normal glucose tolerance. Mean gestational age was shorter in mothers with any type of diabetes than in mothers without diabetes. Birth weight tended to be heavier in mothers with type 1 diabetes, and placental weight was significantly heavier in mothers with type 1 and gestational diabetes and elevated plasma glucose levels (all $p<0.05$). The relative risks of any labour complication and any neonatal complication were 1.49 and 2.28 in type 2 diabetes, 1.59 and 1.95 in gestational diabetes, and 1.22 and 1.30 in a positive screening test result (all $p<0.05$). The relative risks of preterm birth, gestational hypertension, and neonatal jaundice were significantly higher in mothers with types 1 (2.77; 4.07; 2.04) and 2 diabetes (2.65; 5.84; 1.99) and a positive screening test result (1.29; 1.63; 1.12) than in those without diabetes (all $p<0.05$). In conclusion, placental weight is heavier in mothers with non-normal glucose tolerance. Preterm birth, gestational hypertension, and jaundice are more frequent in mothers with types 1 and 2 diabetes. A positive result in a screening test for gestational diabetes suggests not only a non-normal glucose tolerance, but also a medium (middle-level) risk of perinatal complications. (Author)

Full URL: https://doi.org/10.1371/journal.pone.0269610

2025-00401

Challenging the American College of Obstetricians and Gynecologists' Clinical Practice Update on Screening for Pre-existing Diabetes and Early Gestational Diabetes. Heyborne KD, Barbour LA (2025), Obstetrics & Gynecology vol 145, no 1, January 2025, pp 31-38

A recent American College of Obstetricians and Gynecologists Clinical Practice Update continues to recommend targeted (as opposed to universal) screening for pregestational diabetes, no longer recommends screening for early gestational diabetes mellitus (GDM), and provides updated guidelines for immediate postpartum testing for diabetes in patients with GDM. Here, we present data that the targeted screening paradigm, which has repeatedly been shown to fail in practice because of its complexity, no longer makes sense in the context of the high and rising prevalence of diabetes and diabetic risk factors, and we argue that the time has come for universal early pregnancy screening for pregestational diabetes. Furthermore, the recommendation against early screening for GDM is based on 2021 U.S. Preventive Services Task Force guidance, which in turn is based almost entirely on a single underpowered study that excluded individuals at highest risk and does not account for more recent research showing benefits of early diagnosis and treatment. Universal early pregnancy screening for pregestational diabetes may also help to identify patients at risk who will benefit from early GDM diagnosis and treatment and may provide rationale for prioritizing postpartum diabetes testing. (Author)

2025-00377

Glycemic Control and Risk of Congenital Malformations in Women With Type 1 Diabetes. Thorius IH, Petersen J, Husemoen LLN, et al (2024), Obsterics & Gynecology vol 144, no 5, November 2024, pp 725-732

OBJECTIVE:

To investigate the association between maternal glycemic control and the risk of congenital malformations in offspring of women with type 1 diabetes and to examine whether there is a hemoglobin A1C (Hb A1C) threshold value at which the risk for malformations increases significantly.

METHODS:

Analyses were performed on data from a multinational, observational cohort of 1,908 liveborn offspring of women with type 1 diabetes recruited in early pregnancy from 17 countries between 2013 and 2018. Offspring with malformations were identified according to European Surveillance of Congenital Anomalies version 1.4 and categorized as having one or more major malformations or minor malformations exclusively. The association between first-trimester Hb A1C levels and the risk of congenital malformations was investigated with splines in crude and adjusted logistic regression models.

RESULTS:

In total, 11.9% of the offspring (n=227) of women with type 1 diabetes had congenital malformations, including 2.1%

(n=40) with at least one severe malformation. Women giving birth to offspring with malformations had a higher prevalence of psychiatric disorders (13.2% vs 7.2%, P<.01), thyroid disorders (33.0% vs 26.7%, P<.05), and folic acid supplementation (87.1% vs 77.7%, P<.01). The Hb A1C levels in the first trimester were similar (median 6.8% [interquartile range 6.3–7.6%] vs 6.7% [6.2–7.6%], P=.13) compared with women giving birth to offspring without malformations. The spline analysis illustrated a curvilinear association between Hb A1C levels and the risk of malformations with no clear threshold values. Higher first-trimester Hb A1C levels were associated with an increased risk of malformations (crude odds ratio [OR] 1.13, 95% CI, 1.01–1.27, adjusted odds ratio [aOR] 1.29, 95% CI, 1.10–1.51) and major malformations (crude OR 1.49, 95% CI, 1.23–1.81, aOR 1.57, 95% CI, 1.15–2.09).

CONCLUSION:
An increased risk for congenital malformations was curvilinearly associated with higher Hb A1C levels in early pregnancy among women with type 1 diabetes without any threshold values identified.

CLINICAL TRIAL REGISTRATION:
ClinicalTrials.gov, NCT01892319. (Author)

2024-14732

Hypoglycemia in Pregnant Women with Type 1 Diabetes: Is It Inevitable?. Rosenn BM, Khoury JC, Mimouni F, et al (2025), American Journal of Perinatology vol 42, no 11, August 2025, pp 1381-1388

The human body has abundant mechanisms to counteract hypoglycemia and prevent neuroglycopenia primarily involving the secretion of glucagon and adrenalin. Within several years from the onset of diabetes, people with type 1 diabetes lose their ability to mount a counterregulatory response to hypoglycemia and develop hypoglycemia unawareness, thus being at risk for deteriorating to a state of severe hypoglycemia and neuroglycopenia. Pregnant individuals with type 1 diabetes are particularly prone to experience severe hypoglycemia during the first half of pregnancy. This may be not only due to the institution of strict glycemic control and the nausea and vomiting prevalent during the early months of pregnancy, but also because the counterregulatory responses are further diminished during pregnancy. Severe hypoglycemia during early pregnancy does not appear to increase the risks of spontaneous abortion or congenital fetal malformations, but the potential long-term effects on the fetus are unknown. Recent technological advances have contributed to improved glycemic control and time in range as well as decreased risk of hypoglycemia in people with diabetes. These advances include treatment with insulin analogs, use of continuous glucose monitors, and closed-loop systems for administration of insulin. Limited studies have demonstrated that pregnant individuals with type 1 diabetes may also benefit from these modalities. While ongoing research continues to explore the adjustment of closed-loop systems for optimal use during pregnancy, more effort is needed to explore the optimal use of these modalities in pregnancy.

Key Points

People with type 1 diabetes have diminished counterregulatory responses to hypoglycemia and frequently develop hypoglycemia unawareness.

Pregnant individuals with type 1 diabetes are at increased risk for severe hypoglycemia particularly during the first half of pregnancy.

Use of insulin analogs and newer technologies for insulin administration may lower the risk of hypoglycemia in pregnant individuals with type 1 diabetes. (Author)

2024-14729

Satisfaction with Continuous Glucose Monitoring in Pregnant Patients with Type 1 and Type 2 Diabetes. Shrestha KS, Battarbee AN (2025), American Journal of Perinatology vol 42, no 10, July 2025, pp 1362-1365

Objective Continuous glucose monitoring (CGM) improves pregnancy outcomes in type 1 diabetes. Given the rapid uptake of CGM in pregnancies complicated by both type 1 and type 2 diabetes, our objective was to determine if CGM satisfaction and use differed between type 1 and type 2 diabetes.

Study Design Cross-sectional survey study of 100 patients with pregestational diabetes who used Dexcom G6 CGM during pregnancy and received prenatal care at a single tertiary care center. Participants completed the validated 15-question Glucose Monitoring Satisfaction Survey (GMSS) and other questions about CGM use. The primary outcome

was high satisfaction with CGM, defined as a total GMSS score of 4 or greater. Secondary outcomes included GMSS subscales, frequency of CGM app use, and CGM features used. Outcomes were compared between type 1 and type 2 diabetes, and logistic and ordinal regression estimated the association between type 2 diabetes and outcomes.

Results Of 100 surveyed patients, 45 had type 1 and 55 had type 2 diabetes. Patients with type 1 diabetes were more likely to use CGM before pregnancy and use an insulin pump. CGM satisfaction did not differ between type 1 and type 2 diabetes (74.5 vs. 56.6%; adjusted odds ratio [aOR] = 0.54, 95% [confidence interval] CI: 0.21–1.36). High openness, low behavioral burden, low emotional burden, and high worthwhileness also did not differ between groups after adjustment for CGM use before pregnancy. Reported CGM app use was high and did not differ between groups. Patients with type 2 diabetes were less likely to use arrows and/or graphs on the CGM app compared to type 1 diabetes.

Conclusion In this cohort, patients with type 2 diabetes appear to be similarly satisfied with CGM compared to those with type 1 diabetes. Future efforts focused on CGM education for new users may help increase the use of CGM app features, maximize satisfaction, and minimize technology burden.

Key Points

CGM satisfaction was similar between pregnant patients with type 1 and type 2 diabetes.

Patients with both diabetes types thought that CGM was worthwhile and of low burden during pregnancy.

Patients with type 2 diabetes were less likely to report using CGM features during pregnancy. (Author)

2024-14722

Exploring the relationship between maternal Continuous Glucose Monitoring "time in range" and fetal abdominal circumference in pregnant women with Type 1 Diabetes. Woon L, Glyn T, Gorelik A, et al (2024), Journal of Maternal-Fetal and Neonatal Medicine vol 37, no 1, 2024, 2428391

Background

To explore the relationship between maternal glycaemic control and fetal abdominal circumference in pregnancies complicated by T1D.

Methods

This is a retrospective cohort study of 81 pregnant women with T1D using CGM. Inclusion criteria were T1D, CGM use, ≥2 in-house ultrasounds, and the birth of a live singleton neonate between 1st December 2019 and 1st December 2022. Linear regression analysis was used to assess the cross-sectional relationships between estimated fetal abdominal circumference (AC) on ultrasound and time in range (TIR) at matched time-points in the third trimester of pregnancy. Linear regression analysis was also used to examine whether first trimester TIR and HbA1c predicts third trimester fetal AC.

Results

At baseline, the mean ± standard deviation (SD) of the first trimester HbA1c was 7.0 ± 1.4% and mean ± SD total daily dose (TDD) insulin was 46.6 ± 21.0 units. The mean ± SD birthweight was 3367.0 ± 861.3 grams. There was no cross-sectional relationship between TIR and fetal AC at 28-, 32- or 36-week' gestation. The results of the regression analysis indicate a significant relationship between first trimester TIR (independent predictor) and fetal AC (dependent variable) at 32- and 36-weeks' gestation while controlling for maternal age, BMI, pump use, and TDD insulin (Adjβ= −0.42, 95%CI −0.80 to −0.03 and Adjβ = −0.57, 95%CI −1.02 to −0.12 at 32- and 36-weeks respectively). Although there was a significant relationship between first trimester HbA1c and fetal AC at 32-weeks' gestation (β = 3.81, 95%CI 0.29 to 7.33), the relationship was not significant after adjustment for confounders.

Conclusions

There was no cross-sectional relationship between TIR and fetal AC in the third trimester of pregnancy but first trimester TIR did predict fetal AC in late pregnancy. (Author)

Full URL: https://doi.org/10.1080/14767058.2024.2428391

2024-14314

A guide to managing diabetes medication during pregnancy. Blake M (2024), Medical News Today 10 December 2024

Looks at the different medications available for the management of pre-exisiting diabetes in pregnancy and gestational diabetes. States that insulin is often considered the safest option during pregnancy because it does not cross the placenta. Acknowledges that some oral medications, like metformin, may be safe, but others may need replacing. (Author, edited)

Full URL: https://www.medicalnewstoday.com/articles/diabetes-in-pregnancy-medication?slot_pos=article_3&utm_source=Sailthru%20Email&utm_medium=Email&utm_campaign=MNT%20Daily%20News&utm_content=2024-12-11&apid=&rvid=0ed62c4ea77d8ecdf2ab839e181ba2f04874f5148781ac73afcf67fb282f01c3

2024-14247

Management of diabetes in pregnancy. Scottish Intercollegiate Guidelines Network (2024), Scottish Intercollegiate Guidelines Network, Edinburgh, SIGN 171, May 2024. 70 pages

In Scotland, around 1 in 175 pregnancies is complicated by pre-existing diabetes, of which around 70% are type 1 diabetes mellitus (T1DM) and 30% are type 2 diabetes mellitus (T2DM). Up to 11% of pregnancies may be complicated by incident GDM and early screening may detect up to 3% of women with likely undiagnosed diabetes in early pregnancy.

The guideline provides recommendations on:
preconception care in women with known pre-existing diabetes,
antenatal care for all women with diabetes in pregnancy,
risk factors, diagnosis and treatment of GDM, and
detecting glucose intolerance after pregnancy.
Other than in the specific context of management of women with GDM, prevention or remission of type 2 diabetes is not included in the remit of this guideline. These, and further issues are covered by SIGN 172: Prevention, early recognition and treatment, and remission of type 2 diabetes. (Author)

Full URL: https://www.sign.ac.uk/media/2205/sign-171-management-of-diabetes-in-pregnancy.pdf

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2024-13770

Maternal diabetes independent of BMI is associated with altered accretion of adipose tissue in large for gestational age fetuses. Lam P, Mein BJ, Benzie RJ, et al (2022), PLoS ONE vol 17, no 5, May 2022, e0268972

Aim

To analyse the effects of maternal diabetes mellitus (DM) and body mass Index (BMI) on central and peripheral fat accretion of large for gestational age (LGA) offspring.

Methods

This retrospective study included LGA fetuses (n = 595) with ultrasound scans at early (19.23 ± 0.68 weeks), mid (28.98 ± 1.62 weeks) and late (36.20 ± 1.59 weeks) stages of adipogenesis and measured abdominal (AFT) and mid-thigh (TFT) fat as surrogates for central and peripheral adiposity. Women were categorised according to BMI and DM status [pre-gestational (P-DM; n = 59), insulin managed (I-GDM; n = 132) and diet managed gestational diabetes (D-GDM; n = 29)]. Analysis of variance and linear regressions were applied.

Results

AFT and TFT did not differ significantly between BMI categories (normal, overweight and obese). In contrast, AFT was significantly higher in pregnancies affected by D-GDM compared to non-DM pregnancies from mid stage (0.44 mm difference, $p = 0.002$) and for all DM categories in late stage of adipogenesis (≥ 0.49 mm difference, $p < 0.008$). Late stage TFT accretion was higher than controls for P-DM and I-GDM but not for D-GDM (0.67 mm difference, $p < 0.001$; 0.49 mm difference, $p = 0.001$, 0.56 mm difference, $p = 0.22$ respectively). In comparison to the early non-DM group with an AFT to TFT ratio of 1.07, the I-GDM group ratio was 1.25 ($p < 0.001$), which normalised by 28 weeks becoming similar to control ratios.

Conclusions

DM, independent of BMI, was associated with higher abdominal and mid-thigh fat accretion in fetuses. Use of insulin improved central to peripheral fat ratios in fetuses of GDM mothers. (Author)

Full URL: https://doi.org/10.1371/journal.pone.0268972

2024-13603

Comparison of Ultrasound Findings Associated with Adverse Fetal, Obstetric, and Neonatal Outcomes in Pregestational Type 1 And Type 2 Diabetes: A Systematic Review. Kraus AC, Kucirka LM, Johnson J, et al (2025), American Journal of Perinatology vol 42, no 5, April 2025, pp 630-642

Objective We aimed to summarize the available evidence examining the association between prenatal ultrasound findings and adverse fetal, obstetric, and neonatal outcomes in pregnancies complicated by type 1 diabetes mellitus (T1DM) and type 2 diabetes mellitus (T2DM) and to evaluate whether the predictive value of ultrasound findings for adverse outcomes varies between T1DM and T2DM pregnancies.

Study Design We conducted a systematic review of the existing literature through August 12, 2024. We included articles in English that reported associations between ultrasound findings and fetal, obstetric, and neonatal outcomes in pregnant people with T1DM and T2DM. The primary outcome of interest was stillbirth; secondary outcomes were neonatal demise, neonatal intensive care unit admission, neonatal hypoglycemia, respiratory distress syndrome, polycythemia, hyperbilirubinemia, organomegaly, electrolyte disturbances, shoulder dystocia, permanent brachial plexus injury, cord gas, Apgar scores, large for gestational age (LGA), small for gestational age (SGA), and preterm birth. Two independent reviewers examined articles at the abstract level and, if eligible, at the full-text level; disagreements were adjudicated by a third reviewer.

Results Of the 2,088 unique citations reviewed, 12 studies met the inclusion criteria describing associations between ultrasound findings and fetal, obstetric, and neonatal outcomes among a total of 1,165 pregnant people with T1DM and 489 pregnant people with T2DM. Most studies (10/12) examined the association between ultrasound measures of growth, including estimated fetal weight and its individual components, abdominal wall thickness, head circumference to abdominal circumference ratio, and birth weight, LGA or SGA. Studies did not examine stillbirth, neonatal demise, or maternal outcomes other than cesarean section.

Conclusion This systematic review synthesizes the available literature on ultrasound risk markers of adverse fetal, obstetric, and neonatal outcomes separately in pregnant people with T1DM and T2DM. We identified very few studies that distinguished between pregnant people with T1DM and T2DM, and the majority focused on surrogate outcomes (e.g., LGA, SGA) of morbidity. Our findings highlight the need for further studies investigating these distinct diseases to provide evidence for antenatal management recommendations.

Key Points

This systematic review compares ultrasound risk markers for adverse outcomes in pregnancies with T1DM and T2DM.

Few studies compare ultrasound risk markers for adverse outcomes among pregnancies with T1DM and T2DM.

Additional targeted studies to inform antenatal ultrasound care are necessary. (Author)

2024-13388

Method of insulin delivery does not affect perinatal outcomes with type 1 diabetes mellitus. Sobhani NC, Watson K, Kannan A, et al (2024), American Journal of Obstetrics & Gynecology MFM vol 6, no 10, October 2024, 101462

Although type 1 diabetes (T1D) in pregnancy is associated with significant complications, treatment of hyperglycemia with insulin can improve outcomes. Insulin treatment can be delivered via multiple daily injections (MDI) or via continuous subcutaneous insulin infusions (CSII, i.e., insulin pumps). While CSII have been shown to have some advantages over MDI in the nonpregnant population, whether one method of insulin delivery is superior in the pregnant population is unclear. This study was conducted to compare clinical outcomes among gravidas with T1D who used CSII versus MDI, in a contemporary population accounting for important covariates. (Author)

2024-13135

Maternal hemoglobin A1c and left ventricular hypertrophy in infants of mothers with pre-gestational diabetes. Xu W, Spray BJ, Daily JA, et al (2024), Journal of Maternal-Fetal and Neonatal Medicine vol 37, no 1, 2024, 2407038

Objective

Maternal hemoglobin A1c (HbA1c) has been suggested to be a predictor of left ventricular hypertrophy (LVH) in the offspring of mothers with pre-gestational diabetes mellitus, although there is little data supporting this contention. We aimed to assess the relationship between maternal HbA1c and postnatal LVH.

Methods
We performed a retrospective cohort study of infants born to mothers with pre-gestational diabetes mellitus from 2015 to 2021 at our institution. The primary predictor was maternal HbA1c; neonatal left ventricular mass (LVM) z-score was the primary outcome; LVM z-score was considered as both a continuous variable and a binary variable by dichotomizing at 4 to define LVH. Additionally, we used linear regression to determine the relationship between maternal HbA1c and LVM z-score.

Results
There were 116 infants who met inclusion (50% female). Mean maternal HbA1c was generally higher in infants with LVH compared to those without LVH (8.2% with LVH vs. 7.2% without LVH [p = 0.009] in the second trimester, and 7.8% vs. 7.0% [p = 0.025] in the third trimester; no significant difference for first trimester). A greater percentage of infants with LVH were intubated (36% vs. 6%, p < 0.001) and had longer average days of hospitalization (9 vs. 5, p = 0.044). Second and third trimester HbA1c was weakly associated with LVM z-score (R2 = 0.063, p < 0.001 and R2 = 0.068, p < 0.001, respectively); first trimester HbA1c was not significantly predictive of LVM z-score.

Conclusion
Second and third trimester HbA1c is modestly predictive of LVH in infants born to mothers with pre-gestational diabetes mellitus. (Author)
Full URL: https://doi.org/10.1080/14767058.2024.2407038

2024-12352

Unraveling the Magnesium Connection: The Cincinnati PPG's Pioneering Work on Mineral Metabolism in Diabetes and Pregnancy. Mimouni FB, Khoury JC, Ehrlich S, et al (2025), American Journal of Perinatology vol 42, no 6, April 2025, pp 691-696

This study aimed to review the Cincinnati PPG's contribution to the understanding and treatment of neonatal hypocalcemia (NHC) in infants of diabetic mothers. This study is a retrospective review of the NIH-funded Program Project Grant (PPG) works related to mineral metabolism in type 1 diabetic pregnant women. The PPG investigators first described the epidemiology and the additional risk factors for NHC, namely prematurity and neonatal asphyxia, but also recognized the independent effect of maternal diabetes mellitus. They explored the link between NHC and maternal/neonatal hypomagnesemia. They finally conducted a randomized control trial of prevention of NHC by early administration of magnesium sulfate soon after birth to prevent NHC. The PPG in its various phases has allowed to reveal the important role that magnesium plays in the regulation of mineral metabolism in pregnancy and in particular the pregnancy complicated by pregestational diabetes.

Key Points

Poor glycemic control during pregnancy leads to maternal magnesium deficiency.

Maternal magnesium deficiency leads to fetal and neonatal magnesium deficiency.

Neonatal magnesium deficiency leads to functional hypoparathyroidism and parathyroid hormone resistance. (Author)

2024-12350

The antenatal management of pregnancies complicated by pre-existing diabetes. Dempsey A, Mumby C, Myers JE (2020), Obstetrics, Gynaecology and Reproductive Medicine vol 30, no 9, September 2020, pp 283-288

Pregnancies complicated by pre-existing diabetes continue to experience unacceptably high rates of morbidity and mortality compared to the general population. Optimizing the antenatal care of these high-risk pregnancies starts in the pre-conception period and therefore is applicable to all healthcare providers. During pregnancy, improving maternal glycaemic control and fetal wellbeing surveillance forms the mainstay of antenatal management. The complex interaction between maternal disease, fetal growth and placental function is often difficult to tease out due to our current tools of assessing fetal wellbeing lacking in diagnostic accuracy. A holistic, multi-disciplinary approach must be taken during the antenatal management of pregnancies complicated by pre-existing diabetes in order to reduce adverse outcomes for both mother and baby. (Author)

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2024-12327

Intrapartum Care for People with Diabetes—Working towards Evidence-Based Management. Fishel Bartal M (2025), American Journal of Perinatology vol 42, no 9, July 2025, pp 1103-1108

The consensus in the literature supports the need for careful monitoring and management of maternal blood glucose during labor to optimize neonatal outcomes. Guidelines generally recommend strict control of maternal blood glucose during labor, involving frequent checks, and the use of dextrose and insulin as needed. However, recent evidence has not consistently shown a strong association between strict control of blood glucose and a reduction in the rate of neonatal hypoglycemia. This raises questions about the extent to which intrapartum blood glucose control impacts neonatal hypoglycemia. This review aims to explore the literature on intrapartum maternal blood glucose management in individuals with pregestational or gestational diabetes, utilizing peer-reviewed journals and datasets, including PubMed, Google Scholar, and clinical guidelines. Observational studies, small sample sizes, variability in definitions of maternal hyperglycemia and neonatal hypoglycemia, and differences in measurement methods such as timing and thresholds for intervention limit the literature on this topic. Additionally, many studies may not fully account for confounding factors such as maternal body mass index, diet, and other comorbidities affecting blood glucose levels. These limitations underscore the need for a cautious interpretation of current findings and highlight the necessity for future research in this area. This review elaborates on the available data and summarizes evidence on managing labor in pregnancies complicated by diabetes. We also emphasize the need for further research to clarify the relationship between maternal blood glucose during labor and neonatal blood glucose.

Key Points

The benefits of strict intrapartum blood glucose control are unclear.

The optimal maternal blood glucose range to prevent neonatal hypoglycemia remains undefined.

Additional research is necessary to understand the relationship between maternal and neonatal blood glucose.
(Author)

2024-12324

Diabetes and Early Development: Epigenetics, Biological Stress, and Aging. Wang G, Shen WB, Chen AW, et al (2025), American Journal of Perinatology vol 42, no 8, June 2025, pp 977-987

Pregestational diabetes, either type 1 or type 2 diabetes, induces structural birth defects including neural tube defects and congenital heart defects in human fetuses. Rodent models of type 1 and type 2 diabetic embryopathy have been established and faithfully mimic human conditions. Hyperglycemia of maternal diabetes triggers oxidative stress in the developing neuroepithelium and the embryonic heart leading to the activation of proapoptotic kinases and excessive cell death. Oxidative stress also activates the unfolded protein response and endoplasmic reticulum stress. Hyperglycemia alters epigenetic landscapes by suppressing histone deacetylation, perturbing microRNA (miRNA) expression, and increasing DNA methylation. At cellular levels, besides the induction of cell apoptosis, hyperglycemia suppresses cell proliferation and induces premature senescence. Stress signaling elicited by maternal diabetes disrupts cellular organelle homeostasis leading to mitochondrial dysfunction, mitochondrial dynamic alteration, and autophagy impairment. Blocking oxidative stress, kinase activation, and cellular senescence ameliorates diabetic embryopathy. Deleting the mir200c gene or restoring mir322 expression abolishes maternal diabetes hyperglycemia-induced senescence and cellular stress, respectively. Both the autophagy activator trehalose and the senomorphic rapamycin can alleviate diabetic embryopathy. Thus, targeting cellular stress, miRNAs, senescence, or restoring autophagy or mitochondrial fusion is a promising approach to prevent poorly controlled maternal diabetes-induced structural birth defects. In this review, we summarize the causal events in diabetic embryopathy and propose preventions for this pathological condition.

Key Points

Maternal diabetes induces structural birth defects.

Kinase signaling and cellular organelle stress are critically involved in neural tube defects.

Maternal diabetes increases DNA methylation and suppresses developmental gene expression.

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Cellular apoptosis and senescence are induced by maternal diabetes in the neuroepithelium.

microRNAs disrupt mitochondrial fusion leading to congenital heart diseases in diabetic pregnancy. (Author)

2024-12320

A Review of Third-Trimester Complications in Pregnancies Complicated by Diabetes Mellitus. Welsey SR, Day J, Sullivan S, et al (2025), American Journal of Perinatology vol 42, no 9, July 2025, pp 1119-1126

Pregnancies affected by both pregestational and gestational diabetes mellitus carry an increased risk of adverse maternal and neonatal outcomes. While the risks associated with diabetes in pregnancy have been well documented and span across all trimesters, maternal and neonatal morbidity have been associated with select third-trimester complications. Further, modifiable risk factors have been identified that can help improve pregnancy outcomes. This review aims to examine the relationship between select third-trimester complications (large for gestational age, intrauterine fetal demise, hypertensive disorders of pregnancy, preterm birth, perineal lacerations, shoulder dystocia, and cesarean delivery) and the aforementioned modifiable risk factors, specifically glycemic control, blood pressure control, and gestational weight gain. It also highlights how early optimization of these modifiable risk factors can reduce adverse maternal, fetal, and neonatal outcomes.

Key Points

Diabetes mellitus in pregnancy increases the risk of third-trimester complications.

Modifiable risk factors exist for these complications.

Optimizing these modifiable risk factors improves maternal and neonatal outcomes. (Author)

2024-12185

Continuous glucose monitoring in pregnant women with pregestational type 2 diabetes: a narrative review. Ye S, Shahid I, Yates CJ, et al (2024), Obstetric Medicine vol 17, no 4, December 2024, pp 194–200

Background: Type 2 diabetes (T2DM) in pregnancy is associated with poor perinatal outcomes; however, there are limited data on outcomes of continuous glucose monitoring (CGM) use in this population. Objective: We reviewed the literature on studies reporting CGM outcomes in pregnant women with T2DM. We aimed to synthesise in a narrative review, the effects of CGM on glycaemic and perinatal outcomes as well as current research gaps. Results: Of 34 articles screened, three reported CGM outcomes in T2DM pregnancies compared to self-monitoring of blood glucose (SMBG). Other feasibility and mixed population studies were also reviewed. CGM in T2DM has good feasibility, acceptability, and improved glycaemic control beyond SMBG. There were limited data to draw conclusions on its effect on maternal and fetal outcomes. Conclusion: Further studies of perinatal outcomes in pregnant women with T2DM are required to determine the impact of improved glycaemia with CGM. (Author)

2024-12032

Exposure to GLP-1 receptor agonists in early pregnancy did not increase the risk of congenital malformations. Kuitunen I (2024), Acta Paediatrica vol 113, no 12, December 2024, pp 2682-2683

This review aimed to systematically analyse the evidence regarding GLP-1 receptor agonist use during early pregnancy and its impact on congenital malformations. (Author)

Full URL: https://doi.org/10.1111/apa.17412

2024-11893

Stillbirth in women with Type 1 Diabetes mellitus—still a current topic. Dargel S, Westphal J, Kloos C, et al (2024), Archives of Gynecology and Obstetrics vol 310, no 4, October 2024, pp 2015-2021

Purpose

Compared to the general stillbirth rate in Germany for term deliveries of 0.12% the risk in type 1 diabetes mellitus is reported to be up to ten times higher. The reasons for this excess risk of intrauterine demise are still not fully elucidated. Risk factors named in the literature include poor glycemic control before and during pregnancy and the occurrence of ketoacidosis. Additionally there might be a diabetes related type of placental dysfunction leading to organ failure in late pregnancy. Understanding the underlying causes is mandatory to develop strategies to reduce the incidences. The Purpose of this publication is to point out the difficulties in prediction of intrauterine death in

pregnant type 1 diabetes patients and thus emphasizing the necessity of constant awareness to all caregivers.

Methods
We present a case series of four cases of stillbirth that occurred in patients with type 1 diabetes mellitus at our tertiary care obstetric unit during a five-year period.

Results
In all four presented cases the underlying cause of intrauterine demise was different and we could not find a common mechanism or risk profile. Furthermore, established monitoring tools did not become peculiar to raise awareness. We compared our cases to published data. Underlying causes of intrauterine death in type 1 diabetes are discussed in the light of the current literature.

Conclusions
The main risk factors of stillbirth in diabetic pregnancies are high maternal blood glucose levels including pre-conceptional HbA1c and diabetic ketoacidosis. Late acute placental insufficiency are associated with intrauterine death in type 1 diabetes. Despite the elevated risk of near term intrauterine demise there are currently no guidelines on how to monitor pregnancies in type 1 diabetes for fetal distress during the third trimester. Established thresholds for fetal Doppler data indicating fetal distress in normal and growth restricted fetuses may not be applicable for overgrown fetuses. Future research on how to monitor the diabetic fetus needs to be initiated. (Author)
Full URL: https://doi.org/10.1007/s00404-024-07609-9

2024-11671

Association Between Metformin Use in Early Gestational or Type 2 Diabetes in Pregnancy and Preterm Preeclampsia.
Patel M, Battarbee AN, Refuerzo JS, et al (2024), Obsterics & Gynecology vol 144, no 5, November 2024, pp 733-739
OBJECTIVE:
To estimate the association between maternal metformin use for the treatment of early gestational or pre-existing type 2 diabetes and preterm preeclampsia.

METHODS:
This is a planned secondary analysis of the MOMPOD study (Medical Optimization of Management of Overt Type 2 Diabetes in Pregnancy), a randomized trial comparing the effect of adding metformin with insulin treatment on composite neonatal outcome in singleton pregnancies with early gestational or type 2 diabetes. Participants were randomized at 11–23 weeks of gestation to 1,000 mg metformin twice daily or placebo until delivery. A subset of participants had maternal blood collected at 24–30 weeks of gestation, and serum soluble endoglin, apolipoprotein B, vascular cell adhesion molecule-1, soluble fms-like tyrosine kinase 1, placental growth factor, high-sensitivity C-reactive protein, adiponectin, and vascular endothelial growth factor levels were measured. Our primary outcome was preterm preeclampsia, defined as preeclampsia requiring delivery before 37 weeks of gestation. Secondary outcomes included preterm preeclampsia requiring delivery before 34 weeks of gestation and differences in serum biomarkers. Multivariable regression analysis was used to estimate the associations between metformin use and primary or secondary study outcomes.

RESULTS:
Of 831 participants, 119 (14.3%) developed preeclampsia requiring delivery before 37 weeks of gestation: 57 of 416 (13.7%) in the placebo group and 62 of 415 (14.9%) in the metformin group. Thirty-seven (4.4%) developed preeclampsia requiring delivery before 34 weeks of gestation: 15 (3.6%) receiving placebo and 22 (5.3%) receiving metformin. Compared with placebo, metformin was not associated with a significant difference in the occurrence of preeclampsia before 37 weeks of gestation (adjusted odds ratio [aOR] 1.04, 95% CI, 0.70–1.56) or before 34 weeks (aOR 1.43, 95% CI, 0.73–2.81). Similarly, there was no association between maternal metformin use and serum biomarker levels.

CONCLUSION:
Among parturients with early gestational or pre-existing type 2 diabetes, the addition of metformin to insulin was not associated with lower odds of preterm preeclampsia or with serum biomarkers associated with cardiovascular disease risk. (Author)

2024-11592

Blood Pressure Control in Pregnant Patients with Chronic Hypertension and Diabetes: Should <130/80 be the Target?.

Harper LM, Kuo HC, Boggess K, et al (2025), American Journal of Obstetrics & Gynecology (AJOG) vol 232, no 5, May 2025, pp 482.e1-482.e8

Background

The Chronic Hypertension and Pregnancy Study (CHAP) demonstrated that a target blood pressure of <140/90 mm Hg during pregnancy is associated with improved perinatal outcomes. Outside of pregnancy, pharmacologic therapy for patients with diabetes and hypertension is adjusted to a target blood pressure of <130/80 mm Hg. During pregnancy, patients with both diabetes and chronic hypertension may also benefit from tighter control with a target blood pressure (BP) <130/80 mm Hg.

Objective

We compared perinatal outcomes in patients with hypertension and diabetes who achieved BP <130/80 versus 130-139/80-89 mm Hg.

Study Design

This was a secondary analysis of a multi-center randomized controlled trial. Participants were included in this secondary analysis if they had diabetes diagnosed prior to pregnancy or at <20 weeks' gestation and at least two recorded BP measurements prior to delivery. Average systolic and diastolic BP were calculated using ambulatory antenatal BPs. The primary composite outcome was preeclampsia with severe features, indicated preterm birth <35 weeks, or placental abruption. Secondary outcomes were components of the primary outcome, cesarean delivery, fetal or neonatal death, neonatal intensive care unit (NICU) admission, and small for gestational age (SGA). Comparisons were made between those with an average systolic BP <130 mm Hg and average diastolic BP <80 mm Hg and those with an average systolic blood pressure 130-139 mm Hg or diastolic blood pressure 80-89 mm Hg using Student's t-test and chi-squared tests. Multivariable log-binomial regression models were used to evaluate risk ratios between blood pressure groups for dichotomous outcomes while accounting for baseline covariates.

Results

Of 434 participants included, 150 (34.6%) had an average blood pressure less than 130/80 mm Hg. Participants with an average blood pressure less than 130/80 were more likely to be on antihypertensive medications at the start of pregnancy and more likely to have newly diagnosed DM prior to 20 weeks. Participants with an average blood pressure less than 130/80 mm Hg were less likely to have the primary adverse perinatal outcome (19.3% vs 46.5%, adjusted relative risk (aRR) 0.43, 95% CI 0.30-0.61, p<0.01), with decreased risks specifically of preeclampsia with severe features (aRR 0.35, 95% CI 0.23-0.54) and indicated preterm birth prior to 35 weeks (aRR 0.44, 95% CI 0.24-0.79). The risk of NICU admission was lower in the lower blood pressure group (aRR 0.74, 95% CI 0.59-0.94). No differences were noted in cesarean delivery (aRR 1.04, 95% CI 0.90-1.20), fetal or neonatal death (aRR 0.59, 95% CI 0.12-2.92). SGA less than the 10th percentile was lower in the lower blood pressure group (aRR 0.37, 95% CI 0.14-0.96).

Conclusion

In those with chronic hypertension and diabetes prior to 20 weeks, achieving an average goal blood pressure of <130/80 mm Hg may be associated with improved perinatal outcomes. (Author)

2024-10956

Cognitive Function during and after Pregnancy and One-Year Postpartum in Type 1 Diabetes: A Longitudinal Study.

Ivanisevic M, Gasparovic VE, Herman M, et al (2024), Nutrients vol 16, no 16, August 2024, p 2751

Background. This study aims to compare the cognitive function of women with T1DM during and after pregnancy, as well as one year post-delivery. Additionally, it aims to investigate the impacts of leptin and body mass index on cognitive function. Methods. A prospective longitudinal cohort study was conducted involving 64 pregnant women with T1DM. Cognitive function was assessed using a cognitive assessment battery during the first trimester, immediately after delivery, and one year postpartum for the final assessment. This program evaluates a wide range of cognitive abilities and provides a comprehensive cognitive well-being score (high–moderate–low), identifying strengths and weaknesses in reasoning, memory, attention, coordination, and perception. Results. The average age of the participants was 30.9 years, with a mean diabetes duration of 14.9 years. Pregnant women with a BMI of 30 kg/m2 or higher faced an increased risk of reduced cognitive function, memory, and reasoning. Additionally, mothers with lower overall cognitive function and memory levels had significantly higher concentrations of leptin in their blood. Conclusions. Cognitive functions—particularly reasoning and attention—are adversely affected in women with T1DM during pregnancy and shortly after delivery. Elevated BMI and leptin levels can be linked to worse cognitive outcomes in this population. (Author)

Full URL: https://doi.org/10.3390/nu16162751

2024-10251

Effect of maternal diabetes on time to full oral feedings in infants admitted to the neonatal intensive care unit.
Williams M, Schoenig M, Almashharawi L, et al (2024), Journal of Perinatology vol 44, no 11, November 2024, pp 1647–1651

Objective
To compare the time to oral feeds in infants born to mothers with and without diabetes.

Study design
Retrospective study of infants born at or after 34 weeks gestational age and admitted between 1/1/2020 to 01/31/2022. Time to full oral feedings was compared between infants born to mothers with and without diabetes (267 versus 918) Continuous and binomial variables were analyzed with the Mann Whitney U test and the Chi-Square test respectively. Linear regression was then conducted to explore identified potential relationships from these analyses.

Result
Comparison of groups via univariate analysis revealed a mean difference of two more days to establish full oral feedings (p = 0.0001). Maternal pregestational diabetes (PGDM) and obesity (Body mass index; BMI > 30 kg/m2) were associated with longer time for infants to complete oral feeds (p 0.034 and 0.013 respectively).

Conclusion
Infants born to mothers with diabetes took longer to achieve full oral feedings. (Author)

2024-10221

Diabetic Ketoacidosis and Adverse Outcomes Among Pregnant Individuals With Pregestational Diabetes in the United States, 2010–2020. Wen T, Friedman AM, Gyamfi-Bannerman C, et al (2024), Obsterics & Gynecology vol 144, no 5, November 2024, pp 579-589

OBJECTIVE:
To assess the frequency of, risk factors for, and adverse outcomes associated with diabetic ketoacidosis (DKA) at delivery hospitalization among individuals with pregestational diabetes (type 1 and 2 diabetes mellitus) and secondarily to evaluate the frequency of and risk factors for antepartum and postpartum hospitalizations for DKA.

METHODS:
We conducted a serial, cross-sectional study using the Agency for Healthcare Research and Quality's Healthcare Cost and Utilization Project Nationwide Readmissions Database from 2010 to 2020 of pregnant individuals with pregestational diabetes hospitalized for delivery. The exposures were 1) sociodemographic and clinical risk factors for DKA and 2) DKA. The outcomes were DKA at delivery hospitalization, maternal morbidity (nontransfusion severe maternal morbidity (SMM), critical care procedures, cardiac complications, acute renal failure, and transfusion), and adverse pregnancy outcomes (preterm birth, hypertensive disorders of pregnancy, and cesarean delivery) and secondarily DKA at antepartum and postpartum hospitalizations.

RESULTS:
Of 392,796 deliveries in individuals with pregestational diabetes (27.2% type 1 diabetes, 72.8% type 2 diabetes), there were 4,778 cases of DKA at delivery hospitalization (89.1% type 1 diabetes, 10.9% type 2 diabetes). The frequency of DKA at delivery hospitalization was 1.2% (4.0% with type 1 diabetes, 0.2% with type 2 diabetes), and the mean annual percentage change was 10.8% (95% CI, 8.2–13.2%). Diabetic ketoacidosis at delivery hospitalization was significantly more likely among those who had type 1 diabetes compared with those with type 2 diabetes, who were younger in age, who delivered at larger and metropolitan hospitals, and who had Medicaid insurance, lower income, multiple gestations, and prior psychiatric illness. Diabetic ketoacidosis during the delivery hospitalization was associated with an increased risk of nontransfusion SMM (20.8% vs 2.4%, adjusted odds ratio [aOR] 8.18, 95% CI, 7.20–9.29), critical care procedures (7.3% vs 0.4%, aOR 15.83, 95% CI, 12.59–19.90), cardiac complications (7.8% vs 0.8%, aOR 8.87, 95% CI, 7.32–10.76), acute renal failure (12.3% vs 0.7%, aOR 9.78, 95% CI, 8.16–11.72), and transfusion (6.2% vs 2.2%, aOR 2.27, 95% CI, 1.87–2.75), as well as preterm birth (31.9% vs 13.5%, aOR 2.41, 95% CI, 2.17–2.69) and hypertensive disorders of pregnancy (37.4% vs 28.1%, aOR 1.11, 95% CI, 1.00–1.23). In secondary analyses, the overall frequency of antepartum DKA was 3.1%, and the mean annual percentage change was 4.1% (95% CI, 0.3–8.6%); the overall frequency of postpartum DKA was 0.4%, and the mean annual percentage change was 3.5% (95% CI, −1.6% to 9.6%). Of 3,092 antepartum hospitalizations among individuals with DKA, 15.7% (n=485) had a recurrent case of DKA at delivery hospitalization. Of 1,419 postpartum hospitalizations among individuals with DKA, 20.0% (n=285) previously had DKA at delivery hospitalization. The above risk factors for DKA at delivery hospitalization were similar for DKA at antepartum and postpartum hospitalizations.

CONCLUSION:
The frequency of DKA at delivery hospitalization and antepartum hospitalizations for DKA increased between 2010 and 2020 among deliveries in individuals with pregestational diabetes in the United States. Diabetic ketoacidosis is associated with an increased risk of maternal morbidity and adverse pregnancy outcomes. Risk factors for DKA at delivery were similar to those for DKA during the antepartum and postpartum periods. (Author)

2024-10214

Continuous Glucose Monitoring for Diabetes Management During Pregnancy Evidence, Practical Tips, and Common Pitfalls. Battarbee AN, Durnwald C, Yee LM, et al (2024), Obsterics & Gynecology vol 144, no 5, November 2024, pp 649-659

Continuous glucose monitoring (CGM) has the potential to revolutionize diabetes management during pregnancy by providing detailed and real-time data to patients and clinicians, overcoming many of the limitations of self-monitoring of blood glucose. Although there are limited data on the role of CGM to improve pregnancy outcomes in patients with type 2 diabetes or gestational diabetes, CGM has been shown to reduce pregnancy complications in patients with type 1 diabetes. Despite the limited data in some populations, given its ease of use and recent U.S. Food and Drug Administration approval with expanding insurance coverage, CGM has gained widespread popularity among pregnant patients with all types of diabetes. It is critical for obstetric clinicians to understand how CGM can be successfully integrated into clinical practice. We present a practical, step-wise approach to CGM data interpretation that can be incorporated into diabetes management during pregnancy and common CGM pitfalls and solutions. Although technology will continue to advance with newer-generation CGM devices and diabetes technology such as automated insulin delivery (not covered here), these key principles form a basic foundation for understanding CGM technology and its utility for pregnant people. (Author)

2024-10211

Clinical Presentation and Outcomes of Diabetic Ketoacidosis in Pregnancy. Grasch JL, Lammers S, Scaglia Drusini F, et al (2024), Obsterics & Gynecology vol 144, no 5, November 2024, pp 590-598

OBJECTIVE:
To examine the presentation, management, and outcomes of pregnancies complicated by diabetic ketoacidosis (DKA) in a contemporary obstetric population.

METHODS:
This is a case series of all admissions for DKA during pregnancy at a single Midwestern academic medical center over a 10-year period. Diabetic ketoacidosis was defined per the following diagnostic criteria: anion gap more than 12 mEq/L, pH less than 7.30 or bicarbonate less than 15 mEq/L, and elevated serum or urine ketones. Demographic information, clinical characteristics, and maternal and neonatal outcomes were assessed. Patient characteristics and clinical outcomes were compared between individuals with type 1 and those with type 2 diabetes mellitus.

RESULTS:
Between 2012 and 2021, there were 129 admissions for DKA in 103 pregnancies in 97 individuals. Most individuals (n=75, 77.3%) admitted for DKA during pregnancy had type 1 diabetes. The majority of admissions occurred in the third trimester (median gestational age 29 3/7 weeks). The most common precipitating factors were vomiting or gastrointestinal illness (38.0%), infection (25.6%), and insulin nonadherence (20.9%). Median glucose on admission was 252 mg/dL (interquartile range 181–343 mg/dL), and 21 patients (17.6%) were admitted with euglycemic DKA. Fifteen admissions (11.6%) were to the intensive care unit. Pregnancy loss was diagnosed during admission in six individuals (6.3%, 95% CI, 2.3–13.7%). Among pregnant individuals with at least one admission for DKA, the median gestational age at delivery was 34 6/7 weeks (interquartile range 33 2/7–36 3/7 weeks). Most neonates (85.7%, 95% CI, 76.8–92.2%) were admitted to the neonatal intensive care unit and required treatment for hypoglycemia. The cesarean delivery rate was 71.9%. Despite similar hemoglobin A1C values before pregnancy and at admission, individuals with type 1 diabetes had higher serum glucose (median [interquartile range], 256 mg/dL [181–353 mg/dL] vs 216 mg/dL [136–258 mg/dL], P=.04) and higher serum ketones (3.78 mg/dL [2.13–5.50 mg/dL] vs 2.56 mg/dL [0.81–4.69 mg/dL] mg/dL, P=.03) on admission compared with those with type 2 diabetes. Individuals with type 2 diabetes required intravenous insulin therapy for a longer duration (55 hours [29.5–91.5 hours] vs 27 hours [19–38 hours], P=.004) and were hospitalized longer (5 days [4–9 days] vs 4 days [3–6 days], P=.004).

CONCLUSION:
Diabetic ketoacidosis occurred predominantly in pregnancies affected by type 1 diabetes. Individuals with type 1

diabetes presented with greater DKA severity but achieved clinical resolution more rapidly than those with type 2 diabetes. These results may provide a starting point for the development of interventions to decrease maternal and neonatal morbidity related to DKA in the modern obstetric population. (Author)

2024-10203

Pre-existing Diabetes and Stillbirth or Perinatal Mortality: A Systematic Review and Meta-analysis. Blankstein AR, Sigurdson SM, Frehlich L, et al (2024), Obsterics & Gynecology vol 144, no 5, November 2024, pp 608-619

OBJECTIVE:
Despite the well-recognized association between pre-existing diabetes mellitus and stillbirth or perinatal mortality, there remain knowledge gaps about the strength of association across different populations. The primary objective of this systematic review and meta-analysis was to quantify the association between pre-existing diabetes and stillbirth or perinatal mortality, and secondarily, to identify risk factors predictive of stillbirth or perinatal mortality among those with pre-existing diabetes.

DATA SOURCES:
MEDLINE, EMBASE, Cochrane Database of Systematic Reviews, and Cochrane Central Register of Controlled Trials from inception to April 2022.

METHODS OF STUDY SELECTION:
Cohort studies and randomized controlled trials in English or French that examined the association between pre-existing diabetes and stillbirth or perinatal mortality (as defined by the original authors) or identified risk factors for stillbirth and perinatal mortality in individuals with pre-existing diabetes were included. Data extraction was performed independently and in duplicate with the use of prespecified inclusion and exclusion criteria. Assessment for heterogeneity and risk of bias was performed. Meta-analyses were completed with a random-effects model.

TABULATION, INTEGRATION, AND RESULTS:
From 7,777 citations, 91 studies met the inclusion criteria. Pre-existing diabetes was associated with higher odds of stillbirth (37 studies; pooled odds ratio [OR] 3.74, 95% CI, 3.17–4.41, I2=82.5%) and perinatal mortality (14 studies; pooled OR 3.22, 95% CI, 2.54–4.07, I2=82.7%). Individuals with type 1 diabetes had lower odds of stillbirth (pooled OR 0.81, 95% CI, 0.68–0.95, I2=0%) and perinatal mortality (pooled OR 0.73, 95% CI, 0.61–0.87, I2=0%) compared with those with type 2 diabetes. Prenatal care and prepregnancy diabetes care were significantly associated with lower odds of stillbirth (OR 0.26, 95% CI, 0.11–0.62, I2=87.0%) and perinatal mortality (OR 0.41, 95% CI, 0.29–0.59, I2=0%).

CONCLUSION:
Pre-existing diabetes confers a more than threefold increased odds of both stillbirth and perinatal mortality. Maternal type 2 diabetes was associated with a higher risk of stillbirth and perinatal mortality compared with maternal type 1 diabetes.

SYSTEMATIC REVIEW REGISTRATION:
PROSPERO, CRD42022303112. (Author)

2024-09871

'Is there any point in me doing this?' Views and experiences of women in the Diabetes and Antenatal Milk Expressing (DAME) trial. Moorhead AM, Amir LH, Forster DA, et al (2022), Maternal & Child Nutrition vol 18, no 2, April 2022, e13307

The Diabetes and Antenatal Milk Expressing (DAME) randomised controlled trial (RCT) was conducted in 2011–2015, at six sites in Melbourne, Australia to explore the effect of advising women with diabetes in pregnancy to express breast milk from 36 weeks gestation. Infants whose mothers were randomised to express in pregnancy were more likely to be exclusively breast milk fed during their hospital stay, and there was no evidence of harm. This paper explores women's views and experiences of antenatal expressing. In this two-arm RCT, 635 women with diabetes in pregnancy who were otherwise of low medical risk were randomised at 36–37 weeks gestation to usual care (not expressing, n = 316), or the intervention, where women were advised to hand express for 10 min twice daily until birth (n = 319). Semistructured face-to-face interviews were conducted with 10 women who expressed antenatally. They were asked about their experiences of antenatal expressing, including how they felt about the overall experience, the amount of breast milk they expressed, making time to express, and their experience of breastfeeding. Thematic analysis of the in-depth interviews identified six themes: (1) learning and adapting expressing, (2) feelings and sensations associated with expressing, (3) support, (4) dis/empowerment, (5) health, and (6) the value of breast milk. Women had both

positive and negative experiences of antenatal expressing. If health professionals are advising antenatal expressing to women, it is important they understand the range of outcomes and experiences. (Author)
Full URL: https://doi.org/10.1111/mcn.13307

2024-08947

Insulin Management for Gestational and Type 2 Diabetes in Pregnancy. Valent AM, Barbour LA (2024), Obstetrics & Gynecology vol 144, no 5, November 2024, pp 633-647

Insulin is preferred as the first-line agent for glucose management of gestational diabetes mellitus and type 2 diabetes in pregnancy when nutritional and lifestyle modifications are unable to achieve pregnancy-specific glucose targets. Individual heterogeneity in defects of insulin secretion or sensitivity in liver and muscle, unique genetic influences on pregnancy glycemic regulation, and variable cultural and lifestyle behaviors that affect meal, activity, sleep, and occupational schedules necessitate a personalized approach to insulin regimens. Newer insulin preparations have been developed to mimic the physiologic release of endogenous insulin, maintaining appropriate basal levels to cover hepatic gluconeogenesis and simulate the rapid, meal-related, bolus rise of insulin. Such physiologic basal–bolus dosing of insulin can be administered safely, achieving tighter glycemic control while reducing episodes of hypoglycemia. Insulin initiation and titration require understanding the pharmacodynamics of different insulin preparations in addition to a patient's glycemic profiles, effect of variable nutritional intake and mealtimes, physical activity, stress, timing of sleep cycles, and cultural habits. Educating and empowering patients to learn how their glucose responds to insulin, portion and content of meals, and physical activity can increase personal engagement in therapy, flexibility in eating patterns, and improved glycemic control. This Clinical Expert Series article is focused on optimizing insulin management (initiation, dosing, and titration) of gestational and type 2 diabetes in pregnancy. (Author)

2024-08887

Metformin Use Among Parents Doesn’t Increase Birth Defect Risk. Harris E (2024), JAMA (Journal of the American Medical Association) vol 332, no 5, August 2024, p 363

There’s little evidence that taking metformin affects the risk of birth defects among children. Now, a pair of studies in Annals of Internal Medicine suggests that neither maternal nor paternal metformin use increases the risk of congenital malformations. (Author, edited)

2024-08844

How pregnant women with diabetes experience telemonitoring of the fetal heart rate – An interview study. Jepsen I, Nielsen JH, Eriksen SA, et al (2024), European Journal of Obstetrics & Gynecology and Reproductive Biology vol 298, July 2024, pp 123-127

Objectives

The use of telemonitoring in healthcare is generally increasing. Women with complicated pregnancies are using telemonitoring as an alternative to conventional management, encompassing hospitalization or frequent outpatient clinic visits. However, there is sparse evidence on how pregnant women experience monitoring of their unborn babies at home. Women might feel uncomfortable with this responsibility, and moreover they might miss face-to-face contact with healthcare personnel.

Study design

The study setting was a Danish hospital with a tertiary obstetric unit attending approximately 3400 births annually. A qualitative study design with interview as method included 11 pregnant women with type 1 diabetes or Gestational Diabetes Mellitus. This design was used to investigate how pregnant women with complicated pregnancies experienced telemonitoring of the fetus. Reflexive thematic analysis was used to analyze the pregnant women’s experiences of telemonitoring.

Results

Women with type 1 diabetes or Gestational Diabetes Mellitus found the advantages of telemonitoring to outweigh the disadvantages. They experienced telemonitoring as time-saving and that telemonitoring decreased the level of stress. Moreover, telemonitoring supports positive collaboration with healthcare professionals.

The women also experienced a lack of coordination of consultations between different departments at the hospital and challenges with timing, feedback, and technical issues. Moreover, the women requested an opportunity to discuss family formation and emotions.

Conclusions

Pregnant women with type 1 diabetes or Gestational Diabetes Mellitus benefit from the use of telemonitoring. To further improve the implementation and use of telemonitoring clinical implications, consider how timing and

coordination of care, technical equipment, and feedback mechanisms could be improved. (Author)
Full URL: https://doi.org/10.1016/j.ejogrb.2024.04.039

2024-08725

Initiation of Metformin in Early Pregnancy Results in Fetal Bioaccumulation, Growth Restriction & Renal Dysmorphology in a Primate Model. Bolte E, Dean T, Garcia B, et al (2024), American Journal of Obstetrics & Gynecology (AJOG) vol 231, no 3, September 2024, pp 352.e1-352.e16

Background

In recent years, pragmatic metformin use in pregnancy has stretched to include prediabetes, type 2 diabetes, gestational diabetes and (most recently) pre-eclampsia. With its expanded use, however, concerns of unintended harm have been raised.

Objective

We developed an experimental primate model and applied triple-quadruple pole LC mass spectrometry (UHPLC-QQQ) for direct quantitation of maternal and fetal tissue metformin levels with detailed fetal biometry and histopathology.

Study design

Within 30 days of confirmed conception (defined as early pregnancy), n=13 time-bred (TMB) Rhesus dams with gestations designated for fetal necropsy were initiated on twice daily human dose-equivalent 10 mg/kg metformin or vehicle control. Pregnant dams were maintained as pairs and fed either a control chow or 36% fat Western-style diet (WSD). Metformin or placebo vehicle control were delivered in a variety of treats while animals were separated via a slide. A Cesarean was performed at G145, and amniotic fluid and blood were collected and the fetus and placenta were delivered. The fetus was immediately necropsied by trained primate center personnel. All fetal organs were dissected, measured, sectioned, and processed per clinical standards. Fluid and tissue metformin levels were assayed using validated UHPLC-QQQ in SRM against standard curves.

Results

Among the n=13 G145 pregnancies with fetal necropsy, n=1 dam and its fetal tissues had detectable metformin levels despite being allocated to the vehicle control group (>1 µM metformin/kg maternal weight or fetal/placental tissue), while a second fetus allocated to the vehicle control group had severe fetal growth restriction (birthweight 248.32 g, <1%) and was suspected of having a fetal congenital condition. After excluding these two fetal gestations from further analyses, 11 fetuses from dams initiated on either vehicle control (n=4, 3 female, 1 male fetuses) or 10 mg/kg metformin (n=7, 5 female, 2 male fetuses) were available for analyses. Among dams initiated on metformin by G30 (regardless of maternal diet), we observed significant bioaccumulation within the fetal kidney (0.78-6.06 µmol/kg, mean 2.48 µmol/kg) , liver (0.16-0.73 µmol/kg, mean 0.38 µmol/kg), fetal gut (0.28-1.22 µmol/kg, mean 0.70 µmol/kg), amniotic fluid (0.43-3.33 µmol/L, mean 1.88 µmol/L), placenta (0.16-1.0 µmol/kg , mean 0.50 µmol/kg) and fetal serum (0 -0.66 µmol/L , mean 0.23 µmol/L), and fetal urine (4.1-174.1 µmol/L mean 38.5 µmol/L), with fetal levels near biomolar equivalent to maternal levels (maternal serum 0.18-0.86 µmol/L , mean 0.46 µmol/L; maternal urine 42.6-254.0 µmol/L , mean 149.3 µmol/L). WSD feeding neither accelerated nor reduced metformin bioaccumulations in maternal or fetal serum, urine, amniotic fluid, placenta nor fetal tissues. In these 11 animals, fetal bioaccumulation of metformin was associated with less fetal skeletal muscle (57% lower cross-sectional area of gastrocnemius) and decreased liver, heart, and retroperitoneal fat masses ($p<0.05$), collectively driving lower delivery weight ($p<0.0001$) without changing the crown-rump length. Sagittal sections of fetal kidneys demonstrated delayed maturation, with disorganized glomerular generations and increased cortical thickness; this renal dysmorphology was not accompanied by structural nor functional changes indicative of renal insufficiency.

Conclusions

We demonstrate fetal bioaccumulation of metformin with associated fetal growth restriction and renal dysmorphology following maternal initiation of the drug within 30 days of conception in primates. Given these results and the prevalence of metformin use during pregnancy, additional investigation of any potential immediate and enduring effects of prenatal metformin use is warranted. (Author)
Full URL: https://doi.org/10.1016/j.ajog.2024.06.002

2024-08724

Permissive intrapartum glucose control: an equivalence randomized control trial (PERMIT). Bitar G, Bravo R, Pedroza C, et al (2024), American Journal of Obstetrics & Gynecology (AJOG) vol 231, no 3, September 2024, pp 355.e1-355.e11

Background

There is limited high-quality data on the best practices for maternal blood glucose management during labor.

Objective

We compared permissive care (target maternal blood glucose 70–180 mg/dL) to usual care (blood glucose 70–110

mg/dL) among laboring individuals with diabetes.
Study Design
This was a two-site equivalence randomized control trial for individuals with diabetes (pregestational or gestational) at ≥34 weeks in labor. Individuals were randomly allocated to usual care or permissive care. Maternal blood glucose was evaluated by capillary blood glucose monitoring in latent and active labor every 4 and 2 hours. Insulin drip was initiated if maternal blood glucose exceeded the upper bounds of the allocated target. The primary outcome was the first neonatal heel stick glucose within 2 hours of birth before feeding. We assumed a mean first neonatal blood glucose of 50±10 mg/dL. To ensure that the use of permissive care did not increase or decrease the first neonatal blood glucose >10 mg/dL (2-tailed: a=0.05, b=0.1), 96 total participants were required. We calculated adjusted relative risk and 95% confidence intervals in an intention-to-treat analysis. A preplanned Bayesian analysis was used to estimate the probability of equivalence with a neutral informative prior.
Results
Of deliveries with diabetes assessed for eligibility (from October 2022 to June 2023), 280 of 511 (54.8%) met eligibility criteria, and 96 of 280 (34.3%) agreed and were randomized. In the usual care group, 17% required an insulin drip compared with none in permissive care. There was equivalence in the primary outcome between usual and permissive care (57.9 vs 57.1 mg/dL; adjusted mean difference, −0.72 [95% confidence interval, −8.87 to 7.43]). Bayesian analysis indicated a 98% posterior probability of the mean difference not being >10 mg/dL. The rate of neonatal hypoglycemia was 25% in the usual care group and 29% in the permissive group (adjusted relative risk, 1.14; 95% confidence interval, 0.60–2.17). There was no difference in other neonatal or maternal outcomes.
Conclusion
In this randomized control trial, although almost 1 in 6 individuals with diabetes required an insulin drip with usual intrapartum maternal blood glucose care, permissive care was associated with equivalent neonatal blood glucose. (Author)

2024-08643

Unveiling therapeutic potentials and exploring maternal-fetal health benefits of metformin in pregnancy: A scoping review. Neola D, Angelino A, Sirico A, et al (2024), International Journal of Gynecology & Obstetrics vol 167, no 2, November 2024, pp 538-546

This scoping review synthesizes evidence on metformin's use during pregnancy, encompassing diverse conditions like gestational diabetes, type 1 and type 2 diabetes, polycystic ovary syndrome (PCOS), and obesity. Metformin demonstrates comparable efficacy to insulin in gestational diabetes, positive outcomes in type 2 diabetes pregnancies, and potential benefits in reducing complications. The review highlights nuances in its effects across conditions, indicating advantages such as reduced risk of macrosomia and cesarean section in gestational diabetes. However, its prophylactic role in preventing gestational diabetes and associated complications remains inconclusive. In obese pregnant women, mixed results are observed, with potential benefits in reducing pre-eclampsia risk. Metformin shows promise in preventing preterm birth and late miscarriage in PCOS pregnancies. Categorizing patient subgroups is crucial for identifying advantages, especially in gestational diabetes and type 2 diabetes. Challenges arise from study heterogeneity, necessitating standardized indications for dosage, timing, and postpartum follow ups. Efforts to identify patient characteristics influencing metformin efficacy are crucial for tailored therapy. Although metformin emerges as a viable option in complicated pregnancies, comprehensive research, standardized protocols, and subgroup identification efforts will enhance clinical utility, ensuring evidence-based therapies and optimal maternal and fetal outcomes. Bridging existing knowledge gaps remains imperative for advancing metformin's role in pregnancy management. (Author)

2024-08404

Trends and Outcomes among Pregnancy and Nonpregnancy-Related Hospitalizations with Diabetic Ketoacidosis. Bitar G, Sibai BM, Chen HY, et al (2025), American Journal of Perinatology vol 42, no 2, January 2025, pp 164-170

Objective The study's primary objective was to evaluate adverse outcomes among reproductive-age hospitalizations with diabetic ketoacidosis (DKA), comparing those that are pregnancy-related versus nonpregnancy-related and evaluating temporal trends.

Study Design We conducted a retrospective cross-sectional study using the National Inpatient Sample to identify hospitalizations with DKA among reproductive-age women (15–49 years) in the United States (2016–2020). DKA in pregnancy hospitalizations was compared with DKA in nonpregnant hospitalizations. Adverse outcomes evaluated included mechanical ventilation, coma, seizures, renal failure, prolonged hospital stay, and in-hospital death. Multivariable Poisson regression models with robust error variance were used to estimate adjusted relative risk (aRR)

and 95% confidence interval (CI). Annual percent change (APC) was used to calculate the change in DKA rate over time.

Results Among 35,210,711 hospitalizations of reproductive-age women, 447,600 (1.2%) were hospitalized with DKA, and among them, 13,390 (3%) hospitalizations were pregnancy-related. The rate of nonpregnancy-related DKA hospitalizations increased over time (APC = 3.8%, 95% CI = 1.5–6.1). After multivariable adjustment, compared with pregnancy-related hospitalizations with DKA, the rates of mechanical ventilation (aRR = 1.56, 95% CI = 1.18–2.06), seizures (aRR = 2.26, 95% CI = 1.72–2.97), renal failure (aRR = 2.26, 95% CI = 2.05–2.50), coma (aRR = 2.53, 95% CI = 1.68–3.83), and in-hospital death (aRR = 2.38, 95% CI = 1.06–5.36) were higher among nonpregnancy-related hospitalizations with DKA.

Conclusion A nationally representative sample of hospitalizations indicates that over the 5-year period, the rate of nonpregnancy-related DKA hospitalizations increased among reproductive age women, and a higher risk of adverse outcomes was observed when compared with pregnancy-related DKA hospitalizations. (Author)

2024-08236

Association of Human Milk Fatty Acid Composition with Maternal Cardiometabolic Diseases: An Exploratory Prospective Cohort Study. Scime NV, Turner S, Miliku K, et al (2024), Breastfeeding Medicine vol 19, no 5, May 2024, pp 357–367

Background: Human milk fatty acids derive from maternal diet, body stores, and mammary synthesis and may reflect women's underlying cardiometabolic health. We explored whether human milk fatty acid composition was associated with maternal cardiometabolic disease (CMD) during pregnancy and up to 5 years postpartum.
Materials and Methods: We analyzed data from the prospective CHILD Cohort Study on 1,018 women with no preexisting CMD who provided breast milk samples at 3–4 months postpartum. Milk fatty acid composition was measured using gas-liquid chromatography. Maternal CMD (diabetes or hypertension) was classified using questionnaires and birth records as no CMD (reference outcome group; 81.1%), perinatal CMD (developed and resolved during the perinatal period; 14.9%), persistent CMD (developed during, and persisted beyond, the perinatal period; 2.9%), and incident CMD (developed after the perinatal period; 1.1%). Multinomial logistic regression was used to model associations between milk fatty acid composition (individual, summary, ratios, and patterns identified using principal component analysis) and maternal CMD, adjusting for pre-pregnancy anthropometry and race/ethnicity.
Results: Medium-chain saturated fatty acids (MC-SFA), lauric (C12:0; odds ratio [OR] = 0.73, 95% confidence interval [CI] = 0.60–0.89) and myristic acid (C14:0; OR = 0.80, 95% CI = 0.66–0.97), and the high MC-SFA principal component pattern (OR = 0.86, 95% CI = 0.76–0.96) were inversely associated with perinatal CMD. Long-chain polyunsaturated fatty acids adrenic acid (C22:4n-6) was positively associated with perinatal (OR = 1.21, 95% CI = 1.01–1.44) and persistent CMD (OR = 1.56, 95% CI = 1.08–2.25). The arachidonic (C20:4n-6)-to-docosahexaenoic acid (C22:6n-3) ratio was inversely associated with incident CMD (OR = 0.52, 95% CI = 0.28–0.96).
Conclusions: These exploratory findings highlight a potential novel utility of breast milk for understanding women's cardiometabolic health. (Author)

2024-08010

Cumulative Lactation and Clinical Metabolic Outcomes at Mid-Life among Women with a History of Gestational Diabetes. Wander PL, Hinkle SN, Enquobahrie DA, et al (2022), Nutrients vol 14, no 3, February 2022, p 650

Lactation is associated with a lower risk of subsequent cardiometabolic disease among parous women; however, the underlying mechanisms are unknown. Further, the potential protective effects of lactation on cardiometabolic risk markers at mid-life among high-risk women with past gestational diabetes (GDM) are not established. Using data from the Diabetes & Women's Health Study (2012–2014; n = 577), a longitudinal cohort of women with past GDM from the Danish National Birth Cohort (1996–2002), we assessed associations of cumulative lactation duration (none, <6 months, 6–12 months, ≥12–24 months, and ≥24 months) with clinical metabolic outcomes (including type 2 diabetes [T2D], prediabetes, and obesity) and cardiometabolic biomarkers (including biomarkers of glucose/insulin metabolism, fasting lipids, inflammation, and anthropometrics) 9–16 years after enrollment when women were at mid-life. At follow-up, women were 43.9 years old (SD 4.6) with a BMI of 28.7 kg/m2 (IQR 24.6, 33.0); 28.6% of participants had T2D, 39.7% had prediabetes, and 41.2% had obesity. Relative risks (95% CI) of T2D for 0–6, 6–12, 12–24, and ≥24 months of cumulative lactation duration compared to none were 0.94 (0.62,1.44), 0.88 (0.59,1.32), 0.73 (0.46,1.17), and 0.71 (0.40,1.27), respectively. Cumulative lactation duration was not significantly associated with any other clinical outcome or continuous biomarker. In this high-risk cohort of middle-aged women with past GDM, T2D, prediabetes, and obesity were common at follow-up, but not associated with history of cumulative lactation duration 9–16 years after the index

pregnancy. Further studies in diverse populations among women at mid-age are needed to understand associations of breastfeeding with T2D. (Author)
Full URL: https://doi.org/10.3390/nu14030650

2024-07906

Prediction of large-for-gestational-age at birth using fetal biometry in type 1 and type 2 diabetes: A retrospective cohort study. Rathcke SL, Sinding MM, Christensen TT, et al (2024), International Journal of Gynecology & Obstetrics vol 167, no 2, November 2024, pp 695-704

Objective

To compare ultrasound-assessed fetal head circumference (HC), abdominal circumference (AC), HC/AC ratio, and estimated fetal weight (EFW) in prediction of large-for-gestational-age (LGA) at birth in pregnancies affected by type 1 (T1DM) and type 2 (T2DM) diabetes.

Methods

This retrospective cohort study included all women with T1DM and T2DM giving birth to singletons between 2010 and 2019 at Aalborg University Hospital, Denmark. Ultrasound scans were performed at 16, 20, 28 and 34 weeks of pregnancy. LGA was defined as birth weight deviation of 15% or greater from the expected for gestational age (≥90th centile). Prediction of LGA was assessed by logistic regression adjusted for maternal characteristics and glycated hemoglobin (HbA1c) and area under the receiver operating characteristics curve (AUC).

Results

Among 180 T1DM pregnancies, 118 (66%) had an LGA neonate at birth. At 28 weeks of pregnancy, they were predicted with AUCHC/AC = 0.67, AUCAC = 0.85, and AUCEFW = 0.86. The multivariate analysis did not improve the predictive performance of the HC/AC ratio or AC. Among 87 T2DM pregnancies, 36 (41%) had an LGA neonate at birth. At 28 weeks, they were predicted with AUCHC/AC = 0.73, AUCAC = 0.83, and AUCEFW = 0.87. In T2DM, the multivariate analysis significantly improved the predictive performance for both HC/AC ratio and AC from 20 weeks of pregnancy.

Conclusion

In T1DM and T2DM pregnancies, LGA is characterized by a general fetal overgrowth including both AC and HC. Therefore, AC and EFW perform better than the HC/AC ratio in the prediction of LGA. In T2DM, as opposed to T1DM, the predictive performance was improved by the inclusion of maternal characteristics and HbA1c in the analysis. (Author)
Full URL: https://doi.org/10.1002/ijgo.15711

2024-07834

Large for Gestational Age and Adverse Outcomes: Stratified By Diabetes Status. Nazeer SA, Chen HY, Cornthwaite JA, et al (2025), American Journal of Perinatology vol 42, no 1, January 2025, pp 14-24

Objective To examine the association of adverse outcomes among parturients with large for gestational age (LGA; birth weight ≥ 90th) newborns, stratified by diabetes status. Additionally, we described the temporal trends of adverse outcomes among LGA neonates.

Study Design This retrospective cohort study used the U.S. Vital Statistics dataset between 2014 and 2020. The inclusion criteria were singleton, nonanomalous LGA live births who labored and delivered at 24 to 41 weeks with known diabetes status. The coprimary outcomes were composite neonatal adverse outcomes of the following: Apgar score < 5 at 5 minutes, assisted ventilation > 6 hours, seizure, or neonatal or infant mortality, and maternal adverse outcomes of the following: maternal transfusion, ruptured uterus, unplanned hysterectomy, admission to intensive care unit, or unplanned procedure. Multivariable Poisson regression models were used to estimate adjusted relative risks (aRR) and 95% confidence intervals (CI). Average annual percent change (AAPC) was calculated to assess changes in rates of LGA and morbidity over time.

Results Of 27 million births in 7 years, 1,843,467 (6.8%) met the inclusion criteria. While 1,656,888 (89.9%) did not have diabetes, 186,579 (10.1%) were with diabetes. Composite neonatal adverse outcomes (aRR = 1.48, 95% CI = 1.43, 1.52) and composite maternal adverse outcomes (aRR = 1.37, 95% CI = 1.36, 1.38) were significantly higher among individuals with diabetes, compared with those without diabetes. From 2014 to 2020, the LGA rate was stable among people without diabetes. However, there was a downward trend of LGA in people with diabetes (AAPC = − 2.4, 95% CI = − 3.5, −1.4).

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RCM Information Services Limited is a subsidiary of The Royal College of Midwives

Conclusion In pregnancies with LGA newborns, composite neonatal and maternal morbidities were higher in those with diabetes, compared with those without diabetes. (Author)

2024-07624

Caring for pregnant women with pre-existing and gestational diabetes. Royal College of Midwives (2022), Royal College of Midwives, London, September 2022. 7 pages

Guidelines produced by the Royal College of Midwives (RCM) on the care of women with pre-existing and gestational diabetes. Suggests that care should be personalised and women should be encouraged to achieve independence and manage glycaemic control. (LDO)

Full URL: https://www.rcm.org.uk/media/6337/caring-for-pregnant-with-pre-existing-and-gestational-diabetes_digital.pdf

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2024-06406

Metformin may be as safe as insulin during pregnancy, 11-year data shows. Anon (2024), Endocrine Society 2 June 2024

Metformin is safe to use during pregnancy to manage diabetes, with no long-term adverse effects on the children born and their mothers for at least 11 years after childbirth, according to research presented Sunday at ENDO 2024, the Endocrine Society's annual meeting in Boston, Mass. This is the first study to look at longer term effects of metformin use during pregnancy. (Author)

Full URL: https://www.endocrine.org/news-and-advocacy/news-room/2024/endo-2024-press-dutta

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2024-06180

Gestational weight gain and pregnancy outcomes in Chinese women with type 2 diabetes mellitus: evidence from a tertiary hospital in Beijing. Yan X, Jia J, Zheng W, et al (2024), Frontiers in Endocrinology 2 April 2024, online

Objective: To examine the effects of gestational weight gain on pregnancy outcomes and determine the optimal range of weight gain during pregnancy for Chinese women with type 2 diabetes mellitus.

Methods: This retrospective cohort study included 691 Chinese women with type 2 diabetes mellitus from 2012 to 2020. The study utilized a statistical-based approach to determine the optimal range of gestational weight gain. Additionally, multivariate logistic regression analysis was conducted to assess the impact of gestational weight gain on pregnancy outcomes.

Results: (1) In the obese subgroup, gestational weight gain below the recommendations was associated with decreased risks of large for gestational age (adjusted odds ratio [aOR] 0.19; 95% confidence interval [CI] 0.06-0.60) and macrosomia (aOR 0.18; 95% CI 0.05-0.69). In the normal weight subgroup, gestational weight gain below the recommendations of the Institute of Medicine was associated with decreased risks of preeclampsia (aOR 0.18; 95% CI 0.04-0.82) and neonatal hypoglycemia (aOR 0.38; 95% CI 0.15-0.97). (2) In the normal weight subgroup, gestational weight gain above the recommendations of the Institute of Medicine was associated with an increased risk of large for gestational age (aOR 4.56; 95% CI 1.54-13.46). In the obese subgroup, gestational weight gain above the recommendations was associated with an increased risk of preeclampsia (aOR 2.74; 95% CI 1.02, 7.38). (3) The optimal ranges of gestational weight gain, based on our study, were 9-16 kg for underweight women, 9.5-14 kg for normal weight women, 6.5-12 kg for overweight women, and 3-10 kg for obese women. (4) Using the optimal range of gestational weight gain identified in our study seemed to provide better prediction of adverse pregnancy outcomes.

Conclusion: For Chinese women with type 2 diabetes, inappropriate gestational weight gain is associated with adverse pregnancy outcomes, and the optimal range of gestational weight gain may differ from the Institute of Medicine recommendations. (Author)

Full URL: https://doi.org/10.3389/fendo.2024.1348382

2024-06172

Hemoglobin A1c in early pregnancy to identify preexisting diabetes mellitus and women at risk of hyperglycemic pregnancy complications. Cheung KW, Au TS, Ng VWY, et al (2024), AJOG Global Reports vol 4, no 1, February 2024, 100315

BACKGROUND

Unrecognized diabetes mellitus during pregnancy could pose serious maternal and neonatal complications. A hemoglobin A1c level of ≥6.5% was used to diagnose both diabetes mellitus in nonpregnant individuals and diabetes

in pregnancy. As the hemoglobin A1c level could be influenced by maternal physiological changes, the optimal cutoff in early pregnancy to detect women with diabetes in pregnancy and associated complications remains unclear.

OBJECTIVE

This study aimed to evaluate the diagnostic performance of various hemoglobin A1c levels and the optimal hemoglobin A1c cutoff to identify mothers with diabetes in pregnancy diagnosed by the gold standard 75 g oral glucose tolerance test before 24 weeks of gestation. In addition, the pregnancy and neonatal outcomes were compared using the optimal hemoglobin A1c cutoff.

STUDY DESIGN

A retrospective cohort study was conducted between 2004 and 2019. Women with at least 1 risk factor of gestational diabetes mellitus received an oral glucose tolerance test before 24 weeks of gestation. Terminology of hyperglycemia first detected during pregnancy by oral glucose tolerance test was classified as either diabetes in pregnancy or gestational diabetes mellitus following the World Health Organization's recommendation. Women who met the diagnostic criteria of diabetes in pregnancy and early-onset gestational diabetes mellitus (ie, before 24 weeks of gestation) and had a paired hemoglobin A1c measurement within 4 weeks of their early oral glucose tolerance test were studied. Sensitivity, specificity, and positive and negative predictive values at various hemoglobin A1c cutoffs were calculated for the detection of diabetes in pregnancy. The optimal hemoglobin A1c level was identified from the constructed receiver operating characteristic curves. Multivariate binary logistic regression analyses were performed to calculate the unadjusted and adjusted odds ratios for pregnancy complications.

RESULTS

There were 63,111 deliveries, and 22,949 women underwent an oral glucose tolerance test before 24 weeks of gestation. A total of 157 and 3210 women met the diagnostic criteria of diabetes in pregnancy and early-onset gestational diabetes mellitus using an oral glucose tolerance test, respectively. Only 346 participants had a paired hemoglobin A1c and oral glucose tolerance test measurement (82 cases with diabetes in pregnancy and 264 cases with early-onset gestational diabetes mellitus). The receiver operating characteristic curve identified an optimal hemoglobin A1c cutoff of 5.7% to diagnose diabetes in pregnancy, with a sensitivity of 64.6%, specificity of 81.1%, positive predictive value of 51.5%, and negative predictive value of 88.1%. A hemoglobin A1c cutoff of either 5.9% or 6.5% could miss 47.6% or 73.2% of women with diabetes in pregnancy. In multivariate logistic regression analysis, a hemoglobin A1c level of ≥5.7% increased the risk of maternal insulin use (adjusted odds ratio, 6.69; 95% confidence interval, 3.44–12.99), macrosomia (adjusted odds ratio, 7.43; 95% confidence interval, 1.90–29.00), and shoulder dystocia (adjusted odds ratio, 6.56; 95% confidence interval, 1.161–37.03).

CONCLUSION

The optimal hemoglobin A1c cutoff to detect diabetes in pregnancy diagnosed using an oral glucose tolerance test before 24 weeks of gestation was 5.7%, but this cutoff could not reliably identify diabetes in pregnancy owing to the low sensitivity. However, an early hemoglobin A1c level of ≥5.7% indicated increased risks of pregnancy and neonatal complications. (Author)

Full URL: https://doi.org/10.1016/j.xagr.2024.100315

2024-06169

The interplay of inflammation and placenta in maternal diabetes: insights into Hofbauer cell expression patterns.

Tauber Z, Burianova A, Koubova K, et al (2024), Frontiers in Immunology 25 March 2024, online

Introduction: Inflammation of the placenta is harmful to both the fetus and the mother. Inflammation is strongly associated with diabetes, a common complication of pregnancy. Hofbauer cells (HBCs), unique immune system cells of fetal origin in the placenta, play complex roles, including growth of placental villi and their branching, stromal remodelling, and angiogenesis.

Methods: Our study investigated the expression of IL-1β, IL-10, CYP2C8, CYP2C9, CYP2J2 and sEH in HBCs from patients with type 1 diabetes mellitus (T1DM) and gestational diabetes mellitus (GDM) compared to healthy controls using immunohistochemistry. We also assessed the structure of the villus stroma using Masson´s trichrome.

Results: In T1DM, HBCs showed inflammatory activation characterised by increased IL-1β and decreased CYP epoxygenase expression compared to normal placentas. Conversely, significant inflammation in HBCs appeared less likely in GDM, as levels of IL-1β and CYP epoxygenases remained stable compared to normal placentas. However, GDM

showed a significant increase in sEH expression. Both types of diabetes showed delayed placental villous maturation and hypovascularisation, with GDM showing a more pronounced effect.

Conclusion: The expression profiles of IL-1β, CYP epoxygenases and sEH significantlly differ between controls and diabetic placentas and between T1DM and GDM. These facts suggest an association of the CYP epoxygenase-EETs-sEH axis with IL-1β expression as well as villous stromal hypovascularisation. Given the stable high expression of IL-10 in both controls and both types of diabetes, it appears that immune tolerance is maintained in HBCs. (Author)
Full URL: https://doi.org/10.3389/fimmu.2024.1386528

2024-06077

How pregnant women with diabetes experience telemonitoring of the fetal heart rate – An interview study. Jepsen I, Nielsen JH, Eriksen SA, et al (2024), European Journal of Obstetrics & Gynecology and Reproductive Biology 29 April 2024, online

Objectives

The use of telemonitoring in healthcare is generally increasing. Women with complicated pregnancies are using telemonitoring as an alternative to conventional management, encompassing hospitalization or frequent outpatient clinic visits. However, there is sparse evidence on how pregnant women experience monitoring of their unborn babies at home. Women might feel uncomfortable with this responsibility, and moreover they might miss face-to-face contact with healthcare personnel.

Study design

The study setting was a Danish hospital with a tertiary obstetric unit attending approximately 3400 births annually. A qualitative study design with interview as method included 11 pregnant women with type 1 diabetes or Gestational Diabetes Mellitus. This design was used to investigate how pregnant women with complicated pregnancies experienced telemonitoring of the fetus. Reflexive thematic analysis was used to analyze the pregnant women's experiences of telemonitoring.

Results

Women with type 1 diabetes or Gestational Diabetes Mellitus found the advantages of telemonitoring to outweigh the disadvantages. They experienced telemonitoring as time-saving and that telemonitoring decreased the level of stress. Moreover, telemonitoring supports positive collaboration with healthcare professionals.

The women also experienced a lack of coordination of consultations between different departments at the hospital and challenges with timing, feedback, and technical issues. Moreover, the women requested an opportunity to discuss family formation and emotions.

Conclusions

Pregnant women with type 1 diabetes or Gestational Diabetes Mellitus benefit from the use of telemonitoring. To further improve the implementation and use of telemonitoring clinical implications, consider how timing and coordination of care, technical equipment, and feedback mechanisms could be improved. (Author)
Full URL: https://doi.org/10.1016/j.ejogrb.2024.04.039

2024-06025

Prematurity and congenital malformations differ according to the type of pregestational diabetes. Ballesteros M, Guarque A, Ingles M, et al (2024), BMC Pregnancy and Childbirth vol 24, no 335, May 2024

Background

Diabetes mellitus (DM) is the most common metabolic disorder in pregnancy. Women with Type 2 DM seems to have no better perinatal outcomes than those with Type 1 DM.

Methods

Single-center prospective cohort observational study. Pregnant women with diabetes (141 with Type 1 DM and 124 with Type 2 DM) that were followed in the university hospital between 2009 and 2021 were included in this study. Clinical data and obstetric and perinatal outcomes were collected.

Results

As expected, women with Type 1 DM were younger and had a longer duration of diabetes than women with Type 2 DM. Obesity and chronic hypertension were higher in the group of women with Type 2 DM and their value of HbA1c in the second and third trimesters were lower than in Type 1 DM. No differences in prematurity were found, but more extreme prematurity was observed in Type 2 DM, as well as a higher rate of congenital malformations. The frequency of hypoglycemia and the weight of the newborn was higher in Type 1 DM. The maternal independent factors related to the weight of the newborn were: the glycemic control at the third trimester, the weight gain during pregnancy, and

pregestational BMI.

Conclusions

Newborns born to mothers with Type 1 DM were larger and had a higher frequency of hypoglycemia, while congenital malformations and precocious preterm was more associated to Type 2 DM. Metabolic control, weight gain and pregestational weight were important determinants of both obstetric and neonatal complications. (Author)

Full URL: https://doi.org/10.1186/s12884-024-06470-7

2024-05851

Diabetes mellitus in pregnancy across Canada. Nelson CRM, Dzakpasu S, Moore AM, et al (2024), BMC Pregnancy and Childbirth vol 24, no 349, May 2024

Background

Contemporary estimates of diabetes mellitus (DM) rates in pregnancy are lacking in Canada. Accordingly, this study examined trends in the rates of type 1 (T1DM), type 2 (T2DM) and gestational (GDM) DM in Canada over a 15-year period, and selected adverse pregnancy outcomes.

Methods

This study used repeated cross-sectional data from the Canadian Institute of Health Information (CIHI) hospitalization discharge abstract database (DAD). Maternal delivery records were linked to their respective birth records from 2006 to 2019. The prevalence of T1DM, T2DM and GDM were calculated, including relative changes over time, assessed by a Cochrane-Armitage test. Also assessed were differences between provinces and territories in the prevalence of DM.

Results

Over the 15-year study period, comprising 4,320,778 hospital deliveries in Canada, there was a statistically significant increase in the prevalence of GDM and T1DM and T2DM. Compared to pregnancies without DM, all pregnancies with any form of DM had higher rates of hypertension and Caesarian delivery, and also adverse infant outcomes, including major congenital anomalies, preterm birth and large-for-gestational age birthweight.

Conclusion

Among 4.3 million pregnancies in Canada, there has been a rise in the prevalence of DM. T2DM and GDM are expected to increase further as more overweight women conceive in Canada. (Author)

Full URL: https://doi.org/10.1186/s12884-024-06534-8

2024-05727

The IRELAnD study—investigating the role of early low-dose aspirin in diabetes mellitus: a double-blinded, placebo-controlled, randomized trial. Finnegan C, Dicker P, Asandei D, et al (2024), American Journal of Obstetrics & Gynecology MFM vol 6, no 4, April 2024, 101297

BACKGROUND

Although aspirin therapy is being increasingly advocated with the intention of risk modification for a wide range of pregnancy complications, women with prepregnancy diabetes mellitus are commonly excluded from clinical trials.

OBJECTIVE

The primary aim of this study was to examine the effect of aspirin therapy on a composite measure of adverse perinatal outcome in pregnancies complicated by pregestational diabetes mellitus.

STUDY DESIGN

A double-blinded, placebo-controlled randomized trial was conducted at 6 university-affiliated perinatology centers. Women with type 1 diabetes mellitus or type 2 diabetes mellitus of at least 6 months' duration were randomly allocated to 150-mg daily aspirin or placebo from 11 to 14 weeks' gestation until 36 weeks. Established vascular complications of diabetes mellitus, including chronic hypertension or nephropathy, led to exclusion from the trial. The primary outcome was a composite measure of placental dysfunction (preeclampsia, fetal growth restriction, preterm birth <34 weeks' gestation, or perinatal mortality). The planned sample size was 566 participants to achieve a 35% reduction in the primary outcome, assuming 80% statistical power. Secondary end points included maternal and neonatal outcomes and determination of insulin requirements across gestation. Data were centrally managed using ClinInfo and analyzed using SAS 9.4. The 2 treatment groups were compared using t tests or chi-square tests, as required, and longitudinal data were compared using a repeated-measures analysis.

RESULTS

From February 2020 to September 2022, 191 patients were deemed eligible, 134 of whom were enrolled (67

randomized to aspirin and 67 to placebo) with a retrospective power of 64%. A total of 101 (80%) women had type 1 diabetes mellitus and 25 (20%) had type 2 diabetes mellitus. Reaching the target sample size was limited by the impact of the COVID-19 pandemic. Baseline characteristics were similar between the aspirin and placebo groups. Treatment compliance was very high and similar between groups (97% for aspirin, 94% for placebo). The risk of the composite measure of placental dysfunction did not differ between groups (25% aspirin vs 21% placebo; P=.796). Women in the aspirin group had significantly lower insulin requirements throughout pregnancy compared with the placebo group. Insulin requirements in the aspirin group increased on average from 0.7 units/kg at baseline to 1.1 units/kg by 36 weeks' gestation (an average 83% within-patient increase), and increased from 0.7 units/kg to 1.3 units/kg (a 181% within-patient increase) in the placebo group, over the same gestational period (P=.002). Serial hemoglobin A1c levels were lower in the aspirin group than in the placebo group, although this trend did not reach statistical significance.

CONCLUSION

In this multicenter, double-blinded, placebo-controlled randomized trial, aspirin did not reduce the risk of adverse perinatal outcome in pregnancies complicated by prepregnancy diabetes mellitus. Compared with the placebo group, aspirin-treated patients required significantly less insulin throughout pregnancy, indicating a beneficial effect of aspirin on glycemic control. Aspirin may exert a plausible placenta-mediated effect on pregestational diabetes mellitus that is not limited to its antithrombotic properties. (Author)

Full URL: https://doi.org/10.1016/j.ajogmf.2024.101297

2024-05721

Glycemic control assessed by continuous glucose monitoring during pregnancy in women with type 1 diabetes and its association with preeclampsia, an observational Swedish cohort study. Ögge LE, Dotevall A, Elfvin A, et al (2024), Acta Obstetricia et Gynecologica Scandinavica vol 103, no 7, July 2024, pp 1426-1436

Introduction

Women with type 1 diabetes have an increased risk of preeclampsia (PE), but it is not fully understood if degree of glycemic control is associated with this risk. The aim of this study was to assess glycemic control during pregnancy analyzed by continuous glucose monitoring (CGM) in women with and without PE and to investigate if glycemic control is associated with increased risk of PE.

Material and Methods

A total of 120 pregnant Swedish women with type 1 diabetes using CGM were included. Background factors and pregnancy outcomes were collected from medical records. CGM data were collected via the internet-based platform Diasend. Mean glucose, standard deviation of mean glucose, percentage of time in target, time below target, and time above target were presented for each trimester in women who did or did not develop PE. Associations between CGM-derived metrics and PE were analyzed with logistic regression and adjusted for confounders.

Results

Twenty-two women (18.3%) developed PE. There were no significant differences in maternal characteristics between women with and without PE. Glycemic control improved in each trimester but was suboptimal in both groups. Time in target increased from 59% in the non-PE group and 54% in the PE group in the first trimester to 65% in both groups in the third trimester. There were no significant associations between glycemic control and PE after adjustment for confounders.

Conclusions

Degree of glycemic control during pregnancy assessed by CGM was not associated with development of PE in women with type 1 diabetes. However, more research is needed to understand the role of glycemic control in relation to development of PE. (Author)

Full URL: https://doi.org/10.1111/aogs.14856

2024-05170

Glucose control during pregnancy in patients with type 1 diabetes correlates with fetal hemodynamics: a prospective longitudinal study. Simjak P, Anderlova K, Smetanová D, et al (2024), BMC Pregnancy and Childbirth vol 24, no 264, 11 April 2024

Background

Maternal diabetes adversely affects fetal cardiovascular system development. Previous studies have reported that the fetuses of mothers with diabetes exhibit both structural and functional changes; nevertheless, prior studies have not examined the association between glucose control and fetal cardiac morphology and performance. Thus, the

objective was to determine the association between fetal cardiac morphology and function and maternal glucose control in type 1 diabetes and to compare the differences in measured cardiac parameters between the fetuses of mothers with diabetes and healthy controls.

Methods
In this prospective, longitudinal case-control study — including 62 pregnant women with type 1 diabetes mellitus and 30 healthy pregnant women — fetal cardiac assessment using B-mode, M-mode, and spectral pulsed-wave Doppler was performed in the second and third trimesters. In women with T1DM, glycated hemoglobin and data obtained from glucose sensors — including the percentage of time in, below, and above the range (TIR, TBR, and TAR, respectively), and coefficient of variation (CV) — were analyzed across three time periods: the last menstrual period to 13 (V1), 14–22 (V2), and 23–32 weeks (V3) of gestation. Fetal cardiac indices were compared between groups, and the correlation between glucose control and fetal cardiac indices was assessed.

Results
At 28–32 weeks, the fetuses of women with T1DM exhibited increased left ventricular end-diastolic length, relative interventricular septum thickness, right ventricular cardiac output, and pulmonary valve peak systolic velocity compared with healthy controls. At 18–22 weeks, pulmonary and aortic valve diameters, left and right ventricular stroke volumes, and left cardiac output inversely correlated with the CV and glycated hemoglobin levels at V1 and V2. Furthermore, at 28–32 weeks, pulmonary and aortic valve diameters, left ventricular stroke volume, cardiac output, and right/left atrioventricular valve ratio inversely correlated with the TBR at V1, V2, and V3. Moreover, diastolic functional parameters correlated with the TAR and glycated hemoglobin levels, particularly after the first trimester.

Conclusion
In women with T1DM, maternal hyperglycemia during pregnancy correlates with fetal diastolic function, whereas glucose variability and hypoglycemia inversely correlate with fetal left ventricular systolic function in the second and third trimesters. (Author)
Full URL: https://doi.org/10.1186/s12884-024-06462-7

2024-04877

Joint Association of Dietary Protein Intake and Eating Habits with the Risk of Gestational Diabetes Mellitus: A Case-Control Study. Gong K, Xie L, Cao Y, et al (2023), Nutrients vol 15, no 20, October 2023, 4332

Because the associations between different dietary protein sources and the risks of gestational diabetes mellitus (GDM) are inconsistent, and those of eating habits with GDM have rarely been explored, we aimed to investigate the independent and joint association of major dietary protein sources and eating habits with GDM in a case-control study including 353 GDM cases and 718 controls in China. Dietary protein intake and eating habits prior to GDM diagnosis were collected through questionnaires at 24~28 gestational weeks. Multivariate logistic regression was used to evaluate the independent and joint associations of dietary protein intake and eating habits with GDM. The Anderson model was used assess if there is an additive interaction between them. Animal protein, red meat protein and dairy products protein intake were significantly and positively associated with GDM. Among the eating habits, preferences for hot food, firm food and soft food were significantly associated with higher odds of GDM. Individuals with unhealthy eating habits and high dietary protein simultaneously had the highest odds of GDM, and the ORs were 2.06 (1.25, 3.41) for the total protein, 2.97 (1.78, 4.96) for animal meat, 3.98 (2.41, 6.57) for the red meat protein and 2.82 (1.81, 4.41) for the dairy protein; the p values for the trend were all significant ($p < 0.001$). However, no additive interaction was detected. In conclusion, our study found that dietary protein intake and eating habits prior to GDM diagnosis were both independently and jointly associated with the odds of GDM. (Author)
Full URL: https://doi.org/10.3390/nu15204332

2024-04876

The Impact of Dietary Factors during Pregnancy on the Development of Islet Autoimmunity and Type 1 Diabetes: A Systematic Literature Review. Johansen VBI, Josefsen K, Antvorskov JC (2023), Nutrients vol 15, no 20, October 2023, 4333

Aims and hypothesis: The incidence of type 1 diabetes mellitus in children is considerably increasing in western countries. Thus, identification of the environmental determinants involved could ultimately lead to disease prevention. Here, we aimed to systematically review (PROSPERO ID: CRD42022362522) the current evidence of the association between maternal dietary factors during gestation and the risk of developing type 1 diabetes and/or islet autoimmunity (IA) in murine and human offspring. Methods: In accordance with PRISMA guidelines, the present systematic review searched PubMed and Scopus (n = 343) for different combinations of MeSH terms, such as type 1

diabetes, diet, islet autoimmunity, prenatal, nutrient, gluten, gliadin, vitamin, milk, and fibers. Results: We found that the most investigated dietary factors in the present literature were gluten, dietary advanced glycosylated end products (dAGEs), vitamin D, fatty acids, and iron. The results concerning prenatal exposure to a gluten-free environment showed a consistently protective effect on the development of IA. Prenatal exposures to vitamin D and certain fatty acids appeared to protect against the development of IA, whereas in utero iron and fat exposures correlated with increased risks of IA. Conclusion: We conclude that a definite association is not established for most factors investigated as the literature represents a heterogeneous pool of data, although fetal exposures to some maternal dietary components, such as gluten, show consistent associations with increased risks of IA. We suggest that human prospective dietary intervention studies in both cohort and clinical settings are crucial to better evaluate critical and protective prenatal exposures from the maternal diet during pregnancy. (Author)

Full URL: https://doi.org/10.3390/nu15204333

2024-04860

Perinatal Plasma Carotenoids and Vitamin E Concentrations with Glycemia and Insulin Resistance in Women during and after Pregnancy. Lai JS, Godfrey KM, Ong CN, et al (2023), Nutrients vol 15, no 20, October 2023, 4421

We examined the associations of perinatal plasma carotenoids and E vitamers concentrations with glycemia, insulin resistance, and gestational and type 2 diabetes mellitus during pregnancy and post-pregnancy in GUSTO women. Plasma carotenoid and E vitamer concentrations were measured at delivery, and principal component analysis was used to derive the patterns of their concentrations. Fasting and 2 h glucose levels and fasting insulin were measured at 26–28 weeks gestation and 4–6 years post-pregnancy, with the derivation of homeostatic model assessment for insulin resistance (HOMA-IR). In 678 women, two carotenoid patterns (CP1: α- and β-carotene and lutein; CP2: zeaxanthin, lycopene, and β-cryptoxanthin) and one E vitamer pattern (VE: γ-, δ-, and α-tocopherols) were derived. A higher CP1 score (1-SD) was associated with lower gestational fasting glucose (β (95%CI): −0.06 (−0.10, −0.02) mmol/L) and lower gestational (−0.17 (−0.82, 0.01) mmol/L, p = 0.06) and post-pregnancy HOMA-IR (−0.11 (−0.15, −0.08) mmol/L). A higher VE score (1 SD) was associated with higher gestational and post-pregnancy fasting and 2 h glucose (gestational: 0.05 (0.01, 0.08) and 0.08 (0.01, 0.16); post-pregnancy: 0.19 (0.07, 0.31) and 0.24 (0.06, 0.42) mmol/L). Higher α- and β-carotene and lutein may be beneficial for gestational fasting glycemia, but higher vitamin E may increase gestational and post-pregnancy glycemia, although these findings require confirmation in cohorts with prospective longitudinal measurements of these vitamins. (Author)

Full URL: https://doi.org/10.3390/nu15204421

2024-04811

Study on the Dose–Response Relationship between Magnesium and Type 2 Diabetes of Childbearing Women in the China Adult Chronic Disease and Nutrition Surveillance 2015. Zhang H, Yang J, Cao Y, et al (2024), Nutrients vol 16, no 7, April 2024, p 1018

Background: Magnesium (Mg) is an essential element and participates in many metabolic pathways. Many studies have found a certain negative correlation between magnesium and blood glucose parameters, but the dose–response relationship between them is still a relatively narrow research field. We aim to explore the dose–response relationship between plasma and dietary Mg and type 2 diabetes (T2DM) among childbearing women in a nationally representative sample. And we will also initially explore the threshold of dietary and plasma magnesium in the prevention of T2DM and their consistency. Methods: A total of 2912 18–44 year-old childbearing women were recruited from the China Adult Chronic Disease and Nutrition Surveillance (2015). Multivariate logistic regression was used to explore the dose–response relationship between plasma and dietary Mg and glucose parameters. The threshold effect between Mg and T2DM was explored by a restricted cubic spline regression. Results: It was found that when plasma Mg was increased by 0.041 mmol/L, the risk of T2DM, impaired fasting glucose (IFG), and HbA1c-hyperglycemia was reduced by 18%, 19%, and 18%, respectively. The possible threshold value for plasma Mg to prevent the risk of T2DM was 0.87 mmol/L. Through the quality control of the sample dietary survey data, 2469 cases were finally included for dietary analysis. And the possible threshold value for dietary Mg to prevent the risk of T2DM was 408 mg/d. Taking the recommended dietary Mg intake of 330 mg/d as the reference group, when the Mg intake reached 408 mg/d, the risk of T2DM was significantly reduced. And the average plasma Mg level of the people whose dietary intake reached 408 mg/d was 0.87 mmol/L. Conclusions: These results indicate that dietary Mg and plasma Mg have good consistency on the threshold effect of glucose parameters in women of childbearing age. (Author)

Full URL: https://doi.org/10.3390/nu16071018

2024-04476

Perceptions of diabetes distress during pregnancy in women with type 1 and type 2 diabetes: a qualitative interpretive description study. Tschirhart H, Landeen J, Yost J, et al (2024), BMC Pregnancy and Childbirth vol 24, no 232, April 2024

Background
Diabetes distress is commonly seen in adults with pre-existing diabetes and is associated with worsened glycemic management and self-management practices. While a majority of women report increased stress during pregnancy, it is unknown how women with type 1 or type 2 diabetes experience diabetes distress during this unique and transitional time.

Purpose
This study aimed to understand the experiences and perceptions of diabetes distress in women with pre-existing diabetes during pregnancy.

Methods
A qualitative study using an interpretive description approach was conducted. In-depth, one to one interviewing was used to capture rich descriptions of the pregnancy experience. Nested, stratified, and theoretical sampling was used to recruit 18 participants with type 1 and type 2 diabetes from the quantitative strand of this mixed methods study. Constant comparative analysis was used to inductively analyze the data and develop themes.

Findings
Four themes, each with several subthemes, emerged under the main finding of “Diabetes Distress”: 1) Worry for Baby’s Health – “What’s this going to do to the baby?”’ 2) Feeling Overwhelmed with Diabetes Management—“It just seemed unattainable”; 3) Living with Diabetes – “There’s no way out” and 4) Cycle of Diabetes Distress.

Conclusions
The findings from this study identify the sources and experiences of diabetes distress during pregnancy in women with pre-existing diabetes. Diabetes distress often presents as cyclical and multifaceted during pregnancy, with elements of fear for the unborn baby, difficulties with diabetes management, and having negative lived experiences of diabetes. Further work is needed to develop appropriate screening tools for pregnancy and interventions to mitigate diabetes distress. Diabetes educators are well-positioned provide emotional support and person-centred self-management education to individuals with diabetes. (Author)

Full URL: https://doi.org/10.1186/s12884-024-06370-w

2024-04288

Gestational Diabetes and Diabetes in Pregnancy [written answer]. Northern Ireland Assembly (2024), Hansard Written question AQW 6791/22-27, 16 February 2024

Mr Robin Swann responds to a written question from Ms Sian Mulholland to the Minister of Health, asking for details of the number of pregnant women living with (i) Type 1 diabetes; (ii) Type 2 diabetes; and (iii) gestational diabetes, in the last twelve months. (JSM)

Full URL: https://aims.niassembly.gov.uk/questions/printquestionsummary.aspx?docid=389102

2024-03989

Research Progress of Maternal Metabolism on Cardiac Development and Function in Offspring. Ren Z, Luo S, Cui J, et al (2023), Nutrients vol 15, no 15, August 2023, 3388

The developmental origin of health and disease (DOHaD) hypothesis refers to the adverse effects of suboptimal developmental environments during embryonic and early fetal stages on the long-term health of offspring. Intrauterine metabolic perturbations can profoundly impact organogenesis in offspring, particularly affecting cardiac development and giving rise to potential structural and functional abnormalities. In this discussion, we contemplate the existing understanding regarding the impact of maternal metabolic disorders, such as obesity, diabetes, or undernutrition, on the developmental and functional aspects of the offspring’s heart. This influence has the potential to contribute to the susceptibility of offspring to cardiovascular health issues. Alteration in the nutritional milieu can influence mitochondrial function in the developing hearts of offspring, while also serving as signaling molecules that directly modulate gene expression. Moreover, metabolic disorders can exert influence on cardiac development-related genes epigenetically through DNA methylation, levels of histone modifications, microRNA expression, and other factors. However, the comprehensive understanding of the mechanistic underpinnings of these phenomena remains incomplete. Further investigations in this domain hold profound clinical significance, as they can

contribute to the enhancement of public health and the prevention of cardiovascular diseases. (Author)
Full URL: https://doi.org/10.3390/nu15153388

2024-03680

A bumpy ride—Acute recurrent pancreatitis in pregnancy in a Type 2 diabetic, presenting with euglycemic diabetic ketoacidosis: A case report. Ali SS, Bhat S, Salih HA, et al (2024), International Journal of Gynecology & Obstetrics vol 166, no 2, August 2024, pp 897-898

We describe a case of recurrent idiopathic pancreatitis in a pregnant diabetic who presented with euglycemic diabetic ketoacidosis (DKA), was managed successfully and delivered a healthy baby. (Author)

2024-02540

Continuous glucose monitoring in pregnancies with type 1 diabetes: small increases in time-in-range improve maternal and perinatal outcomes. Sobhani NC, Goemans S, Nguyen A, et al (2024), American Journal of Obstetrics & Gynecology (AJOG) vol 231, no 4, October 2024, pp 467.e1-467.e8

Background

Continuous glucose monitors provide detailed information regarding glycemic control in pregnant patients with type 1 diabetes. Little data have been published examining the association between continuous glucose monitor parameters and perinatal outcomes among gravidas with type 1 diabetes using continuous glucose monitors.

Objective

This study aimed to examine the association between perinatal outcomes and time-in-range as assessed by continuous glucose monitors used in pregnant individuals with type 1 diabetes. We hypothesized that higher time-in-range would be associated with lower risk of adverse perinatal outcomes.

Study Design

This multicenter retrospective cohort study included all gravidas with type 1 diabetes using continuous glucose monitors who delivered from 2020 to 2022 at 5 University of California sites. Only those with continuous glucose monitor target range set to 70 to 140 mg/dL (±10 mg/dL) were included. Time-in-range (%) was recorded at 12, 16, 20, 24, 28, and 32 weeks. The primary maternal and neonatal outcomes were preeclampsia and large for gestational age, defined as birthweight ≥95th percentile. Kruskal–Wallis tests were used to compare median time-in-range between those with and without the primary outcomes. Log-binomial regression was used to obtain risk ratios, with adjustment for microvascular disease and years with type 1 diabetes.

Results

A total of 91 patients were included. Most used an insulin pump (81%) and did not have diabetic microvascular disease (72%). Median time since diagnosis of type 1 diabetes was 16 years, and median periconception hemoglobin A1c was 6.7%. Compared with those with preeclampsia, normotensive gravidas had significantly higher time-in-range at nearly every time point. A similar pattern was observed for those with normal-birthweight infants compared with large-for-gestational-age infants. On adjusted analyses, every 5-unit increase in time-in-range at 12 weeks was associated with 45% and 46% reductions in the risks of preeclampsia and large for gestational age, respectively (preeclampsia: adjusted risk ratio, 0.55; 95% confidence interval, 0.30–0.99; large for gestational age: adjusted risk ratio, 0.54; 95% confidence interval, 0.29–0.99).

Conclusion

Higher time-in-range is associated with lower risk of preeclampsia and large for gestational age. This association is observed early in gestation, when each 5-unit increase in time-in-range is associated with ⍰50% reduction in the risk of these complications. These findings can be used to counsel patients regarding the risk of pregnancy complications at specific time-in-range values, and to encourage patients that even small improvements in time-in-range can have significant impact on pregnancy outcomes. Larger studies are needed to further explore these findings and to identify optimal time-in-range to reduce perinatal complication rates. (Author)

2024-02320

Relationship of Glucose, C-peptide, Leptin, and BDNF in Maternal and Umbilical Vein Blood in Type-1 Diabetes. Delmis J, Oreskovic S, Elvedji Gasparovic V, et al (2023), Nutrients vol 15, no 3, February 2023, 600

The study aimed to determine the relationship between glucose, C-peptide, brain-derived neurotrophic factor (BDNF), and leptin between mother and fetus and neonatal weight. Methods: In the prospective observational cohort study, we included 66 women with type-1 diabetes mellitus (T1DM). According to the z-score for neonatal weight, patients were divided into healthy-weight neonates (n = 42) and overweight neonates (n = 24). The maternal blood samples were taken during pregnancy and cesarean section when the umbilical vein blood sample was also

withdrawn. The maternal vein sera were analyzed for fasting glucose, C-reactive protein (CRP), leptin, BDNF, TSH, FT3, and FT4. The umbilical vein sera were analyzed for glucose, C-peptide, leptin, TSH, thyroid-stimulating protein (FT3), free thyroxine (FT4), and BDNF concentration. The neonatologist measured the skinfold thickness on the third day of neonatal life. Results: A strong correlation was confirmed between maternal and umbilical vein glucose concentration and maternal glucose and C-peptide in umbilical vein blood. A negative correlation was found between the concentration of BDNF in the umbilical vein and glucose in maternal blood. A strong correlation was seen between BMI and maternal blood leptin concentration, neonatal fat body mass, and umbilical vein blood leptin concentration. Higher BMI elevated BDNF, and TSH increase the odds for overweight neonates in the first trimester of pregnancy. Maternal higher leptin concentration in the first trimester decrease the odds of overweight neonates. Conclusions: Maternal glucose concentrations affect the fetus's glucose, C-peptide, and BDNF concentrations. Leptin levels increase in maternal blood due to increased body mass index, and in the neonate, fat body mass is responsible for increased leptin concentrations. (Author)

Full URL: https://doi.org/10.3390/nu15030600

2024-02097

Changes in the shape and function of the fetal heart of pre- and gestational diabetes mothers. Li S, Wang L, Yang H, et al (2024), BMC Pregnancy and Childbirth vol 24, no 57, January 2024

Background

Hyperglycemia during pregnancy can affect fetal heart in many ways, including causing cardiac malformation, leading to hypertrophic cardiomyopathy and cardiac dysfunction. Echocardiographic evaluation can assist identify alterations in heart structure, morphology and function, enabling prompt monitoring and management. However, according to earlier research, the cardiac alterations are modest in hyperglycemic mothers' fetuses, and might not be detectable using conventional methods and it is also unclear whether these changes are related to the metabolism of mothers. Fetal Heart Quantification (Fetal HQ) can assess ventricular geometry and function more sensitively and thoroughly, and identify sub-clinical cardiac dysfunction. The purpose of this study was to evaluate fetal heart by Fetal HQ in fetuses of hyperglycemic mothers who either had pre-gestational or gestational diabetes and to correlate them with maternal metabolic indices.

Methods

The fetuses of 25 gestational age-matched control mothers, 48 women with gestational diabetes mellitus (GDM), and 11 women with diabetes mellitus (DM) were included in the prospective case-control research. Using fetal echocardiography and speckle tracking echocardiography (STE), the heart of the fetus was evaluated. Differences in the groups' anthropometric, metabolic, and cardiac parameters were examined. It was assessed whether maternal features, prenatal glucose, lipids, and maternal hemoglobin A1c (HbA1c) correlated with fetal cardiac parameters.

Results

The LV EDV and ESV were significantly higher in the GDM group as compared to the DM group ($p < 0.05$). The GSI% was significantly lower in the GDM group compared with the control ($p < 0.05$). The LV SV and CO of the GDM group were both significantly higher compared with the DM group ($p < 0.05$). There was a significant decrease in RV FS for segments 1–7 in GDM fetuses compared to the control ($p < 0.05$) and for segments 5–10 compared to DM ($p < 0.05$). Fetal cardiac morphology and function indices correlate with maternal pregestational weight, BMI, early pregnancy fast glucose, lipids, and glycemic control levels.

Conclusions

Fetuses exposed to gestational diabetes have altered heart morphology and function that is linked to maternal metabolic parameters, which presents a special indication for performing geometry and function cardiac assessment. Fetal HQ can be employed to evaluate the fetal cardiac shape and function in fetuses exposed to gestational diabetes. (Author)

Full URL: https://doi.org/10.1186/s12884-024-06262-z

2024-01775

Maternal Diabetes and Overweight and Congenital Heart Defects in Offspring. Turunen R, Pulakka A, Metsälä J, et al (2024), JAMA Network Open vol 7, no 1, January 2024, e2350579

Importance Maternal diabetes and overweight or obesity are known to be associated with increased risk of congenital heart defects (CHDs) in offspring, but there are no large studies analyzing outcomes associated with these factors in 1 model.

Objective To investigate the association of maternal diabetes and overweight or obesity with CHDs among offspring in 1 model.

Design, Setting, and Participants This nationwide, population-based register study was conducted in a birth cohort from Finland consisting of all children born between 2006 and 2016 (620 751 individuals) and their mothers. Data were analyzed from January 2022 until November 2023.

Exposures Maternal prepregnancy body mass index (BMI; calculated as weight in kilograms divided by height in meters squared), categorized as underweight (<18.5), normal (18.5-24.9), overweight (25.0-29.9), and obesity (≥30), was assessed. Maternal diabetes status, classified as no diabetes, type 1 diabetes (T1D), type 2 or other diabetes, and gestational diabetes, was assessed.

Main Outcomes and Measures Odds ratios (ORs) of isolated CHDs in children were found. In addition, 9 anatomical CHD subgroups were studied.

Results Of 620 751 children (316 802 males [51.0%]; 573 259 mothers aged 20-40 years [92.3%]) born in Finland during the study period, 10 254 children (1.7%) had an isolated CHD. Maternal T1D was associated with increased odds of having a child with any CHD (OR, 3.77 [95% CI, 3.26-4.36]) and 6 of 9 CHD subgroups (OR range, 3.28 [95% CI, 1.55-6.95] for other septal defects to 7.39 [95% CI, 3.00-18.21] for transposition of great arteries) compared with no maternal diabetes. Maternal overweight was associated with left ventricular outflow tract obstruction (OR, 1.28 [95% CI, 1.10-1.49]) and ventricular septal defects (OR, 0.92 [95% CI, 0.86-0.98]), and obesity was associated with complex defects (OR, 2.70 [95% CI, 1.14-6.43]) and right outflow tract obstruction (OR, 1.31 [95% CI, 1.09-1.58]) compared with normal maternal BMI.

Conclusions and Relevance This study found that maternal T1D was associated with increased risk for most types of CHD in offspring, while obesity and overweight were associated with increased risk for complex defects and outflow tract obstruction and decreased risk for ventricular septal defects. These different risk profiles of T1D and overweight and obesity may suggest distinct underlying teratogenic mechanisms. (Author)
Full URL: https://doi.org/10.1001/jamanetworkopen.2023.50579

2024-01699

What are the childbearing experiences of women with type 1 diabetes? A scoping review of qualitative literature.

Roddy J, McGowan L (2024), Midwifery vol 128, January 2024, 103884

Problem

Type 1 diabetes is associated with the risk of adverse outcomes for mother and baby.

Background

How pregnant people adapt to the challenges of type 1 diabetes and engage with healthcare professionals can affect how likely they will be to maintain good glycaemic control. Therefore, it is important to understand the childbearing and care experiences of women with type 1 diabetes.

Aim

To examine contemporary literature describing the childbearing experiences of women with type 1 diabetes over the last decade.

Method

The review follows 5 stages of Arksey and O'Malley's scoping review framework. Four databases were searched for English language publications 2012–2023 using indexed terms and Boolean operators. 64 studies were retrieved, 10 included in the review. Braun and Clarke's thematic synthesis process was used to collate findings.

Findings

Five key themes emerged: 1. Glycaemic control dominates the childbearing journey, 2. Emphasis on risk, 3. Importance of social and peer support, 4. Care organisation, systems, and communication, 5. The impact of technology on the childbearing experience.

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Conclusion

Based on lived experiences, women with type 1 diabetes value being treated as partners in their care by health professionals providing medical and midwifery services. Peer and social support from family, friends and the diabetes community can bring comfort and reassurance in a perceived 'medicalised' childbearing journey. Further research is needed on the impact of the use of type 1 diabetes technologies on childbearing experiences and how peer support can be incorporated into current care provision. (Author)

2024-01644

Pregnancy in women with cystic fibrosis and diabetes: An audit of outcomes at two tertiary obstetric hospitals in Australia in the pre-cystic fibrosis transmembrane conductance regulator modulator era. Davidson SJ, France M, Barrett HL, et al (2023), Obstetric Medicine vol 16, no 4, December 2023, pp 217-221

Background

Pregnancy in women with cystic fibrosis (CF) is becoming more common. Long-term metabolic issues such as diabetes are also becoming more common and have potentially important impacts on pregnancy outcomes. This study aimed to assess the impact of diabetes on pregnancy outcomes for women with CF.

Methods

We undertook a retrospective chart audit of pregnancies to women with CF at the two tertiary obstetric hospitals in Southeast Queensland associated with CF and transplant management clinics between 2006 and 2016.

Results

A total of 38 pregnancies among 26 women were identified. Four women (five pregnancies) had cystic fibrosis-related diabetes (CFRD) diagnosed prior to pregnancy, and 12 women (15 pregnancies) developed gestational diabetes (GDM) complicating pregnancy. CFRD and GDM were associated with higher rates of delivery complications, prematurity, and the need for neonatal intensive care unit admission.

Conclusion

Diabetes is common during pregnancy in women with CF and impacts pregnancy outcomes. (Author)

2024-01580

First Large Study of GLP-1 Receptor Agonists During Pregnancy. Harris E (2024), JAMA (Journal of the American Medical Association) vol 331, no 4, January 2024, p 280

Recent results provided "reassuring" early evidence that taking noninsulin antidiabetic medications (ADMs) for type 2 diabetes—including glucagon-like peptide 1 (GLP-1) receptor agonists—during early pregnancy is not linked with a greater risk of major birth defects than taking insulin. The researchers followed up the children of more than 50 000 pregnant people in 6 countries for 1 year after they were born, monitoring them for conditions such as cleft palate and congenital hydrocephalus. (Author)

2024-01031

Pre-gestational diabetes: Maternal body mass index and gestational weight gain are associated with augmented umbilical venous flow, fetal liver perfusion, and thus birthweight. Lund A, Ebbing C, Rasmussen S, et al (2021), PLoS ONE vol 16, no 8, August 2021, e0256171

Objectives

To assess how maternal body mass index and gestational weight gain are related to on fetal venous liver flow and birthweight in pregnancies with pre-gestational diabetes mellitus.

Methods

In a longitudinal observational study, 49 women with pre-gestational diabetes mellitus were included for monthly assessments (gestational weeks 24–36). According to the Institute Of Medicine criteria, body mass index was categorized to underweight, normal, overweight, and obese, while gestational weight gain was classified as insufficient, appropriate or excessive. Fetal size, portal flow, umbilical venous flow and distribution to the fetal liver or ductus venosus were determined using ultrasound techniques. The impact of fetal venous liver perfusion on birthweight and how body mass index and gestational weight gain modified this effect, was compared with a reference population (n = 160).

Results

The positive association between umbilical flow to liver and birthweight was more pronounced in pregnancies with pre-gestational diabetes mellitus than in the reference population. Overweight and excessive gestational weight gain

were associated with higher birthweights in women with pre-gestational diabetes mellitus, but not in the reference population. Fetuses of overweight women with pre-gestational diabetes mellitus had higher umbilical (p = 0.02) and total venous liver flows (p = 0.02), and a lower portal flow fraction (p = 0.04) than in the reference population. In pre-gestational diabetes mellitus pregnancies with excessive gestational weight gain, the umbilical flow to liver was higher than in those with appropriate weight gain (p = 0.02).

Conclusions
The results support the hypothesis that umbilical flow to the fetal liver is a key determinant for fetal growth and birthweight modifiable by maternal factors. Maternal pre-gestational diabetes mellitus seems to augment this influence as shown with body mass index and gestational weight gain. (Author)
Full URL: https://doi.org/10.1371/journal.pone.0256171

2024-00023

Population-based birth cohort study on diabetes in pregnancy and infant hospitalisations in Cree, other First Nations and non-Indigenous communities in Quebec. Huang R, Xiao L, Zhu J, et al (2023), BMJ Open vol 13, no 12, December 2023, e074518

Objectives Diabetes in pregnancy, whether pre-gestational (chronic) or gestational (de novo hyperglycaemia), increases the risk of adverse birth outcomes. It is unclear whether gestational diabetes increases the risk of postnatal morbidity in infants. Cree First Nations in Quebec are at high risk for diabetes in pregnancy. We assessed whether pre-gestational or gestational diabetes may increase infant hospitalisation (an infant morbidity indicator) incidence, and whether this may be related to more frequent infant hospitalisations in Cree and other First Nations in Quebec.

Design Population-based birth cohort study through administrative health data linkage.

Setting and participants Singleton infants (≤1 year) born to mothers in Cree (n=5070), other First Nations (9910) and non-Indigenous (48 200) communities in rural Quebec.

Results Both diabetes in pregnancy and infant hospitalisation rates were much higher comparing Cree (23.7% and 29.0%) and other First Nations (12.4% and 34.1%) to non-Indigenous (5.9% and 15.5%) communities. Compared with non-diabetes, pre-gestational diabetes was associated with an increased risk of any infant hospitalisation to a greater extent in Cree and other First Nations (relative risk (RR) 1.56 (95% CI 1.28 to 1.91)) than non-Indigenous (RR 1.26 (1.15 to 1.39)) communities. Pre-gestational diabetes was associated with increased risks of infant hospitalisation due to diseases of multiple systems in all communities. There were no significant associations between gestational diabetes and risks of infant hospitalisation in all communities. The population attributable risk fraction of infant hospitalisations (overall) for pre-gestational diabetes was 6.2% in Cree, 1.6% in other First Nations and 0.3% in non-Indigenous communities.

Conclusions The study is the first to demonstrate that pre-gestational diabetes increases the risk of infant hospitalisation overall and due to diseases of multiple systems, but gestational diabetes does not. High prevalence of pre-gestational diabetes may partly account for the excess infant hospitalisations in Cree and other First Nations communities in Quebec. (Author)
Full URL: https://doi.org/10.1136/bmjopen-2023-074518

2023-13555

Safety of GLP-1 Receptor Agonists and Other Second-Line Antidiabetics in Early Pregnancy. Cesta CE, Rotem R, Bateman BT, et al (2023), JAMA Internal Medicine 11 December 2023, online

Importance: Increasing use of second-line noninsulin antidiabetic medication (ADM) in pregnant individuals with type 2 diabetes (T2D) may result in fetal exposure, but theirteratogenic risk is unknown.
Objective: To evaluate periconceptional use of second-line noninsulin ADMs and whether it is associated with increased risk of major congenital malformations (MCMs) in the infant.
Design, setting, and participants: This observational population-based cohort study used data from 4 Nordic countries (2009-2020), the US MarketScan Database (2012-2021), and the Israeli Maccabi Health Services database (2009-2020). Pregnant women with T2D were identified and their live-born infants were followed until up to 1 year after birth.
Exposure: Periconceptional exposure was defined as 1 or more prescription fill of sulfonylureas, dipeptidyl peptidase 4 (DPP-4) inhibitors, glucagon-like peptide 1 (GLP-1) receptor agonists, and sodium-glucose cotransporter 2 (SGLT2) inhibitors, or insulin (active comparator) from 90 days before pregnancy to end of first trimester.

Main outcomes and measures: Relative risks (RRs) and 95% CIs for MCMs were estimated using log-binomial regression models, adjusting for key confounders in each cohort and meta-analyzed.
Results: Periconceptional exposure to second-line noninsulin ADMs differed between countries (32, 295, and 73 per 100 000 pregnancies in the Nordics, US, and Israel, respectively), and increased over the study period, especially in the US. The standardized prevalence of MCMs was 3.7% in all infants (n = 3 514 865), 5.3% in the infants born to women with T2D (n = 51 826), and among infants exposed to sulfonylureas was 9.7% (n = 1362); DPP-4 inhibitors, 6.1% (n = 687); GLP-1 receptor agonists, 8.3% (n = 938); SGLT2 inhibitors, 7.0% (n = 335); and insulin, 7.8% (n = 5078). Compared with insulin, adjusted RRs for MCMs were 1.18 (95% CI, 0.94-1.48), 0.83 (95% CI, 0.64-1.06), 0.95 (95% CI, 0.72-1.26), and 0.98 (95% CI, 0.65-1.46) for infants exposed to sulfonylureas, DPP-4 inhibitors, GLP-1 receptor agonists, and SGLT2 inhibitors, respectively.
Conclusions and relevance: Use of second-line noninsulin ADMs is rapidly increasing for treatment of T2D and other indications, resulting in an increasing number of exposed pregnancies. Although some estimates were imprecise, results did not indicate a large increased risk of MCMs above the risk conferred by maternal T2D requiring second-line treatment. Although reassuring, confirmation from other studies is needed, and continuous monitoring will provide more precise estimates as data accumulate. (Author)
Full URL: https://doi.org/10.1001/jamainternmed.2023.6663

2023-13424

Maternal and neonatal glycaemic control after antenatal corticosteroid administration in women with diabetes in pregnancy: A retrospective cohort study. Tuohy JF, Bloomfield FH, Crowther CA, et al (2021), PLoS ONE vol 16, no 2, February 2021, e0246175

Objective
To describe maternal and neonatal glycaemic control following antenatal corticosteroid administration to women with diabetes in pregnancy.

Design
Retrospective cohort study

Setting
A tertiary hospital in Auckland, New Zealand

Population
Women with diabetes in pregnancy who received antenatal corticosteroids from 2006–2016.

Methods
Corticosteroid administration, maternal and neonatal glycaemia data were retrieved from electronic patient records. Demographic data were downloaded from the hospital database. Relationships between variables were analysed using multivariate analysis.

Main outcome measures
Maternal hyperglycaemia and neonatal hypoglycaemia

Results
Corticosteroids were administered to 647 of 7317 of women with diabetes (8.8%) who gave birth to 715 babies. After an initial course of corticosteroids, 92% and 52% of women had blood glucose concentrations > 7 and > 10 mmol/L respectively. Median peak blood glucose concentration of approximately 10 mmol/L occurred 9 hours after corticosteroid administration and hyperglycaemia lasted approximately 72 hours. Thirty percent of women gave birth within 72 hours of the last dose of corticosteroids. Babies of women who were hyperglycaemic within 24 hours of birth were more likely to develop hypoglycaemia (< 2.6 mmol/L, OR 1.51 [95% CI 1.10–2.07], p = 0.01) and severe hypoglycaemia (≤ 2.0 mmol/L, OR 2.00 [95% CI 1.41–2.85], p < 0.0001) than babies of non-hyperglycaemic mothers. There was no association between maternal glycaemia within 7 days of the last dose of corticosteroids and neonatal hypoglycaemia.

Conclusions
Hyperglycaemia is common in women with diabetes in pregnancy following antenatal corticosteroid administration. Maternal hyperglycaemia in the 24 hours prior to birth is associated with increased risk of neonatal hypoglycaemia.

Limitations included the retrospective study design, so that not all data were available for all women and babies and the glucose testing schedule was variable. (Author)
Full URL: https://doi.org/10.1371/journal.pone.0246175

2023-13409

Adverse effects of type 2 diabetes mellitus on ovarian reserve and pregnancy outcomes during the assisted reproductive technology process. Qin X, Du J, He R, et al (2023), Frontiers in Endocrinology 15 November 2023, online

Objective: To study the effect of type 2 diabetes mellitus(T2DM)on overall ovarian reserve and pregnancy outcomes during assisted reproductive technology (ART) among childbearing infertile women.

Design: Retrospective cohort study.

Setting: The Reproductive Medicine Special Hospital, The First Hospital of Lanzhou University, between January 2019 and December 2022.

Patient(s): A total of 265 infertile female patients aged 20–45 years who underwent in vitro fertilization-embryo transfer (IVF-ET), intracytoplasmic sperm injection-embryo transfer (ICSI-ET), or rescue intracytoplasmic sperm injection-embryo transfer (RICSI-ET) in the first fresh cycle.

Intervention(s): None.

Main Outcome Measure(s): Serum Anti-Müllerian Hormone (AMH) levels, clinical pregnancy rate (CPR), live birth rate (LBR), and abortion rate (AR) in the T2DM group and non-T2DM group.

Result(s): Patients with T2DM showed statistically decreased levels of AMH compared to the non-T2DM group. During ovarian stimulation, those with T2DM required significantly higher total and initial doses of gonadotropin (GN), although they had fewer retrieved oocytes and worse pregnancy outcomes than the non-T2DM group. Multivariate logistic regression analysis adjusting for confounding factors showed that T2DM alone was an independent risk factor for CPR and LBR (adjusted odds ratio [a OR], 0.458, adjusted 95% confidence interval [CI], 0.235-0.891, P = 0.022; a OR, 0.227, 95% CI, 0.101-0.513, P<0.001; respectively), and the abortion rate in the T2DM group was 3.316 times higher than the non-T2DM group(a OR, 3.316, 95%CI, 1.248-8.811, P = 0.016);

Conclusion: Infertile patients with T2DM have decreased ovarian reserve, and T2DM has a deleterious impact on clinical pregnancy outcomes during the ART process compared with non-T2DM infertile women.

Capsule: Infertile women with T2DM have decreased ovarian reserve and pregnancy outcomes during the assisted reproductive technology process compared with non-T2DM infertile women. (Author)
Full URL: https://doi.org/10.3389/fendo.2023.1274327

2023-13110

Diabetes in pregnancy and risk of near-miss, maternal mortality and foetal outcomes in the USA: a retrospective cross-sectional analysis. Tavera G, Dongarwar D, Salemi JL, et al (2022), Journal of Public Health vol 44, no 3, September 2022, pp 549–557

Background

The prevalence of diabetes in pregnant women has increased in the USA over recent decades. The primary aim of this study was to assess the association between diabetes in pregnancy and maternal near-miss incident, maternal mortality and selected adverse foetal outcomes.

Methods

We conducted a retrospective, cross-sectional analysis among pregnancy-related hospitalizations in USA between 2002 and 2014. We examined the association between DM and GDM as exposures and maternal in-hospital mortality, maternal cardiac arrest, early onset of delivery, poor foetal growth and stillbirth as the outcome variables.

Results

Among the 57.3 million pregnant women in the study population, the prevalence of GDM and DM was 5.4 and 1.3%, respectively. We found that pregnant women with DM were three times more likely to experience cardiac arrest (OR =

3.21; 95% CI = 2.57–4.01) and in-hospital maternal death (OR = 3.05; 95% CI = 2.45–3.79), as compared to those without DM. Among pregnant women with GDM and DM, the risk for early onset of delivery was higher, compared to women without GDM or DM.

Conclusion
A diagnosis of diabetes prior to pregnancy contributes significantly to the risk of maternal cardiac arrest, maternal mortality and adverse foetal outcomes. (Author)
Full URL: https://doi.org/10.1093/pubmed/fdab117

2023-13035

Neonatal Hypoglycemia following Late Preterm Antenatal Corticosteroid Administration in Individuals with Diabetes in Pregnancy. Raj-Derouin N, Perino JM, Fisher S, et al (2023), American Journal of Perinatology 10 November 2023, online

Objective Antenatal corticosteroid (ACS) administration is standard practice for pregnant individuals delivering in the late preterm period, though no guidelines are in place for those with diabetes. This study aims to characterize the prevalence of neonatal hypoglycemia after ACS administration in pregnant individuals with diabetes delivering in the late preterm period.

Study Design This is a retrospective, single-center, case–control study of individuals with diabetes who delivered between 340/7 and 366/7 weeks' gestation at a large academic medical center from 2016 to 2021. A total of 169 individuals were included in the analysis; 87 received corticosteroids and 82 did not. The proportion of neonates with hypoglycemia, neonatal intensive care unit (NICU) admission, respiratory distress syndrome, and hyperbilirubinemia were compared between parents who received ACSs versus those who did not.

Results The prevalence of neonatal hypoglycemia (40.2 vs. 23.2%, p = 0.027), requiring treatment (40.3 vs. 22.4%, p = 0.041), and hyperbilirubinemia (35.6 vs 18.5%, p = 0.018) was greater for neonates born to individuals with diabetes who received late preterm ACSs compared with those who did not. There was no difference in NICU admission and respiratory distress between the groups. These results remained unchanged after controlling for confounders including gestational age at delivery and birth weight.

Conclusion This study demonstrates that late preterm corticosteroid administration to pregnant individuals with diabetes increases the risk for neonatal hypoglycemia without changing the rates of respiratory morbidity. (Author)

2023-11938

Automated Insulin Delivery in Women with Pregnancy Complicated by Type 1 Diabetes. Lee TTM, Collett C, Bergford S, et al (2023), The New England Journal of Medicine vol 389, no 17, October 2023, pp 1566-1578

BACKGROUND
Hybrid closed-loop insulin therapy has shown promise for management of type 1 diabetes during pregnancy; however, its efficacy is unclear.

METHODS
In this multicenter, controlled trial, we randomly assigned pregnant women with type 1 diabetes and a glycated hemoglobin level of at least 6.5% at nine sites in the United Kingdom to receive standard insulin therapy or hybrid closed-loop therapy, with both groups using continuous glucose monitoring. The primary outcome was the percentage of time in the pregnancy-specific target glucose range (63 to 140 mg per deciliter [3.5 to 7.8 mmol per liter]) as measured by continuous glucose monitoring from 16 weeks' gestation until delivery. Analyses were performed according to the intention-to-treat principle. Key secondary outcomes were the percentage of time spent in a hyperglycemic state (glucose level >140 mg per deciliter), overnight time in the target range, the glycated hemoglobin level, and safety events.

RESULTS
A total of 124 participants with a mean (±SD) age of 31.1±5.3 years and a mean baseline glycated hemoglobin level of 7.7±1.2% underwent randomization. The mean percentage of time that the maternal glucose level was in the target range was 68.2±10.5% in the closed-loop group and 55.6±12.5% in the standard-care group (mean adjusted difference, 10.5 percentage points; 95% confidence interval [CI], 7.0 to 14.0; P<0.001). Results for the secondary outcomes were consistent with those of the primary outcome; participants in the closed-loop group spent less time in a hyperglycemic state than those in the standard-care group (difference, −10.2 percentage points; 95% CI, −13.8 to −6.6);

had more overnight time in the target range (difference, 12.3 percentage points; 95% CI, 8.3 to 16.2), and had lower glycated hemoglobin levels (difference, −0.31 percentage points; 95% CI, −0.50 to −0.12). Little time was spent in a hypoglycemic state. No unanticipated safety problems associated with the use of closed-loop therapy during pregnancy occurred (6 instances of severe hypoglycemia, vs. 5 in the standard-care group; 1 instance of diabetic ketoacidosis in each group; and 12 device-related adverse events in the closed-loop group, 7 related to closed-loop therapy).

CONCLUSIONS
Hybrid closed-loop therapy significantly improved maternal glycemic control during pregnancy complicated by type 1 diabetes. (Funded by the Efficacy and Mechanism Evaluation Program; AiDAPT ISRCTN Registry number, ISRCTN56898625. opens in new tab.) (Author)

2023-11743

Hypoglycemia and associated comorbidities among newborns of mothers with diabetes in an academic tertiary care center. Bamehrez M (2023), Frontiers in Pediatrics 13 October 2023, online

Background: Hypoglycemia is considered the common metabolic problem in newborns with serious long-term sequelae. This study evaluates the incidence of hypoglycemia in the newborns of mothers with diabetes mellitus and assesses the comorbidities that affect the newborns of mothers with gestational diabetes compared with the newborns of mothers with pregestational diabetes mellitus.

Methods: This retrospective cohort study was conducted between January-2018 and December-2020. All admissions to the hospital nursery of the newborns of diabetic mothers with diabetes mellitus were included.

Results: The study comprised 1,036 mothers with diabetes, of the newborns of mothers with pregestational diabetes, 22% had hypoglycemia, and of mothers with gestational diabetes, 12%. Mothers with pregestational diabetes had a significantly higher risk of needing an emergency cesarean section (OR: 2.1, 95% CI: 1.3–3.4); and of having a baby who is large for its gestational age (OR: 9.5, 95% CI: 2.6–35.5), must be admitted to the NICU (OR: 2.9, 95% CI: 1.5–5.6), has respiratory distress syndrome (OR: 3.3, 95% CI: 1.5–7.4), and needs gavage feeding (OR: 3.5, 95% CI: 1.4–8.9).

Conclusion: About 13% of the newborns of mothers with diabetes had hypoglycemia. Significantly more of these newborns were of mothers with pregestational diabetes than of mothers with gestational diabetes. Newborn of mothers with pregestational diabetes mellitus have the risk of large weight and neurological problems, such as sucking difficulties, length of hospital stay, NICU admission, and respiratory distress syndrome. (Author)
Full URL: https://doi.org/10.3389/fped.2023.1267248

2023-11227

Prognostic accuracy of antenatal doppler ultrasound measures in predicting adverse perinatal outcomes for pregnancies complicated by diabetes: a systematic review. Rane BM, Malau-Aduli BS, Alele F, et al (2023), AJOG Global Reports vol 3, no 3, August 2023, 100241

OBJECTIVE
This study aimed to assess the prognostic accuracies of Doppler ultrasound measures in predicting adverse perinatal outcomes for pregnancies complicated with preexisting or gestational diabetes mellitus.

DATA SOURCES
An online database search of MEDLINE, Cochrane, Embase, CINAHL, Scopus, and Emcare from inception to April 2022 was conducted.

STUDY ELIGIBILITY CRITERIA
Studies reporting singleton, nonanomalous fetuses of women with either preexisting (type 1 or 2 diabetes mellitus) or gestational diabetes mellitus during pregnancy were included. In addition, the included studies assessed cerebroplacental ratio and middle cerebral artery and/or umbilical artery pulsatility index in the prediction of either: preterm birth, cesarean delivery for fetal distress, APGAR (Appearance, Pulse, Grimace, Activity, and Respiration) score <7 at 5 minutes, neonatal intensive care unit admission (>24 hours), acute respiratory distress syndrome, jaundice, hypoglycemia, hypocalcemia, or neonatal death.

METHODS

The PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines were followed and 610 articles were identified, of which 15 were included. Two authors independently extracted prognostic data from each article and assessed the study applicability and risk of bias using the QUADAS-2 (Quality Assessment of Diagnostic Accuracy Studies-2) scoring criteria.

RESULTS
A total of 15 studies were included in the review and comprised prospective (n=10; 66%) and retrospective (n=5; 33%) cohorts. Sensitivity and positive predictive values varied widely across each Doppler measurement. Umbilical artery sensitivities were higher than those of cerebroplacental ratio and middle cerebral artery for hypoglycemia, jaundice, neonatal intensive care unit admission, respiratory distress, and preterm birth. Cerebroplacental ratio was the most reported index test; however, prognostic accuracy was worse than that of umbilical artery and middle cerebral artery Doppler across all adverse perinatal outcomes. Significant risk of bias was present in 14 (94%) studies, with substantial heterogeneity observed across studies in terms of study design and outcomes assessed.

CONCLUSION
Abnormal umbilical artery pulsatility index may be of more clinical value in predicting adverse perinatal outcomes compared with cerebroplacental ratio and middle cerebral artery pulsatility index in diabetic pregnancies. Further evaluation of umbilical artery Doppler measurements in diabetic pregnancies using standardized variables across studies is required for broader clinical application. The significant association between abnormal Doppler measurement and hypoglycemia may warrant further investigation. (Author)
Full URL: https://doi.org/10.1016/j.xagr.2023.100241

2023-10922

A holistic approach to preventing type 2 diabetes in Asian women with a history of gestational diabetes mellitus: a feasibility study and pilot randomized controlled trial. Liew SJ, Soon CS, Chooi YC, et al (2023), Frontiers in Global Women's Health 28 September 2023, online

Background: Gestational Diabetes Mellitus (GDM) exposes women to future risk of Type 2 Diabetes. Previous studies focused on diet and physical activity, less emphasis was given to tackle intertwined risk factors such as sleep and stress. Knowledge remains scarce in multi-ethnic Asian communities. This study explored the: (1) feasibility of a holistic digital intervention on improving diet, physical activity (PA), sleep and stress of Asian women with a history of GDM, and (2) preliminary efficacy of the holistic intervention on women's physical and mental well-being via a pilot randomized controlled trial.

Methods: Female volunteers with a history of GDM but without pre-existing diabetes were recruited from multi-ethnic Singaporean community. Each eligible woman was given a self-monitoring opportunity using Oura Ring that provided daily feedback on step counts, PA, sleep and bedtime heart rate. Intervention group additionally received personalized recommendations aimed to reinforce healthy behaviors holistically (diet, PA, sleep and stress). Dietary intake was evaluated by a research dietitian, while step counts, PA, sleep and bedtime heart rate were evaluated by health coaches based on Oura Ring data. Perceived physical and mental health and well-being were self-reported. Clinical outcomes included glycemic status determined by HbA1c and OGTT tests, body mass index, blood pressures and lipid profile.

Results: Of 196 women from the community, 72 women completed diabetes screening, 61 women were eligible and 56 women completed the study. The 56 completers had mean age of 35.8 ± 3.7 years, predominantly Chinese, majority had their first GDM diagnosed at least 2 years ago and had two GDM-affected pregnancies. After intervention period, more women in the Intervention group achieved at least 8,000 steps/day and had at least 6 hours of sleep per night. Noticeable reduction of added sugar in their food and beverages were observed after the dietary intervention. Changes in body weight and mental well-being were observed but group differences were not statistically significant.

Conclusions: The holistic approach appeared feasible for personalizing lifestyle recommendations to promote physical and mental well-being among women with a history of GDM. Larger studies with sufficient assessment timepoints and follow-up duration are warranted to improve the evaluation of intervention effects on clinical outcomes. (Author)
Full URL: https://doi.org/10.3389/fcdhc.2023.1251411

2023-10537

Semaglutide and pregnancy. Skov K, Mandic IN, Nyborg KM (2023), International Journal of Gynecology & Obstetrics vol 163, no

2, November 2023, pp 699-700

Both use and cessation of semaglutide constitutes problems prior to and during pregnancy. More problems are expected with increasing use. (Author)

Full URL: https://doi.org/10.1002/ijgo.15092

2023-10505

Impact on Neonatal Outcomes with Late Preterm and Early Term Delivery in Women with Diabetes. Austin BA, McFarling KM, Likins B, et al (2024), American Journal of Perinatology vol 41, no 2, January 2024, pp 122-126

Objective Late preterm and early term deliveries are common in pregnancies complicated by diabetes due to higher rates of obstetric complications including increased stillbirth risk. However, early delivery is associated with multiple neonatal adverse outcomes, which may be further increased by maternal diabetes. We examined whether there is an additive effect on adverse neonatal outcomes in the setting of maternal diabetes in the late preterm and early term periods.

Study Design This was a retrospective cohort study of women with a singleton, nonanomalous pregnancy delivering at a single academic medical center in the late preterm (340/7–366/7 weeks) or early term (370/7–386/7 weeks) period between 2010 and 2019. Women were categorized by diabetes status: no diabetes, type 1 (T1DM), type 2 (T2DM), or gestational diabetes (GDM). Multivariate logistic regression was used to calculate adjusted odds ratios (aOR) and 95% confidence intervals (CI) for risk of both mild and severe composite neonatal outcome with delivery in the late preterm or early term period using pregnancies without diabetes as the referent.

Results A total of 8,072 pregnancies were included with T1DM, T2DM, and GDM complicating 1.8, 5.6, and 9.9% of pregnancies, respectively. Expected demographic differences were seen among groups including higher rates of non-Hispanic Black race, chronic hypertension, and higher body mass index in women with T2DM. The probability of severe composite adverse neonatal outcome was significantly increased in women with T1DM in the late preterm (aOR: 4.4; CI: 2.4–8.1) and early term (aOR: 1.6; CI: 1.1–2.3) periods, largely driven by the need for mechanical ventilation. The mild composite outcome was increased among all women with diabetes with early term delivery but highest in women with T1DM.

Conclusion Pregnancies complicated by diabetes, particularly T1DM, have higher rates of neonatal adverse outcomes independent of gestational age at delivery, which is an important consideration when late preterm or early term delivery is planned. (Author)

2023-10432

Diabetes and pregnancy study (DAPSY): a 10-year single-center cohort study of pregnancies affected by diabetes. Kapustin R, Kopteeva E, Tiselko A, et al (2024), Archives of Gynecology and Obstetrics vol 309, no 6, June 2024, pp 2643 - 2651

Purpose

The aim of our study was to investigate to what degree clinical characteristics can contribute to incidence and structure of pregnancy and childbirth complications in women with diabetes, and to reveal key risk factors for adverse outcomes.

Methods

We conducted a retrospective single-center cohort study from January 2008 through December 2017, including 3069 singleton pregnancies, affected by type 1 diabetes (T1D, n = 498), type 2 diabetes (T2D, n = 214), and gestational diabetes mellitus (GDM, n = 2357).

Results

More than 10 years duration of T1D associated with increased risk for preterm birth (RR 2.03, 95% CI 1.28–3.20) and preeclampsia (RR 1.57, 95% CI 1.09–2.26). Diabetic nephropathy, same as diabetic proliferative retinopathy, was associated with increased risk of C-section, preeclampsia development, SGA delivery. In patients with T1D who received CSII (12%), we do not report superior outcomes compared to MDI. Pre-pregnancy HbA1c level less than 6.5% reduced the risk of preeclampsia for T1D (RR 0.28, 95% CI 0.19–0.67) and risk of LGA birth for T2D (RR 0.43, 95% CI 0.19–0.92). Achieving glycemic target values by full-term pregnancy reduced the risk of excessive fetal adiposity (RR 0.81 for T1D, RR 0.39 for T2D). For T2D and GDM, the leading risk factors were obesity and chronic hypertension. For patients with GDM, insulin administration and early diagnosis of GDM were the significant risk factors for adverse outcomes.

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Conclusion
Diabetes during pregnancy is challenging for the clinician, but optimizing glycemic control, treatment regimens, and close attention to comorbidities can help to reduce the risks and ensure appropriate quality diabetes management. (Author)

2023-10348

Hyperglycemia Recognized in Early Pregnancy Is Phenotypically Type 2 Diabetes Mellitus Not Gestational Diabetes Mellitus: A Case Control Study. Agha-Jaffar R, Oliver NS, Kostoula M, et al (2021), Obstetrical and Gynecological Survey vol 76, no 3, March 2021, pp 133-135

Gestational diabetes mellitus (GDM) is defined as diabetes in pregnancy during the second or third trimester that is not overtly preexisting diabetes mellitus (DM). The time frame during gestation is based on the Hyperglycemia and Adverse Pregnancy Outcomes (HAPO) study, which showed an association between glucose and infants born large for gestational age in women who took a 75-g oral glucose tolerance test (OGTT) at routine testing (24–48 weeks' gestation). (Abstracted from J Matern Fetal Neonatal Med 2020;33:3977–3983)(Author)

2023-10233

Factors influencing pregnancy planning of multi-ethnic Asian women with diabetes: A qualitative study. Irmi ZI, Ng CJ, Lee PY, et al (2020), PLoS ONE vol 15, no 12, 2 December 2020, e0242690

Introduction: Pregnancy planning varies among women with diabetes. Observing that the literature examining the factors affecting diabetic women's pregnancy intentions in multi-ethnic Asian populations is limited, we sought to explore these factors to give a better perspective on these women's pregnancy planning.

Methods: This qualitative study used individual in-depth interviews to capture the views and experiences of non-pregnant diabetic women of reproductive age in four public health clinics in a southwestern state of peninsular Malaysia from May 2016 to February 2017. The participants were purposively sampled according to ethnicity and were interviewed using a semi-structured topic guide. Interviews were audio-recorded, and transcripts were analysed using thematic analysis.

Results: From the 33 interviews that were analysed, four important factors influencing participants' decisions regarding pregnancy planning were identified. Participants' perception of poor pregnancy outcomes due to advanced age and medical condition was found to have an impact. However, despite these fears and negative relationships with doctors, personal, family and cultural influences supported by religious 'up to God' beliefs took centre stage in the pregnancy intention of some participants. Participants demonstrated a variety of understandings of pregnancy planning. They outlined some activities for pregnancy preparation, although many also reported limited engagement with pre-pregnancy care.

Conclusions: This study emphasised the known dilemma experienced by diabetic women considering their desire for an ideal family structure against their perceived pregnancy risks, heterogeneous religious beliefs and the impact of cultural demands on pregnancy intention. This study urges healthcare providers to increase their engagement with the women in pregnancy planning in a more personalised approach.

Conflict of interest statement
The authors have declared that no competing interests exist. (Author)
Full URL: https://doi.org/10.1371/journal.pone.0242690

2023-09623

Effect of Calcium Channel Blocker on Labor Curve in Pregnant Individuals with Chronic Hypertension. Barake C, Seagraves E, Huang JC, et al (2023), American Journal of Perinatology 19 June 2023, online

Objective This study aimed to compare the labor progress between individuals who received calcium channel blocker (CCB) and those who did not receive CCB during labor.

Study Design This was a secondary analysis of a retrospective cohort study of individuals with chronic hypertension who underwent vaginal delivery at a tertiary care center from January 2010 to December 2020. We excluded individuals with prior uterine surgeries and a 5-minute Apgar score of less than 5. We used a repeated-measures

regression with a third-order polynomial function to compare the average labor curves according to antihypertensive medication. Estimates of the median (5th–95th percentile) traverse times between two dilations were computed using interval-censored regression.

Results Of 285 individuals with chronic hypertension, 88 (30.9%) received CCB. Individuals who received CCB during labor compared with those who did not were more likely to deliver at earlier gestational age and to have pregestational diabetes and superimposed preeclampsia ($p < 0.01$). The progress of labor in the latent phase was not found to be significantly different between both groups (median: 11.51 vs. 8.74 hours; $p = 0.08$). However, after stratification by parity, nulliparous individuals who received CCB during labor were more likely to have a longer latent phase of labor (median: 14.4 vs. 8.5 hours; $p = 0.03$)

Conclusion A calcium channel blocker may slow the latent phase of labor in individuals with chronic hypertension. Aiming to minimize intrapartum iatrogenic interventions, allowing adequate time for pregnant individuals during the latent phase of labor is especially important if individuals are on a calcium channel blocker. (Author)

2023-09460

Type 1 diabetes in pregnancy. Pirie L (2023), MIDIRS Midwifery Digest vol 33, no 3, September 2023, pp 237-240

Diabetes in pregnancy is a serious complication that requires meticulous control of blood sugar levels to prevent adverse outcomes for both mother and neonate (Wylie & Bryce 2016). According to the National Institute for Health and Care Excellence (NICE) (2020), approximately five per cent of women who give birth each year have either pre-existing or gestational diabetes. Of the pregnant diabetic population, 7.5 per cent will have pre-existing type 1 diabetes (NICE 2020). (Author)

2023-08760

Adverse pregnancy outcomes and risk of type 2 diabetes in postmenopausal women. Zhu K, Wactawski-Wende J, Mendola P, et al (2024), American Journal of Obstetrics & Gynecology (AJOG) vol 230, no 1, January 2024, pp 93.e1-93.e19

Background

Although gestational diabetes and delivering high-birth-weight infants are known to predict a higher risk of future type 2 diabetes, the association of hypertensive disorders of pregnancy and other adverse pregnancy outcomes with type 2 diabetes is not well-established.

Objectives

We aimed to examine the associations between different types of adverse pregnancy outcomes and incident type 2 diabetes among postmenopausal women.

Study Design

The Women's Health Initiative, a nationwide cohort of postmenopausal women, collected self-reported history of adverse pregnancy outcomes including gestational diabetes, hypertensive disorders of pregnancy, preterm birth, and delivering low [<2,500g] or high birth weight [>4,500g] infants. Participants were followed annually for self-reported incident type 2 diabetes treated with medication from baseline (1993-1998) through March 2021. We used logistic regression to examine the associations of any and individual adverse pregnancy outcomes with diabetes. Stratified analyses were conducted to assess effect modification by body mass index, race and ethnicity, education, parity, breastfeeding, and age at first birth.

Results

This analysis included 49,717 women without a history of diabetes at enrollment who had a least one pregnancy and responded to the questionnaire about adverse pregnancy outcomes. After adjusting for body mass index, demographic, lifestyle, and reproductive factors, gestational diabetes (odds ratio, 2.26, 95% confidence interval: 1.94-2.63), high birth weight (odds ratio, 1.30, 95% confidence interval: 1.18-1.44), and hypertensive disorders of pregnancy (odds ratio, 1.18, 95% confidence interval: 1.08-1.30) were independently associated with higher odds of type 2 diabetes, respectively, while preterm birth and low birth weight were not associated with diabetes risk. A history of more than two adverse pregnancy outcomes was associated with higher odds of type 2 diabetes (odds ratio, 1.55, 95% confidence interval: 1.28-1.88). We further observed higher odds of type 2 diabetes (odds ratio, 3.69, 95% confidence interval: 2.38-5.70) among women with a history of both gestational diabetes and hypertensive disorders of pregnancy compared to those without any adverse pregnancy outcomes.

Conclusion

Postmenopausal women with a history of gestational diabetes, delivering high birth weight infants or hypertensive disorders of pregnancy are at risk for future type 2 diabetes. In addition, women with two or more conditions had an augmented risk and might be prioritized for screening and prevention efforts for type 2 diabetes. (Author)

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2023-08601

Prediction of birthweight and risk of macrosomia in pregnancies complicated by diabetes. Shulman Y, Shah BR, Berger H, et al (2023), American Journal of Obstetrics & Gynecology MFM vol 5, no 8, August 2023, 101042

BACKGROUND

Antenatal detection of accelerated fetal growth and macrosomia in pregnancies complicated by diabetes mellitus is important for patient counseling and management. Sonographic fetal weight estimation is the most commonly used tool to predict birthweight and macrosomia. However, the predictive accuracy of sonographic fetal weight estimation for these outcomes is limited. In addition, an up-to-date sonographic fetal weight estimation is often unavailable before birth. This may result in a failure to identify macrosomia, especially in pregnancies complicated by diabetes mellitus where care providers might underestimate fetal growth rate. Therefore, there is a need for better tools to detect and alert care providers to the potential risk of accelerated fetal growth and macrosomia.

OBJECTIVE

This study aimed to develop and validate prediction models for birthweight and macrosomia in pregnancies complicated by diabetes mellitus.

STUDY DESIGN

This was a completed retrospective cohort study of all patients with a singleton live birth at ≥36 weeks of gestation complicated by preexisting or gestational diabetes mellitus observed at a single tertiary center between January 2011 and May 2022. Candidate predictors included maternal age, parity, type of diabetes mellitus, information from the most recent sonographic fetal weight estimation (including estimated fetal weight, abdominal circumference z score, head circumference–to–abdomen circumference z score ratio, and amniotic fluid), fetal sex, and the interval between ultrasound examination and birth. The study outcomes were macrosomia (defined as birthweights >4000 and >4500 g), large for gestational age (defined as a birthweight >90th percentile for gestational age), and birthweight (in grams). Multivariable logistic regression models were used to estimate the probability of dichotomous outcomes, and multivariable linear regression models were used to estimate birthweight. Model discrimination and predictive accuracy were calculated. Internal validation was performed using the bootstrap resampling technique.

RESULTS

A total of 2465 patients met the study criteria. Most patients had gestational diabetes mellitus (90%), 6% of patients had type 2 diabetes mellitus, and 4% of patients had type 1 diabetes mellitus. The overall proportions of infants with birthweights >4000 g, >4500 g, and >90th percentile for gestational age were 8%, 1%, and 12%, respectively. The most contributory predictor variables were estimated fetal weight, abdominal circumference z score, ultrasound examination to birth interval, and type of diabetes mellitus. The models for the 3 dichotomous outcomes had high discriminative accuracy (area under the curve receiver operating characteristic curve, 0.929–0.979), which was higher than that achieved with estimated fetal weight alone (area under the curve receiver operating characteristic curve, 0.880–0.931). The predictive accuracy of the models had high sensitivity (87%–100%), specificity (84%–92%), and negative predictive values (84%–92%). The predictive accuracy of the model for birthweight had low systematic and random errors (0.6% and 7.5%, respectively), which were considerably smaller than the corresponding errors achieved with estimated fetal weight alone (−5.9% and 10.8%, respectively). The proportions of estimates within 5%, 10%, and 15% of the actual birthweight were high (52.3%, 82.9%, and 94.9%, respectively).

CONCLUSION

The prediction models developed in the current study were associated with greater predictive accuracy for macrosomia, large for gestational age, and birthweight than the current standard of care that includes estimated fetal weight alone. These models may assist care providers in counseling patients regarding the optimal timing and mode of delivery. (Author)

2023-08509

Double diabetes as an effect modifier for adverse perinatal outcome in pregnant women with type 1 diabetes mellitus – a retrospective multicenter cohort study. Malinowska-Polubiec A, Zawiejska A, Romejko-Wolniewicz E, et al (2023), Frontiers in Endocrinology 28 July 2023, online

Introduction: Double diabetes (DDiab) is defined as T1DM coexisting with insulin resistance (IR), metabolic syndrome (MetS), and/or obesity. Little evidence is available regarding how frequent DDiab is among T1DM pregnancies and whether it affects the perinatal outcome in this population.

Aims of the study: To explore the prevalence of DDiab in early pregnancy in the cohort of pregnant women with T1DM and to examine the association between an early-pregnancy DDiab status and fetomaternal complications characteristic for T1DM in pregnancy.

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RCM Information Services Limited is a subsidiary of The Royal College of Midwives

Material and methods: A retrospective data analysis of the multicenter cohort of N=495 pregnant women in singleton pregnancy complicated with T1DM followed from early pregnancy until delivery in three tertiary referral centers. DDiab status was defined as T1DM plus pre-pregnancy obesity defined as BMI≥30 kg/m2 measured at the first antenatal visit (DDiabOb), or T1DM plus pre-pregnancy IR defined as eGDR (estimated Glucose Disposal Rate) below the 25th centile for the cohort measured at the first antenatal visit (DDiabIR). Proportions of the adverse pregnancy outcomes were compared between DDiabOb and Non-DDiabOb and between DDiabIR and Non-DDiabIR patients.

Characteristics of the study group: (data presented as mean(SD) or percentage): age: 30.0(5.1) years; age when T1DM diagnosed: 17.5(8.5) years; T1DM duration: 12.0(7,9) years; microvascular complications (White classes R,F,RF): 11.9%, pre-pregnancy counselling: 26.6%, baseline gestational age: 10.5(4.3) weeks, pre-pregnancy BMI: 23.7(4.3) kg/m2; chronic hypertension: 9.1%, gestational hypertension (PIH) 10.7%, preeclampsia (PET): 3.2%; nulliparity 53.8%, smoking in pregnancy: 4.8%, eGWG: 22.4%, DDiabOB: 10.1%; DdiabIR: 25.2%; LGA: 44.0%, and NICU admission: 20.8%.

Results: (data from the univariate analysis given as OR(95%CI)): both DDiabOB and DDiabIR status increased the risk for eGWG [23.15 (10.82; 55.59); 3.03 (1.80; 5.08), respectively]. DDiabIR status increased the risk for PET [4.79 (1.68;14.6)], preterm delivery [1.84 (1.13; 3.21)], congenital malformation [2.15 (1.07;4.25)], and NICU hospitalization [2.2 (1.20;4.01)]. Both DDiabOB and DDiabIR accurately ruled out PET (NPV 97.3%/98.3%, accuracy: 88.3%/75.6%, respectively), congenital malformation (NPV 85.6%/88.4%, accuracy: 78.9/69.8, respectively), and perinatal mortality (NPV 98.7%/99.2%, accuracy: 88.8%/74.5%, respectively).

Conclusions: Double diabetes became a frequent complication in T1DM pregnant population. Double diabetes diagnosed in early pregnancy allows for further stratification of the T1DM pregnant population for additional maternal risk. (Author)

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2023-08318

Trend of pregnancy outcomes in type 1 diabetes compared to control women: a register-based analysis in 1996-2018.
Fazekas-Pongor V, Svébis MM, Major D, et al (2023), Frontiers in Endocrinology 12 July 2023, online

Introduction: In 1989, the St Vincent declaration aimed to approximate pregnancy outcomes of diabetes to that of healthy pregnancies. We aimed to compare frequency and trends of outcomes of pregnancies affected by type 1 diabetes and controls in 1996–2018.

Methods: We used anonymized records of a mandatory nation-wide registry of all deliveries between gestational weeks 24 and 42 in Hungary. We included all singleton births (4,091 type 1 diabetes, 1,879,183 controls) between 1996 and 2018. We compared frequency and trends of pregnancy outcomes between type 1 diabetes and control pregnancies using hierarchical Poisson regression.

Results: The frequency of stillbirth, perinatal mortality, large for gestational age, caesarean section, admission to neonatal intensive care unit (NICU), and low Appearance, Pulse, Grimace, Activity, and Respiration (APGAR) score was 2-4 times higher in type 1 diabetes compared to controls, while the risk of congenital malformations was increased by 51% and SGA was decreased by 42% (all p<0.05). These observations remained significant after adjustment for confounders except for low APGAR scores. We found decreasing rate ratios comparing cases and controls over time for caesarean sections, low APGAR scores (p<0.05), and for NICU admissions (p=0.052) in adjusted models. The difference between cases and controls became non-significant after 2009. No linear trends were observed for the other outcomes.

Conclusions: Although we found that the rates of SGA, NICU care, and low APGAR score improved in pregnancies complicated by type 1 diabetes, the target of the St Vincent Declaration was only achieved for the occurrence of low APGAR scores. (Author)

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2023-07770

Intrapartum Continuous Subcutaneous Insulin Infusion versus Intravenous Insulin Infusion among Pregnant Individuals with Type 1 Diabetes Mellitus: A Randomized Controlled Trial. Wilkie GL, Delpapa E, Leftwich HK (2023), American Journal of Obstetrics & Gynecology (AJOG) vol 229, no 6, December 2023, pp 680.e1-680.e8

Background
Intrapartum glucose management is critical to reducing neonatal hypoglycemia shortly after birth. While it is known that insulin is required for all pregnant individuals with T1DM, the optimal mode of intrapartum glycemic control is not known.
Objective
To compare the effect of intrapartum usage of continuous subcutaneous insulin infusion (CSII) versus intravenous (IV) insulin infusion for glucose management among pregnant individuals with type 1 diabetes mellitus (T1DM) on neonatal blood glucose levels.
Study Design
This was a randomized controlled trial of pregnant participants with T1DM. After written informed consent, participants were randomly allocated to one of two intrapartum insulin administration strategies: continuation of their CSII or IV insulin infusion. The primary outcome was the first neonatal blood glucose level.
Results
Between March 2021 and April 2023, seventy-six participants were approached, and 70 participants were randomized (35 participants in the IV insulin infusion group and 35 participants in the CSII group). Both groups were similar in terms of age, race/ethnicity, pre-gravid body mass index, nulliparity, and gestational age at delivery. There was no statistically significant difference in the first neonatal glucose measurement between both groups (50.1±23.4 vs. 49.2±22.6, p=0.86). Additionally, there were no statistically significant differences in any secondary neonatal outcomes. Approximately 57.1% of neonates in the CSII group required either oral, IV, or both treatments for hypoglycemia, while 51.4% of neonates in the IV infusion group required treatment. In both groups, 28.6% of neonates required IV treatment for hypoglycemia.
Conclusion
Pregnant individuals with T1DM utilizing either IV insulin infusion or continuation of their CSII for intrapartum insulin administration had no difference in the primary outcome of neonatal hypoglycemia. Patients should be given the option for both glycemic management strategies intrapartum. (Author)

2023-07423

Consumption of differently processed milk products in infancy and early childhood and the risk of islet autoimmunity. Koivusaari K, Syrjälä E, Niinistö S, et al (2020), British Journal of Nutrition vol 124, no 2, July 2020

Several prospective studies have shown an association between cows' milk consumption and the risk of islet autoimmunity and/or type 1 diabetes. We wanted to study whether processing of milk plays a role. A population-based birth cohort of 6081 children with HLA-DQB1-conferred risk to type 1 diabetes was followed until the age of 15 years. We included 5545 children in the analyses. Food records were completed at the ages of 3 and 6 months and 1, 2, 3, 4 and 6 years, and diabetes-associated autoantibodies were measured at 3–12-month intervals. For milk products in the food composition database, we used conventional and processing-based classifications. We analysed the data using a joint model for longitudinal and time-to-event data. By the age of 6 years, islet autoimmunity developed in 246 children. Consumption of all cows' milk products together (energy-adjusted hazard ratio 1·06; 95 % CI 1·02, 1·11; P = 0·003), non-fermented milk products (1·06; 95 % CI 1·01, 1·10; P = 0·011) and fermented milk products (1·35; 95 % CI 1·10, 1·67; P = 0·005) was associated with an increased risk of islet autoimmunity. The early milk consumption was not associated with the risk beyond 6 years. We observed no clear differences based on milk homogenisation and heat treatment. Our results are consistent with the previous studies, which indicate that high milk consumption may cause islet autoimmunity in children at increased genetic risk. The study did not identify any specific type of milk processing that would clearly stand out as a sole risk factor apart from other milk products. (Author)

2023-07314

Glycemic Control in Pregnancies Complicated by Pre-Existing Diabetes Mellitus and Congenital Malformations: A Danish Population-Based Study. Arendt LH, Pedersen LH, et al (2021), Clinical Epidemiology vol 2021, no 13, 26 July 2021, pp 615-626

Purpose: To study the occurrence of major congenital abnormalities in children of women with type 1 and type 2 diabetes and investigate the association between glycated haemoglobin (HbA1c) and major congenital malformations according to type 1 diabetes and type 2 diabetes separately.
Patients and methods: In this register-based study, all singletons born alive from January 1, 2000 to December 31, 2015 in the North Denmark and Central Denmark regions of Denmark and their mothers were included. We used data from Danish health registers and the LABKA database. Logistic regression models were used to compute crude and adjusted prevalence odds ratios (cORs and aORs) with 95% confidence intervals (CIs) for major congenital malformations overall

and for subtypes, by type of maternal pre-existing diabetes and HbA1c levels.
Results: Among 314,245 infants included, 2020 (0.64%) had mothers with type 1 diabetes and 498 (0.16%) had mothers with type 2 diabetes. We found an aOR of 2.9 (95% CI: 2.5, 3.5) and 1.9 (95% CI: 1.3; 2.8) for major malformations for type 1 and type 2 diabetes, respectively. The highest occurrence was seen for major congenital heart diseases, but we also observed higher occurrence of several other non-cardiac malformations. For both type 1 and type 2 diabetes, the prevalence of major congenital malformations increased with higher levels of maternal HbA1c with no safe threshold level. Mothers with type 1 diabetes had higher risks than those without diabetes irrespective of HbA1c, and women with HbA1c levels ≥ 9.5% had 8 times the odds of major congenital malformations [aOR 8.7 (95% CI: 5.4; 14.5)].
Conclusions: The prevalence of major congenital malformations progressively increased with poorer glycemic control during pregnancy, with no obvious safe threshold level, for both type 1 and type 2 diabetes. (Author)
Full URL: https://doi.org/10.2147/CLEP.S298748

2023-07078

The Mutations and Clinical Variability in Maternally Inherited Diabetes and Deafness: An Analysis of 161 Patients.
Yang M, Xu L, Xu C, et al (2021), Frontiers in Endocrinology 25 November 2021, online

Aims: To investigate the clinical features and mitochondrial mutations for maternally inherited diabetes and deafness.

Methods: PubMed, Embase, Medline, Web of Science, the China National Knowledge Infrastructure, and Wanfang were searched with the following search terms: “Maternally inherited diabetes and deafness” OR “MIDD” OR “Mitochondrial diabetes”. The mutations and clinical features were analyzed. Correlation between the heteroplasmy levels of the m.3243A>G mutation in the peripheral blood and age at the onset of diabetes was conducted by Spearman test. The significance level was set as $p < 0.05$. Statistical analysis was performed using the Statistical Package for the Social Sciences version 26 for Windows.

Results: Totally 161 patients with 21 different mitochondrial mutations were enrolled. The most common mutation was the m.3243A>G mutation in 136 cases. Of 142 patients, 120 (84.51%) had family histories of diabetes or hearing loss. Hearing loss presented in 85.71% of the patients with mitochondrial mutations. Central nervous system diseases were found in 29.19%, myopathy in 22.98%, oculopathy in 23.60%, cardiac disease in 23.60%, and nephropathy in 13.66% of the patients. Forty-two of 101 (41.58%) patients were underweight. A significant negative correlation was found between the heteroplasmy levels of the m.3243A>G mutation in the peripheral blood and age at the onset of diabetes.

Conclusions: The young onset of diabetes with low or normal BMI, maternal inheritance, and presence of impairments of multiple systems should prompt a genetic testing in order to differentiate MIDD from other types of diabetes earlier. (Author)
Full URL: https://doi.org/10.3389/fendo.2021.728043

2023-06076

PRECeDe Pilot: Prevention of neonatal respiratory distress with antenatal corticosteroids before elective caesarean section in women with diabetes – a feasibility randomised trial. Said JM, Karahalios A, Yates CJ, et al (2023), BJOG: An International Journal of Obstetrics and Gynaecology vol 130, no 12, November 2023, pp 1451-1458

Objective
The PRECeDe Pilot Trial was designed to determine the feasibility of undertaking a multicentre, randomised controlled trial (RCT) to assess the efficacy of antenatal corticosteroids administration within 7 days before elective caesarean section (CS) in women with pre-gestational diabetes (PGDM) or gestational diabetes (GDM).

Design
Triple blind, parallel group, placebo-controlled, pilot RCT.

Setting
Single-centre tertiary maternity hospital in Melbourne, Australia.

Population
Pregnant women with PGDM (type 1 or type 2 diabetes) or GDM booked for a planned CS scheduled between 35+0 and 38+6 weeks of gestation.

Methods
Eligible participants were randomised to receive two injections of either betamethasone 11.4 mg or normal saline placebo, 24 hours apart within 7 days before CS scheduled between 35+0 and 38+6 weeks of gestation.

Main Outcome Measure
The proportion of eligible women who consented and were randomised.

Trial Registration
Australian and New Zealand Clinical Trials Registry ACTRN12619001475134.

Results
Of 537 women eligible, 182 were approached and 47 (26%) were recruited. Of these, 22 were allocated to the betamethasone group and 25 were allocated to the placebo group. There were no serious adverse events related to participation.

Conclusion
It is feasible to undertake a triple-blind, placebo-controlled RCT investigating the efficacy of antenatal corticosteroids in preventing respiratory morbidity in infants of women with PGDM or GDM who are undergoing an elective CS between 35+0 and 38+6 weeks. (Author)
Full URL: https://doi.org/10.1111/1471-0528.17513

2023-05705

Understanding the self-management experiences and support needs during pregnancy among women with pre-existing diabetes: a qualitative descriptive study. Sushko K, Strachan P, Butt M, et al (2023), BMC Pregnancy and Childbirth vol 23, no 309, May 2023

Background
With the increasing prevalence of pre-existing type 1 and type 2 diabetes in pregnancy and their associated perinatal risks, there is a need to focus on interventions to achieve optimal maternal glycemia to improve pregnancy outcomes. One strategy focuses on improving diabetes self-management education and support for expectant mothers with diabetes. This study's objective is to describe the experience of managing diabetes during pregnancy and identify the diabetes self-management education and support needs during pregnancy among women with type 1 and type 2 diabetes.

Methods
Using a qualitative descriptive study design, we conducted semi-structured interviews with 12 women with pre-existing type 1 or 2 diabetes in pregnancy (type 1 diabetes, n = 6; type 2 diabetes, n = 6). We employed conventional content analyses to derive codes and categories directly from the data.

Results
Four themes were identified that related to the experiences of managing pre-existing diabetes in pregnancy; four others were related to the self-management support needs in this population. Women with diabetes described their experiences of pregnancy as terrifying, isolating, mentally exhausting and accompanied by a loss of control. Self-management support needs reported included healthcare that is individualized, inclusive of mental health support and support from peers and the healthcare team.

Conclusions
Women with diabetes in pregnancy experience feelings of fear, isolation and a loss of control, which may be improved through personalized management protocols that avoid "painting everybody with the same brush" as well as peer support. Further examination of these simple interventions may yield important impacts on women's experience and sense of connection. (Author)
Full URL: https://doi.org/10.1186/s12884-023-05542-4

2023-03970

Prediabetes in pregnancy – follow-up, treatment, and outcomes compared to overt pregestational diabetes. Schiller T, Barak O, Winter Shafran Y, et al (2023), Journal of Maternal-Fetal and Neonatal Medicine vol 36, no 1, 2023, 2191153

Objective

There are limited data on follow-up, treatment, and maternal and fetal outcomes in women with prediabetes before or at the beginning of pregnancy. The aim of this study was to comprehensively characterize women with prediabetes compared to women with type 2 diabetes mellitus.

Study design
This was a retrospective cohort data from a single medical center treating women with pregestational prediabetes mellitus (PDM). Women were compared to pregestational overt type 2 diabetes mellitus (T2DM).

Results
Data were collected from 120 women in the PDM group and 86 women in the T2DM group. Baseline characteristics were comparable, albeit women in the PDM group arrived at medical attention significantly later, 55% after 15 weeks gestation. Women with PDM needed significantly less treatment to achieve glycemic control and glycated hemoglobin remained lower throughout pregnancy. Maternal and fetal outcomes were similar between groups, although significantly higher rates of macrosomia and neonatal jaundice were observed in the T2DM group.

Conclusions
The lack of clear guidelines causes a delay in the first prenatal visit of women with PDM. Comparable pregnancy outcomes may tip the balance toward acceptance of early treatment. Establishing clear guidelines will enable primary caregivers to refer prediabetic women sooner for lifestyle modifications and treatment if needed. (Author)
Full URL: https://doi.org/10.1080/14767058.2023.2191153

2023-03832

Maternal provisions in type 1 diabetes: Evidence for both protective & pathogenic potential. Strachan E, Clemente-Casares X, Tsai S (2023), Frontiers in Immunology 22 March 2023, online

Maternal influences on the immune health and development of an infant begin in utero and continue well into the postnatal period, shaping and educating the child's maturing immune system. Two maternal provisions include early microbial colonizers to initiate microbiota establishment and the transfer of antibodies from mother to baby. Maternal antibodies are a result of a lifetime of antigenic experience, reflecting the infection history, health and environmental exposure of the mother. These same factors are strong influencers of the microbiota, inexorably linking the two. Together, these provisions help to educate the developing neonatal immune system and shape lymphocyte repertoires, establishing a role for external environmental influences even before birth. In the context of autoimmunity, the transfer of maternal autoantibodies has the potential to be harmful for the child, sometimes targeting tissues and cells with devastating consequences. Curiously, this does not seem to apply to maternal autoantibody transfer in type 1 diabetes (T1D). Moreover, despite the rising prevalence of the disease, little research has been conducted on the effects of maternal dysbiosis or antibody transfer from an affected mother to her offspring and thus their relevance to disease development in the offspring remains unclear. This review seeks to provide a thorough evaluation of the role of maternal microorganisms and antibodies within the context of T1D, exploring both their pathogenic and protective potential. Although a definitive understanding of their significance in infant T1D development remains elusive at present, we endeavor to present what has been learned with the goal of spurring further interest in this important and intriguing question. (Author)
Full URL: https://doi.org/10.3389/fimmu.2023.1146082

2023-03524

Associations Between Preconception Glycemia and Preterm Birth: The Potential Role of Health Care Access and Utilization. Delker E, Ramos GA, Bandoli G, et al (2023), Journal of Women's Health vol 32, no 3, March 2023

Background: Preconception diabetes is strongly associated with adverse birth outcomes. Less is known about the effects of elevated glycemia at levels below clinical cutoffs for diabetes. In this study, we estimated associations between preconception diabetes, prediabetes, and hemoglobin A1c (HbA1c) on the risk of preterm birth, and evaluated whether associations were modified by access to or utilization of health care services.

Materials and Methods: We used data from Add Health, a US prospective cohort study with five study waves to date. At Wave IV (ages 24–32), glucose and HbA1c were measured. At Wave V (ages 32–42), women with a live birth reported whether the baby was born preterm. The analytic sample size was 1989.

Results: The prevalence of preterm birth was 13%. Before pregnancy, 6.9% of women had diabetes, 23.7% had prediabetes, and 69.4% were normoglycemic. Compared to the normoglycemic group, women with diabetes had 2.1

(confidence interval [95% CI]: 1.5–2.9) times the risk of preterm birth, while women with prediabetes had 1.3 (95% CI: 1.0, 1.7) times the risk of preterm birth. There was a nonlinear relationship between HbA1c and preterm birth such that risk of preterm birth emerged after HbA1c = 5.7%, a standard cutoff for prediabetes. The excess risks of preterm birth associated with elevated HbA1c were four to five times larger among women who reported unstable health care coverage and among women who used the emergency room as usual source of care.

Conclusion: Our findings replicate prior research showing strong associations between preconception diabetes and preterm birth, adding that prediabetes is also associated with higher risk. Policies and interventions to enhance access and utilization of health care among women before pregnancy should be examined. (Author)

2023-03387

Comprehensive Management of Type 2 Diabetes During Pregnancy. Valent AM, Caughey AB (2023), JAMA (Journal of the American Medical Association) vol 329, no 12, March 2023, pp 1022-1023

Type 2 diabetes (T2D) is associated with maternal and offspring complications (eFigure in the Supplement). Although the prevalence of type 1 diabetes during pregnancy has remained stable, the prevalence of T2D has increased from 1.8 to 7.3 per 1000 deliveries in the past 10 years.1 The pathogenesis of T2D leads to progressive insulin resistance, defective pancreatic beta cell insulin secretion, and inappropriate glucagon secretion by the alpha cells. The multiorgan metabolic dysregulation of T2D complicates the dynamic physiologic and metabolic changes necessary during pregnancy to grow and develop a healthy fetus. Therefore, addressing the factors that affect the metabolic complexity of T2D optimizes glycemia and promotes a healthier intrauterine environment. (Author)

2023-03353

Association of Community Walkability and Glycemic Control Among Pregnant Individuals with Pregestational Diabetes. Field C, Lynch CD, Fareed N, et al (2023), American Journal of Obstetrics & Gynecology MFM vol 5, no 5, May 2023, 100898

BACKGROUND

Neighborhood walkability is a community-level social determinant of health that measures whether people who live in a neighborhood walk as a mode of transportation. Whether neighborhood walkability is associated with glycemic control among pregnant individuals with pregestational diabetes remains to be defined.

OBJECTIVES

To evaluate the association between community-level neighborhood walkability and glycemic control as measured by hemoglobin A1c (A1c) among pregnant individuals with pregestational diabetes.

STUDY DESIGN

This was a retrospective analysis of pregnant individuals with pregestational diabetes enrolled in an integrated prenatal and diabetes care program from 2012-2016. Participant addresses were geocoded and linked at the census tract level. The exposure was community walkability, defined by the U.S. Environmental Protection Agency (EPA) National Walkability Index (score range 1-20), which incorporates intersection density (design), proximity to transit stops (distance), and a mix of employment and household types (diversity). Individuals from neighborhoods that were the most walkable (score 15.26-20.0) were compared with those from neighborhoods that were less walkable (score <15.26) defined per national EPA recommendations. The outcomes were glycemic control, including A1c <6.0% and <6.5%, measured both in early and late pregnancy, and mean change in A1c across pregnancy. Modified Poisson regression and linear regression were used, respectively, and adjusted for maternal age, body mass index at delivery, parity, race and ethnicity as a social determinant of health, insurance status, baseline A1c, gestational age at A1c measurement in early and late pregnancy, and diabetes type.

RESULTS

Among 417 pregnant individuals (33% type 1, 67% type 2 diabetes), 10% were living in the most walkable communities. All 417 individuals underwent A1c assessment in early pregnancy (median gestational age: 9.7 weeks; IQR: 7.4, 14.1), and 376 underwent repeat A1c in late pregnancy (median gestational age: 30.4 weeks, IQR: 27.8, 33.6). Pregnant individuals living in the most walkable communities were more likely to have an A1c <6.0% in early pregnancy (15% vs. 8%; aRR: 1.46; 95% CI: 1.00-2.16), as well as an A1c <6.5% in late pregnancy compared to those living in less walkable communities (13% vs. 9%; aRR: 1.33; 95% CI: 1.08-1.63). For individuals living in the most walkable communities, the median A1c was 7.5 (IQR 6.0, 9.4) in early pregnancy and 5.9 (IQR 5.4, 6.4) in late pregnancy. For those living in less walkable communities, the median A1c was 7.3 (IQR 6.2, 9.2) in early pregnancy and 6.2 (IQR 5.6, 7.1) in late pregnancy. Change in A1c across pregnancy was not associated with walkability.

CONCLUSIONS

Pregnant individuals with pregestational diabetes living in more walkable communities had better glycemic control in

both early and late pregnancy. Whether community-level interventions to enhance neighborhood walkability can improve glycemic control in pregnancy requires further study. (Author)

2023-03285

Risk of Stillbirth in Pregnancies Complicated by Diabetes, Stratified by Fetal Growth. McElwee ER, Oliver EA, McFarling K, et al (2023), Obstetrics & Gynecology vol 141, no 4, April 2023, pp 801-809

OBJECTIVE:

To compare stillbirth rates per week of expectant management stratified by birth weight in pregnancies complicated by gestational diabetes mellitus (GDM) or pregestational diabetes mellitus.

METHODS:

A national population-based retrospective cohort study of singleton, nonanomalous pregnancies complicated by pregestational diabetes or GDM was performed using national birth and death certificate data from 2014 to 2017. Stillbirth rates per 10,000 patients (stillbirth incidence at gestational age week/ongoing pregnancies−[0.5×live births at gestational age week]) were determined for each week of pregnancy from 34 to 39 completed weeks of gestation. Pregnancies were stratified by birth weight, categorized as having small-for-gestational-age (SGA), appropriate-for-gestational-age (AGA), or large-for-gestational-age (LGA) fetuses, assigned by sex-based Fenton criteria. Relative risk (RR) and 95% CI for stillbirth were calculated for each gestational age week compared with the GDM-related AGA group.

RESULTS:

We included 834,631 pregnancies complicated by either GDM (86.9%) or pregestational diabetes (13.1%) in the analysis, with a total of 3,033 stillbirths. Stillbirth rates increased with advancing gestational age for pregnancies complicated by both GDM and pregestational diabetes regardless of birth weight. Compared with pregnancies with AGA fetuses, those with both SGA and LGA fetuses were significantly associated with an increased risk of stillbirth at all gestational ages. Ongoing pregnancies at 37 weeks of gestation complicated by pregestational diabetes with LGA or SGA fetuses had respective stillbirth rates of 64.9 and 40.1 per 10,000 patients. Pregnancies complicated by pregestational diabetes had an RR of stillbirth of 21.8 (95% CI 17.4–27.2) for LGA fetuses and 13.5 (95% CI 8.5–21.2) for SGA fetuses compared with GDM-related AGA at 37 weeks of gestation. The greatest absolute risk of stillbirth was in pregnancies complicated by pregestational diabetes at 39 weeks of gestation with LGA fetuses (97/10,000).

CONCLUSION:

Pregnancies complicated by both GDM and pregestational diabetes affected by pathologic fetal growth have an increased risk of stillbirth with advancing gestational age. This risk is significantly higher with pregestational diabetes, especially pregestational diabetes with LGA fetuses. (Author)

2023-03200

Association of increased fetal epicardial fat thickness with maternal pregestational and gestational diabetes. Sever B, Bayraktar B, Adıyaman D, et al (2023), Journal of Maternal-Fetal and Neonatal Medicine vol 36, no 1, 2023, 2183474

Objective

To evaluate the changes of fetal epicardial fat thickness (EFT) in pregnancies with pregestational diabetes mellitus (PGDM) and gestational diabetes mellitus (GDM) and to identify the diagnostic effectiveness of fetal EFT in differentiating PGDM and GDM from normal pregnancies.

Methods

The study was conducted with pregnant women who admitted to perinatology department between October 2020 and August 2021. Patients were grouped as PGDM (n = 110), GDM (n = 110), and control (n = 110) for comparison of fetal EFT. EFT was measured in all three groups at 29 weeks of gestation. Demographic characteristics and ultrasonographic findings were recorded and compared.

Results

The mean fetal EFT was significantly higher in PGDM (1.47 ± 0.083 mm, $p < .001$) and GDM (1.40 ± 0.082 mm, $p < .001$) groups compared to control group (1.19 ± 0.049 mm) and was also significantly higher in PGDM group than GDM group ($p < .001$). Fetal EFT was significantly positively correlated with maternal age, fasting, 1st hour, 2nd hour glucose values, HbA1c, fetal abdominal circumference, and deepest vertical pocket of amniotic fluid ($p < .001$). Fetal EFT value of 1.3 mm diagnosed PGDM patients with a sensitivity of 97.3% and a specificity of 98.2%. Fetal EFT value of 1.27 mm

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diagnosed GDM patients with a sensitivity of 94% and a specificity of 95%.

Conclusions
Fetal EFT is greater in pregnancies with diabetes than in normal pregnancies, and also greater in PGDM than in GDM. In addition, fetal EFT is strongly correlated with maternal blood glucose levels in diabetic pregnancies. (Author)
Full URL: https://doi.org/10.1080/14767058.2023.2183474

2023-02620

Maternal insulin-like growth factors and insulin-like growth factor-binding proteins for macrosomia prediction in diabetic and nondiabetic pregnancy: A prospective study. Alekseenkova EN, Babakov VN, Selkov Sa, et al (2023), International Journal of Gynecology & Obstetrics vol 162, no 2, August 2023, pp 605-613

Objective
Attributable to the insulin-like growth factor (IGF) axis involvement in fetal growth regulation, possible contribution of the maternal IGF axis to antenatal fetal macrosomia diagnosis is a subject of particular interest in diabetic pregnancy.

Methods
A total of 130 women were prospectively enrolled in a longitudinal single-center cohort study. The four study groups were: type 1 diabetes (n = 40), type 2 diabetes (n = 35), gestational diabetes (n = 40), and control (n = 15). IGF-1 and IGF-2 and insulin-like growth factor-binding protein (IGFBP) 1, 3, 6, and 7 serum levels were analyzed in 11- to 14-week and 30- to 34-week samples with a specific immunoassay.

Results
In mothers of large-for-gestational-age neonates (90th percentile), higher (median test) first-trimester IGF-1 (P = 0.007) and lower IGFBP-1 (P = 0.035) were observed. The IGF-1/IGFBP-1 ratio was positively associated with neonatal weight (r = 0.434, P < 0.001). Receiver operating characteristic analysis revealed an association between large for gestational age and the first-trimester IGF-1 (area under the curve [AUC] = 0.747, P < 0.001), IGFBP-1 (AUC = 0.334, P = 0.011), and IGF-1/IGFBP-1 ratio (AUC = 0.750, P < 0.001). IGF-1/IGFBP-1 ratio had better performance for prediction of birth weight over 4000 g (AUC = 0.822, P < 0.001).

Conclusion
The authors detected different first-trimester IGF-1 and IGF-1/IGFBP-1 thresholds applicable for either supposition or rejection of macrosomia diagnosis. Further investigation is needed to determine how the maternal IGF axis can contribute to fetal macrosomia prediction. (Author)

2023-02483

Association between Diabetes in Pregnancy and Shoulder Dystocia by Infant Birth Weight in an Era of Cesarean Delivery for Suspected Macrosomia. Abdelwahab M, Frey HA, Lynch CD, et al (2023), American Journal of Perinatology vol 40, no 9, July 2023, pp 929-936

Objective We estimated the association between diabetes and shoulder dystocia by infant birth weight subgroups (<4,000, 4,000–4,500, and >4,500 g) in an era of prophylactic cesarean delivery for suspected macrosomia.

Study Design A secondary analysis from the National Institute of Child Health and Human Development U.S. Consortium for Safe Labor of deliveries at ≥24 weeks with a nonanomalous, singleton fetus with vertex presentation undergoing a trial of labor. The exposure was either pregestational or gestational diabetes compared with no diabetes. The primary outcome was shoulder dystocia and secondarily, birth trauma with a shoulder dystocia. We calculated adjusted risk ratios (aRRs) with modified Poison's regression between diabetes and shoulder dystocia and the number needed to treat (NNT) to prevent a shoulder dystocia with cesarean delivery.

Results Among 167,589 assessed deliveries (6% with diabetes), pregnant individuals with diabetes had a higher risk of shoulder dystocia at birth weight <4,000 g (aRR: 1.95; 95% confidence interval [CI]: 1.66–2.31) and 4,000 to 4,500 g (aRR: 1.57; 95% CI: 1.24–1.99), albeit not significantly at birth weight >4,500 g (aRR: 1.26; 95% CI: 0.87–1.82) versus those without diabetes. The risk of birth trauma with shoulder dystocia was higher with diabetes (aRR: 2.29; 95% CI: 1.54–3.45). The NNT to prevent a shoulder dystocia with diabetes was 11 and 6 at ≥4,000 and >4,500 g, versus without diabetes, 17 and 8 at ≥4,000 and >4,500 g, respectively.

Conclusion Diabetes increased the risk of shoulder dystocia, even at lower birth weight thresholds than at which cesarean delivery is currently offered. Guidelines providing the option of cesarean delivery for suspected macrosomia may have decreased the risk of shoulder dystocia at higher birth weights. (Author)

2023-02225

Psychologically informed oral health interventions in pregnancy and type 2 diabetes: A scoping review. Kristensen CB, Ide M, Forbes A, et al (2022), Frontiers in Global Women's Health 21 December 2022, online

Introduction: Oral health is a critical aspect of gestational diabetes management. Gestational diabetes is high blood glucose levels during pregnancy and is managed like type 2 diabetes with diet and physical activity interventions. This scoping review sets out to discuss why oral health support should also become part of gestational diabetes management.

Objectives: The primary objective was to synthesise the existing psychologically informed oral health interventions for pregnant women and individuals with type 2 diabetes, and the extent to which these interventions map on to the COM-B Model. No literature exists on oral health interventions in gestational diabetes, why studies with type 2 diabetes populations were selected instead. The secondary objective was to identify the precise outcomes targeted in the interventions.

Methodology: The Joanna Briggs Institute's Methodology for Scoping Reviews was used to conduct this review. The populations of interest were pregnant women and individuals with type 2 diabetes, and eligible concepts were psychologically informed oral health interventions. Quasi-experimental and experimental designs were considered. The Ovid Interface including Embase, Medline, Global Health, APA PsychInfo, Health Management Information, Maternity, Infant Care Database, the Cochrane Library, and CINAHL was used as information sources. The study selection followed the PRISMA guidelines. The first search was conducted on the week commencing the 25th of July 2022, with a follow-up search conducted on the 10th of October 2022.

Results: 28 records were included for synthesis. The most frequently assessed psychological outcome was oral health knowledge and the most frequently assessed oral clinical outcome was Plaque Index. All studies used an educational intervention approach, while psychological capability in the COM-B Model was targeted in all interventions by increasing oral health knowledge among the participants. The Health Belief Model was the most frequently used theory in the interventions.

Conclusion: The results demonstrate that oral health is a recognised aspect of pregnancy and type 2 diabetes. The findings from this review and a qualitative interview study which is under development will inform the first oral health intervention for women with gestational diabetes in the United Kingdom. (Author)

Full URL: https://doi.org/10.3389/froh.2022.1068905

2023-02126

Prescribing for pregnancy: managing diabetes. Hurrell A, White SL, Webster LM (2021), Drug and Therapeutics Bulletin vol 59, no 6, 2021

Topics for DTB review articles are selected by DTB's editorial board to provide concise overviews of medicines and other treatments to help patients get the best care. Articles include a summary of key points and a brief overview for patients. Articles may also have a series of multiple choice CME questions. (Author)

2023-01909

Glycosylated haemoglobin as an indicator of diabetes control in pregnancy: A 10-year review of the relationship between HbA1c trends and delivery outcome in type I and type II diabetes. Finnegan C, Smyth S, Smith O, et al (2023), European Journal of Obstetrics & Gynecology and Reproductive Biology vol 281, February 2023, pp 36-40

Background

Pregestational diabetes mellitus (PGDM) confers an increased risk of adverse maternal and neonatal outcomes [1,2]. Glycaemic control in the medium and long term is commonly evaluated by examining glycosylated haemoglobin (HbA1c) levels. However, the value of HbA1c in pregnancy may be diminished by increased level of red cell turnover characteristic of pregnancy [3 , 4]. We sought to examine the impact of HbA1c in the first trimester and pre-delivery, and the within-patient change throughout gestation on mode of delivery and birthweight in pregnancies complicated by a pre-pregnancy diagnosis of type I or type II diabetes.

Methods
A 10-year consecutive cohort of pregnancies complicated by PGDM, from Jan 2010 until Dec 2019, was examined for HbA1c data in the first trimester and within 6 weeks of delivery. Perinatal outcome data, including gestational age at delivery, mode of delivery and birthweight centile, were obtained from hospital records. The Spearman Rank correlation was used to correlate HcA1c levels in the first trimester with birthweight centiles. Non-parametric summaries and rank-based tests, Signed-rank test and Kruskal-Wallis test, were used to compare Hba1c levels.
Results
During the 10-year study period, a consecutive cohort of 396 pregnancies that attained a viable gestational age (>24 weeks' gestation) and complicated by pregestational diabetes was identified; representing 81 % of the population of pregestational diabetic pregnancies managed by this service during the study period. The median [IQR] HbA1c levels (mmol/mol) in the first trimester, pre-delivery and the differential across gestation were 51 [19] mmol/mol, 43 [11] mmol/mol and −8 [13] mmol/mol, respectively. A statistically significant reduction in HbA1c levels throughout gestation was observed ($p < 0.001$). The median [IQR] birthweight centile was 69 [50 – 96]. The distributions in HbA1c levels and birthweight centiles were heavily skewed. No correlation was identified between HbA1c levels and mode of delivery.
Conclusion
Neither baseline HbA1c levels, pre-delivery values, nor trends across gestation appear to impact birthweight centile or mode of delivery in PGDM. While optimising glycaemic control can affect the long term health of the mother, these indices cannot be relied upon to reflect the impact of glycaemic control on fetal growth aberrations that influence mode of delivery. (Author)

2023-01663

Pregnancy: Diabetes [written answer]. Scottish Parliament (2023), Official Report Written Question S6W-14410, 26 January 2023

Maree Todd responds to a written question asked by Craig Hoy (South Scotland, Scottish Conservative and Unionist Party,) to the Scottish Government regarding what it has done to improve the rates of pre-pregnancy counselling, particularly in women with type 2 diabetes, and what data it is using to measure whether those rates are improving. (AS)

Full URL: https://archive2021.parliament.scot/parliamentarybusiness/28877.aspx?SearchType=Advance&ReferenceNumbers=S6W-14410

2023-01661

Pregnancy: Diabetes [written answer]. Scottish Parliament (2023), Official Report Written Question S6W-14411, 26 January 2023

Maree Todd responds to a written question asked by Craig Hoy (South Scotland, Scottish Conservative and Unionist Party,) to the Scottish Government regarding what it has done to improve pregnancy outcomes for women with type (a) 1 and (b) 2 diabetes. (AS)

Full URL: https://archive2021.parliament.scot/parliamentarybusiness/28877.aspx?SearchType=Advance&ReferenceNumbers=S6W-14411

2023-01657

Pregnancy: Diabetes [written answer]. Scottish Parliament (2023), Official Report Written Question S6W-14405, 26 January 2023

Maree Todd responds to a written question asked by Craig Hoy (South Scotland, Scottish Conservative and Unionist Party,) to the Scottish Government regarding what work it has done to improve outcomes in pregnancy for women who are living with diabetes. (AS)

Full URL: https://archive2021.parliament.scot/parliamentarybusiness/28877.aspx?SearchType=Advance&ReferenceNumbers=S6W-14405

2023-01654

Pregnancy: Diabetes [written answer]. Scottish Parliament (2023), Official Report Written Question S6W-14407, 26 January 2023

Maree Todd responds to a written question asked by Craig Hoy (South Scotland, Scottish Conservative and Unionist Party,) to the Scottish Government regarding what it has done to develop pregnancy-specific quality improvement measures within the diabetes dashboard. (AS)

Full URL: https://archive2021.parliament.scot/parliamentarybusiness/28877.aspx?SearchType=Advance&ReferenceNumbers=S6W-14407

2023-01650

Pregnancy: Diabetes [written answer]. Scottish Parliament (2023), Official Report Written Question S6W-14408, 26 January 2023

Maree Todd responds to a written question asked by Craig Hoy (South Scotland, Scottish Conservative and Unionist Party,) to the Scottish Government regarding what it has done to ensure structured patient education is available for all women (a) living with diabetes during and (b) planning a pregnancy. (AS)

Full URL: https://archive2021.parliament.scot/parliamentarybusiness/28877.aspx?SearchType=Advance&ReferenceNumbers=S6W-14408

2023-01511

Time in Range and Pregnancy Outcomes in People with Diabetes Using Continuous Glucose Monitoring. Bartal MF, Cornthwaite JAA, Ghafir D, et al (2023), American Journal of Perinatology vol 40, no 5, April 2023, pp 461-466

Objective The international consensus on continuous glucose monitoring (CGM) recommends time in range (TIR) target of >70% for pregnant people. Our aim was to compare outcomes between pregnant people with TIR ≤ versus >70%.

Study Design This study was a retrospective study of all people using CGM during pregnancy from January 2017 to May 2021 at a tertiary care center. All people with pregestational diabetes who used CGM and delivered at our center were included in the analysis. Primary neonatal outcome included any of the following: large for gestational age, neonatal intensive care unit (NICU) admission, need for intravenous (IV) glucose, or respiratory distress syndrome (RDS). Maternal outcomes included hypertensive disorders of pregnancy and delivery outcomes. Logistic regression was used to estimate unadjusted and adjusted odds ratios (aORs) with 95% confidence intervals (CIs).

Results Of 78 people managed with CGM, 65 (80%) met inclusion criteria. While 33 people (50.1%) had TIR ≤70%, 32 (49.2%) had TIR >70%. People with TIR ≤70% were more likely to be younger, have a lower body mass index, and have type 1 diabetes than those with TIR >70%. After multivariable regression, there was no difference in the composite neonatal outcome between the groups (aOR: 0.56, 95% CI: 0.16–1.92). However, neonates of people with TIR ≤70% were more likely to be admitted to the NICU (p = 0.035), to receive IV glucose (p = 0.005), to have RDS (p = 0.012), and had a longer hospital stay (p = 0.012) compared with people with TIR >70%. Furthermore, people with TIR ≤70% were more likely to develop hypertensive disorders (p = 0.04) than those with TIR >70%.

Conclusion In this cohort, the target of TIR >70% was reached in about one out of two people with diabetes using CGM, which correlated with a reduction in neonatal and maternal complications. (Author)

2023-01455

Centers for Disease Control and Prevention–Recognized Diabetes Prevention Program After Gestational Diabetes Mellitus. Henderson CE, Nezam H, Castillo KM (2023), AJOG Global Reports vol 3, no 1, February 2023, 100150

Gestational diabetes mellitus is associated with an increased risk of developing type 2 diabetes mellitus. To decrease or delay the risk of developing type 2 diabetes mellitus after gestational diabetes mellitus, postpartum care should include a recommendation that the individual participates in a recognized Diabetes Prevention Program. (Author)

Full URL: https://doi.org/10.1016/j.xagr.2022.100150

2023-01255

Screening test characteristics and comparison of diabetes outcomes among pregnant patients with prediabetes. Wilkie GL, Delpapa E, Leftwich HK (2022), Journal of Obstetrics and Gynaecology 30 November 2022, online

This study sought to compare test characteristics of hemoglobin A1c, oral glucose tolerance test and fasting plasma glucose for the development of gestational diabetes among women with prediabetes. Diabetes outcomes were compared by screening test used for prediabetes diagnosis among a retrospective cohort of pregnant patients between 2017–2021. During the study, 8132 patients received diabetes screening and 14.0% met criteria for prediabetes. By screening test, 75.1% were screened with hemoglobin A1c, 10.0% with fasting plasma glucose and 14.9% with a 75-g oral glucose tolerance test. Hemoglobin A1c had the highest positive predictive value (67.2%). Use of hemoglobin A1c was significantly more likely to identify women with GDM than oral glucose tolerance test (aOR 3.94,

95% CI 2.30–6.73). In this study cohort, hemoglobin A1c was able to identify patients that were more likely to develop GDM in an at-risk population.

IMPACT STATEMENT
What is already known on this subject? Prediabetes is becoming more common in the general population; however little is known about prediabetes in pregnancy. Women with prediabetes in pregnancy appear to be at increased risk of developing gestational diabetes mellitus, however there is minimal information about various screening tests performance in pregnancy for detection of prediabetes and subsequent gestational diabetes.

What do the results of this study add? The results of this study compare three commonly used screening tests for screening for diabetes. When identifying women with prediabetes, they are at increased risk for developing gestational diabetes mellitus if identified by hemoglobin A1c.

What are the implications of these findings for clinical practice and/or further research? The clinical implication of this study is that women can be screened with hemoglobin A1c in early pregnancy for both overt diabetes, but also may be identified as high risk with prediabetes. Among women with prediabetes by hemoglobin A1c, they remain at high risk for developing gestational diabetes mellitus. (Author)

2023-00516

Secular trend in prevalence and socioeconomic correlates of diabetes in pregnancy in Taiwan. Lu CL, Wu JL, Li HY, et al (2023), International Journal of Gynecology & Obstetrics vol 161, no 2, May 2023, pp 552-559

Objective
To assess the trend in prevalence and socioeconomic correlates of diabetes in pregnancy (DIP) in Taiwan from 2007 to 2014.

Methods
In all, 1 606 344 pregnancies, including 199 383 DIP (1693 with pre-pregnancy type 1 diabetes [T1DM], 17 171 with pre-pregnancy type 2 diabetes [T2DM], and 180 519 with gestational diabetes mellitus [GDM]) were investigated. Logistic regression models were performed to identify the covariates significantly associating with DIP.

Results
Over the study period, the prevalence of pre-pregnancy T2DM increased by 568.44%; the prevalence of T1DM and GDM also increased but with a smaller magnitude. However, only the prevalence of pre-pregnancy T2DM showed an increase after socioeconomic variables were considered. Compared with immigrant mothers, native-born mothers had a significantly higher adjusted odds ratio of DIP, particularly pre-pregnancy T1DM (3.33, 95% confidence interval 1.57–7.05). Additionally, indigenous mothers and those from rural areas had a higher prevalence of pre-pregnancy T2DM but lower prevalence of GDM. Lower maternal education and income were associated with higher prevalence of pre-pregnancy T1DM but lower prevalence of pre-pregnancy T2DM and GDM.

Conclusion
Socioeconomic variables largely accounted for the increased secular trend in pre-pregnancy T1DM and GDM, but the prevalence of pre-pregnancy T2DM still doubled, which was independent of socioeconomic covariates. (Author)

2023-00447

Cesarean delivery rates and indications in pregnancies complicated by diabetes. Olerich KLW, Souter VL, Fay EE, et al (2022), Journal of Maternal-Fetal and Neonatal Medicine 06 October 2022, Online

Objective
Rates of pregestational (PGDM) and gestational diabetes (GDM), and their associated pregnancy complications, are rising. Pregnancies complicated by diabetes have increased cesarean delivery (CD) rates; however, there are limited data regarding the current rates of, and contributing factors to, these deliveries. The Robson Ten Group Classification System (TGCS) is a clinically relevant, standardized framework that can be used to evaluate and analyze cesarean rates. The objective of this study was to evaluate rates of, and indications for, intrapartum, unplanned CD among pregnancies complicated by diabetes, compared to normoglycemic (NG) pregnancies, in a large United States birth cohort.

Methods

This retrospective cohort study used chart-abstracted data on births between 24 and 42 weeks' gestation at 17 hospitals that contributed to the Obstetrical Care Outcome Assessment Program database between 01/2016 and 03/2019. The CD rate for NG pregnancies, and pregnancies complicated by gestational and PGDM was calculated and compared using the Robson TGCS. The indications for intrapartum CD in patients with term, singleton, vertex gestations without a prior cesarean were then analyzed. Univariate and multivariate logistic regression models were used to compare the cesarean rate and indications for CD, between the diabetic groups and the NG group. Results were adjusted for maternal age, BMI, neonatal birth weight, and insurance status, as well as clustering by hospital.

Results
A total of 86,381 pregnant people were included in the study cohort. Of these 76,272 (88.3%) were NG, 8591 (9.9%) had GDM, and 1518 (1.8%) had PGDM. Compared to NG patients, overall cesarean rates were higher in patients with GDM (40.3% vs. 29.7%; aOR 1.25, 95%CI 1.18–1.31) and PGDM (60.0% vs. 29.7%; aOR 2.53, 95%CI 2.04–3.13). This finding remained true when the cohort was restricted to term, singleton, vertex laboring patients without a prior cesarean; compared to NG patients, the cesarean rate was higher in patients with GDM (17.4% vs. 12.2%, aOR 1.37, 95%CI 1.29–1.45) and PGDM (26.0% vs. 12.2%, aOR 2.55, 95%CI 2.00–3.25). The cesarean rate for fetal indications was similar in the GDM (5.7%) and NG (4.4%) groups, while those patients with PGDM had a significantly higher rate (10.4%; aOR 2.01, 95%CI 1.43–2.83). Similarly, the rate of cesarean for labor dystocia in patients with PGDM was significantly higher than in NG patients (16.9% vs. 7.0%, and aOR 2.28, 95%CI 1.66–3.13) while patients with GDM had an intermediate rate (10.6% vs. 7.0%, aOR 1.49, 95%CI 1.40–1.57).

Conclusions
The CD rate is significantly higher in pregnancies complicated by diabetes, particularly pregestational, compared to NG pregnancies. Despite controlling for maternal factors and birth weight, pregnancies complicated by diabetes are more likely to undergo an unplanned intrapartum cesarean secondary to labor dystocia than their NG counterparts, but only pregnancies complicated by PGDM have an increased risk of cesarean for fetal indications. More research is needed to understand whether this higher cesarean rate is due to factors intrinsic to diabetes in laboring patients or is due to a difference in the way clinicians manage diabetics in labor. (Author)
Full URL: https://doi.org/10.1080/14767058.2022.2128653

2023-00118
Current practice, attitude and views of providing pregnancy care for women with type 1 diabetes in China: a qualitative study. Luo S, Yan J, Yang D, et al (2022), BMJ Open Vol 12, no 11, November 2022, e061657
Objective Data are sparse on healthcare needs related to pregnancy among Chinese women with type 1 diabetes (T1D) or the gap between the needs and healthcare provision in China. We aimed to identify their needs and the gaps in pregnancy care provision.

Design This is a qualitative, face-to-face, one-to-one in-depth interview study. We recruited our participants using a purposive sampling strategy. Semistructural outlines were used to guide the interviews. The interviews were digitally recorded, transcribed and analysed using a thematic framework method with NVivo V.10.0.

Setting Guangdong Province in China.

Participants This study involved three key stakeholders of pregnancy care for women with T1D: 29 women with T1D of childbearing age (aged 18–50 years), 16 family members (husbands, parents and parents-in-law of women with T1D) and 35 relevant healthcare providers (HCPs).

Results We found that women with T1D and the family members had a more pessimistic attitude towards pregnancy outcomes, which was different from the more positive view of HCPs. However, all three stakeholders shared the following perspectives regarding pregnancy-related care for women with T1D: (1) lack of knowledge and access to education, (2) lack of multidisciplinary cooperation, (3) education should be started earlier in adulthood, (3) positive role of peer support, and (4) hope for future training of HCPs for relevant knowledge and skills specified for T1D and pregnancy with T1D.

Conclusions An immense gap was identified between the needs of women with T1D regarding pregnancy-related care and current care provision in China. These findings suggest that education be provided to patients and HCPs, and the role of professional and multidisciplinary support should be enhanced to optimise pregnancy care for women with

T1D in China. (Author)
Full URL: http://dx.doi.org/10.1136/bmjopen-2022-061657

2022-10533

Progression to type 2 diabetes mellitus after gestational diabetes mellitus diagnosed by IADPSG criteria: Systematic review and meta-analysis. Juan J, Sun Y, Wei Y, et al (2022), 6 October 2022, online

Background: To estimate the progression rates to type 2 diabetes mellitus (T2DM) in women with gestational diabetes mellitus (GDM) diagnosed by the International Association of Diabetes and Pregnancy Study Group (IADPSG) criteria.

Methods: Systematic review and meta-analysis were conducted by searching Medline, Embase, and Cochrane between January 1, 2010 and December 31, 2021 for observational studies investigating progression to T2DM after GDM. Inclusion criteria were IADPSG-diagnosed GDM, studies with both GDM and controls, postpartum follow-up duration at least one year. Data were pooled by random effects meta-analysis models. Heterogeneity was assessed by I2 statistic. The pooled relative risk for incidence of T2DM and pre-diabetes between GDM participants and controls were estimated. Reasons for heterogeneity among studies were investigated by prespecified subgroup and meta-regression analysis. Publication bias was assessed by the Begg's and Egger's tests.

Results: This meta-analysis of six studies assessed a total of 61932 individuals (21978 women with GDM and 39954 controls). Women with IADPSG-diagnosed GDM were 6.43 times (RR=6.43, 95% CI:3.45-11.96) more likely to develop T2DM in the future compared with controls. For GDM women, the cumulative incidence of T2DM was 12.1% (95% CI: 6.9%-17.3%), while the pooled cumulative incidence of T2DM was estimated to be 8% (95% CI: 5-11%) in studies with 1 to 5 years of follow-up and increased to 19% (95% CI: 3-34%) for studies with more than 5 years of follow-up. Women with IADPSG-diagnosed GDM had 3.69 times (RR=3.69, 95% CI:2.70-5.06) higher risk of developing pre-diabetes (including impaired fasting glucose and/or impaired glucose tolerance) than controls. Meta-regression analysis showed that the study effect size was not significantly associated with study design, race, length of follow-up, and maternal age (P>0.05). Overall, the studies had a relatively low risk of bias.

Conclusions: Women with IADPSG-diagnosed GDM have higher risk of developing T2DM and pre-diabetes. The risk of T2DM in GDM women are higher with longer follow-up duration. Our results highlight the importance of promoting postpartum screening and keeping health lifestyle as well as pharmacological interventions to delay/prevent the onset of T2DM/pre-diabetes in GDM women.

Systematic review registration: https://www.crd.york.ac.uk/prospero, identifier (CRD42022314776) (Author)
Full URL: https://doi.org/10.3389/fendo.2022.1012244

2022-10526

Comparison of insulin requirements across gestation in women with hyperglycemia in pregnancy: A prospective cohort study. Rao C, Ping F (2022), 20 October 2022, online

Objectives: The aim of this study is to explore the daily insulin dose and the percentage change in preprandial and basal insulin dosage of women with different types of hyperglycemia in pregnancy (HIP) during the whole gestation and postpartum period.

Methods: A total of 121 subjects with HIP requiring insulin therapy were enrolled from a prospective cohort consisted of 436 pregnant women with hyperglycemia. The subjects were divided into three groups: Group 1 [type 1 diabetes mellitus (T1DM) and maturity onset diabetes of the young (MODY)], Group 2 [type 1 diabetes mellitus (T2DM)], and Group 3 [gestation diabetes mellitus (GDM)]. The primary study measurements included daily dose and percentage of different types of exogenous insulin requirements across gestation in different groups.

Results: Insulin total daily dosage of Group 1 was highest among the three groups and increased significantly from the first to the second/third trimester. Percentage of preprandial insulin increased from 53.8% (46.7, 60.0) and 54.5% (42.3, 62.9) in the first trimester to 63.6% (54.9, 75.0) and 67.2% (51.8, 73.7) in the second/third trimester in Group 1 and Group 2. All subjects with T1DM and 18.6% of subjects with T2DM still required insulin administration after delivery, with a 26.9% (19.0, 46.0) and 36.7% (26.9, 52.6) decrease in total insulin dose, respectively, whereas subjects with GDM and MODY weaned off insulin completely.

Conclusion: The insulin requirements for pregnancy complicated with T1DM and MODY were higher than those for

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T2DM and GDM. In the subjects with PGDM, the insulin requirement and percentage of preprandial insulin increased gradually from early to mid- and late pregnancy. (Author)
Full URL: https://doi.org/10.3389/fendo.2022.1013663

2022-10301

Growth patterns among late preterm infants of mothers with diabetes. Buck CO, Shabanova V, Taylor SN (2022), Journal of Maternal-Fetal and Neonatal Medicine vol 35, no 25, 2022, pp 10116-10123

Objective
Exposure to diabetes mellitus during pregnancy increases the risk of offspring obesity and cardiometabolic disease. Limited information exists regarding growth patterns among preterm infants exposed to maternal diabetes. This study describes growth differences during early childhood among late preterm infants of mothers with and without diabetes during pregnancy.

Materials and methods
In a retrospective longitudinal analysis, weight trajectories from birth to age 2 years were compared between diabetes exposure groups (N = 1554) using mixed effects modeling and adjusting for maternal and infant demographic covariates.

Results
Overall, 134 (9%) infants were exposed to diabetes (DM-group). DM-group had higher average weight (adjusted difference 300 g [95% CI: 228, 371]) and weight z-score (adjusted difference 0.67 standard deviation scores (SDS) [95% CI: 0.50, 0.84]) compared with unexposed infants. DM-group infants had accelerated weight gain from birth to discharge (adjusted weight difference 31.8 g [95% CI: 12.5, 51.1], adjusted weight z-score difference 0.07 SDS [95% CI: 0.02, 0.11]) compared with unexposed infants, including in the first postnatal week (adjusted weight gain velocity difference, day 0–3: 6.07 g/day [95% CI: 0.88, 11.25]; day 3–7: 8.37 g/day [95% CI: 1.60, 15.13]). Through age two, infants in the DM-group maintained higher average weight (adjusted difference 185.7 g [95% CI: 37.2, 334.3]) and weight z-score (adjusted difference 0.32 SDS [95% CI: 0.09, 0.55]) than unexposed infants, with greater weight gain between 18 and 24 months (adjusted difference 28.5 g/week [95% CI: 2.6, 54.4]).

Conclusions
Maternal diabetes exposed late preterm infants had higher weight from birth to age two and greater weight gain in the first postnatal week than unexposed infants. Long term risk associated with weight trajectories in this population requires further study. (Author)

2022-10273

The relationship between falling insulin requirements and serial ultrasound measurements in women with preexisting diabetes: a prospective cohort study. Padmanabhan S, Lee V, Mclean M, et al (2022), Journal of Maternal-Fetal and Neonatal Medicine vol 35, no 25, 2022, pp 10239-10245

Introduction
A large fall in insulin requirements (FIR) in women with diabetes is associated with adverse clinical outcomes but previous studies have not examined its relation with serial ultrasound parameters.

Objective
To determine whether FIR is associated with alteration in umbilical artery Doppler parameters and fetal growth restriction (FGR) in women with preexisting diabetes.

Methods
Serial obstetric Doppler ultrasounds were conducted 2 weekly from 28 weeks gestation in women with Type 1 and Type 2 diabetes who were being treated with insulin. Estimated fetal weight (EFW), head circumference:abdominal circumference (HC:AC) ratio and umbilical artery doppler parameters (SD ratio) and pulsatility index (PI) were measured. Information on insulin dose was collected prospectively throughout pregnancy and women with FIR ≥ 15% were considered cases. Linear mixed effect models were used to assess the association between FIR and ultrasound parameters.

Results
One hundred and forty two women were included in the study (type 1 diabetes n = 41, type 2 diabetes n = 101). Thirty

women demonstrated FIR ≥ 15%. There was no significant difference in the change of S/D ratio or PI over the third trimester in cases with FIR ≥ 15%, compared to the rest of the cohort, before or after adjusting for type of diabetes. Likewise there was no difference in EFW and HC:AC ratio with advancing gestation before or after adjusting for variables known to influence fetal growth. FGR rates (3.3 vs 8% p = 0.298) and high S/D ratio > 95% (13.3 vs 8%, p = 0.296) were similar between the two groups.

Conclusions
FIR ≥ 15% was not associated with changes in placental flow or FGR however larger studies are needed to evaluate this further. (Author)

2022-10128

Epigenetic and transcriptomic alterations in offspring born to women with type 1 diabetes (the EPICOM study). Knorr S, Skakkebæk A, Just J, et al (2022), BMC Medicine vol 20, no 338, 23 September 2022

Background
Offspring born to women with pregestational type 1 diabetes (T1DM) are exposed to an intrauterine hyperglycemic milieu and has an increased risk of metabolic disease later in life. In this present study, we hypothesize that in utero exposure to T1DM alters offspring DNA methylation and gene expression, thereby altering their risk of future disease.

Methods
Follow-up study using data from the Epigenetic, Genetic and Environmental Effects on Growth, Metabolism and Cognitive Functions in Offspring of Women with Type 1 Diabetes (EPICOM) collected between 2012 and 2013.

Setting
Exploratory sub-study using data from the nationwide EPICOM study.

Participants
Adolescent offspring born to women with T1DM (n=20) and controls (n=20) matched on age, sex, and postal code.

Main outcome measures
This study investigates DNA methylation using the 450K-Illumina Infinium assay and RNA expression (RNA sequencing) of leucocytes from peripheral blood samples.

Results
We identified 9 hypomethylated and 5 hypermethylated positions ($p < 0.005$, $|\Delta M\text{-value}| > 1$) and 38 up- and 1 downregulated genes ($p < 0.005$, $\log2FC \geq 0.3$) in adolescent offspring born to women with T1DM compared to controls. None of these findings remained significant after correction for multiple testing. However, we identified differences in gene co-expression networks, which could be of biological significance, using weighted gene correlation network analysis. Interestingly, one of these modules was significantly associated with offspring born to women with T1DM.

Functional enrichment analysis, using the identified changes in methylation and gene expression as input, revealed enrichment in disease ontologies related to diabetes, carbohydrate and glucose metabolism, pathways including MAPK1/MAPK3 and MAPK family signaling, and genes related to T1DM, obesity, atherosclerosis, and vascular pathologies. Lastly, by integrating the DNA methylation and RNA expression data, we identified six genes where relevant methylation changes corresponded with RNA expression (CIITA, TPM1, PXN, ST8SIA1, LIPA, DAXX).

Conclusions
These findings suggest the possibility for intrauterine exposure to maternal T1DM to impact later in life methylation and gene expression in the offspring, a profile that may be linked to the increased risk of vascular and metabolic disease later in life. (Author)

Full URL: https://doi.org/10.1186/s12916-022-02514-x

2022-09777

Inadequate pregnancy planning in diabetics, and its impact on glycemic control and complications. Imai RY, Monteagudo PT, Mattar R, et al (2023), Archives of Gynecology and Obstetrics vol 308, no 4, October 2023, pp 1229 - 1238

Introduction

To assess the intention of actual pregnancy and its influence on glycated hemoglobin (HbA1c) profile before and during the pregnancy of women with previous diabetes mellitus (DM).

Methods
Prospective cohort study included pregnant women with previous DM assisted from October/2018 to October/2019. Data were collected with standardized questionnaire and from medical records. Comparisons of variables of interest (Student's t test, Mann–Whitney or chi-square test) were performed between the group of women who did or denied report having interest to become pregnant. And a logistic regression analysis were performed considering prematurity or fetal/neonatal complication as dependent variables.

Results
Sixty patients were included, with HbA1c mean of pre-pregnancy, first and third trimesters of 9.3, 8.1 and 6.8%, respectively. 7.7% women had HbA1c ≤ 6.5% in pre-pregnancy and 16.7% in first trimester. 83.3% reported having received guidance on the importance of glucose control and contraception before their current pregnancy. Although 28.3% reported the intention to become pregnant, only 28.3% reported regular use of any contraceptive method before it, none of which had HbA1c in the recommended goal for pregnancy. Glycemic control did not differ between groups intending or not to become pregnant. Women with adequate glycemic control in first trimester had a lower frequency of prematurity (p = 0.015) and fetal complications (p = 0.001), and better control at the end of pregnancy.

Discussion
Although most of these women reported having had information about the importance of a planned pregnancy, adequate glycemic control of women with diabetes before and during the pregnancy is still not a reality nowadays. It might be necessary to improve medical communication in pregnancy planning. (Author)

2022-09578

The Effect of Financial Incentives on Adherence to Glucose Self-Monitoring during Pregnancy among Patients with Insulin-Requiring Diabetes: A Randomized Clinical Trial. Wernimont SA, Fleener D, Summers KM, et al (2022), American Journal of Perinatology 2 September 2022, online

Objective Glucose self-monitoring is critical for the management of diabetes in pregnancy, and increased adherence to testing is associated with improved obstetrical outcomes. Incentives have been shown to improve adherence to diabetes self-management. We hypothesized that use of financial incentives in pregnancies complicated by diabetes would improve adherence to glucose self-monitoring.

Study Design We conducted a single center, randomized clinical trial from May 2016 to July 2019. In total, 130 pregnant patients, <29 weeks with insulin requiring diabetes, were recruited. Participants were randomized in a 1:1:1 ratio to one of three payment groups: control, positive incentive, and loss aversion. The control group received $25 upon enrollment. The positive incentive group received 10 cents/test, and the loss aversion group received $100 for >95% adherence and "lost" payment for decreasing adherence. The primary outcome was percent adherence to recommended glucose self-monitoring where adherence was reliably quantified using a cellular-enabled glucometer. Adherence, calculated as the number of tests per day divided by the number of recommended tests per day×100%, was averaged from time of enrollment until admission for delivery.

Results We enrolled 130 participants and the 117 participants included in the final analysis had similar baseline characteristics across the three groups. Average adherence rates in the loss aversion, control and positive incentive groups were 69% (SE=5.12), 57% (SE = 4.60), and 58% (SE=3.75), respectively (p=0.099). The loss aversion group received an average of $50 compared with $38 (positive incentive) and $25 (control).

Conclusion In this randomized clinical trial, loss aversion incentives tended toward higher adherence to glucose self-monitoring among patients whose pregnancies were complicated by diabetes, though did not reach statistical significance. Further studies are needed to determine whether use of incentives improve maternal and neonatal outcomes. (Author)

2022-09553

Maternal Education Level Among People with Diabetes and Associated Adverse Outcomes. Bartal MF, Chen HY, Cornthwaite JAA, et al (2022), American Journal of Perinatology 12 September 2022, online

Objective The aim of the study is to determine the relation between education and adverse outcomes in individuals

with pregestational or gestational diabetes.

Study Design This population-based cohort study, using the U.S. vital statistics datasets, evaluated individuals with pregestational or gestational diabetes who delivered between 2016 and 2019. The primary outcome was composite neonatal adverse outcome including any of the following: large for gestational age (LGA), Apgar's score <five at 5 minutes, assisted ventilation >6 hours, neonatal seizure, or neonatal death. The secondary outcome was composite maternal adverse outcomes including any of the following: admission to intensive care unit, transfusion, uterine rupture, or unplanned hysterectomy. Multivariable analysis was used to estimate adjusted relative risks (aRR) and 95% confidence intervals (CIs).

Results Of 15,390,962 live births in the United States, 858,934 (5.6%) were eligible for this analysis. Compared with individuals with a college education and above, the risk of composite neonatal adverse outcome was higher in individuals with some college (aRR = 1.08, 95% CI = 1.07–1.09), high school (aRR = 1.06, 95% CI = 1.04–1.07), and less than high school (aRR = 1.05, 95% CI = 1.03–1.07) education. The components of composite neonatal adverse outcome that differed significantly between the groups were LGA, Apgar's score <five at 5 minutes, and assisted ventilation for >6 hours. Infant death differed when stratified by education level. An increased risk of composite maternal adverse outcome was also found with a lower level of education.

Conclusion Among individuals with diabetes, lower education was associated with a modestly higher risk of adverse neonatal and maternal outcomes. (Author)

2022-08753

Modification of the association between diabetes and birth defects by obesity, National Birth Defects Prevention Study, 1997–2011. Tinker SC, Gilboa SM, Moore CA, et al (2021), Birth Defects Research vol 113, no 14, August 2021, pp 1084-1097

Background

Maternal pregestational diabetes and obesity are risk factors for birth defects. Diabetes and obesity often occur together; it is unclear whether their co-occurrence compounds birth defect risk.

Methods

We analyzed 1997–2011 data on 29,671 cases and 10,963 controls from the National Birth Defects Prevention Study, a multisite case-control study. Mothers self-reported height, pregestational weight, and diabetes (pregestational and gestational; analyzed separately). We created four exposure groups: no obesity or diabetes (referent), obesity only, diabetes only, and both obesity and diabetes. We estimated odds ratios (ORs) using logistic regression and the relative excess risk due to interaction (RERI).

Results

Among mothers with pregestational obesity without diabetes, modest associations (OR range: 1.1–1.5) were observed for neural tube defects, small intestinal atresia, anorectal atresia, renal agenesis/hypoplasia, omphalocele, and several congenital heart defects. Pregestational diabetes, regardless of obesity, was strongly associated with most birth defects (OR range: 2.0–75.9). Gestational diabetes and obesity had a stronger association than for obesity alone and the RERI (in parentheses) suggested additive interaction for hydrocephaly (1.2; 95% confidence interval [CI]: −0.1, 2.5), tetralogy of Fallot (0.9; 95% CI: −0.01, 1.8), atrioventricular septal defect (1.1; 95% CI: −0.1, 2.3), hypoplastic left heart syndrome (1.1; 95% CI: −0.2, 2.4), and atrial septal defect secundum or not otherwise specified (1.0; 95% CI: 0.3, 1.6; only statistically significant RERI).

Conclusions

Our results do not support a synergistic relationship between obesity and diabetes for most birth defects examined. However, there are opportunities for prevention by reducing obesity and improving glycemic control among women with pregestational diabetes before conception. (Author)

2022-08697

Maternal diabetes-related malformations in Utah: A population study of birth prevalence 2001–2016. Orbain MM, Johnson J, Nance A, et al (2021), Birth Defects Research vol 113, no 2, January 2021, pp 152-160

Maternal pregestational diabetes mellitus is associated with an increased risk for congenital malformations of about 2–4 times the background risk. Notably, the types and patterns of congenital malformations associated with maternal diabetes are nonrandom, with a well-established increased risk for specific classes of malformations, especially of the

heart, central nervous system, and skeleton. While the increased risk in clinical and epidemiological studies is well documented in the literature, a precise estimate of overall birth prevalence of these specific congenital malformations among women with maternal pregestational diabetes, is lacking. The purpose of this study was to determine total prevalence of structural malformations associated with maternal pregestational diabetes mellitus in a population-based study. We identified infants with specific birth defects whose mother had pregestational diabetes mellitus in the Utah Birth Defect Network (UBDN), an active birth defects surveillance program that registers the occurrence of selected structural defects in the state of Utah. We defined specific maternal diabetes-related malformations based on epidemiologic and clinical studies in the literature. Of the 825,138 recorded Utah births between 2001 and 2016, a total of 91 cases were identified as likely having diabetic embryopathy within UBDN data. The prevalence of diabetes-related congenital malformation cases was calculated per year; the overall prevalence of diabetes-related malformations 2001–2016 was 1.1 per 10,000 births in Utah (95% CI, 0.9–1.3). Knowledge of the overall prevalence of diabetes-related malformations is important in predicting the number of cases that are potentially prevented with the implementation of programs to foster preconceptional management of maternal pregestational diabetes. (Author)

2022-08474

The Impact of Neighborhood Deprivation on Glycemic Control for Patients with Type 2 Diabetes During Pregnancy. Zahedi-Spung L, Polnaszek B, Duckham H, et al (2022), Journal of Women's Health Vol 31, no 8, August 2022, pp 1156-1164

Background: The impact of neighborhood level factors on glycemic control and pregnancy outcomes is understudied. The primary objective was to determine whether there is an association between glycemic control during pregnancy and level of neighborhood deprivation, defined by area deprivation index (ADI).

Materials and Methods: We conducted a retrospective cohort study of women with type 2 diabetes who received care at a tertiary referral center from 2007 to 2017. Patients living in more deprived neighborhoods (ADI >85th national percentile) were compared to those living in less deprived neighborhoods (ADI ≤85th percentile). The primary outcome was change in hemoglobin A1c (HbA1c) over time. Demographic characteristics were compared between groups, and trends in mean A1c through each trimester were tested with repeated measures analysis.

Results: Of 237 women meeting study criteria, 93 (39.2%) lived in less deprived (low ADI) and 144 (60.8%) lived in more deprived neighborhoods (high ADI). Women living in more deprived neighborhoods were more likely to be Black (86.8% vs. 53.8%, $p < 0.01$), less likely to be married (11.3% vs. 31.2%, $p < 0.01$), and had more severe diabetes ($p = 0.05$). Both groups achieved significant improvement in HbA1c across each trimester using repeated measures analysis. Those living in more deprived neighborhoods had significantly more improvement in HbA1c from their initial visit to the third trimester compared to those in less deprived neighborhoods, ($p = 0.01$) such that there was no longer a statistically significant disparity in HbA1c by the third trimester (6.69 ± 0.97 Less deprived vs. 6.95 ± 1.22 more deprived, $p = 0.19$).

Conclusions: Low-income women living in more deprived neighborhoods enter pregnancy with significantly worse glycemic control than those living in less deprived neighborhoods, but the gap in glycemic control largely closes by the end of pregnancy with similar maternal and neonatal outcomes. (Author)

2022-08255

Fetal echocardiographic parameters in pregnancies complicated by diabetes: a case control study [Retracted]. Darwish A, Abdel-Raouf M, Kamel R, et al (2022), BMC Pregnancy and Childbirth vol 22, no 650, 18 August 2022

Background

At present, the prevalence of pregestational diabetes is 2.2% with an overall prevalence of hyperglycaemia in pregnancy of about 16.2%. Fetuses of diabetic mothers are at risk of functional cardiac abnormalities without structural cardiac anomalies especially in the third trimester. The main aim of this study was to assess the association of diabetes with different fetal echocardiographic parameters.

Methods

A case control study comprising a total of 120 pregnant women (60 cases and 60 controls). The cases group included fetuses of mothers known to have pre-gestational type 2 diabetes (DM group) while the control group included fetuses of euglycaemic healthy pregnant women. They were examined twice at 23–24 weeks' gestation (visit 1) and followed up at 27–28 weeks’ gestation (visit 2). The Modified Myocardial Performance Index (Mod MPI) was obtained in all fetuses. Also, M-mode echocardiography was used to measure the interventricular septum thickness at diastole

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in a transverse four chamber view.

Results
There was a significant increase in Iso-volumetric contraction time (ICT) (45.4 ms ± 8.9), Iso-volumetric relaxation time (IRT) (54.7 ms ± 11.22), Interventricular septal thickness (IVST) (4.08 mm ± 0.8), aortic acceleration time (AAT) (54.16 ms ± 12.77) and MPI (0.64 ± 0.09) in the diabetic group compared to the normal control group ICT (38.5 ms ± 9.59), IRT (46.13 ms ± 10.29), IVST (3.17 mm ± 0.6), AAT (49.73 ms ± 10.68) and MPI (0.5 ± 0.1) (all P values were < 0.001).

When comparing parameters assessed at both visits among diabetic patients, there was a significant increase in IVST in the second visit (4.74 ± 0.78 mm) compared to the first visit (4.08 ± 0.8 mm) (P value < 0.05).

The incidence of hypertrophic cardiomyopathy (HCM) was significantly higher in diabetic patients than in the control group. This is was observed in both first and second visit (33.4% and 56.7%) (P value < 0.001).

Conclusions
Fetuses of diabetic pregnant females show a significant increase in MPI, decrease in E\A ratio and HCM. These alterations in cardiac functions and structure were found to be continuous throughout the period of time between the two visits. (Author) [Erratum: BMC Pregnancy and Childbirth, vol 25, no 19, January 2025. https://doi.org/10.1186/s12884-024-07016-7; Retraction: BMC Pregnancy and Childbirth, vol 26, no 1, 14 February 2026, 163. https://doi.org/10.1186/s12884-026-08812-z]
Full URL: https://doi.org/10.1186/s12884-022-04969-5

2022-08101

A 10-year audit of pregnancies affected by diabetic ketoacidosis at the Pretoria Academic Complex. Maseko NF, van Zyl D, Adam S (2022), International Journal of Gynecology & Obstetrics vol 158, no 3, September 2022, pp 557-563

Background
Diabetic ketoacidosis (DKA) during pregnancy is associated with increased rates of maternal and perinatal mortality and morbidity. DKA management guidelines are designed to ensure optimal management and minimize adverse outcomes.

Objective
To determine the level of adherence to DKA management guidelines at a tertiary center in Pretoria, South Africa and report on maternal and perinatal outcomes of the pregnancies complicated by DKA.

Methods
This was a retrospective clinical record audit using the Society for Endocrinology, Metabolism and Diabetes of South Africa guidelines against documented management. Adherence to three cornerstones of therapy was measured: intravenous fluids, insulin therapy, and management of electrolytes.

Results
Fifty-six records of pregnancies that were complicated with DKA over a 10-year period were reviewed. Mean age was 29.6 years (range 20–43 years). Thirty-six (64.3%) women had type 1 diabetes mellitus. DKA was categorized into mild (n = 26, 46.4%), moderate (n = 22, 39.3%), and severe (n = 8, 14.3%). The study demonstrated lack of adherence to the three cornerstones of therapy. Of the 49 (85.7%) women with recorded perinatal outcomes, 30.6% had stillbirths. Severe maternal DKA (pH <7.0) demonstrated adverse perinatal outcomes (P = 0.005).

Conclusion
Despite the availability of guidelines, DKA is sub-optimally managed in pregnancy, which may contribute to adverse maternal and perinatal outcomes. (Author)

2022-07680

Maternal Diabetes and Intrapartum Fetal Electrocardiogram. Plunkett BA, Weiner SJ, Saade GR, et al (2022), American Journal of Perinatology 10 July 2022, online

Objective Fetal electrocardiogram (ECG) ST changes are associated with fetal cardiac hypoxia. Our objective was to evaluate ST changes by maternal diabetic status and stage of labor.

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Methods This was a secondary analysis of a multicentered randomized-controlled trial in which laboring patients with singleton gestations underwent fetal ECG scalp electrode placement and were randomly assigned to masked or unmasked ST-segment readings. Our primary outcome was the frequency of fetal ECG tracings with ST changes by the stage of labor. ECG tracings were categorized into mutually exclusive groups (ST depression, ST elevation without ST depression, or no ST changes). We compared participants with DM, gestational diabetes mellitus (GDM), and no DM.

Results Of the 5,436 eligible individuals in the first stage of labor (95 with pregestational DM and 370 with GDM), 4,427 progressed to the second stage. ST depression occurred more frequently in the first stage of labor in participants with pregestational DM (15%, adjusted odds ratio [aOR] 2.20, 95% confidence interval [CI] 1.14–4.24) and with GDM (9.5%, aOR 1.51, 95% CI 1.02–2.25) as compared with participants without DM (5.7%). The frequency of ST elevation was similar in participants with pregestational DM (33%, aOR 0.79, 95% CI 0.48–1.30) and GDM (33.2%, aOR 0.91, 95% CI 0.71–1.17) as compared with those without DM (34.2%). In the second stage, ST depression did not occur in participants with pregestational DM (0%) and occurred more frequently in participants with GDM (3.5%, aOR 2.01, 95% CI 1.02–3.98) as compared with those without DM (2.0%). ST elevation occurred more frequently in participants with pregestational DM (30%, aOR 1.81, 95% CI 1.02–3.22) but not with GDM (19.0%, aOR 1.06, 95% CI 0.77–1.47) as compared with those without DM (17.8%).

Conclusion ST changes in fetal ECG occur more frequently in fetuses of diabetic mothers during labor. ClinicalTrials.gov number, NCT01131260.

Precis: ST changes in fetal ECG, a marker of fetal cardiac hypoxia, occur more frequently in fetuses of diabetic parturients.

Key Points

Fetal hypertrophic cardiomyopathy (HCM) and cardiac dysfunction occur frequently among fetuses of diabetic patients.

Fetal ECG changes such as ST elevation and depression reflect cardiac hypoxia.

Fetuses of diabetic patients demonstrate a higher prevalence of fetal ECG tracings with ST changes. (Author)

2022-07497

Neonatal outcomes following antenatal corticosteroid administration prior to elective caesarean delivery in women with pre-gestational diabetes: A retrospective cohort study. Thevathasan I, Karahalios A, Unterscheider J, et al (2023), Australian and New Zealand Journal of Obstetrics and Gynaecology (ANZJOG) vol 36, no 1, February 2023, pp 93-98

Background

The benefit of antenatal corticosteroid (ACS) administration for the prevention of neonatal morbidity and mortality has been well described for preterm infants. Some studies have demonstrated a benefit for infants born by elective caesarean section (CS) at late preterm or term gestations. However, the neonatal benefits of ACS are not well described when given to pregnant women with diabetes.

Aims

The aim of this study was to evaluate the neonatal outcomes following ACS administration in women with pre-gestational diabetes mellitus (PGDM) when administered prior to elective CS after 36 weeks gestation.

Methods

This retrospective observational study included all women with PGDM who gave birth by elective CS between 36+0 and 38+6 weeks gestation. Neonatal outcomes for exposed participants were compared to outcomes for non-exposed participants.

Results

Of the 306 women identified, 65 (21.2%) were exposed to ACS within seven days prior to birth and 241 (78.8%) were not. Although not statistically significant, ACS-exposed infants born prior to 38+0 weeks were less likely to require respiratory support or neonatal nursery admission compared to those who were not exposed; however, exposed infants born after 37+0 weeks were more likely to require parenteral treatment for neonatal hypoglycaemia.

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Conclusion
This study did not demonstrate any statistically significant beneficial or harmful effects of ACS in neonates of women with PGDM who are born by elective CS. While it is plausible that ACS could reduce neonatal respiratory morbidity in this population, further prospective studies evaluating the benefits and harms are required before recommending this practice. (Author)
Full URL: https://doi.org/10.1111/ajo.13586

2022-07184

Continuous glucose monitoring: A cost-effective tool to reduce pre-term birth rates in women with type one diabetes. Sekhon JK, Graham D, Mehrotra C, et al (2023), Australian and New Zealand Journal of Obstetrics and Gynaecology (ANZJOG) vol 63, no 2, April 2023, pp 146-153

Background
Women with type one diabetes experience poorer obstetric outcomes than normoglycaemic women in pregnancy.

Objective
To investigate the cost and clinical effectiveness of continuous glucose monitoring (GCM) compared to self-monitoring of blood glucose in improving obstetric outcomes in women with type one diabetes during pregnancy.

Materials and Methods
This retrospective cohort study included women with type one diabetes referred to a state-wide tertiary obstetric centre before and after the introduction of government-funded CGMs in Australia in March 2019. Forty-nine women using CGMs were propensity matched on a range of clinical features with a historical group of 49 women with type one diabetes who exclusively used intermittent self-monitoring of blood in the year prior to the introduction of funding of sensors. Medical records and administrative cost data were audited to quantify cost and clinical effectiveness.

Results
There were significantly lower pre-term (95% CI 0.39–0.922; P = 0.026) and very pre-term birth rates (95% CI 1.002–1.184; P = 0.041) in the CGM group. There was a significant reduction in the length of antenatal inpatient hospital stay (P < 0.01) and adult special care unit stay (P = 0.013) and neonatal admission to the neonatal intensive care unit (P = 0.0262) in the continuous glucose monitoring group. CGMs represented a net cost saving to the health care sector of $12 063 per pregnancy where the device was used, with an incremental cost-effectiveness ratio of $3275 per prevented pre-term birth.

Conclusions
CGM use in pregnancy is a cost-effective intervention for reducing the risk of pre-term birth in women with type one diabetes, resulting in a net cost benefit to the health sector. (Author)
Full URL: https://doi.org/10.1111/ajo.13581

2022-06845

School performance in Danish children exposed to maternal type 1 diabetes in utero: A nationwide retrospective cohort study. Spangmose AL, Skipper N, Knorr S, et al (2022), PLoS Medicine vol 19, no 4, April 2022, e1003977

Background
Conflicting results have been reported concerning possible adverse effects on the cognitive function of offspring of mothers with type 1 diabetes (O-mT1D). Previous studies have included offspring of parents from the background population (O-BP), but not offspring of fathers with type 1 diabetes (O-fT1D) as the unexposed reference group.

Methods and findings
This is a population-based retrospective cohort study from 2010 to 2016. Nationally standardized school test scores (range, 1 to 100) were obtained for public school grades 2, 3, 4, 6, and 8 in O-mT1D and compared with those in O-fT1D and O-BP. Of the 622,073 included children, 2,144 were O-mT1D, and 3,474 were O-fT1D. Multiple linear regression models were used to compare outcomes, including the covariates offspring with type 1 diabetes, parity, number of siblings, offspring sex, smoking during pregnancy, parental age, and socioeconomic factors. Mean test scores were 54.2 (standard deviation, SD 24.8) in O-mT1D, 54.4 (SD 24.8) in O-fT1D, and 56.4 (SD 24.7) in O-BP. In adjusted analyses, the mean differences in test scores were −1.59 (95% CI −2.48 to −0.71, p < 0.001) between O-mT1D and O-BP and −0.78

(95% CI −1.48 to −0.08, p = 0.03) between O-fT1D and O-BP. No significant difference in the adjusted mean test scores was found between O-mT1D and O-fT1D (p = 0.16). The study's limitation was no access to measures of glycemic control during pregnancy.

Conclusions
O-mT1D achieved lower test scores than O-BP but similar test scores compared with O-fT1D. Glycemic control during pregnancy is essential to prevent various adverse pregnancy outcomes in women with type 1 diabetes. However, the present study reduces previous concerns regarding adverse effects of in utero hyperglycemia on offspring cognitive function. (Author) [Erratum: PLoS Medicine, vol 19, no 6, June 2022, e1004021. https://doi.org/10.1371/journal.pmed.1004021]
Full URL: https://doi.org/10.1371/journal.pmed.1003977

2022-06636

Maternal autoimmune disease and risk of hospitalization for autoimmune disease, allergy, and cancer in offspring.
Zhao X, Bégin P, Kang H, et al (2022), Pediatric Allergy and Immunology vol 33, no 2, February 2022, e13728
Background
Children whose mothers have autoimmune disease may be at risk of developing immune-mediated disorders. We assessed the association between maternal autoimmune disease and risk of autoimmune disease, allergy, and cancer in offspring.

Methods
We analyzed a cohort of 1,011,623 children born in Canada between 2006 and 2019. We identified mothers who had autoimmune diseases and assessed hospitalizations for autoimmune disease, allergy, and cancer in offspring between birth and 14 years of age. We estimated hazard ratios (HR) for the association of maternal autoimmune disease with child hospitalization in adjusted Cox regression models. We used within-sibling analysis to control for genetic and environmental confounders.

Results
A total of 20,354 children (2.0%) had mothers with an autoimmune disease. Compared with no autoimmune disease, maternal autoimmune disease was associated with the risk of childhood hospitalization for autoimmune disease (HR 1.96, 95% CI 1.66–2.31) and allergy (HR 1.30, 95% CI 1.21–1.40), but was not significantly associated with cancer (HR 1.31, 95% CI 0.96–1.80). Type 1 diabetes, celiac disease, inflammatory arthritis, and systemic lupus erythematosus were among specific maternal autoimmune diseases most strongly associated with childhood hospitalization for autoimmune disease and allergy. The associations disappeared after controlling for genetic and environmental confounders in the within-sibling analysis.

Conclusions
Maternal autoimmune disease is associated with an increased risk of autoimmune disease and allergy hospitalization in offspring, but the relationship appears to be confounded by genetic and environmental factors. Prenatal exposure to immunologic or pharmacologic products is not likely a direct cause of immune-mediated disease in children. (Author)

2022-06227

Pre-Eclampsia Biomarkers for Women With Type 1 Diabetes Mellitus: A Comprehensive Review of Recent Literature.
Fremaine KZ, Kerrigan L, Eastwood KA, et al (2022), Frontiers in Bioengineering and Biotechnology 26 May 2022, online
Background: Pre-eclampsia is a serious consideration for women with type 1 diabetes mellitus (T1DM) planning pregnancy. Risk stratification strategies, such as biomarkers measured in the first trimester of pregnancy, could help identify high-risk women. The literature on T1DM-specific pre-eclampsia biomarkers is expanding. We aimed to provide a narrative review of recently published evidence to identify the most promising biomarker candidates that could be targeted for clinical implementation in existing PE models.

Methods: A search using MeSH terms was carried out of Medline, EMBASE, Maternity and Infant Care, Web of Science, and Scopus for relevant papers published since 2015 inclusive and in English. The time limit was applied from the publication of the preceding systematic review in this field. Included studies had pre-eclampsia as a primary outcome, measured one or more serum, plasma or urine biomarkers at any time during pregnancy, and had a distinct group of women with T1DM who developed pre-eclampsia. Studies with pre-eclampsia as a composite outcome were not

considered. No restrictions on study types were applied. A narrative synthesis approach was adopted for analysis.

Results: A total of 510 records were screened yielding 18 eligible studies relating to 32 different biomarkers. Higher first-trimester levels of HbA1c and urinary albumin were associated with an increased risk of pre-eclampsia development in women with T1DM. Urinary neutrophil gelatinase-associated lipocalin and adipokines were novel biomarkers showing moderate predictive ability before 15 gestational weeks. Two T1DM-specific pre-eclampsia prediction models were proposed, measuring adipokines or urinary neutrophil gelatinase-associated lipocalin together with easily attainable maternal clinical characteristics. Contradicting previous literature, pre-eclampsia risk in women with T1DM was correlated with vitamin D levels and atherogenic lipid profile in the context of haptoglobin phenotype 2-2. Pregnancy-associated plasma protein-A and soluble endoglin did not predict pre-eclampsia in women with T1DM, and soluble Fms-like tyrosine kinase 1 only predicted pre-eclampsia from the third trimester.

Conclusion: Maternally derived biomarkers reflecting glycemic control, insulin resistance and renal dysfunction performed better as PE predictors among women with T1DM than those derived from the placenta. These biomarkers could be trialed in current PE prediction algorithms to tailor them for women with T1DM. (Author)
Full URL: https://doi.org/10.3389/fbioe.2022.809528

2022-06195

Introduction of diabetic retinopathy screening into an antenatal clinic: Impact on maternal screening and diagnosis rates. Phillips JL, Raja V, Mehrotra C, et al (2022), Australian and New Zealand Journal of Obstetrics and Gynaecology (ANZJOG) vol 62, no 6, December 2022, pp 906-909

Pregnancy is a risk factor for the development and progression of diabetic retinopathy (DR) in women with pre-gestational diabetes. However, a minority of pregnant women with diabetes adhere to retinal screening recommendations. The introduction of an onsite retinal camera at our tertiary maternity hospital significantly increased the proportion of women who received at least one retinal screen during pregnancy (93.0% vs 54.3%, P < 0.001) and the identification of both DR and DR progression. We conclude that the use of a retinal camera in similar clinics is a feasible option to improve DR screening and diagnosis rates in pregnancy. (Author)

2022-05753

Differences in Hemoglobin A1c during Pregnancy between Non-Hispanic Black versus White Women with Prepregnancy Diabetes. Venkatesh KK, Fareed N, Kiefer MK, et al (2022), American Journal of Perinatology vol 39, no 12, September 2022, pp 1279-1287

Objective The objective of this was to determine whether the change in hemoglobin A1c (HbA1c) from early to late pregnancy differs between non-Hispanic Black and White women with prepregnancy diabetes.

Study design A retrospective analysis was performed from an integrated prenatal and diabetes care program from 2012 to 2016. We compared HbA1c as a continuous measure and secondarily, HbA1c <6.5%, cross-sectionally, and longitudinally in early (approximately 10 weeks) and late (approximately 31 weeks) pregnancies. Linear and logistic regression were used and adjusted for age, body mass index, White diabetes class, medication use, diabetes type, gestational age at baseline HbA1c measurement, and baseline hemoglobin.

Results Among 296 non-Hispanic Black (35%) and White pregnant women (65%) with prepregnancy diabetes (39% type 1 and 61% type 2), Black women were more likely to experience increased community-level social determinants of health as measured by the Social Vulnerability Index (SVI) and were less likely to have type 1 diabetes and have more severe diabetes versus White women ($p < 0.05$). Black women had higher mean HbA1c (7.8 vs. 7.4%; beta: 0.75; 95% confidence interval [CI]: 0.30–1.19) and were less likely to have HbA1c < 6.5% at 10 weeks compared with White women (24 vs. 35%; adjusted odds ratio: 0.45; 95% CI: 0.24–0.81) but not after adjusting for SVI. At 31 weeks, both groups had similar mean HbA1c (both 6.5%) and were equally as likely to have HbA1c < 6.5% (57 vs. 54%). From early to late pregnancy, Black women had a higher percentage decrease in HbA1c (1.3 vs. 0.9%; beta = 0.63; 95% CI: 0.27–0.99) and were equally as likely to have an improvement or stable HbA1C < 6.5% from 10 to 31 weeks, with both groups having a similar mean HbA1c (6.5%) at 31 weeks.

Conclusion Despite experiencing greater community-level social determinants of health, Black women with pregestational diabetes had a larger reduction in HbA1c and were able to equally achieve the target of HbA1c < 6.5% by late pregnancy compared with White women as part of an integrated diabetes and prenatal care program. (Author)

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2022-05747

Outcomes of Moderately Preterm Infants of Insulin-Dependent Diabetic Mothers. Gray KD, Saha S, Battarbee AN, et al (2024), American Journal of Perinatology vol 41, no 9, July 2024, pp 1212-1222

Objective Little is known about the hospital outcomes of moderately preterm (MPT; 29 0/7–33 6/7 weeks gestational age) infants born to insulin-dependent diabetic mothers (IDDMs). We evaluated characteristics and outcomes of MPT infants born to IDDMs compared with those without IDDM (non-IDDM).

Study Design Cohort study of infants from 18 centers included in the MPT infant database from 2012 to 2013. We compared characteristics and outcomes of infants born to IDDMs and non-IDDMs.

Results Of 7,036 infants, 527 (7.5%) were born to IDDMs. Infants of IDDMs were larger at birth, more often received continuous positive pressure ventilation in the delivery room, and had higher risk of patent ductus arteriosus (adjusted relative risk or aRR: 1.49, 95% confidence interval [CI]: 1.20–1.85) and continued hospitalization at 40 weeks postmenstrual age (aRR: 1.55, 95% CI: 1.18–2.05).

Conclusion MPT infants of IDDM received more respiratory support and prolonged hospitalizations, providing further evidence of the important neonatal health consequences of maternal diabetes. (Author)

2022-04797

Clinical analysis of 2860 cases of diabetes in pregnancy: a single-center retrospective study. Chen J, Wang Z, Wu W, et al (2022), BMC Pregnancy and Childbirth vol 22, no 418, 18 May 2022

Background

To investigate the epidemiological, clinical characteristics and outcomes of diabetes in pregnancy (DIP).

Methods

This single-center, retrospective study included 16,974 pregnant women hospitalized during 2018–2019. Among them, 2860 DIP patients were grouped according to diabetes type, glycemic status, and insulin use. Multivariate logistic regression analysis was conducted.

Results

The incidence of DIP [17.10%; pregestational diabetes mellitus (PGDM), 2.00% (type I, 0.08%; type 2, 1.92%); gestational diabetes mellitus (GDM), 14.85% (GDM A1, 13.58%; GDM A2, 1.27%)] increased annually. Premature birth, congenital anomalies, large for gestational age (LGA), neonatal asphyxia, neonatal intensive care unit transfer, hypertension, and puerperal infection were more common in DIP than in healthy pregnancies. The most common comorbidities/complications were hypertension, thyroid dysfunction, cervical incompetence, intrahepatic cholestasis, premature membrane rupture, oligo/polyhydramnios, and fetal distress. GDM incidence at ages ≥35 and ≥ 45 years was 1.91 and 3.26 times that at age < 35 years, respectively. If only women with high-risk factors were screened, 34.8% GDM cases would be missed. The proportion of insulin use was 14.06% (PGDM, 55%; GDM, 8.53%). Mean gestational age at peak insulin dose in DIP was 32.87 ± 5.46 weeks. Peak insulin doses in PGDM and GDM were 3.67 and 2 times the initial doses, respectively. The risks of LGA, premature birth, cesarean section, and neonatal hypoglycemia in PGDM were 1.845, 1.533, 1.797, and 1.368 times of those in GDM, respectively. The risks of premature birth and neonatal hypoglycemia in women with poor glycemic control were 1.504 and 1.558 times of those in women with good control, respectively.

Conclusions

The incidence of adverse outcomes in DIP is high. (Author)

Full URL: https://doi.org/10.1186/s12884-022-04712-0

2022-04215

Stillbirth in women with diabetes: a retrospective analysis of fetal autopsy reports. Lynch TA, Westen E, Li D, et al (2022), Journal of Maternal-Fetal and Neonatal Medicine vol 35, no 11, 2022, pp 2091-2098

Introduction

Diabetes in pregnancy is associated with an increased rate of stillbirth. There are a wide variety of factors that have been implicated including placental insufficiency, hypoxia, hyperinsulinemia and impaired cardiac function. Furthermore, there is evidence that diabetic pregnancies have an increased rate of fetal cardiomyopathy as compared

to non-diabetic pregnancies. Prior studies have indicated that this association can also be an etiology for diabetic stillbirth. The purpose of this study was to determine if diabetic pregnancies have an increased risk of fetal cardiomyopathy identified on fetal autopsy as compared to non-diabetic women with a stillbirth in a cohort of pregnancies that had evaluation with a fetal autopsy.

Materials and methods
Retrospective cohort study of women with a stillbirth who consented to fetal autopsy at an academic medical center from 2011 to 2017. Stillbirth was defined as an intrauterine fetal demise at ≥20 weeks' gestation. Women with diabetes defined as pre-gestational diabetes type 1, pre-gestational diabetes type 2, and gestational diabetes were compared to women without diabetes. Primary outcome was fetal cardiomyopathy. Other etiologies for stillbirth were also evaluated and classified according to the Stillbirth Collaborative Research Network (SCRN) initial causes of fetal death. Fisher exact test, $\chi 2$ test, and Mann Whitney U tests were performed as appropriate, with $p < .05$ considered significant. Generalized linear models were performed for fetal organ weights controlling for gestational age of delivery, maternal chronic hypertension, delivery body mass index, and birthweight.

Results
A total of 78 women elected to have fetal autopsy examinations during the study period. Of these, 75 had complete information available for review. A total of 60 women did not have diabetes and 15 women had diabetes. Of pregnancies complicated by diabetes, 11 had insulin dependent diabetes and 4 had non-insulin dependent diabetes. Fetal cardiomyopathy was diagnosed on autopsy for 7 (46.7%) of pregnancies with diabetes and 2 (3.3% of pregnancies without diabetes (RR 14.00 [95% CI 3.23–60.65], $p < .001$). These associations were still significant even when analyzing only those pregnancies without fetal congenital heart disease (7 [46.7%] diabetic pregnancies with cardiomyopathy versus 1 [2.0%] nondiabetic pregnancy with cardiomyopathy, RR 23.80 [95% CI 3.17–178.46], $p < .001$). There was no difference between diabetic and non-diabetic pregnancies in regards to other causes for stillbirth. Stillbirths in pregnancies with diabetes also had larger fetal heart, liver, and adrenal weights on fetal autopsy.

Conclusion
Women with diabetes have 14 times the risk of fetal cardiomyopathy identified at fetal autopsy as compared to women without diabetes. As the prediction and prevention of diabetic stillbirth is limited, information on potential causes of stillbirth may help future research identify those pregnancies at the greatest risk for adverse outcome. (Author)

2022-04206

Healthy mum, healthy baby, healthy future. The case for UK leadership in the development of safe, effective and accessible medicines for use in pregnancy. University of Birmingham, Birmingham Health Partners (2022), University of Birmingham, Edgbaston, Birmingham, May 2022. 32 pages

Leading figures from charity, healthcare, industry, law and academia outline a collaborative vision for UK leadership to improve maternal health. The report proposes a clear roadmap to improve the lives of millions of people, not just for women while they are pregnant, but for future generations. (Publisher, edited)

Full URL: https://www.birminghamhealthpartners.co.uk/wp-content/uploads/2022/05/Final-Healthy-Mum-Healthy-Baby-Healthy-Future-Report-AW_Accessible-PDF-REDUCED-FILE-SIZE.pdf

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2022-04186

WHO criteria for diabetes in pregnancy: a retrospective cohort. Zaccara TA, Paganoti CF, Mikami FCF, et al (2022), BMC Pregnancy and Childbirth vol 22, no 385, 3 May 2022

Background
Recognizing that hyperglycemia in pregnancy can impact both individually a patient's health and collectively the healthcare system and that different levels of hyperglycemia incur different consequences, we aimed to evaluate the differences and similarities between patients who met the diagnostic criteria for gestational diabetes mellitus (GDM) or diabetes in pregnancy (DIP) according to the World Health Organization diagnostic criteria based on the 75 g oral glucose tolerance test (OGTT).

Methods
This retrospective study included a cohort of 1064 women followed-up at the Gestational Diabetes Unit of Hospital das Clinicas da Faculdade de Medicina da Universidade de Sao Paulo (Sao Paulo, Brazil). Patients were classified into GDM and DIP groups, according to their OGTT results. Their electronic charts were reviewed to obtain clinical and laboratory

data for all participants.

Results

Women in the DIP group had a higher pre-pregnancy body mass index (30.5 vs 28.1 kg/m2, odds ratio [OR] 1.07, 95% confidence interval [CI] 1.02–1.11), more frequently experienced GDM in a previous pregnancy (25% vs. 11%, OR 2.71, 95% CI 1.17–6.27), and were more likely to have chronic hypertension (43.1% vs. 23.5%, OR 2.46, 95% CI 1.47–4.11), a current twin pregnancy (10.8% vs. 2.9%, OR 4.04, 95% CI 1.70–9.61), or require insulin (46.1% vs. 14.3%, OR 5.14, 95% CI 3.06–8.65) than those in the GDM group. Patients in the DIP group also had a higher frequency of large-for-gestational-age infants (12.3% vs. 5.1%, OR 2.78, 95% CI 1.23–6.27) and abnormal postpartum OGTT (45.9% vs. 12.6%, OR 5.91, 95% CI 2.93–11.90) than those in the GDM group. Nevertheless, in more than half of the DIP patients, glucose levels returned to normal after birth.

Conclusions

Diabetes in pregnancy is associated with an increased risk of adverse perinatal outcomes but does not equate to a diagnosis of diabetes post-pregnancy. It is necessary to identify and monitor these women more closely during and after pregnancy. Keeping patients with hyperglycemia in pregnancy engaged in healthcare is essential for accurate diagnosis and prevention of complications related to abnormal glucose metabolism. (Author)

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2022-04149

Ultrasound predictors of adverse outcome in pregnancy complicated by pre-existing and gestational diabetes.

Garbagnati M, Aye CYL, Cavallaro A, et al (2022), Acta Obstetricia et Gynecologica Scandinavica vol 101, no 7, July 2022, pp 787-793

Introduction

Ultrasound assessment of fetuses subjected to hyperglycemia is recommended but, apart from increased size, little is known about its interpretation, and the identification of which large fetuses of diabetic pregnancy are at risk is unclear. Newer markers of adverse outcomes, abdominal circumference growth velocity and cerebro-placental ratio, help to predict risk in non-diabetic pregnancy. Our study aims to assess their role in pregnancies complicated by diabetes.

Material and methods

This is a retrospective analysis of a cohort of singleton, non-anomalous fetuses of women with pre-existing or gestational diabetes mellitus, and estimated fetal weight at the 10th centile or above. Gestational diabetes was diagnosed by selective screening of at risk groups. A universal ultrasound scan was offered at 20 and 36 weeks of gestation. Estimated fetal weight, abdominal circumference growth velocity, presence of polyhydramnios, and cerebro-placental ratio were evaluated at the 36-week scan. A composite adverse outcome was defined as the presence of one or more of perinatal death, arterial cord pH less than 7.1, admission to Neonatal Unit, 5-minute Apgar less than 7, severe hypoglycemia, or cesarean section for fetal compromise. A chi-squared test was used to test the association of estimated fetal weight at the 90th centile or above, polyhydramnios, abdominal circumference growth velocity at the 90th centile or above, and cerebro-placental ratio at the 5th centile or below with the composite outcome. Logistic regression was used to assess which ultrasound markers were independent risk factors. Odds ratios of composite adverse outcome with combinations of independent ultrasound markers were calculated.

Results

A total of 1044 pregnancies were included, comprising 87 women with pre-existing diabetes mellitus and 957 with gestational diabetes. Estimated fetal weight at the 90th centile or above, abdominal circumference growth velocity at the 90th centile or above, cerebro-placental ratio at the 5th centile or below, but not polyhydramnios, were significantly associated with adverse outcomes: odds ratios (95% confidence intervals) 1.85 (1.21–2.84), 1.54 (1.02–2.31), 1.92 (1.21–3.30), and 1.53 (0.79–2.99), respectively. Only estimated fetal weight at the 90th centile or above and cerebro-placental ratio at the 5th centile or below were independent risk factors. The greatest risk (odds ratio 6.85, 95% confidence interval 2.06–22.78) was found where both the estimated fetal weight is at the 90th centile or above and the cerebro-placental ratio is at the 5th centile or below.

Conclusions

In diabetic pregnancies, a low cerebro-placental ratio, particularly in a macrosomic fetus, confers additional risk. (Author)

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2022-03884

Pre-eclampsia with paradoxical polyuria: diabetes insipidus in pregnancy. Dashraath P, Chen K, Htet ZW, et al (2022), The Lancet vol 399, no 10337, 7 May 2022, p 1809

A 31-year-old woman reporting a headache and epigastric pain for the past 12 h attended our unit. She had a history of gestational hypertension and 5 days earlier had a caesarean section at term; there had been no post-partum haemorrhage and she had been allowed home. The patient's haemoglobin concentration had been 11·7 g/dL (normal >10 post partum), and the serum creatinine concentration 48 µmol/L (normal <90); she was normotensive and on no medication. (Author)

2022-03801

Not so sweet diabetes: a rare case of postpartum central diabetes insipidus. Zhen XM, Wong K, Fernandes A, et al (2022), Journal of Obstetrics and Gynaecology vol 42, no 6, 2022, pp 2508-2510

Case report of postpartum central diabetes insipidus in a 36-year-old woman. The patient had an uncomplicated obstetric history and underwent an emergency caesarean section at 40 weeks' gestation. Serum sodium levels were normal until postpartum day one, and the patient subsequently developed polyuria and increased thirst. (LDO)

2022-02935

The effect of fetal weight on the accuracy of sonographic weight estimation among women with diabetes. Meyer R, Rottenstreich A, Tsur A, et al (2022), Journal of Maternal-Fetal and Neonatal Medicine vol 35, no 9, 2022, pp 1747-1753

Objective

The assessment of sonographic estimated fetal weight (EFW) enables identification of fetuses in the extremes of weight, thus aiding in the planning and management of peripartum care. There are conflicting reports regarding the accuracy of EFW in diabetic mothers. We aimed to study the factors associated with the accuracy of EFW at term, specifically the role of gestational and pre-gestational diabetes in this setting.

Methods

A retrospective study including all women carrying singleton term gestations who delivered within a week following a sonographic fetal weight estimation between 2011 and 2019. Accurate EFW was defined as within 10% of the actual birthweight. We allocated the study cohort into two groups: (1) Accurate EFW (2) inaccurate EFW. Both groups were compared in order to identify factors associated with the inaccuracy of EFW.

Results

Overall, 41,263 deliveries were available for evaluation, including 412 (1.0%) deliveries among women with pre-gestational diabetes and 4,735 (11.5%) among women with gestational diabetes. Of them, 7,280 (17.6%) had inaccurate EFW. Inaccurate EFW was associated with nulliparity, OR 0.82 [95% CI] (0.78–0.87), oligohydramnios, OR 0.81 [95% CI] (0.71–0.93), pregestational diabetes, OR [95% CI] 0.61 (0.50–0.79), and extremity of fetal weight; <2,500 grams–OR [95% CI] 0.37 (0.33–0.41) and >4,000 grams OR [95% CI] 0.52 (0.48–0.57). On multiple regression analysis, the following factors were independently associated with inaccurate EFW: pregestational diabetes, OR [95% CI] 0.58 (0.46–0.73), p < .001, nulliparity, OR [95% CI] 0.86 (0.82–0.91), p < .001 and higher fetal weight (for each 500 grams), OR [95% CI [1.25 (1.21–1.30), p < .001. On analysis of different weight categories, pregestational diabetes was associated with inaccurate EFW only in those with birthweight >3,500 grams, OR [95% CI] 0.37 (0.24–0.56) (p < .001).

Conclusion

Among pregestational diabetic women, the accuracy of sonographic EFW when assessed to be >3,500 grams is questionable. This should be taken into consideration when consulting women and planning delivery management.

Synopsis

Among pregestational diabetic women, the accuracy of estimated sonographic fetal weight higher than 3,500 grams is of limited accuracy. (Author)

2022-02918

Small-for-gestational age placentas associate with an increased risk of adverse outcomes in pregnancies complicated by either type I or type II pre-gestational diabetes mellitus. Starikov R, Has P, Wu R, et al (2022), Journal of Maternal-Fetal and Neonatal Medicine vol 35, no 9, 2022, pp 1677-1682

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Introduction

One-fifth of pregnancies with pre-gestational diabetes mellitus (pre-DM) yield placentas <10th percentile small for gestational age (SGA), compared to a non-diabetic population. We hypothesized that SGA placentas of women with pre-DM, whether type I (T1DM) or type II (T2DM), exhibit distinct histopathological changes and pregnancy outcomes compared to pre-DM pregnancies with an AGA placenta.

Methods

We conducted a retrospective, cohort study of placentas from pregnant women enrolled in the Diabetes in Pregnancy Program at Brown University between 2003 and 2011, by comparing pre-DM patients with SGA placentas to pre-DM patients with AGA placental weights.

Results

The SGA placenta groups were associated with an increased risk for adverse clinical outcomes, compared to AGA placentas in pregnancies complicated by either T1DM or T2DM. Compared to their AGA pre-DM counterparts, T1DM, SGA placentas show increased peri-villous fibrin/fibrinoid deposition, thrombosis in fetal blood vessels, and meconium staining. Moreover, the histopathology of SGA placentas from T2DM is characterized by decidual vasculopathy, accelerated villous maturity, and erythroblastosis, compared to T2DM AGA placentas. The contrasting placental pathologies between the two pre-DM SGA phenotypes evolved independent of patient demographics and were unrelated to indicators of the glycemic control present at early gestational ages.

Discussion

A sub-population of pre-DM women with either T1DM or T2DM diabetes that have an SGA placenta are at increased risk for adverse clinical outcomes in pregnancy, compared to pre-DM women with AGA placental weights. (Author)

2022-02693

Percent error of ultrasound examination to estimate fetal weight at term in different categories of birth weight with focus on maternal diabetes and obesity. Dittkrist L, Vetterlein J, Henrich W, et al (2022), BMC Pregnancy and Childbirth vol 22, no 241, 23 March 2022

Background

Sonography based estimate of fetal weight is a considerable issue for delivery planning. The study evaluated the influence of diabetes, obesity, excess weight gain, fetal and neonatal anthropometrics on accuracy of estimated fetal weight with respect to the extent of the percent error of estimated fetal weight to birth weight for different categories.

Methods

Multicenter retrospective analysis from 11,049 term deliveries and fetal ultrasound biometry performed within 14 days to delivery. Estimated fetal weight was calculated by Hadlock IV. Percent error from birth weight was determined for categories in 250 g increments between 2500 g and 4500 g. Estimated fetal weight accuracy was categorized as accurate ≤ 10% of birth weight, under- and overestimated by > ± 10% – ± 20% and > 20%.

Results

Diabetes was diagnosed in 12.5%, obesity in 12.6% and weight gain exceeding IOM recommendation in 49.1% of the women. The percentage of accurate estimated fetal weight was not significantly different in the presence of maternal diabetes (70.0% vs. 71.8%, p = 0.17), obesity (69.6% vs. 71.9%, p = 0.08) or excess weight gain (71.2% vs. 72%, p = 0.352) but of preexisting diabetes (61.1% vs. 71.7%; p = 0.007) that was associated with the highest macrosomia rate (26.9%). Mean percent error of estimated fetal weight from birth weight was 2.39% ± 9.13%. The extent of percent error varied with birth weight with the lowest numbers for 3000 g–3249 g and increasing with the extent of birth weight variation: 5% ± 11% overestimation in the lowest and 12% ± 8% underestimation in the highest ranges.

Conclusion

Diabetes, obesity and excess weight gain are not necessarily confounders of estimated fetal weight accuracy. Percent error of estimated fetal weight is closely related to birth weight with clinically relevant over- and underestimation at both extremes. This work provides detailed data regarding the extent of percent error for different birth weight categories and may therefore improve delivery planning. (Author)

Full URL: https://doi.org/10.1186/s12884-022-04519-z

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2022-02003

Should pregnant women with diabetes be counseled differently if nephropathy was detected? a population database study. Aldhaheri S, Baghlaf H, Badeghiesh A, et al (2022), Journal of Maternal-Fetal and Neonatal Medicine vol 35, no 25, 2022, pp 9614-9621

Introduction

The prevalence of diabetes mellitus has increased tremendously in the last two decades among women of reproductive age and this is mainly due to the pandemic of obesity. Diabetes mellitus is a well-known cause of maternal and neonatal complications in pregnancy. Diabetic nephropathy is a marker of severe diabetes and results in organ damage. However, only a small number of studies have evaluated the implications of diabetic nephropathy on pregnancy complications, with most having 50 to 100 nephropathy subjects. Our study aims to compare pregnant women with diabetes mellitus complicated by nephropathy or not and evaluate the relationship with obstetrical and perinatal morbidity and mortality, on a larger population.

Methods

This was a population-based study using data from the Healthcare Cost and Utilization Project—Nationwide Inpatient Sample (HCUP-NIS) including women who delivered between 2004 and 2014. Multivariate logistic regression was used to control for confounding effects.

Results

Among 86,615 pregnancies that were complicated by diabetes mellitus, 1,241 (1.4%) had diabetic nephropathy. Diabetic nephropathy was strongly associated with preeclampsia (aOR 2.3, 95% CI 1.90–2.68), as well as chronic hypertension with superimposed preeclampsia or eclampsia (aOR 4.2, 95% CI 3.53–5.01), preterm birth (aOR 1.8, 95% CI 1.59–2.1), and blood transfusion (aOR 3.6 95% CI 2.82–4.46). Both groups were similar in age and income.

Conclusion

Diabetic nephropathy is associated with increased obstetrical and perinatal morbidity compared to diabetes mellitus alone. These patients may benefit from a high dose of folic acid, more vigilant antenatal surveillance, delivery in a tertiary care center, and more rigorous screening and prevention methods for pregnancy-induced hypertension diseases at antenatal care visits. (Author)

2022-01986

Glucose variability as the risk factor of preeclampsia in pregnant patients with type 1 diabetes mellitus. Tiselko AV, Kapustin RV, Milyutina YP, et al (2022), Journal of Maternal-Fetal and Neonatal Medicine vol 35, no 25, 2022, pp 9639-9646

Objective

To analyze glucose variability and investigate its role as a predictor for preeclampsia development in pregnant women with type 1 diabetes mellitus (T1DM) with various insulin therapy regimens.

Methods

A total of 200 pregnant women with T1DM were included in the study. A hundred women used continuous subcutaneous insulin infusion (CSII), and the rest of the group was administered with multiple daily insulin injections (MDI). Continuous glucose monitoring (CGM), index calculation of glucose variability (MAGE, MODD, CONGA, and CV), assessment of preeclampsia frequency and severity were conducted.

Results

The work results show the link between the severity rate of preeclampsia and the duration of T1DM as well as the level of HbA1c before and during pregnancy. The rate of preeclampsia in the group of women, using CSII comprises 26.8% of cases that appear less than in the group of those, administered with MDI that is 46.6% ($\chi 2 = 5.45$; $p < .05$). A negative correlation is defined between pathological glucose variability and gestational age when preeclampsia occurs. A negative correlation was also revealed between MODD, CV, and the time for the detection of preeclampsia: $r = -0.30$, $r = -0.24$, respectively. The study illustrates the correlation obtained between preeclampsia and glucose variability and the value of MAGE, MODD, CV, and SD. Preeclampsia development is affected by the duration of hyperglycemic conditions in the third trimester of pregnancy. The data in the group of women using MDI marks the early development of preeclampsia on the 33.0 [32–34] week of pregnancy compared to the group of women practicing CSII on 35.5 [33–36] week of pregnancy ($Z = 5.4$; $p < .001$). The increase of risk of preeclampsia development is proved in pregnant patients with T1DM when the hyperglycemic condition lasts more than 25% of a 24-h period according to the rate of CGM and measurements of glucose variability MODD > 1.07 and CONGA > 3.39.

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Conclusion

Comprehensive evaluation of the glycemic profile while using CGM revealed a correlation between pathological glucose variability and the frequency and severity of preeclampsia thus proving the benefits of CSII in pregnant patients with T1DM to perform glycemic targets and decrease glucose variability, which eventually led to the decrease of preeclampsia frequency in this group of women. (Author)

2022-01962

Metformin in pregnancy: survey shows no safety concerns. Medicines and Healthcare Products Regulatory Agency (2022), Drug Safety Update vol 15, no 8, March 2022

A large study has shown no safety issues of concern relating to the use of metformin during pregnancy. The licence for metformin now reflects that it can be considered for use during pregnancy and the periconceptional phase as an addition or an alternative to insulin, if clinically needed. This is consistent with current clinical guidance. (Author)

Full URL: https://www.gov.uk/drug-safety-update/metformin-in-pregnancy-study-shows-no-safety-concerns

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2022-01698

Prepregnancy Counseling Among U.S. Women With Diabetes and Hypertension, 2016–2018. Marshall CJ, Huma Z, Deardorff J, et al (2021), American Journal of Preventive Medicine vol 61, no 4, October 2021, pp 529-536

Introduction

Individuals who have diabetes or hypertension established before pregnancy are at increased risk for maternal and infant health complications. Guidelines recommend that providers deliver prepregnancy counseling, but little is known about the receipt of those services among patients with chronic conditions.

Methods

Data from the 2016–2018 Pregnancy Risk Assessment Monitoring System, a population-based survey among women with recent live births, were used. Self-reported receipt of prepregnancy counseling on folic acid supplementation, pregnancy desire, contraceptive use, and improving health before pregnancy was examined overall and by diabetes and hypertension status. Multivariable logistic regression examined the association between diabetes and hypertension status and the 4 prepregnancy counseling outcomes. Analyses were conducted in 2020.

Results

Overall, 2.1% of women reported having both diabetes and hypertension, 1.3% reported having diabetes alone, and 3.1% reported having hypertension alone. Less than half of the sample reported receiving each prepregnancy counseling outcome. In adjusted models, women with hypertension alone were more likely to report each counseling outcome than women without diabetes or hypertension. Women with diabetes alone were only more likely to report receiving counseling about improving health, and women with both conditions were not more likely to report the receipt of any counseling outcome under study.

Conclusions

Women with prepregnancy diabetes, hypertension, or both reported low levels of the recommended prepregnancy counseling, suggesting an evidence–practice gap that should be addressed to optimize maternal and infant health outcomes. There is a need for evidence-based and patient-centered models of prepregnancy counseling for those with diabetes and hypertension. (Author)

2022-01115

Risks of specific congenital anomalies in offspring of women with diabetes: A systematic review and meta-analysis of population-based studies including over 80 million births. Zhang T-N, Huang X-M, Zhao X-Y, et al (2022), PLoS Medicine vol 19, no 2, February 2022, e1003900

Background

Pre-gestational diabetes mellitus (PGDM) has been known to be a risk factor for congenital heart defects (CHDs) for decades. However, the associations between maternal PGDM and gestational diabetes mellitus (GDM) and the risk of specific types of CHDs and congenital anomalies (CAs) in other systems remain under debate. We aimed to investigate type-specific CAs in offspring of women with diabetes and to examine the extent to which types of maternal diabetes are associated with increased risk of CAs in offspring.

Methods and findings

We searched PubMed and Embase from database inception to 15 October 2021 for population-based studies reporting on type-specific CAs in offspring born to women with PGDM (combined type 1 and 2) or GDM, with no limitation on

language. Reviewers extracted data for relevant outcomes and performed random effects meta-analyses, subgroup analyses, and multivariable meta-regression. Risk of bias appraisal was performed using the Cochrane Risk of Bias Tool. This study was registered in PROSPERO (CRD42021229217). Primary outcomes were overall CAs and CHDs. Secondary outcomes were type-specific CAs. Overall, 59 population-based studies published from 1990 to 2021 with 80,437,056 participants met the inclusion criteria. Of the participants, 2,407,862 (3.0%) women had PGDM and 2,353,205 (2.9%) women had GDM. The meta-analyses showed increased risks of overall CAs/CHDs in offspring born to women with PGDM (for overall CAs, relative risk [RR] = 1.99, 95% CI 1.82 to 2.17, P < 0.001; for CHDs, RR = 3.46, 95% CI 2.77 to 4.32, P < 0.001) or GDM (for overall CAs, RR = 1.18, 95% CI 1.13 to 1.23, P < 0.001; for CHDs, RR = 1.50, 95% CI 1.38 to 1.64, P < 0.001). The results of the meta-regression analyses showed significant differences in RRs of CAs/CHDs in PGDM versus GDM (all P < 0.001). Of the 23 CA categories, excluding CHD-related categories, in offspring, maternal PGDM was associated with a significantly increased risk of CAs in 21 categories; the corresponding RRs ranged from 1.57 (for hypospadias, 95% CI 1.22 to 2.02) to 18.18 (for holoprosencephaly, 95% CI 4.03 to 82.06). Maternal GDM was associated with a small but significant increase in the risk of CAs in 9 categories; the corresponding RRs ranged from 1.14 (for limb reduction, 95% CI 1.06 to 1.23) to 5.70 (for heterotaxia, 95% CI 1.09 to 29.92). The main limitation of our analysis is that some high significant heterogeneity still persisted in both subgroup and sensitivity analyses.

Conclusions

In this study, we observed an increased rate of CAs in offspring of women with diabetes and noted the differences for PGDM versus GDM. The RRs of overall CAs and CHDs in offspring of women with PGDM were higher than those in offspring of women with GDM. Screening for diabetes in pregnant women may enable better glycemic control, and may enable identification of offspring at risk for CAs. (Author)

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2022-01053

Are the first-trimester levels of PAPP-A and fb-hCG predictors for obstetrical complications in diabetic pregnancy?.

Kapustin RV, Kascheeva TK, Alekseenkova EN, et al (2022), Journal of Maternal-Fetal and Neonatal Medicine vol 35, no 6, 2022, pp 1113-1119

Objective

To assess the levels of pregnancy-associated plasma protein-A (PAPP-A) and β-human chorionic gonadotropin (fb-hCG) in cases of diabetic pregnancy, to determine whether these biomarkers can be considered significant predictors for macrosomia, preeclampsia (PE), intrauterine growth restriction (IUGR), and preterm birth in mothers with different types of pregestational diabetes mellitus (DM).

Methods

It was a retrospective cohort study. Study groups were presented: type 1 DM (n = 100), type 2 DM (n = 50), and controls (n = 25). At 11 + 0 to 13 + 6 week's gestation, we recorded maternal characteristics and medical history, and performed a combined test for the detection of risk of chromosomal abnormalities. To assess the performance of the markers in the prediction of the main obstetrical complications (PE, IUGR, preterm birth, and macrosomia), receiver-operating characteristic (ROC) curves were produced and area under the curves was calculated.

Results

The study has shown that DM is associated with a high rate of perinatal complications: PE, IUGR, macrosomia, and preterm birth. The median level of PAPP-A was significantly lower in case of type 1 DM- 0.89 (inter quartile range (IQR), 0.51–1.1), and type 2 DM-0.88 (IQR, 0.42–1.15) compared to the unaffected group 1.03 (IQR, 0.96–1.12; p = .025). There were no significant differences in the fb-hCG multiples of the normal median (MoM; p = .14) between the diabetic and unaffected groups. More significant results were obtained when calculated by percentile: in diabetic pregnancies, PAPP-A and fb-hCG MoMs values were lower in the 5–10% ranges and higher in the 95% range, compared to the control group. ROC-analysis did not show any significant data that first-trimester PAPP-A and fb-hCG serum levels are predictors for PE, IUGR, macrosomia, and preterm birth.

Conclusion

The routine first-trimester serum screening of fetal Down syndrome cannot be used as a tool of risk identification for PE, IUGR, macrosomia, and preterm birth in case of diabetic pregnancy. (Author)

2022-00999

Planned vaginal and planned cesarean delivery outcomes in pregnancies complicated with pregestational type 1

diabetes – A three-year academic tertiary hospital cohort study. Kruit H, Mertsalmi S, Rahkonen L, et al (2022), BMC Pregnancy and Childbirth vol 22, no 173, 2 March 2022

Background

Finland has the world's highest incidence of 62.5/100000 of diabetes mellitus type 1 (DM1) with approximately 400 (1%) DM1 pregnancies annually. Pregnancies complicated by DM1 are accompanied with increased risk for perinatal morbidity and mortality. Timing and mode of delivery are based on the risk of complications, yet the data on labor induction is limited. The aim of this study was to compare delivery outcomes in planned vaginal (VD) and planned cesarean deliveries (CD) in late preterm and term DM1 pregnancies, and to evaluate the feasibility of labor induction.

Materials and Methods

Pregnant women with DM1, live singleton fetus in cephalic presentation ≥34 gestational weeks delivering in Helsinki University Hospital between January 1st 2017 and December 31st 2019 were included. The primary outcome were the rates of adverse maternal and perinatal outcome. The study population was classified according to the 1980-revised White's classification. Statistical analyses were performed by IBM SPSS Statistics for Windows.

Results

Two hundred four women were included, 59.8% (n = 122) had planned VD. The rate of adverse maternal outcome was 27.5% (n = 56), similar between the planned modes of delivery and White classes. The rate of perinatal adverse outcome was 38.7% (n = 79), higher in planned CD (52.4% vs. 29.5%;p = 0.001). The most common adverse perinatal event was respiratory distress (48.8% vs. 23.0%;p < 0.001). The rate of adverse perinatal outcome was higher in White class D + Vascular compared to B + C (45.0% vs. 25.0%, OR after adjustment by gestational age 2.34 [95% CI 1.20–4.50];p = 0.01). The total rate of CD was 63.7% (n = 130), and 39.3% (n = 48) in planned VD. Women with White class D + Vascular more often had emergency CD compared to White Class B + C (48.6% vs. 25.0%;p = 0.009). The rate of labor induction was 51%, being 85.2% in planned VD. The rate of VD in induced labor was 58.7% (n = 61) and the rate of failed induction was 14.1% (n = 15).

Conclusion

Planned VD was associated with lower rate of adverse perinatal outcome compared to planned CS, with no difference in the rates of adverse maternal outcome. Induction of labor may be feasible option but should be carefully considered in this high-risk population. (Author)

Full URL: https://doi.org/10.1186/s12884-022-04510-8

2022-00228

Diabetes mellitus, maternal adiposity, and insulin-dependent gestational diabetes are associated with Covid-19 in pregnancy: The INTERCOVID Study. Eskenazi B, Rauch S, Iurlaro E, et al (2022), American Journal of Obstetrics & Gynecology (AJOG) vol 227, no 1, July 2022, pp 74.e1-74.e16

Background

Among non-pregnant individuals, diabetes mellitus (DM) and high body mass index (BMI) increase the risk of Covid-19 and its severity.

Objective

To determine whether DM and high BMI are risk factors for Covid-19 in pregnancy and whether gestational diabetes mellitus (GDM) is also associated with covid-19 diagnosis.

Study Design

INTERCOVID was a multinational study, conducted between March 2020 and February 2021 in 43 institutions from 18 countries, enrolling 2184 pregnant women ≥18 years; 2071 were included in these analyses. For each woman diagnosed with Covid-19, two non-diagnosed women delivering or initiating antenatal care at the same institution were also enrolled. Main exposures were pre-existing DM or high BMI (overweight/obesity defined as ≥25 kg/m2), and GDM in pregnancy. Main outcome was a confirmed diagnosis of Covid-19 based on an RT-PCR test, antigen test, antibody test, radiological pulmonary findings, or ≥2 predefined Covid-19 symptoms at any time during pregnancy or delivery. Relationships of exposures and Covid-19 diagnosis were assessed using generalized linear models with a Poisson distribution and log link function, with robust standard errors to account for model misspecification. We also conducted sensitivity analyses: 1) restricted to those with an RT-PCR or antigen test in the last week of pregnancy; 2) restricted to those with an RT-PCR or antigen test during the entire pregnancy; 3) generating values for missing data using multiple imputation; and 4) analyses controlling for month of enrollment. In addition, among those who were diagnosed with Covid-19, we examined whether having GDM, DM, or high BMI, increased risk for having symptomatic vs. asymptomatic Covid-19.

Results

Covid-19 was associated with preexisting DM (RR=1.94, 95% CI=1.55, 2.42), overweight/obesity (RR=1.20; 95% CI=1.06, 1.37), and GDM (RR=1.21; 95% CI=0.99, 1.46). The GDM association was specifically among women requiring insulin, whether they were of normal-weight (RR=1.79, 95% CI=1.06, 3.01) or overweight/obese (RR=1.77, 95% CI=1.28, 2.45). A somewhat stronger association with Covid-19 diagnosis was observed among women with pre-existing DM, whether they were of normal weight (RR=1.93, 95% CI=1.18, 3.17) or overweight/obese (RR=2.32, 95% CI=1.82, 2.97). When the sample was restricted to those with a RT-PCR or antigen test in the week before delivery or during the entire pregnancy, including missing variables using imputation, or controlling for month of enrollment, the observed associations were comparable.

Conclusion

DM and overweight/obesity are risk factors for Covid-19 diagnosis in pregnancy, and insulin-dependent GDM is also associated with the disease. It is therefore essential that those women with these co-morbidities are vaccinated. (Author)

2022-00089

Characteristics and outcomes of pregnant women with type 1 or type 2 diabetes: a 5-year national population-based cohort study. Murphy HR, Howgate C, O'Keefe J, et al (2021), Lancet Diabetes & Endocrinology vol 9, no 3, March 2021, pp 153-164

Background: Diabetes in pregnancy is associated with preterm delivery, birthweight extremes, and increased rates of congenital anomaly, stillbirth, and neonatal death. We aimed to identify and compare modifiable risk factors associated with adverse pregnancy outcomes in women with type 1 diabetes and those with type 2 diabetes and to identify effective maternity clinics.

Methods: In this national population-based cohort study, we used data for pregnancies among women with type 1 or type 2 diabetes collected in the first 5 years of the National Pregnancy in Diabetes audit across 172 maternity clinics in England, Wales, and the Isle of Man, UK. Data for obstetric complications (eg, preterm delivery [<37 weeks' gestation], large for gestational age [LGA] birthweight [>90th percentile]) and adverse pregnancy outcomes (congenital anomaly, stillbirth, neonatal death) were obtained for pregnancies completed between Jan 1, 2014, and Dec 31, 2018. We assessed associations between modifiable (eg, HbA1c, BMI, pre-pregnancy care, maternity clinic) and non-modifiable risk factors (eg, age, ethnicity, deprivation, duration of type 1 diabetes) with pregnancy outcomes in women with type 1 diabetes compared with those with type 2 diabetes. We calculated associations between maternal factors and perinatal deaths using a regression model, including diabetes type and duration, maternal age, BMI, deprivation quintile, first trimester HbA1c, preconception folic acid, potentially harmful medications, and third trimester HbA1c.

Findings: Our dataset included 17 375 pregnancy outcomes in 15 290 pregnant women. 8690 (50·0%) of 17 375 pregnancies were in women with type 1 diabetes (median age at delivery 30 years [10-90th percentile 22-37], median duration of diabetes 13 years [3-25]) and 8685 (50·0%) were in women with type 2 diabetes (median age at delivery 34 years [27-41], median duration of diabetes 3 years [0-10]). The rates of preterm delivery (3325 [42·5%] of 7825 pregnancies among women with type 1 diabetes, 1825 [23·4%] of 7815 with type 2 diabetes; p<0·0001), and LGA birthweight (4095 [52·2%] of 7845 with type 1 diabetes, 2065 [26·2%] of 7885 with type 2 diabetes; p<0·0001) were higher in type 1 diabetes. The prevalence of congenital anomaly (among women with type 1 diabetes: 44·8 per 1000 livebirths, terminations, and fetal losses; among women with type 2 diabetes: 40·5 per 1000 livebirths, terminations, and fetal losses; p=0·17) and stillbirth (type 1 diabetes: 10·4 per 1000 livebirths and stillbirths; type 2 diabetes: 13·5 per 1000 livebirths and stillbirths; p=0·072) did not significantly differ between diabetes types, but rates of neonatal death were higher in mothers with type 2 diabetes than in those with type 1 diabetes (type 1 diabetes: 7·4 per 1000 livebirths; type 2 diabetes 11·2 per 1000 livebirths; p=0·013). Across the whole study population, independent risk factors for perinatal death (ie, stillbirth or neonatal death) were third trimester HbA1c of 6·5% (48 mmol/mol) or higher (odds ratio 3·06 [95% CI 2·16-4·33] vs HbA1c <6·5%), being in the highest deprivation quintile (2·29 [1·16-4·52] vs the lowest quintile), and having type 2 diabetes (1·65 [1·18-2·31] vs type 1 diabetes). Variations in HbA1c and LGA birthweight were associated with maternal characteristics (age, diabetes duration, deprivation, BMI) without substantial differences between maternity clinics.

Interpretation: Our data highlight persistent adverse pregnancy outcomes in women with type 1 or type 2 diabetes. Maternal glycaemia and BMI are the key modifiable risk factors. No maternity clinics were had appreciably better outcomes than any others, suggesting that health-care system changes are needed across all clinics.

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2021-14250

Diabetic ketoacidosis in pregnancy – Case series, pathophysiology, and review of the literature. Eshkoli T, Barski L, Faingelernt Y, et al (2022), European Journal of Obstetrics & Gynecology and Reproductive Biology vol 269, February 2022, pp 41-46

Objective

Diabetic ketoacidosis (DKA) during pregnancy is a life-threatening emergency for both the mother and the fetus. The pathophysiology of DKA in pregnancy has its own characteristics due to multiple factors, such as insulin resistance, accelerated starvation and respiratory alkalosis, thus creating ketosis-prone state, with DKA occurring at milder degrees of hyperglycemia, even in normoglycemic levels, which can result in delayed diagnosis and treatment with potential for adverse metabolic consequences.

Study design

In this article, we presented 8 clinical cases of DKA during pregnancy.

We discuss the spectrum of the clinical picture, the entity of euglycemic DKA vs hyperglycemic DKA, the period of pregnancy in appearance of episode of DKA and triggers of DKA.

Conclusion

The treatment of DKA in pregnant women must be started immediately and must be accentuated on intravenous fluids, insulin and electrolyte replacement. DKA in pregnancy may be euglycemic. Prevention, early recognition, immediate hospitalization, and aggressive management remain the cornerstones in DKA management in pregnancy. (Author)

2021-14118

Aspirin Use for Preeclampsia Prevention Among Women With Prepregnancy Diabetes, Obesity, and Hypertension. Ray JG, Abdulaziz KE, Berger H, et al (2022), JAMA (Journal of the American Medical Association) vol 327, no 4, 25 January 2022, pp 388-390

This study estimates aspirin use for preeclampsia prevention in pregnant women with prepregnancy diabetes, obesity, chronic hypertension, and combinations of these factors in 2018-2020. (Author)

2021-12820

Comparison of intrapartum glycemic management strategies in pregnant women with type 1 diabetes mellitus. Wilkie GL, Orr L, Leung K, et al (2022), Journal of Maternal-Fetal and Neonatal Medicine vol 35, no 25, 2022, pp 8756-8760

Background

Achieving intrapartum maternal euglycemia in women with type 1 diabetes mellitus (T1DM) is critical to reducing the risk of neonatal hypoglycemia.

Objective

This study sought to compare the maternal and neonatal outcomes among women with T1DM by different intrapartum glycemic control strategies of continuation of subcutaneous insulin pumps versus intravenous insulin infusion.

Methods

A retrospective cohort study was performed to identify all women with type 1 diabetes mellitus in pregnancy between 1 October 2017 and 1 August 2020 at our tertiary medical center. Medical records were reviewed for sociodemographic, clinical characteristics, and perinatal outcomes. A composite neonatal outcome was created to include one or more of the following outcomes: 5-minute APGAR less than 7, neonatal intensive care unit admission, neonatal hypoglycemia, or respiratory distress.

Results

We identified 75 women with T1DM that met inclusion criteria, 27(36%) who remained on their subcutaneous insulin pump and 48(64%) who were transitioned to intravenous insulin infusion intrapartum. Women that continued subcutaneous insulin were more likely to be older (30.5 vs. 28.1, p = .04), multiparous (74% vs. 50%, p = .042), and have a continuous glucose monitor (CGM) (93% vs. 43%, p < .001). There was no difference in maternal hypoglycemic events (14.8% vs. 18.8%, p = .76) or severe hyperglycemia (greater than 250 mg/dL)/development of diabetic ketoacidosis (3.7% vs. 4.2%, p = .99) in labor between both groups. There was no difference in neonatal composite outcome when adjusted for gestational age at delivery, maternal age, parity, and CGM use for both groups (aOR 0.73, 95% CI 0.12–4.43, p = .728).

Conclusion
Continuation of subcutaneous insulin in the intrapartum period appears to be a reasonable option in women with T1DM, however future, larger studies are needed to confirm this. Both patient and provider must be comfortable with this intrapartum strategy for effective glycemic control. (Author)

2021-12818

Glycemic variability and indices of glycemic control among pregnant women with type 1 diabetes (T1D) based on the use of continuous glucose monitoring share technology. Sklar J, Pyle L, Snell-Bergeon JK, et al (2022), Journal of Maternal-Fetal and Neonatal Medicine vol 35, no 25, 2022, pp 8968-8974

Background
Pregnancies complicated by type 1 diabetes (T1D) experience high levels of glycemic variability, which may be associated with adverse maternal and neonatal outcomes. Therefore, strategies that help pregnant women with T1D manage their glycemic control are of great interest.

Methods
We examined associations with or without remote monitoring of Continuous Glucose Monitor (CGM) data by friends and family with indices of glycemic control and glycemic variability during pregnancies complicated by T1D in a pilot non-randomized trial (n = 28). During preconception or the first trimester, participants were placed in one of two groups based on device compatibility: (1) CGM Alone (n = 13): women without iPhone, iPad or iPod Touch; or (2) CGM Share (n = 15): women with iPhone, iPad, or iPod Touch and followers with devices compatible for data viewing. Linear mixed models were used to compare indices of glycemic control and glycemic variability over time between groups.

Results
Participants using CGM Share had lower estimated HbA1c levels over time (p = .028), glucose management index (p = .041), and fewer glucose excursions >200 mg/dL in each trimester (p = .022) compared to those using CGM Alone. Participants using CGM Alone had higher high blood glucose index (p = .020), mean area under the curve (p = .026), and standard deviation (p = .046) compared to those using CGM Share. Other measures of glycemic variability did not differ between groups.

Conclusion
In this non-randomized pilot study, use of CGM Share was associated with improvements in several indices of glycemic control and glycemic variability. (Author)

2021-12774

Rates of diabetic retinopathy screening in pregnant patients with type 1 and type 2 diabetes in a predominantly Indigenous Central Australian population. Wicik K, Bahrami B, Halliday M, et al (2022), Australian and New Zealand Journal of Obstetrics and Gynaecology (ANZJOG) vol 62, no 3, June 2022, pp 364-369

Background
Pregnancy is a risk factor for the progression of diabetic retinopathy (DR) in women with pre-gestational diabetes. Australian screening guidelines recommend DR screening in the first trimester of pregnancy. The rates of DR screening in pregnant patients with pre-gestational diabetes are unknown in Australia.

Aim
To determine the rates of DR screening in pregnant women with pre-gestational diabetes at Alice Springs Hospital Diabetes Antenatal Care and Education (DANCE) clinic.

Materials and Methods
Retrospective review of women with pre-gestational diabetes who attended the DANCE clinic between July 2016 and June 2020.

Results
There were 146 pregnancies in 144 individual women included in this review. There were 93% (n = 134) who identified as Aboriginal but not Torres Strait Islander. DR screening was performed in 23 (16%) pregnancies, in which DR was present in six (26%) and no retinal abnormality was found in 17 (74%). Of seven (5%) women who had a history of DR, only three had a screen during the pregnancy period. The location of the DR screen included Alice Springs Hospital

(17%, n = 4), Alice Springs general practice clinics (35%, n = 8) and remote NT community clinics outside of Alice Springs (39%, n = 9). The trimesters in which women received their DR screens were: trimester 1, 45%, n = 10; trimester 2, 39%, n = 9; trimester 3, 17%, n = 4.

Conclusion
The minority of pregnant women who attend the DANCE clinic at Alice Springs Hospital received DR screening in adherence with national guidelines. (Author)

2021-12732

Adverse pregnancy outcomes in women with diabetes-related microvascular disease and risks of disease progression in pregnancy: A systematic review and meta-analysis. Relph S, Patel T, Delaney L, et al (2021), PLoS Medicine vol 18, no 11, November 2021, e1003856

Background
The rise in the global prevalence of diabetes, particularly among younger people, has led to an increase in the number of pregnant women with preexisting diabetes, many of whom have diabetes-related microvascular complications. We aimed to estimate the magnitude of the risks of adverse pregnancy outcomes or disease progression in this population.

Methods and findings
We undertook a systematic review and meta-analysis on maternal and perinatal complications in women with type 1 or 2 diabetic microvascular disease and the risk factors for worsening of microvascular disease in pregnancy using a prospective protocol (PROSPERO CRD42017076647). We searched major databases (January 1990 to July 2021) for relevant cohort studies. Study quality was assessed using the Newcastle–Ottawa Scale. We summarized the findings as odds ratios (ORs) with 95% confidence intervals (CIs) using random effects meta-analysis. We included 56 cohort studies involving 12,819 pregnant women with diabetes; including 40 from Europe and 9 from North America. Pregnant women with diabetic nephropathy were at greater risk of preeclampsia (OR 10.76, CI 6.43 to 17.99, $p < 0.001$), early (<34 weeks) (OR 6.90, 95% CI 3.38 to 14.06, $p < 0.001$) and any preterm birth (OR 4.48, CI 3.40 to 5.92, $p < 0.001$), and cesarean section (OR 3.04, CI 1.24 to 7.47, $p = 0.015$); their babies were at higher risk of perinatal death (OR 2.26, CI 1.07 to 4.75, $p = 0.032$), congenital abnormality (OR 2.71, CI 1.58 to 4.66, $p < 0.001$), small for gestational age (OR 16.89, CI 7.07 to 40.37, $p < 0.001$), and admission to neonatal unit (OR 2.59, CI 1.72 to 3.90, $p < 0.001$) compared to those without nephropathy. Diabetic retinopathy was associated with any preterm birth (OR 1.67, CI 1.27 to 2.20, $p < 0.001$) and preeclampsia (OR 2.20, CI 1.57 to 3.10, $p < 0.001$) but not other complications. The risks of onset or worsening of retinopathy were increased in women who were nulliparous (OR 1.75, 95% CI 1.28 to 2.40, $p < 0.001$), smokers (OR 2.31, 95% CI 1.25 to 4.27, $p = 0.008$), with existing proliferative disease (OR 2.12, 95% CI 1.11 to 4.04, $p = 0.022$), and longer duration of diabetes (weighted mean difference: 4.51 years, 95% CI 2.26 to 6.76, $p < 0.001$) compared to those without the risk factors. The main limitations of this analysis are the heterogeneity of definition of retinopathy and nephropathy and the inclusion of women both with type 1 and type 2 diabetes.

Conclusions
In pregnant women with diabetes, presence of nephropathy and/or retinopathy appear to further increase the risks of maternal complications. (Author)
Full URL: https://doi.org/10.1371/journal.pmed.1003856

2021-12478

Gestational Weight Gain and Adverse Maternal and Neonatal Outcomes for Pregnancies Complicated by Pregestational and Gestational Diabetes. Kiefer MK, Adebayo A, Cleary E, et al (2022), American Journal of Perinatology vol 39, no 7, May 2022, pp 691-698

Objective This study aimed to investigate the association between excess and less than recommended gestational weight gain (GWG) and adverse maternal and neonatal outcomes in women with pregestational and gestational diabetes.

Study Design We conducted a secondary analysis of the National Institute of Child Health and Human Development (NICHD) Consortium on Safe Labor (CSL) study. We included deliveries >23 weeks of nonanomalous singletons with either pregestational or gestational diabetes. The exposure was GWG greater than or less than compared with the U.S. Institute of Medicine recommendations for total pregnancy weight gain per prepregnancy body mass index. Consistent with the 2020 Delphi outcome for diabetes in pregnancy, maternal outcomes included cesarean delivery

and preeclampsia and neonatal outcomes included small for gestational age (SGA), large for gestational age (LGA), macrosomia >4,000 g, preterm birth <37 weeks, stillbirth, and neonatal death. We modeled both absolute GWG and GWG z-scores, standardized for gestational duration. Multivariable logistic regression with generalized estimating equations was used, adjusting for age, race/ethnicity, parity, prior cesarean delivery, chronic hypertension, tobacco use, U.S. region, and delivery year.

Results Of 8,322 deliveries (n = 8,087 women) complicated by pregestational or gestational diabetes, 47% were in excess, 27% were within, and 26% were less than GWG recommendations. Deliveries with excess absolute GWG were at higher adjusted odds of cesarean delivery, preeclampsia, LGA, and macrosomia, compared with those within recommendations. Similar results were observed when using standardized GWG z-scores, in addition to higher likelihood of preterm birth and neonatal death. Less than recommended GWG was associated with a lower likelihood of these adverse outcomes but higher SGA. Additionally, less GWG by z-score was associated with a lower likelihood of stillbirth.

Conclusion Excess GWG increases the risk of adverse maternal and neonatal outcomes for women with pregestational and gestational diabetes. Less GWG than recommended may decrease this risk. (Author)

2021-12279

Aspirin for the prevention of pre-eclampsia in women with pre-existing diabetes: Systematic review. Zen M, Haider R, Simmons D, et al (2022), Australian and New Zealand Journal of Obstetrics and Gynaecology (ANZJOG) vol 62, no 1, February 2022, pp 12-21

Background

There is a lack of evidence for pre-eclampsia prophylaxis with aspirin in women with pre-existing diabetes mellitus (DM).

Aims

To examine the evidence for aspirin in pre-eclampsia prophylaxis in women with pre-existing DM.

Material and Methods

An electronic search using Ovid MEDLINE, Embase, CinicalTrials.gov and the Cochrane CENTRAL register of controlled trials through to February 2021 was performed. Reference lists of identified studies, previous review articles, clinical practice guidelines and government reports were manually searched. Randomised controlled trials (RCTs) of aspirin vs placebo for pre-eclampsia prophylaxis were included. Articles were manually reviewed to determine if cohorts included women with DM. The systematic review was performed following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses statement. Data from included trials were extracted independently by two authors who also independently assessed risk of bias as per the Cochrane Handbook criteria version 5.1.0. Data were analysed using Rev-Man 5.4.

Results

Forty RCTs were identified, of which 11 included a confirmed subset of women with DM; however, data were insufficient for meta-analysis. Meta-analysis of 930 women with DM, from individual patient data included in a systematic review and unpublished data from one of the 11 RCTs, showed a non-significant difference in the outcome of pre-eclampsia in participants treated with aspirin compared to placebo (odds ratio 0.58; 95% CI 0.20–1.71; P = 0.33).

Conclusions

Pre-eclampsia risk reduction with aspirin prophylaxis in women with pre-existing DM may be similar to women without pre-existing DM. However, randomised data within this meta-analysis were insufficient, warranting the need for further studies within this high-risk group of women. (Author)

2021-12014

Increased fetal epicardial fat thickness: A novel ultrasound marker for altered fetal metabolism in diabetic pregnancies. Akkurt MO, Turan OM, Crimmins S, et al (2018), Journal of Clinical Ultrasound vol 46, no 6, June/August 2018, pp 397-402

Objective

To evaluate whether fetal epicardial fat thickness (EFT) differs in diabetic and nondiabetic pregnant women.

Methods
Retrospective case-control study of pregnancies between 24 and 36 weeks complicated by preexisting (PDM) or gestational (GDM) diabetes mellitus, matched one to one with controls for body mass index and gestational age (GA). Epicardial fat was identified as the hypoechogenic area between myocardium and visceral pericardium over the right ventricle and its thickness was measured by a single observer blinded to clinical condition and outcomes. A linear regression analysis was performed to assess the relationship between GA and EFT, and regression lines were compared between diabetics and controls.

Results
53 PDM and 53 GDM pregnant women were matched with controls. With the exception of maternal age, the demographics were similar among groups. EFT increased significantly with advancing gestation in both diabetics and controls ($P < 0.0001$) and was significantly greater in diabetics than in controls ($P < 0.0001$). The best fit lines were different between diabetics (EFT = 0.05 × GA + 0.07 mm; R2 = 0.70) and controls (EFT = 0.07 × GA + 0.04 mm; R2 = 0.93) ($P < 0.0001$).

Conclusion
Fetal EFT was greater in diabetics than in nondiabetics, and even greater in pregestational diabetics. EFT maybe an additional and/or earlier marker to identify early changes in fetal metabolism before accelerated fetal growth and polyhydramnios is apparent. (Author)

2021-12013

Relationship between fetal peak systolic velocity in Middle cerebral artery and umbilical blood gas values and hemoglobin levels in diabetic pregnant women. Kutuk MS, Dolanbay M, Karasu AFG, et al (2018), Journal of Clinical Ultrasound vol 46, no 6, June/August 2018, pp 391-396

Purpose
To assess the relationship between peak systolic velocity in the middle cerebral artery (MCA-PSV) and fetal hypoxia in diabetic pregnant women requiring insulin therapy.

Methods
The data of diabetic pregnant women using insulin who were followed in our departments were reviewed retrospectively. The relationships between MCA-PSV and umbilical cord pO2, pCO2, base deficit, hemoglobin, and birth weight were analyzed.

Results
A total of 120 cases were included in the final analysis. The median (Q1- Q3) gestational age at Doppler evaluation was 37 weeks 3 days (37–38 weeks and 2 days), and the mean ± SD gestational age at delivery was 38 weeks 4 days ± 3days. The mean ± SD hemoglobin A1c (HbA1c) level was 5.7% ± 1.0% and, median (Q1–Q3) daily total insulin dose was 25 U (10U–48U). There was no statistically significant correlation between MCA–PSV and pH, PO2, PCO2, base deficit, Hb, and birth weight (Spearman correlation, r:–.001[P = .99], r:–.011[P = .90], r:–.052 [P = .51], r: .049[P = .59], r: .049 [P = .59], r: .030 [P = .75], respectively). Using binary logistic regression analysis, no independent factor for the prediction of fetal acidosis (venous pH < 7.23), and metabolic acidosis (base deficit >6.3 mmol/L) was detected.

Conclusion
MCA–PSV is not a good indicator of fetal polycythemia or chronic hypoxia in fetuses of diabetic pregnant women. Fetal well-being should be monitored with other tools in these circumstances. (Author)

2021-11823

Association of Maternal History of Spontaneous Abortion and Stillbirth With Risk of Congenital Heart Disease in Offspring of Women With vs Without Type 2 Diabetes. Ji H, Liang H, Yu Y, et al (2021), JAMA Network Open vol 4, no 11, November 2021, e2133805

Importance The associations of maternal history of spontaneous abortion (SA) and stillbirth with congenital heart disease (CHD) remain elusive.

Objective To evaluate the associations of maternal history of pregnancy loss with CHD in offspring and the role of maternal type 2 diabetes.

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Design, Setting, and Participants This population-based cohort study included singleton live offspring born between January 1, 1977, and December 31, 2016, identified through Danish national health registries. Statistical analysis was performed from October 1, 2019, through September 1, 2021.

Exposures Maternal history of SA, with frequency varying from 1 or 2 to 3 or more episodes, and maternal history of single and multiple stillbirths.

Main Outcomes and Measures Overall CHD identified by hospital diagnosis. Cox proportional hazard regression was used to estimate the hazard ratio (HR) of CHD. Diabetes was evaluated as a potential confounder and a potential effect modifier.

Results Among 1 642 534 included offspring (mean [SD] age, 14.11 [8.39] years; 843 265 male [51.35%]), 246 669 (15.02%) were born to mothers with a history of SA and 9750 (0.59%) were born to mothers with a history of stillbirth. The HRs of CHD were 1.16 (95% CI, 1.13-1.20) for offspring with a maternal history of SA and 1.49 (95% CI, 1.32-1.68) for offspring with a maternal history of stillbirth. Significant dose-response associations were observed among offspring with a maternal history of 3 or more episodes of SA (HR, 1.60; 95% CI, 1.39-1.84) and those with maternal history of multiple stillbirths (HR, 2.75; 95% CI, 1.63-4.65). If only inpatient CHD cases were included, the risk of CHD was higher than that found in the main analysis, with HRs of 1.24 (95% CI, 1.19-1.30) for maternal history of SA and 1.78 (95% CI, 1.51-2.11) for maternal history of stillbirth. The observed associations were strengthened by maternal prepregnancy type 2 diabetes (HR for maternal history of SA, 1.65 [95% CI, 1.37-1.97]; HR for maternal history of stillbirth, 1.74 [95% CI, 1.06-2.85]).

Conclusions and Relevance These findings suggest that offspring born to mothers with a previous SA or stillbirth, especially multiple episodes, or with prepregnancy type 2 diabetes were at a higher risk of being diagnosed with CHD. These findings may help identify women at increased risk in whom detailed fetal heart assessment may be cost-effective and highlight the importance of screening for type 2 diabetes in women of reproductive age. (Author)
Full URL: https://doi.org/10.1001/jamanetworkopen.2021.33805

2021-11752

Long-term neurodevelopmental outcomes among preterm infants born to mothers with diabetes mellitus. Sugar J, Lum TG, Fertel S, et al (2022), Journal of Perinatology vol 42, no 4, April 2022, pp 499-502

Background
The long-term effects of maternal diabetes on preterm infant neurodevelopment are unknown. This study aims to determine if there was an increased likelihood of neurodevelopmental impairment in preterm infants born to mothers with diabetes.

Materials and methods
A retrospective cohort study was conducted on preterm infants with neurodevelopmental evaluations at 18–36 months corrected age using the Bayley Scales of Infant and Toddler Development Third edition.

Results
680 former preterm infants were evaluated. There was no difference in cognitive, language, and motor scores. Infants born to diabetic mothers with AMA were significantly different in cognitive (adjusted-β (a-β),−7.24 [95%CI, −11.719 to −2.769]; P = 0.002) and language domains (a-β,−7.783 [95%CI, −13.603 to −1.963]; (P = 0.009).

Discussion
There was no significant difference in neurodevelopmental outcomes of preterm infants exposed to maternal diabetes. Preterm infants born to mothers with diabetes and AMA demonstrated lower cognitive and language scores at 2 years corrected age. (Author)

2021-11268

Associations between aspirin prophylaxis and fetal growth and preeclampsia in women with pregestational diabetes. Khatri NS, White SW, Graham DF (2022), Australian and New Zealand Journal of Obstetrics and Gynaecology (ANZJOG) vol 62, no 2, April 2022, pp 268-273

Background
Current guidelines recommend low-dose aspirin for preeclampsia prophylaxis in all women with pregestational (type

one and type two) diabetes mellitus. Most trials showing the efficacy of low-dose aspirin in reducing preeclampsia risk have either excluded or included only small numbers of such women.

Aim
To evaluate the association of low-dose aspirin prophylaxis in women with pregestational diabetes with the incidence of large for gestational age (LGA) infants and preeclampsia.

Materials and Methods
A retrospective observational study of pregnancies to women with pregestational diabetes. Outcomes included rates of LGA and preeclampsia. Women were prescribed low-dose aspirin prophylaxis from early pregnancy according to physician discretion after considering preeclampsia risk. Statistical analyses assessed the group overall and with stratification by diabetes type and other preeclampsia risk factors.

Results
Of 716 pregnancies, aspirin was prescribed in 296 (41%). Preeclampsia occurred more frequently in women who received aspirin (58 of 296, 20%) than those who did not (39 of 420, 9%, P < 0.001). This association was maintained after adjustment for diabetes type and other preeclampsia risk factors (adjusted odds ratio (aOR) 1.78; 95% CI 1.02–3.11). LGA infants were commoner in women with type one diabetes of short duration who took aspirin (aOR 2.21; 95% CI 1.05–4.66).

Conclusion
Low-dose aspirin use in women with pregestational diabetes may be associated with an increased risk of preeclampsia. In women with type one diabetes of short duration aspirin use may be associated with an increased risk of LGA infants. The retrospective nature of this study is acknowledged and assessment of such prophylaxis by further studies is warranted. (Author)

2021-11160

Pregnancy outcomes among women with type 1 diabetes mellitus using continuous subcutaneous insulin infusion versus multiple daily injections: A retrospective cohort study. Dixon BRS, Nankervis A, Hopkins SCN (2019), Obstetric Medicine Vol 12, no 3, September 2019, pp 136-142

Background
Insulin delivery options for pregnant women with type 1 diabetes mellitus are either continuous subcutaneous insulin infusion or multiple daily injections. The aim of this paper is to compare pregnancy outcomes in women with type 1 diabetes mellitus using continuous subcutaneous insulin infusion or multiple daily injections in pregnancy.

Methods
Retrospective single-centre cohort study of 298 pregnancies booked between 2006 and 2016. Descriptive analysis was performed for HbA1c values. Logistic regression models were created to compare selected maternal and neonatal outcomes.

Results
Continuous subcutaneous insulin infusion was associated with increased risk of large-for-gestational age (aOR 2.00, 95% CI 1.20–3.34) and preterm neonates (aOR 1.80, 95% CI 1.04–3.03). Continuous subcutaneous insulin infusion had no association with increased risk of adverse pregnancy outcomes. No difference in HbA1c values existed between groups.

Conclusion
Using continuous subcutaneous insulin infusion for type 1 diabetes mellitus through pregnancy is associated with increased risk of large-for-gestational age and preterm neonates, without increased risk of associated adverse maternal or neonatal outcomes. (Author)

2021-10307

Validation of ICD-10 Codes for Gestational and Pregestational Diabetes During Pregnancy in a Large, Public Hospital. Stanhope KK, Joseph NT, Platner M, et al (2021), Epidemiology Vol 32, no 2, March 2021, pp 277-281

Background:
The use of billing codes (ICD-10) to identify and track cases of gestational and pregestational diabetes during

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pregnancy is common in clinical quality improvement, research, and surveillance. However, specific diagnoses may be misclassified using ICD-10 codes, potentially biasing estimates. The goal of this study is to provide estimates of validation parameters (sensitivity, specificity, positive predictive value, and negative predictive value) for pregestational and gestational diabetes diagnosis using ICD-10 diagnosis codes compared with medical record abstraction at a large public hospital in Atlanta, Georgia.

Methods:
This study includes 3,654 deliveries to Emory physicians at Grady Memorial Hospital in Atlanta, Georgia, between 2016 and 2018. We linked information abstracted from the medical record to ICD-10 diagnosis codes for gestational and pregestational diabetes during the delivery hospitalization. Using the medical record as the gold standard, we calculated sensitivity, specificity, positive predictive value, and negative predictive value for each.

Results:
For both pregestational and gestational diabetes, ICD-10 codes had a high-negative predictive value (>99%, Table 3) and specificity (>99%). For pregestational diabetes, the sensitivity was 85.9% (95% CI = 78.8, 93.0) and positive predictive value 90.8% (95% CI = 85, 97). For gestational diabetes, the sensitivity was 95% (95% CI = 92, 98) and positive predictive value 86% (95% CI = 81, 90).

Conclusions:
In a large public hospital, ICD-10 codes accurately identified cases of pregestational and gestational diabetes with low numbers of false positives. (Author)

2021-10044

Maternal and neonatal outcomes in mothers with diabetes mellitus in qatari population. Bayoumi MAA, Masri RM, Matani NYS, et al (2021), BMC Pregnancy and Childbirth vol 21, no 651, 24 September 2021

Background
Diabetes Mellitus (DM) is a major cause of maternal, fetal, and neonatal morbidities. Our objective was to estimate the effect of both pre-pregnancy and gestational DM on the growth parameters of newborns in the Qatari population.

Methods
In this population-based cohort study, we compared the data of neonates born to Qatari women with both pre-pregnancy and gestational diabetes mellitus in 2017 with neonates of healthy non-diabetic Qatari women.

Results
Out of a total of 17020 live births in 2017, 5195 newborns were born to Qatari women. Of these, 1260 were born to women with GDM, 152 were born to women with pre-pregnancy DM and 3783 neonates were born to healthy non-diabetic (control) women. The prevalence of GDM in the Qatari population in 2017 was 24.25%. HbA1C% before delivery was significantly higher in women with pre-pregnancy DM (mean 6.19 ± 1.15) compared to those with GDM (mean 5.28 ± 0.43) (P <0.0001). The mean birth weight in grams was 3066.01 ± 603.42 in the control group compared to 3156.73 ± 577.88 in infants born to women with GDM and 3048.78 ± 677.98 in infants born to women with pre-pregnancy DM (P <0.0001). There was no statistically significant difference regarding the mean length (P= 0.080), head circumference (P= 0.514), and rate of major congenital malformations (P= 0.211). Macrosomia (Birth weight > 4000 gm) was observed in 2.7% of the control group compared to 4.8% in infants born to women with GDM, and 4.6% in infants born to women with pre-pregnancy DM (P= 0.001). Multivariate logistic regression analysis demonstrated that higher maternal age (adjusted OR 2.21, 95% CI 1.93, 2.52, P<0.0001), obesity before pregnancy (adjusted OR 1.71, 95% CI 1.30, 2.23, P<0.0001), type of delivery C-section (adjusted OR 1.25, 95% CI 1.09, 1.44, P=0.002), and body weight to gestational age LGA (adjusted OR 2.30, 95% CI 1.64, 2.34, P<0.0001) were significantly associated with increased risk of GDM.

Conclusion
Despite the multi-disciplinary antenatal diabetic care management, there is still an increased birth weight and an increased prevalence of macrosomia among the infants of diabetic mothers. More efforts should be addressed to improve the known modifiable factors such as women's adherence to the diabetic control program. Furthermore, pre-pregnancy BMI was found to be significantly associated with gestational DM, and this is a factor that can be addressed during pre-conceptional counseling. (Author) [Erratum: BMC Pregnancy and Childbirth, vol 21, no 773, 16 November 2021, online, https://doi.org/10.1186/s12884-021-04244-z].

Full URL: https://doi.org/10.1186/s12884-021-04124-6

2021-09666

Association between maternal pregestational glucose level and adverse pregnancy outcomes: a population-based retrospective cohort study. Zeng M, He Y, Li M, et al (2021), BMJ Open vol 11, no 9, September 2021, e048530

Objective To investigate the association between maternal pregestational blood glucose level and adverse pregnancy outcomes.

Design Retrospective cohort study.

Setting This study was conducted in the Chongqing Municipality of China between April 2010 and December 2016.

Participants A total of 60 222 women (60 360 pregnancies) from all 39 counties of Chongqing who participated in the National Free Preconception Health Examination Project and had pregnancy outcomes were included.

Primary outcome measures Adverse pregnancy outcomes included spontaneous abortion, induced abortion or labour due to medical reasons, stillbirth, preterm birth (PTB), macrosomia, large for gestational age, low birth weight (LBW) and small for gestational age.

Results Of the 60 360 pregnancies, rates of hypoglycaemic, normoglycaemia, impaired fasting glycaemia (IFG) and diabetic hyperglycaemic before conception were 5.06%, 89.30%, 4.59% and 1.05%, respectively. Compared with women with normoglycaemia, women with pregestational glucose at the diabetic level (≥7.0 mmol/L) might have a higher rate of macrosomia (6.18% vs 4.16%), whereas pregestational IFG seemed to be associated with reduced risks of many adverse outcomes, including spontaneous abortion, induced abortion due to medical reasons, PTB and LBW. After adjusting for potential confounders, pregestational diabetic hyperglycaemic was remained to be significantly associated with an increased risk of macrosomia (adjusted risk ratio 1.49, 95% CI 1.07 to 2.09). Abnormal maternal glucose levels before pregnancy (either hypoglycaemic or hyperglycaemic) seemed to have no significant negative effect on spontaneous abortion or induced abortion due to medical reasons.

Conclusion Although without overt diabetes mellitus, women with once diabetic fasting glucose level during their preconception examinations could be associated with an increased risk for macrosomia. Uniform guidelines are needed for maternal blood glucose management during pre-pregnancy care to improve pregnancy outcomes. (Author)

Full URL: http://dx.doi.org/10.1136/bmjopen-2020-048530

2021-09608

Predictors of a successful vaginal delivery in women with type 1 diabetes: a retrospective analysis of 20 years. Weschenfelder F, Herrmann E, Lehmann T, et al (2022), Archives of Gynecology and Obstetrics vol 305, no 6, June 2022, pp 1445-1452

Purpose

To evaluate the independent factors associated with the success of a trial of vaginal birth (TVB) in women with type 1 diabetes. Despite all therapeutic efforts and technological innovations, rates of caesarean sections (CS) in pregnant women with type 1 diabetes remain unchanged above 60%. Our aim was to point out influencing factors to improve the quality of antepartum counseling.

Methods

We performed a retrospective cohort study of 195 pregnancies with type 1 diabetes treated between 2000 and 2019. After exclusions, 118 women with near-term singleton pregnancies intended vaginal birth (TVB). Group differences between CS and successful vaginal delivery were analyzed. Multivariate logistic regression was performed by including clinical and metabolic variables to determine the independent effects on a successful vaginal delivery. Subgroup analysis for nulliparous women.

Results

Of 118 women with TVB, 67 (56.8%) were delivered vaginally. History of previous vaginal delivery (OR 10.29; CI 2.39; 44.30), HbA1c changes during pregnancy (per % increase; OR 0.59; CI 0.36; 0.96) and gestational weight gain (per kg; OR 0.87; CI 0.80; 0.96) were independent predictors for a successful vaginal delivery. In nulliparous women, the duration

of diabetes was independently and negatively associated with vaginal delivery.

Conclusion

Provided data can help to improve antepartum counseling in type 1 diabetic patients. It seems that women with type 1 diabetes should avoid postponing pregnancy and childbirth. (Author)

Full URL: https://doi.org/10.1007/s00404-021-06255-9

2021-09166

Haptoglobin Phenotype Modulates Lipoprotein-Associated Risk for Preeclampsia in Women With Type 1 Diabetes. Kelly CB, Yu JY, Jenkins AJ, et al (2019), The Journal of Clinical Endocrinology and Metabolism vol 104, no 10, October 2019, pp 4743-4755

Context

The incidence of preeclampsia (PE) is increased in women with diabetes (≈20% vs ≈5% in the general population), and first trimester lipoprotein profiles are predictive. Haptoglobin (Hp), a protein with functional genetic polymorphisms, has antioxidant, anti-inflammatory, and angiogenic effects. Among people with diabetes, the Hp 2-2 phenotype is associated with cardiorenal disease.

Objective

To investigate whether Hp phenotype is associated with PE in type 1 diabetes mellitus (T1DM) and/or modulates lipoprotein-associated risks.

Design and Setting

Multicenter prospective study of T1DM pregnancy.

Patients

Pregnant women with T1DM (normal albuminuria, normotensive at enrolment, n = 47) studied at three visits, all preceding PE onset: 12.3 ± 1.9, 21.8 ± 1.5, and 31.5 ± 1.6 weeks' gestation (mean ± SD).

Main Outcome Measures

Hp phenotype and lipoprotein profiles in women with (n = 23) vs without (n = 24) subsequent PE.

Results

Hp phenotype did not predict PE, but lipoprotein associations with subsequent PE were confined to women with Hp 2-2, in whom the following associations with PE were observed: increased low-density lipoprotein (LDL) cholesterol, LDL particle concentration, apolipoprotein B (APOB), triacylglycerol/high-density lipoprotein (HDL) cholesterol ratio, and APOB/apolipoprotein AI (APOA1) ratio; decreased HDL cholesterol, APOA1, large HDL particle concentration, and peripheral lipoprotein lipolysis (all $P < 0.05$). In women with one or two Hp-1 alleles, no such associations were observed.

Conclusions

In women with T1DM, although Hp phenotype did not predict PE risk, lipoprotein-related risks for PE were limited to those with the Hp 2-2 phenotype. Hp phenotype may modulate PE risk in diabetes. (Author)

Full URL: https://doi.org/10.1210/jc.2019-00723

2021-09154

Incorporating Aboriginal women's voices in improving care and reducing risk for women with diabetes in pregnancy - A phenomenological study. Wood AJ, Graham S, Boyle JA, et al (2021), BMC Pregnancy and Childbirth vol 21, no 624, 16 September 2021

Background

There is a high burden of gestational diabetes (GDM) and type 2 diabetes in pregnancy for Aboriginal and Torres Strait Islander women. Postpartum diabetes programs have the potential to prevent recurrent GDM and improve management of type 2 diabetes. However, data on such programs are limited, particularly in the Indigenous context. We aimed to explore Aboriginal Australian women's and health providers' preferences for a program to prevent and improve diabetes after pregnancy.

Methods

A phenomenological methodology underpinned semi-structured in-depth interviews with eleven Aboriginal women and seven health professionals across the Northern Territory from October 2019- February 2020. Interviews were analysed using an inductive analysis framework to address the barriers and enablers of proposed diabetes prevention programs identified by participants.

Results

Identified structural barriers to lifestyle change included: food insecurity, persuasive marketing of unhealthy food options, lack of facilities and cultural inappropriateness of previous programs. Enablers to lifestyle change included: a strong link between a healthy lifestyle and connection with Country, family and community. Suggested strategies to improve lifestyle included: co-designed cooking classes or a community kitchen, team sports and structural change (targeting the social determinants of health). Lifestyle change was preferred over metformin to prevent and manage diabetes after pregnancy by participants and health care providers.

Conclusions

We recommend individual level programs be designed alongside policies that address systemic inequalities. A postpartum lifestyle program should be co-designed with community members and grounded in Aboriginal conceptions of health to adequality address the health disparities experienced by Aboriginal people in remote communities. (Author)

Full URL: https://doi.org/10.1186/s12884-021-04055-2

2021-08478

Glucose tolerance test with a single abnormal value in pregnancy and the risk of type-2 diabetes mellitus. Berezowsky A, Raban O, Aviram A, et al (2022), Archives of Gynecology and Obstetrics vol 305, no 4, April 2022, pp 869-875

Purpose

To evaluate the association between a single abnormal value on a 3-h 100 g oral glucose tolerance test (OGTT) results and future type-2 diabetes mellitus (Type-2 DM).

Methods

Retrospective cohort study of women between 18 and 45 years of age who underwent a 3-h OGTT during pregnancy and delivered in a tertiary medical center between 2007 and 2014. The women were followed for a median period of 64 months postpartum. According to OGTT values, women were divided into three groups: normoglycemic (normal OGTT), single abnormal OGTT value (SAV) and gestational diabetes mellitus (two or more abnormal OGTT values, GDM). General pre-pregnancy characteristics, cardiovascular risk factors and future diagnosis of Type-2 DM, as the primary outcome, were recorded.

Results

During the study period, 5295 women underwent an OGTT and were followed for a median period of 64 months (interquartile range of 32). The cohort was divided as following: 3639 (68.73%) were normoglycemic, 854 (16.13%) had a SAV in the OGTT and 802 (15.15%) were diagnosed with GDM. Compared with normoglycemic controls, women with SAV and GDM tended to be older (32.20, 33.10 and 31.35 years for SAV, GDM and controls, respectively, $p < 0.001$); with higher rates of pre-pregnancy obesity (18.62%, 20.77% and 13.22% for SAV, GDM and controls, respectively, $p < 0.001$), pre-pregnancy hyperlipidemia (13.35%, 15.30% and 10.52% for SAV, GDM and controls, respectively, $p = 0.021$) and pre-pregnancy chronic hypertension (5.50%, 4.43% and 3.18% for SAV, GDM and controls, respectively, $p = 0.01$). Post-pregnancy Type-2 DM was diagnosed at a higher rate among women with SAV or GDM (2.69% for SAV, 7.39% for GDM and 0.66% for normoglycemic controls, $p < 0.001$). Using a cox proportional hazard regression, SAV and GDM were significantly and independently associated with a higher rate of future overt type-2 diabetes (adjusted aOR 3.59 for SAV and 11.38 for GDM, $p < 0.001$).

In a sub-analysis of the OGTT values, overall, abnormal fasting glucose had the highest correlation with developing future Type-2 DM (8.95% compared with 6.02% for OGTT_60, 6.03% for OGTT_120 and 7.35% for OGTT_180, $p < 0.001$).

A predictive model, combining multiple risk factors, as pre-pregnancy obesity and hypertension with SAV complicating the index pregnancy showed a risk as high as 3.40% for developing future Type-2 DM.

Conclusion

SAV is independently associated with a significant higher rate of future Type-2 DM, as early as 5 years following the

index pregnancy. (Author)

2021-08277

An integrated pre-pregnancy care programme framework theoretically modelled from the perspectives of women with Type 2 diabetes and healthcare professionals. Forde R, Collin J, Brackenridge A, et al (2021), Midwifery vol 103, December 2021, 103130

Background

Pregnancies in women with diabetes are associated with significant additional risks for the fetus, infant and mother such as, higher risk of stillbirths or congenital anomalies. Pre-pregnancy care can attenuate these risks. However, while women with Type 2 diabetes account for half of pregnancies in women with pre-existing diabetes, they are much less likely to receive pre-pregnancy care than women with Type 1 diabetes. This discrepancy may be related to the fact that most pre-pregnancy care is located in specialist diabetes centres where women with Type 1 diabetes are managed; whereas women with Type 2 diabetes are managed in primary care and reproductive care is not a routine element of diabetes care. Therefore, to improve pre-pregnancy care among women with Type 2 diabetes strategies need to be tailored to the specific needs of this group and the context of their diabetes care.

Objectives

This paper seeks to inform the development of an integrated pre-pregnancy care programme by presenting strategies identified by women with Type 2 diabetes and healthcare professionals that address some of the barriers they experience in relation to pre-pregnancy care.

Methods

A qualitative study using semi-structured in-depth interviews with women of reproductive age with Type 2 diabetes (n=30) and diabetes healthcare professionals (n=22) from both primary and secondary care. Data were transcribed verbatim and analysed thematically using Framework Analysis. The identified themes were then mapped to create a theoretical intervention framework using Normalisation Process Theory and the Capabilities, Opportunity, and Motivation to perform a Behaviour model.

Results

Six themes were identified expressing the need for a multimodal approach for improving the uptake of pre-pregnancy care in women with Type 2 diabetes. These themes were then mapped onto the constructs of Normalisation Process Theory as follows: coherence (enhancing understanding of reproductive needs among women and healthcare professionals); cognitive participation (constructing a positive narrative for pregnancy and Type 2 diabetes); collective action (increasing the visibly of the reproductive needs of women, integrating healthcare systems and utilising supportive technologies); and reflexive monitoring (using multi-modal approaches to support systemised care). The data were also modelled to identify target behaviours for intervention detailing what needs to be done by whom, when and where.

Conclusion

Women with Type 2 diabetes account for half of pregnancies in those with pre-existing diabetes; however, they are less likely to receive pre-pregnancy care than women with Type 1 diabetes. Pre-pregnancy care can reduce the maternal and fetal risks associated with Type 2 diabetes. This study presents strategies to improve the current low uptake of pre-pregnancy care for women with Type 2 diabetes. These strategies have been tailored to the specific needs of women and healthcare professionals and support integration within the woman's routine diabetes management. (Author)

2021-08160

Self-management education among women with pre-existing diabetes in pregnancy: A scoping review. Sushko K, Menezes HT, Strachan P, et al (2021), International Journal of Nursing Studies vol 117, May 2021, 103883

Background

Education is a cornerstone of self-management for adults with diabetes. Self-management is particularly important during pregnancy for women with type 1 and type 2 diabetes, as perinatal outcomes are affected by maternal glycemic control. To our knowledge, literature describing the provision of diabetes education and support during pregnancy for women with type 1 and type 2 diabetes has not been synthesized, nor examined within its context as a complex intervention.

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Objectives and design
This scoping review aims to synthesize the evidence regarding prenatal diabetes education and support for women with type 1 and type 2 diabetes and to apply the Medical Research Council framework for complex interventions where appropriate.

Data sources and methods
We searched EMBASE, CINAHL, and MEDLINE from inception to February 2019 for primary studies focused on prenatal diabetes education among women with type 1 and type 2 diabetes. Two independent reviewers screened eligible studies against inclusion criteria. A narrative synthesis of the included studies was conducted.

Results
Of 511 identified citations, 30 studies were included in the final review. Approximately 44% of the pooled sample were women with type 1 diabetes, 46% had gestational diabetes mellitus, and 10% had type 2 diabetes. Education focused on self-monitoring of blood glucose, attaining glycemic targets, and following a healthy diet. Many studies included educational elements that went beyond traditional didactic teaching and promoted self-management skills and self-management support. The majority of education was delivered via one-on-one outpatient appointments every one to three weeks. About half of the reviewed studies used a multidisciplinary team approach, with most including a combination of physicians, nurses, dietitians, and midwives. Application of the Medical Research Council framework revealed that most studies were limited in methods (i.e., randomization) and few examined process evaluation or intervention cost-effectiveness.

Conclusion
We identified a lack of studies centred on educational interventions for women with type 2 diabetes in pregnancy. As pregnancy for women with type 2 diabetes involves significant changes, including the transition from oral hypoglycemics to insulin therapy, often without exposure to diabetes-specific preconception care and counselling, future research may focus on optimizing preconception and prenatal education and support for this high-risk group. This is particularly relevant as the prevalence of type 2 diabetes is increasing worldwide. Future research ought to also design, implement and evaluate interventions in accordance with the Medical Research Council framework for complex interventions. (Author)

2021-08078

Awareness of euglycaemic diabetic ketoacidosis during pregnancy prevents recurrence of devastating outcomes: a case report of two pregnancies in one patient. Dargel S, Schleussner E, Kloos C, et al (2021), BMC Pregnancy and Childbirth vol 21, no 552, 12 August 2021

Background
Euglycaemic diabetic ketoacidosis (DKA) during pregnancy is a life-threatening obstetric emergency. It requires early identification and prompt action. Obstetricians' knowledge about symptoms, diagnostic pitfalls and management during pregnancy and delivery need to be improved. We report a case of a young diabetic woman developing severe euglycaemic DKA in two consecutive pregnancies; the first pregnancy resulted in the most deviating outcome (i.e., intrauterine death), while the second pregnancy resulted in the delivery of a healthy newborn. Thus, the novelty of the case presented here is the possibility to demonstrate how the management of DKA in pregnancy can dramatically change outcomes.

Case presentation
We report a case of a young diabetic woman in whom DKA was concealed by hyperemesis and oesophageal reflux. This woman presented to our delivery unit with severe euglycaemic DKA during her first pregnancy. While the mother's condition could be successfully stabilized, the foetus died shortly after admission. Two years later, the same woman presented with similar problems. Repeated episodes of mild euglycaemic DKA could be successfully managed with consequent interdisciplinary treatment and close observation, leading to a good pregnancy outcome, i.e., the birth of a healthy child.

Conclusion
Awareness of euglycaemic DKA needs to be increased to reduce the risk of severe complications during pregnancies in diabetic women. This case report demonstrates that increased awareness of DKA with immediate recognition and a successful multidisciplinary approach are mandatory for an positive pregnancy outcomes. (Author)

Full URL: https://doi.org/10.1186/s12884-021-03947-7

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2021-08008

Type 2 diabetes and neonatal hypoglycemia: role of route of delivery and insulin infusion. Alrais MA, Ward C, Cornthwaite JAA, et al (2022), Journal of Maternal-Fetal and Neonatal Medicine vol 35, no 25, 2022, pp 7445-7451

Objective

To compare the rate of neonatal hypoglycemia among newborns delivered by individuals with Type 2 diabetes mellitus (T2DM) in two clinical scenarios: who attempted vaginal delivery vs. had a planned cesarean delivery (CD); who had intrapartum insulin infusion vs. who did not.

Methods

This was a retrospective cohort study of individuals with insulin-treated T2DM who had non-anomalous singleton pregnancy and delivered at a single tertiary center (March 2012 and May 2018). Individuals with chronic renal failure, proliferative retinopathy, or major congenital anomalies were excluded. The primary outcome was neonatal hypoglycemia (blood glucose < 40 mg/dl <24 h of age or < 50 mg/dl >24 h of age). Secondary outcomes included neonatal outcomes. Multivariable Poisson regression models with robust error variance were used to examine the association between groups and the primary outcome. Adjusted relative risk (aRR) and 95% confidence intervals (CI) were calculated.

Results

Of 233 individuals with T2DM, 215 (92.2%) met the inclusion criteria, of whom 95 (44%) attempted vaginal delivery and 120 (56%) had a planned CD. Individuals who labored had a higher gestational age at delivery (36.6 vs. 35.8 weeks, p = .005), and higher blood glucose levels upon admission (125 vs 103, p < .001) compared to those with a planned CD. After adjustment for potential confounders, there was no difference in risk of neonatal hypoglycemia between the groups (41.2 vs 44.1%, aRR 1.05, 95% CI = 0.75–1.45). Among those who attempted vaginal delivery, 34 (35.8%) required insulin infusion. There was no difference in the risk of neonatal hypoglycemia (aRR = 0.79, 95% CI = 0.45–1.37) between newborns delivered by individuals who required insulin infusion and those who did not.

Conclusion

Over 40% of newborns delivered by individuals with insulin-dependent T2DM had hypoglycemia; however, there was no significant difference in the risk of hypoglycemia, irrespective of the route of delivery and the use of insulin infusion. (Author)

2021-07969

Maternal diabetes mellitus and its impact on the risk of delivering a child with congenital heart disease: a systematic review and meta-analysis. Papazoglou AS, Moysidis DV, Panagopoulos P, et al (2022), Journal of Maternal-Fetal and Neonatal Medicine vol 35, no 25, 2022, pp 7685-7694

Aim

Maternal pregestational diabetes mellitus (PGDM), type 1 or type 2, has been established as a potential risk factor for congenital heart disease (CHD). At the same time, the correlation between gestational diabetes mellitus (GDM) and increased risk of CHD has not been yet fully elucidated. The objective of this systematic review and meta-analysis (PROSPERO number: CRD42020182390) was to analyze the existing evidence on PGDM and to attempt to fill, to the best of our ability, the remaining knowledge gap in the association of GDM with CHD.

Materials and methods

Two authors have independently searched the Pubmed/Medline, Scopus, Cochrane, Web of Science, and Theses Global databases with keywords and Boolean operators. The search yielded 9333 relevant articles, which were later screened for eligibility. Original peer-reviewed (case-control or cohort) studies were included if they were published in English between 1997 and 2020. Thirteen studies on mothers with PGDM and seven studies on mothers with GDM were finally included in our meta-analysis to investigate the association of maternal diabetes with the risk of delivering a child with CHD. The selected studies were all assessed for their methodological quality using the Newcastle–Ottawa scale. Associations with p < .05 were considered statistically significant.

Results

Our meta-analysis (I2 > 75%, total population: n = 12,461,586) of 79,476 women with PGDM and 160,893 with GDM produced an odds ratio of 3.48 (2.36–4.61) and 1.55 (1.48–1.61), respectively. Additionally, we did not find any noticeable difference in the risk for CHD among diabetic women living in the USA and Europe. Nevertheless, it still needs to be clarified, whether or not the gestational diabetic population includes undiagnosed women with

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preexisting diabetes, which might account for the increased risk of delivering a child with CHD in women classified as suffering from GDM.

Conclusion
While both GDM and PGDM seem to significantly increase the risk of CHD in comparison with the general population, PDGM appears to have a greater association with CHD, being correlated with a 3.5-fold increase in the risk of malformation. Preconceptional and gestational diabetes care are, therefore, essential to mitigate the adverse effect of hyperglycemia on fetal heart formation during pregnancy. (Author)

2021-07677

A systematic review on outcome reporting in randomised controlled trials assessing treatment interventions in pregnant women with pregestational diabetes. Kgosidialwa O, Bogdanet D, Egan A, et al (2021), BJOG: An International Journal of Obstetrics and Gynaecology vol 128, no 12, November 2021, pp 1894-1904

Background
Pregestational diabetes mellitus (PGDM) is associated with adverse pregnancy outcomes. Studies assessing interventions to improve maternal and infant outcomes have increased exponentially over recent years. Several outcomes in this field of maternal diabetes are rare, making it difficult to synthesise evidence.

Objectives
To collect outcomes reported in studies assessing treatment interventions in pregnant women with PGDM.

Search strategy
CENTRAL, Web of Science, Medline, CINAHL, Embase and ClinicalTrials.gov from their inception until 27 January 2020.

Selection criteria
Any randomised controlled trial assessing treatment interventions in pregnant women with PGDM reported in English.

Data collection and analysis
Two independent reviewers assessed the suitability of articles and retrieved the data. Outcomes extracted from the literature were broadly categorised into maternal, fetal/infant or other outcomes by the study advisory group.

Main results
Sixty-seven of the 1475 studies identified fulfilled the inclusion criteria. The median number of outcomes reported per study was 15 (range 1–46). The majority of studies were from North America and Europe. Insulin and metformin were the most commonly investigated pharmacological interventions. Glucose monitoring was the most assessed technological intervention. In all, 131 unique outcomes were extracted: maternal (n = 69), fetal/infant (n = 61) and other (n = 1).

Conclusions
Outcome reporting in treatment interventions trials of pregnant women with PGDM is varied, making it difficult to synthesise evidence, especially for rare outcomes. Systems are needed to standardise outcome reporting in future clinical trials and so facilitate evidence synthesis in this area of maternal diabetes.

Registration
The systematic review was registered prospectively with the International Prospective Register of Systematic Reviews (PROSPERO) database (Registration number CRD42020173549).

Tweetable abstract
Outcome reporting is heterogeneous in intervention trials of pregnant women with diabetes existing before pregnancy. (Author)

Full URL: https://doi.org/10.1111/1471-0528.16842

2021-07675

A core outcome set for the treatment of pregnant women with pregestational diabetes: an international consensus study. Kgosidialwa O, Bogdanet D, Egan AM, et al (2021), BJOG: An International Journal of Obstetrics and Gynaecology vol 128, no

11, October 2021, pp 1855-1868

Objective
To develop a core outcome set (COS) for randomised controlled trials (RCTs) evaluating the effectiveness of interventions for the treatment of pregnant women with pregestational diabetes mellitus (PGDM).

Design
A consensus developmental study.

Setting
International.

Population
Two hundred and five stakeholders completed the first round.

Methods
The study consisted of three components. (1) A systematic review of the literature to produce a list of outcomes reported in RCTs assessing the effectiveness of interventions for the treatment of pregnant women with PGDM. (2) A three-round, online eDelphi survey to prioritise these outcomes by international stakeholders (including healthcare professionals, researchers and women with PGDM). (3) A consensus meeting where stakeholders from each group decided on the final COS.

Main outcome measures
All outcomes were extracted from the literature.

Results
We extracted 131 unique outcomes from 67 records meeting the full inclusion criteria. Of the 205 stakeholders who completed the first round, 174/205 (85%) and 165/174 (95%) completed rounds 2 and 3, respectively. Participants at the subsequent consensus meeting chose 19 outcomes for inclusion into the COS: trimester-specific haemoglobin A1c, maternal weight gain during pregnancy, severe maternal hypoglycaemia, diabetic ketoacidosis, miscarriage, pregnancy-induced hypertension, pre-eclampsia, maternal death, birthweight, large for gestational age, small for gestational age, gestational age at birth, preterm birth, mode of birth, shoulder dystocia, neonatal hypoglycaemia, congenital malformations, stillbirth and neonatal death.

Conclusions
This COS will enable better comparison between RCTs to produce robust evidence synthesis, improve trial reporting and optimise research efficiency in studies assessing treatment of pregnant women with PGDM.

Tweetable abstract
165 key stakeholders have developed #Treatment #CoreOutcomes in pregnant women with #diabetes existing before pregnancy. (Author)
Full URL: https://doi.org/10.1111/1471-0528.16825

2021-07400

Offspring birthweight and placental weight—does the type of maternal diabetes matter? A population-based study of 319 076 pregnancies. Strøm-Roum EM, Jukic AM, Eskild A (2021), Acta Obstetricia et Gynecologica Scandinavica vol 100, no 10, October 2021, pp 1885-1892

Introduction
Our aim was to estimate the difference in birthweight and in placental weight in pregnancies with type 1 diabetes, type 2 diabetes, and gestational diabetes compared with pregnancies without diabetes.

Material and methods
By using data from the Medical Birth Registry of Norway during the years 2009–2017, we included 319 076 singleton pregnancies with delivery after the 21st week of pregnancy. We used linear regression analyses to estimate the difference in birthweight and in placental weight in grams (g) in pregnancies with type 1 diabetes, type 2 diabetes, and gestational diabetes, using pregnancies without diabetes as the reference. Adjustments were made for pregnancy duration and pre-pregnancy body mass index.

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Results

In pregnancies without diabetes, mean crude birthweight was 3527 g (SD 552 g). The adjusted mean birthweight was 525 g (95% CI 502–548 g) higher in pregnancies with type 1 diabetes compared with pregnancies without diabetes. In pregnancies with type 2 diabetes, and pregnancies with gestational diabetes, birthweights were 192 g (95% CI 160–223 g) and 102 g (95% CI 93–110 g) higher, respectively. Mean crude placental weight was 664 g (SD 147 g) in pregnancies without diabetes. Compared with pregnancies without diabetes, the adjusted mean placental weight was 109 g (95% CI 101–116 g) higher in pregnancies with type 1 diabetes, 50 g (95% CI 39–60 g) higher in pregnancies with type 2 diabetes, and 31 g (95% CI 28–34 g) higher in pregnancies with gestational diabetes.

Conclusions

The increase in birthweight and in placental weight associated with maternal diabetes was most pronounced for type 1 diabetes, followed by type 2 diabetes, and gestational diabetes. (Author)

Full URL: https://doi.org/10.1111/aogs.14217

2021-07207

The Relationship between Fetal Abdominal Wall Thickness and Intrapartum Complications amongst Mothers with Pregestational Type 2 Diabetes. Isabey EP, Pylypjuk CL (2021), Journal of Diabetes Research 31 May 2021, online

Objectives. To evaluate the utility of fetal abdominal wall thickness (AWT) for predicting intrapartum complications amongst mothers with pregestational type 2 diabetes. Methods. This was a historical cohort study of pregnant mothers with pregestational type 2 diabetes delivering at a Canadian tertiary-care center between January 1, 2014, and December 31, 2018. Delivery records were reviewed to collect information about demographics and peripartum complications. Stored fetal ultrasound images from 36 weeks' gestation were reviewed to collect fetal biometry and postprocessing measurement of AWT performed in a standardized fashion by 2 blinded and independent observers. The relationship between fetal AWT was then correlated with risk of intrapartum complications including emergency Caesarean section (CS) and shoulder dystocia. Results. 216 pregnant women with type 2 diabetes had planned vaginal deliveries and were eligible for inclusion. Mean maternal age was 31.3 years, and almost all were overweight or obese at the time of delivery (96.8%). Overall, the incidence of shoulder dystocia and emergency intrapartum CS was 7.4% and 17.6%, respectively. There was no difference in mean fetal AWT between those having a spontaneous vaginal delivery (8.2 mm (95% CI 7.9-8.5)) and those needing emergency intrapartum CS (8.1 mm (95% CI 7.4-8.8);) or shoulder dystocia (8.7 mm (95% CI 7.9-9.5);). There was strong interobserver correlation of AWT measurements (;). The strongest association with intrapartum complications was birthweight (): with grams, the relative risk of shoulder dystocia or CS is 2.75 (95% CI 1.74-4.36;). Conclusions. There was no obvious benefit of AWT measurement at 36 weeks for predicting shoulder dystocia or intrapartum CS amongst women with type 2 diabetes in our population. The strongest predictor of intrapartum complications remained birthweight, and so studies for improving estimation of fetal weight and evaluating the role of intrapartum ultrasound for predicting risk of delivery complications are still needed. (Author)

Full URL: https://www.hindawi.com/journals/jdr/2021/5544599/

2021-06672

Characteristics of pregnant women with diabetes using injectable glucose-lowering drugs in the EVOLVE study. Mathiesen ER, Ali N, Anastasiou E, et al (2022), Journal of Maternal-Fetal and Neonatal Medicine vol 35, no 25, 2022, pp 7992-8000

Aims

To examine clinical parameters, glycemic control, folic acid supplementation, and the presence of other chronic diseases during early pregnancy in the EVOLVE study population (women with pre-existing diabetes treated with injectable glucose-lowering drugs).

Methods

Cross-sectional baseline evaluation of EVOLVE: an international, multicenter, non-interventional study investigating the safety of injectable glucose-lowering drugs in pregnant women with pre-existing type 1 (T1D) or type 2 diabetes (T2D). Data were collected at enrollment visit interviews before gestational week 16.

Results

In total, 2383 women from 17 mainly European countries were enrolled in the study: 2122 with T1D and 261 with T2D; mean age was 31 and 33 years, and duration of diabetes was 15 and 6 years, respectively. For women with T1D or T2D, 63% and 75%, respectively, received basal and rapid-acting insulin, 36% and 3% rapid-acting insulin only, 0.7% and 14.0% basal insulin only, 0.2% and 5.4% premix insulin, 0.0% and 1.2% injectable glucagon-like peptide-1 receptor

agonist treatment without insulin. In women with T1D or T2D, respectively, during early pregnancy, 59% and 62% had HbA1c <7.0% (53 mmol/mol); 16% and 36% reported not taking folic acid before or during early pregnancy. Overall, >40% of women had ≥1 chronic concomitant condition (predominantly thyroid disease or hypertension). Retinopathy was the most commonly reported diabetic complication. The most commonly reported previous pregnancy complication was miscarriage.

Conclusions

Baseline data from this large multinational population of women with pre-existing diabetes indicate that sub-optimal glycemic control, poor pregnancy planning, and chronic concomitant conditions were common in early pregnancy. (Author)

2021-06637

Antenatal prediction of fetal macrosomia in pregnancies affected by maternal pre-gestational diabetes. O'Dwyer V, Russell NM, McDonnell BP, et al (2022), Journal of Maternal-Fetal and Neonatal Medicine vol 35, no 25, 2022, pp 7412-7416

Aims

Higher rates of fetal macrosomia may occur in infants of women with pre-gestational diabetes compared with non-diabetic controls. Antenatal predication of fetal macrosomia remains challenging. Ultrasound over-estimated fetal weight could result in over-classification of fetuses as macrosomic with corresponding inappropriate clinical interventions. Previously we had studied a measurement – the anterior abdominal wall measurement (AAW) – to predict fetal macrosomia in fetal estimation of weight. The purpose of the study was to study whether specific third trimester ultrasound measurements with measures of glycaemic control (HbA1c) predicted macrosomia in babies born to women with pre-gestational diabetes. In particular, a new variant of this measurement (fetal anterior abdominal wall thickness (AAW), abdominal circumference (AC) ratio: AAW:AC) was investigated.

Methods

This was a prospective cohort study in a tertiary referral maternity hospital. Serial growth scans including measurement of AAW and AC: AAW ratio was performed at 30, 33- and 36-weeks' gestation. Birth-weight data was collected, and macrosomia was defined as >90th centile based on gestational age and gender of the baby. Serial HbA1c as measured at the first antenatal visit, 14, 20- and 36-weeks' gestation were reported for this study.

Results

Of the 416 pregnancies analyzed, mean maternal age was 33.3 years. One in five women were primigravida's. The mean birthweight was 3548 g (+/− 581 g), of which 142 (34%) babies were classified as macrosomic. The median gestational age at delivery was 383 weeks (314 − 402 weeks). There were 37 (9%) babies born preterm at <37 weeks' gestation. Mean AC measurements in fetuses that would be born with macrosomia compared with those with a non-macrosomic birth weight were 282 mm vs. 266 mm at 30 weeks, 318.3 mm vs. 297 mm at 33 weeks and 350 mm vs. 325 mm at 36 weeks' gestation (all $p < .001$). Mean AAW measurements in macrosomic fetuses compared with normal size fetuses were 3.7 mm vs. 3.3 mm at 30 weeks, 4.9 mm vs 4.3 mm at 33 weeks and 5.9 mm vs. 5.3 mm at 36 weeks' gestation (all $p < .001$). The mean AC: AAW was 0.01 for both normal and macrosomic fetuses at 30 weeks. There was no clinical or statistical difference in AC:AAW ratios between non-macrosomic and macrosomic infants. Binary logistic regression showed that AC at 36 weeks was most predictive of macrosomia (76.5%), followed by AAW at 30 weeks (68.5%). Using a combination of HbA1c booking, 14, 20, 36 weeks and AAW 30, 33, 36 weeks and AC 30, 33, 36 weeks predicted macrosomia in 80.9%. The ratio of AC: AAW did not act as a useful antenatal clinical predictor of macrosomia at birth.

Conclusions

Abdominal circumference at 36 weeks was the single best predictor of fetal macrosomia. A combined model of HbA1c, AC and AAW was the best antenatal predictor of macrosomia, with intriguing clinical possibilities in the possible prevention of maternal and fetal complications of macrosomia. (Author)

2021-06625

Baseline renal function and adverse outcomes in pregnancies complicated by pregestational diabetes. Champion ML, Steele R, Sinkey R, et al (2022), Journal of Maternal-Fetal and Neonatal Medicine vol 35, no 25, 2022, pp 7330-7336

Objective

To examine the relationship between baseline renal function (serum creatinine, urine protein to creatinine ratio) in women with diabetes and adverse pregnancy outcomes.

Study Design
This was a retrospective cohort study of singleton pregnancies with pregestational diabetes and baseline renal function tests <20 weeks gestational age (wga) from the years 2007 to 2013. Those with baseline creatinine ≥1.2 mg/dL were excluded due to the association of renal disease with adverse outcomes. The primary outcome was the development of preeclampsia with severe features at <34 wga. Secondary outcomes were preeclampsia at any gestational age, preterm birth, indicated preterm birth, small for gestational age, and a neonatal adverse outcomes composite. The relationship between baseline renal function and the primary outcome was assessed with ROC curves. Objective cutoffs were determined by the Liu method. Outcomes were compared using univariable and multivariable analyses.

Results
Baseline renal function was assessed in 321 women with pregestational diabetes. With baseline serum creatinine <1.2 mg/dL serum creatinine was not associated with preeclampsia <34 weeks (AUC 0.47, 95% CI = 0.32–0.63). Urine protein to creatinine (UPC) ratio was moderately associated with preeclampsia <34 weeks with area under curve (AUC) 0.56 (0.39–0.74). Baseline creatinine above the Liu cutoff (0.65 mg/dL) was not significantly associated with primary or secondary outcomes (Table 1). UPC above the Liu cutoff (0.21) was significantly associated with severe preeclampsia <34 wga (24% vs 3.7%, aOR = 6.6, 95% CI = 2.1–20.8), with development of preeclampsia at any gestational age (56% vs 23.4%, aOR = 3.3, 95% CI = 1.4–7.9), and preterm birth (80% vs 36.2%, aOR 6.5 95% CI = 2.3–18.1).

Conclusion
Creatinine was not associated with adverse pregnancy outcomes at thresholds <1.2 mg/dL in women with pregestational diabetes. Those with a baseline UPC ≥ 0.21 have an increased risk of preeclampsia and preterm delivery. Baseline 24 hr urine protein should be obtained in these patients to aid in counseling and future diagnosis of preeclampsia. (Author)

2021-06032

First trimester fasting glucose and glycated haemoglobin cut-offs associated with abnormal glucose homeostasis in the post-partum reclassification in women with hyperglycaemia in pregnancy. Chaves C, Cunha FM, Martinho M, et al (2022), Archives of Gynecology and Obstetrics vol 305, no 2, February 2022, pp 475-482

Hyperglycaemia first detected during pregnancy is either gestational diabetes mellitus (GDM) or previous undiagnosed diabetes. We aimed to study if there were a first trimester fasting glycaemia (FTG) and a glycated haemoglobin (HbA1c) cut-off values associated with type 2 diabetes mellitus (T2DM) or abnormal glucose homeostasis (AGH) at the post-partum oral glucose tolerance test (OGTT) reclassification. We retrospectively studied a group of pregnant women from the Portuguese National Registry of GDM. Receiver-operating characteristic (ROC) curves were used to determine the best FTG and HbA1c cut-offs to predict T2DM and AGH. We studied 4068 women. The area under the ROC curves (AUC) for the association with T2DM was 0.85 (0.80–0.90) for FTG and 0.85 (0.80–0.91) for HbA1c. The best FTG cut-off for association with T2DM was 99 mg/dL: sensitivity 77.4%, specificity 74.3%, positive predictive value (PPV) 4.8%, and negative predictive value (NPV) 99.5%. The best HbA1c cut-off for association with T2DM was 5.4%: sensitivity 79.0%, specificity 80.1%, PPV 5.7%, and NPV 99.6%. The AUC for the association of FTG and HbA1c with AGH were 0.73 (0.70–0.76) and 0.71 (0.67–0.74), respectively. The best FTG cut-off for predicting AGH was 99 mg/dL: sensitivity 59.4%, specificity 76.2%, PPV 17.0%, and NPV 95.8%. The best HbA1c cut-off was 5.4%: sensitivity 48.7%, specificity 81.5%, PPV 17.8%, and NPV 95.1%. We suggest an FTG of 99 mg/dL and an HbA1c of 5.4% as the best cut-offs below which T2DM is unlikely to be present. Almost all patients with FTG < 99 mg/dL and HbA1c < 5.4% did not reclassify as T2DM. These early pregnancy cut-offs might alert the physician for the possibility of a previous undiagnosed diabetes and alert them to the importance of testing for it after delivery. (Author)

2021-05857

Association of antenatal steroids with neonatal mortality and morbidity in preterm infants born to mothers with diabetes mellitus and hypertension. Weydig HM, Rosenfeld CR, Jaleel MA, et al (2021), Journal of Perinatology vol 41, no 7, July 2021, pp 1660-1668

Background
Randomized trials of antenatal steroids (ANS) included women at 24–33 weeks gestational age (GA); however, few women had preeclampsia and women with diabetes mellitus (DM) were excluded.

Methods

Cohort study including preterm births at 230/7–286/7 weeks GA before (Epoch-1) and after (Epoch-2) expansion of ANS administration to women with DM and hypertensive disorders (HTN). We compared Group-A (neither DM nor HTN) and Group-B (DM and/or HTN).

Results
Among 747 neonates the adjusted odds ratio (aOR) for surfactant administration, in-hospital mortality, severe intraventricular hemorrhage (IVH) and death or severe IVH were lower in ANS-exposed neonates than unexposed neonates. In Group-B, ANS administration was independently associated with less severe IVH and less death or severe IVH, but not less surfactant use or mortality.

Conclusions
Increased ANS administration in women with DM and/or HTN was independently associated with less severe IVH and less death or severe IVH but without decrease in surfactant administration. (Author)

2021-05491

Congenital Malformation Risk According to Hemoglobin A1c Values in a Contemporary Cohort with Pregestational Diabetes. Martin RB, Duryea EL, Ambia AM, et al (2021), American Journal of Perinatology vol 38, no 12, October 2021, pp 1217-1222

Objective The study aimed to evaluate the association between hemoglobin A1c values and likelihood of fetal anomalies in women with pregestational diabetes.

Study Design Women with pregestational diabetes who delivered at a single institution that serves a nonreferred population from May 1, 2009 to December 31, 2018 were ascertained. Hemoglobin A1c values were obtained at the first prenatal visit. Women who delivered a singleton live- or stillborn infant with a major malformation as defined by European Surveillance of Congenital Anomalies criteria were identified. In infants with multiple system anomalies, each malformation was considered separately. Hemoglobin A1c values were analyzed categorically by using Mantel–Haenszel method and continuously with linear regression for trend for fetal anomalies.

Results A total of 1,676 deliveries to women with pregestational diabetes were delivered at our institution, and hemoglobin A1c was assessed in 1,573 deliveries (94%). There were 129 deliveries of an infant with at least one major malformation, an overall anomaly rate of approximately 8%. Mean hemoglobin A1c concentration was significantly higher in pregnancies with anomalous infants, 9.3 ± 2.1% versus 8.0 ± 2.1%, and $p < 0.001$. There was no difference in gestational age at the time hemoglobin A1c was obtained, 13 ± 8.3 versus 14 ± 8.7 weeks. Hemoglobin A1c was associated with increased probability of a congenital malformation. This reached 10% with a hemoglobin A1c concentration of 10%, and 20% with a hemoglobin A1c of 13%. Similar trends were seen when examining risk of anomalies by organ system with increasing hemoglobin A1c levels, with the greatest increase in probability for both cardiac and genitourinary anomalies.

Conclusion In women with pregestational diabetes, hemoglobin A1c is strongly associated with fetal anomaly risk. Data from a contemporary cohort may facilitate counseling and also highlight the need for preconceptual care and glycemic optimization prior to entry to obstetric care. (Author)

2021-05442

Metformin Exposure and Risk of Hypertensive Disorders of Pregnancy in Patients with Type 2 Diabetes. Racine JL, Adams JH, Antony KM, et al (2021), American Journal of Perinatology vol 38, no 11, September 2021, pp 1103-1108

Objective Metformin has been found to have a role in promoting vascular remodeling and angiogenesis which may reduce the risk of developing preeclampsia. Prior studies have shown a decrease in the incidence of hypertensive disorders of pregnancy in patients with type 2 and gestational diabetes taking metformin. We hypothesize metformin exposure decreases the risk of developing hypertension in patients with type 2 diabetes.

Study Design Retrospective cohort study from 2009 to 2019 of singleton pregnancies was complicated by type 2 diabetes. We compared patients who received metformin throughout pregnancy to those with no metformin exposure. The primary outcome was a hypertension composite defined as gestational hypertension, preeclampsia with or without severe features, HELLP syndrome, or eclampsia. Individual hypertensive outcomes and neonatal outcomes were secondarily evaluated. Logistic regression was used to adjust for confounding variables.

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Results A total of 254 pregnancies were included. Women exposed to metformin were significantly less likely to develop hypertension composite compared with nonexposed women (22.7 vs. 33.1%, aOR 0.53, 95% CI 0.29–0.96). The incidence of preeclampsia with severe features was also significantly lower in those who received metformin compared with those who did not (12.1 vs. 20.7%, aOR 0.38, 95% CI 0.18–0.81). There were no differences in preterm birth prior to 34 or 37 weeks, fetal growth restriction, or birth weight between the study groups. A subgroup analysis of women without chronic hypertension also had a significantly lower risk of developing preeclampsia with severe features (7.6 vs. 17.8%, aOR 0.35, 95% CI 0.13–0.94).

Conclusion Metformin exposure was associated with a decreased risk of composite hypertensive disorders of pregnancy in patients with pregestational type 2 diabetes. These data suggest that there may be benefit to metformin administration beyond glycemic control in this patient population. (Author)

2021-04751

CopenFast trial: Faster-acting insulin Fiasp versus insulin NovoRapid in the treatment of women with type 1 or type 2 diabetes during pregnancy and lactation - a randomised controlled trial. Nørgaard SK, Mathiesen ER, Nørgaard K, et al (2021), BMJ Open Vol 11, no 4, March 2021, e045650

Introduction Faster-acting insulin aspart (Fiasp) is approved for use in pregnancy and lactation, but no clinical study has evaluated its effects during this life stage in women with pre-existing diabetes. The aim of the CopenFast trial is to evaluate the effect of Fiasp compared with insulin aspart (NovoRapid) on maternal glycaemic control during pregnancy, delivery and lactation and on fetal growth and infant health.

Methods and analysis An open-label randomised controlled trial of pregnant women with type 1 or type 2 diabetes including women on multiple daily injection (MDI) therapy or insulin pump therapy. During a 2-year inclusion period, approximately 220 women will be randomised 1:1 to Fiasp or NovoRapid in early pregnancy and followed until 3 months after delivery. At 9, 21 and 33 gestational weeks and during planned induction of labour or caesarean section, women are offered blinded continuous glucose monitoring (CGM) for 7 days. Randomisation will stratify for type of diabetes and insulin treatment modality (MDI or insulin pump therapy, respectively). Health status of the infants will be followed until 3 months of age. The primary outcome is birth weight SD score adjusted for gestational age and gender. Secondary outcomes include maternal glycaemic control including glycated haemoglobin, preprandial and postprandial self-monitored plasma glucose levels, episodes of mild and severe hypoglycaemia, maternal gestational weight gain and weight retention, CGM time spent in, above and below target ranges as well as pregnancy outcomes including pre-eclampsia, preterm delivery, perinatal mortality and neonatal morbidity. Data analysis will be performed according to the intention-to-treat principle.

Ethics and dissemination The trial has been approved by the Regional Ethics Committee (H-19029966) on 7 August 2019. Results will be sought disseminated in peer-reviewed journals and at scientific meetings.

Trial registration number NCT03770767 (Author)

Full URL: http://dx.doi.org/10.1136/bmjopen-2020-045650

2021-04729

Detemir vs neutral protamine Hagedorn insulin for diabetes mellitus in pregnancy: a comparative effectiveness, randomized controlled trial. Bartal MF, Ward C, Blackwell SC, et al (2021), American Journal of Obstetrics & Gynecology (AJOG) vol 225, no 1, July 2021, pp 87.e1-87.e10

Background

Insulin detemir, being used increasingly during pregnancy, may have pharmacologic benefits compared with neutral protamine Hagedorn.

Objective

We evaluated the probability that compared with treatment with neutral protamine Hagedorn, treatment with insulin detemir reduces the risk for adverse neonatal outcome among individuals with type 2 or overt type 2 diabetes mellitus (gestational diabetes mellitus diagnosed at <20 weeks' gestation).

Study Design

We performed a multiclinic randomized controlled trial (September 2018 to January 2020), which included women with singleton gestation with type 2 or overt type 2 diabetes mellitus who sought obstetrical care at ≤21 weeks' gestation. Participants were randomized to receive either insulin detemir or neutral protamine Hagedorn by a clinic-stratified scheme. The primary outcome was a composite of adverse neonatal outcomes, including shoulder

dystocia, large for gestational age, neonatal intensive care unit admission, respiratory distress (defined as the need of at least 4 hours of respiratory support with supplemental oxygen, continuous positive airway pressure or ventilation at the first 24 hours of life), or hypoglycemia. The secondary neonatal outcomes included gestational age at delivery, small for gestational age, 5-minute Apgar score of <7, lowest glucose level, need for intravenous glucose, respiratory distress syndrome, need for mechanical ventilation or continuous positive airway pressure, neonatal jaundice requiring therapy, brachial plexus injury, and hospital length of stay. The secondary maternal outcomes included hypoglycemic events, hospital admission for glucose control, hypertensive disorder of pregnancy, maternal weight gain, cesarean delivery, and postpartum complications. We used the Bayesian statistics to estimate a sample size of 108 to have >75% probability of any reduction in the primary outcome, assuming 80% power and a hypothesized effect of 33% reduction with insulin detemir. All analyses were intent to treat under a Bayesian framework with neutral priors (a priori assumed a 50:50 likelihood of either intervention being better; National Clinical Trial identifier 03620890).

Results

There were 108 women randomized in this trial (57 in insulin detemir and 51 in neutral protamine Hagedorn), and 103 women were available for analysis of the primary outcome (n=5 for pregnancy loss before 24 weeks' gestation). Bayesian analysis indicated an 87% posterior probability of reduced primary outcome with insulin detemir compared with neutral protamine Hagedorn (posterior adjusted relative risk, 0.88; 95% credible interval, 0.61–1.12). Bayesian analyses for secondary outcomes showed consistent findings of lower adverse maternal outcomes with the use of insulin detemir vs neutral protamine Hagedorn: for example, maternal hypoglycemic events (97% probability of benefit; posterior adjusted relative risk, 0.59; 95% credible interval, 0.29–1.08) and hypertensive disorders (88% probability of benefit; posterior adjusted relative risk, 0.81; 95% credible interval, 0.54–1.16).

Conclusion

In our comparative effectiveness trial involving individuals with type 2 or overt type 2 diabetes mellitus, use of insulin detemir resulted in lower rates of adverse neonatal and maternal outcomes compared with neutral protamine Hagedorn. (Author)

2021-03116

Fetal fractional limb volumes in pregnancies following bariatric surgery. Maric T, Kanu C, Mandalia S, et al (2020), Acta Obstetricia et Gynecologica Scandinavica Vol 100, no 2, February 2021, pp 272-278

Introduction

Obesity rates have reached an epidemic level and bariatric surgery is the most effective method of sustainable weight loss. Pregnancy following bariatric surgery is associated with an increased prevalence of small babies. The objective of the study is to compare the fetal fat distribution, as assessed by fractional arm and thigh volume using three-dimensional ultrasonography, in pregnancies following maternal bariatric surgery with those without such history.

Material and methods

This is a prospective, longitudinal, observational study conducted in a Maternity Unit in the UK. The study included 189 pregnant women; 63 with previous bariatric surgery [27 restrictive (13 with gastric band, 14 with sleeve gastrectomy) and 36 malabsorptive procedures] and 126 with no previous surgery but similar maternal booking body mass index. Fetal arm and thigh volume were obtained at 30-33 and 35-37 weeks' gestation and fractional limb volumes were calculated using a commercially available software. Women underwent a 75 g, 2 h oral glucose tolerance test at 28-31 weeks of gestation.

Results

Overall, adjusted fetal arm and thigh volume were smaller in the post-bariatric, compared to the no surgery, group and this was more marked in women who had undergone a previous sleeve gastrectomy ($P < .001$ and $P = .002$, respectively) or a malabsorptive procedure ($P < .001$ for both). There was a strong positive correlation between maternal fasting/post-prandial (2 h) glucose levels, at the time of the oral glucose tolerance test, and arm and thigh volume at both 30-33 and 35-37 weeks ($P < .01$ for all).

Conclusions

The study has demonstrated that in the third trimester of pregnancy, fetuses of women with previous bariatric surgery have smaller fractional limb volumes, therefore less soft tissue, compared to fetuses of women without such surgery and this may be related to the lower maternal glucose levels seen in the former pregnancies. (Author)

2021-03114

Fetal cardiovascular hemodynamics in type 1 diabetic pregnancies at near-term gestation. Lehtoranta L, Haapsamo M, Vuolteenaho O, et al (2020), Acta Obstetricia et Gynecologica Scandinavica Vol 100, no 2, February 2021, pp 263-271

Introduction

Poor glycemic control in maternal type 1 diabetes mellitus during pregnancy can affect fetal cardiac and placental function. However, studies concerning fetal central hemodynamics have revealed conflicting results. We hypothesized that in pregnancies complicated by maternal type 1 diabetes, fetal cardiovascular and placental hemodynamics are comparable to the control fetuses at near-term gestation. In addition, we investigated the relation between newborn serum biomarkers of cardiac function and fetal cardiovascular and placental hemodynamics. Furthermore, we studied whether maternal diabetes is associated with placental inflammation.

Material and methods

In this prospective case-control study, fetal central and peripheral hemodynamics were assessed by ultrasonography in 33 women with type 1 diabetes and in 67 controls with singleton pregnancies between 34+2 and 40+2 gestational weeks. Newborn umbilical cord serum was collected to analyze cardiac natriuretic peptides (atrial and B-type natriuretic peptides) and troponin T concentrations. Placental tissue samples were obtained for cytokine analyses.

Results

Fetal ventricular wall thicknesses were greater and weight-adjusted stroke volumes and cardiac outputs were lower in the type 1 diabetes group than in the control group. Pulsatility in the aortic isthmus and inferior vena cava blood flow velocity waveforms was greater in the type 1 diabetes group fetuses than in the controls. A positive correlation was found between branch pulmonary artery and aortic isthmus pulsatility index values. Umbilical artery pulsatility indices were comparable between the groups. Umbilical cord serum natriuretic peptide and troponin T concentrations were elevated in the type 1 diabetes fetuses. These cardiac biomarkers correlated significantly with cardiovascular hemodynamics. Placental cytokine levels were not different between the groups.

Conclusions

In maternal type 1 diabetes pregnancies, fetal cardiovascular hemodynamics is impaired. Maternal type 1 diabetes does not seem to alter placental vascular impedance or induce placental inflammation. (Author)

2021-03104

Glycemic, maternal and neonatal outcomes in women with type 1 diabetes using continuous glucose monitoring during pregnancy – Pump vs multiple daily injections, a secondary analysis of an observational cohort study. Kjölhede K, Berntorp K, Kristensen K, et al (2021), Acta Obstetricia et Gynecologica Scandinavica vol 100, no 5, May 2021, pp 927-933

Introduction

Continuous glucose monitoring (CGM) provides detailed information about glucose level fluctuations over time. The method is increasingly being used in pregnant women with type 1 diabetes. However, only one previous study compared CGM results related to pregnancy outcomes in women using insulin pumps with those administering multiple daily injections (MDI). We performed a secondary analysis of CGM metrics from an observational cohort of pregnant women with type 1 diabetes and compared insulin pump and MDI therapies in relation to maternal and neonatal outcomes.

Material and methods

The study included 185 pregnant Swedish women with type 1 diabetes undergoing CGM throughout pregnancy. Women were divided according to insulin administration mode, ie MDI (n = 131) or pump (n = 54). A total of 91 women used real-time CGM and 94 women used intermittently viewed CGM. Maternal demographics and maternal and neonatal outcome data were collected from medical records. CGM data were analyzed according to predefined glycemic indices: mean glucose; standard deviation; percentage of time within, below and above glucose target range; mean amplitude of glycemic excursion; high and low glucose indices; and coefficient variation in percent. Associations between insulin administration mode and CGM data, on the one hand, and maternal and neonatal outcomes, on the other, were analyzed with analysis of covariance and logistic regression, respectively, adjusted for confounders.

Results

There were no differences in maternal characteristics or glycemic indices between the MDI and pump groups, except for a longer duration of type 1 diabetes and higher frequencies of microangiopathy and real-time CGM among pump users. Despite improvement with each trimester, glucose levels remained suboptimal throughout pregnancy in both

groups. There were no differences between the MDI and pump groups concerning the respective associations with any of the outcomes. The frequency of large for gestational age was high in both groups (MDI 49% vs pump 63%) and did not differ significantly.

Conclusions
Pregnant women with type 1 diabetes did not differ in glycemic control or pregnancy outcome, related to MDI or pump administration of insulin. Glycemic control remained suboptimal throughout pregnancy, regardless of insulin administration mode. (Author)

2021-02996

Evaluation of a Telemedicine Program Managing High-Risk Pregnant Women with Pre-Existing Diabetes in Arkansas's Medicaid Program. Sung Y-S, Zhang D, Eswaran H, et al (2021), Seminars in Perinatology vol 45, no 5, August 2021, 151421

Objective
We aim to evaluate the effects of the telemedicine program, High-Risk Pregnancy Program at University of Arkansas for Medical Sciences (UAMS), on health services utilization and medical expenditures among pregnant women with pre-existing diabetes and their newborns.

Research Design and Methods
The study sample was selected from the Arkansas Medicaid claims linked to infant birth/death certificates and UAMS telemedicine records from 2013 through 2016. We used propensity score matching based on participants' characteristics to create three groups - UAMS telemedicine care, UAMS in-person care, and non-UAMS prenatal care. We compared inpatient and outpatient care services, medication use and caesarean section rates, severe maternal morbidity, infant mortality and preterm birth rates and medical expenditures.

Results
The UAMS telemedicine group had fewer inpatient admissions (1.18 vs 1.31; 95% CI: -0.27, 0.00), lower insulin use rates (41.86% vs 59.88%; 95% CI: -29.00%, -7.05%) and lower maternal care expenditures ($7,846 vs $10,644; 95% CI: -$4,089, -$1,507) compared with the UAMS in-person care group. Women receiving UAMS telemedicine had more prenatal care visits (10.45 vs 8.57; 95% CI: -2.96, -0.81), higher insulin use rates (41.86% vs 26.74%: 95% CI: 4.63%, 25.60%) and similar maternal care expenditures ($7,846 vs $7,051), compared with those receiving non-UAMS in-person care. Caesarean section, severe maternal morbidity, and infant mortality rates were similar across the three groups.

Conclusion
UAMS telemedicine was associated with improved utilization of prenatal care among pregnant women with pre-existing diabetes. Telemedicine services did not differ from usual in-person services in clinical outcomes and medical expenditures. (Author)

2021-02917

Maternal-foetal complications in pregnancy: a retrospective comparison between type 1 and type 2 diabetes mellitus. Guarnotta V, Mineo MI, Giacchetto E, et al (2021), BMC Pregnancy and Childbirth vol 21, no 243, 22 March 2021

Background
The aim of the study was a retrospective comparison of the differences in maternal-foetal outcomes between women with type 1 and type 2 diabetes mellitus (T1DM and T2DM).

Methods
A cohort of 135 patients with pregestational diabetes, 73 with T1DM (mean age 29 ± 5 years) and 62 with T2DM (mean age 33 ± 6 years), in intensive insulin treatment throughout pregnancy were evaluated. Clinical and metabolic parameters and the prevalence of maternal and foetal complications were assessed.

Results
Women with T1DM showed lower pregestational BMI ($p < 0.001$), pregestational weight ($p < 0.001$), weight at delivery ($p < 0.001$), Δ_total_insulin requirement (IR) at the first, second and third trimesters (all $p < 0.001$) and higher weight gain during pregnancy ($p < 0.001$), pregestational HbA1c ($p = 0.040$), HbA1c in the first ($p = 0.004$), second ($p = 0.020$) and third ($p = 0.010$) trimesters compared to T2DM. Women with T1DM had a higher risk of macrosomia ($p = 0.005$) than

T2DM, while women with T2DM showed higher prevalence of abortion (p = 0.037) than T1DM. At multivariate analysis, pregestational BMI and Δ_total_IR of the first trimester were independently associated with abortion in T2DM, while weight gain during pregnancy was independently associated with macrosomia in T1DM.

Conclusion

Women with T1DM have a higher risk of macrosomia than T2DM due to weight gain throughout pregnancy. By contrast, women with T2DM have a higher risk of spontaneous abortion than T1DM, due to pregestational BMI and Δ_total_IR in the first trimester. (Author)

Full URL: https://doi.org/10.1186/s12884-021-03702-y

2021-02517

Association between pregestational diabetes and mortality among appropriate-for-gestational age birthweight infants. Ashour AMN, Garacci E, Palatnik A, et al (2022), Journal of Maternal-Fetal and Neonatal Medicine vol 35, no 25, 2022, pp 5291-5300

Background/objective

Existing studies have shown that pregestational diabetes is a significant risk factor for adverse birth outcomes. However, it is unclear, whether pregestational diabetes and neonatal birthweight that is appropriate for the gestational age (AGA), a proxy for overall adequate glycemic control, is associated with higher infant mortality. To address this controversy, this study investigated the relationship between pregestational diabetes and infant mortality in appropriate-for-gestational age infants in the United States.

Methods

Data from the National Vital Statistics System-Linked Birth-Infant Death dataset, including 6,962,028 live births between 2011 and 2013 were analyzed. The study was conducted in the US and data were analyzed in Milwaukee, Wisconsin. The outcome was mortality among AGA newborns, defined as annual deaths per 1000 live births with birthweights between the 10th and 90th percentiles for gestational age delivering at ≥37 weeks. The exposure was pregestational diabetes. Covariates were maternal demographics, behavioral/clinical, and infant factors. Logistic regression was used with p values <.05 considered statistically significant.

Results

A total of 6,962,028 live births met inclusion criteria. Of these, a total of 11,711 (1.0%) term AGA birthweight infants died before their first birthday. About 35,689 (0.5%) mothers were diagnosed with pregestational diabetes prior to pregnancy with 0.3% of infants whose mothers had diabetes dying in their first year of life. In the unadjusted model, pregestational diabetes had a significant association with increased odds of mortality in term AGA infants (OR: 1.9, 95% CI: 1.6 − 2.3). AGA mortality remained significantly higher for women with pregestational diabetes compared to controls, after adjusting for maternal demographics (OR: 1.9, 95% CI: 1.6–2.3), behavioral/clinical characteristics (OR: 1.6, 95% CI: 1.3–2.0), and infant factors (OR: 1.3, 95% CI: 1.1–1.6).

Conclusions

In term pregnancies, pregestational diabetes was significantly associated with 30% higher mortality among AGA birthweight infants. Our study is innovative in its focus on AGA infants that overall is associated with good maternal glycemic control during pregnancy and in theory should confer a risk for infant mortality that is similar to pregnancies not complicated by pregestational diabetes. Despite this, we still found that even term AGA infants have higher risk of mortality in the setting of maternal pregestational diabetes. Implications of our findings underscore the importance of close antepartum surveillance and optimization of glycemic control preconception, identification of treatment targets, and health policies to reduce infant mortality. The results from this study may assist other researchers and clinicians understand how best to target future interventions to reduce term infant mortality and the burden of pregestational diabetes in the United States. (Author)

2021-02440

Exploratory study of clinician and patient views regarding the use of a preconception care app for women with diabetes. Nwolise CH, Carey N, Shawe J (2020), Health Informatics Journal vol 26, no 4, December 2020, pp 2673-2688

Women with diabetes are at increased risk of adverse maternal and foetal outcomes. Preconception care can minimise risk of complications and improve outcomes, but current provision is inadequate. Electronic health technology, particularly apps, could improve preconception care provision but research is lacking in this area. The aim of this article is to explore the views and experiences of clinicians and women with diabetes regarding the use of a

mobile app for preconception care. An exploratory study was conducted. Data were collected using focus group and interviews with 19 participants, comprising 10 clinicians and 9 women with type 1 or 2 diabetes. Data were analysed thematically. Women with diabetes and clinicians highlighted the inadequacy and challenges of current preconception care service provision and expressed a high level of enthusiasm and interest, towards a preconception care app that could support preconception care delivery for women with diabetes and overcome barriers to preconception care service provision and uptake. The acceptability of mobile health technology to both women and clinicians creates an important opportunity to overcome existing barriers to service provision, delivery and uptake, and improve both maternal and foetal outcomes for women with diabetes. (Author)

Full URL: https://doi.org/10.1177%2F1460458220921707

2021-02276

Comparison of a subcutaneous versus intravenous insulin protocol for managing hyperglycemia following antenatal betamethasone in women with diabetes: a pilot randomized controlled trial. Sweeting AN, Hsieh A, Wong J, et al (2022), Journal of Maternal-Fetal and Neonatal Medicine vol 35, no 25, 2022, pp 5888-5896

Introduction

Evaluate the safety and efficacy of a subcutaneous insulin (SC-I) versus intravenous insulin (IV-I) protocol for optimizing maternal blood glucose levels (BGLs) post-betamethasone administration.

Methods

Randomized controlled in-patient pilot study in pregnant women with diabetes, excluding type 1 diabetes, receiving betamethasone ≥24 weeks' gestation. Interventions were stratified SC-I and IV-I protocols, titrated to hourly BGLs (IV-I) or predicted maternal hyperglycemia and 2–4 hourly BGLs (SC-I). Primary outcome was percentage at-target BGL 4.0–8.0 mmol/L over 48 h post-betamethasone. Secondary outcomes were rates of maternal hyperglycemia (>8.0 mmol/L), hypoglycemia (<4.0 mmol/L) and neonatal hypoglycemia (≤2.5 mmol/L).

Results

19 women (3 with type 2 diabetes [T2DM], 4 with gestational diabetes [GDM]-diet, 12 GDM-insulin) were randomized to a SC-I (n = 13) or IV-I (n = 6) protocol in a 9-month period. There was a non-significant trend for higher mean percentage at-target BGLs with SC-I vs IV-I (87% vs 81%; p = .055); this was significant when the cohort was restricted to women with GDM (89% vs 81%; p = .04). Maternal hyperglycemia (85% vs 100%; p = .31) and hypoglycemia (54% vs 33%; p = .41) were not significantly different, but there were no BGLs <3.8 mmol/L with IV-I (vs 4 women with SC-I; p = .13). The rate of neonatal hypoglycemia was not different between groups.

Conclusion

A SC-I or IV-I protocol controls maternal BGLs following betamethasone, but SC-I appears safe and minimizes labor intensive IV-I in GDM. An adequately powered RCT to assess superiority of SC-I is planned.

2021-02265

Association between time of delivery and composite adverse outcomes in pregnancies complicated by diabetes. Wagner S, Chen H-Y, Ocon AL, et al (2022), Journal of Maternal-Fetal and Neonatal Medicine vol 35, no 25, 2022, pp 5792-5798

Objectives

To compare the composite neonatal and maternal adverse outcomes among women with diabetes who labor and deliver at 37–41 weeks at distinct time shifts.

Methods

This population-based retrospective cohort study using the US Vital Statistics dataset on Period Linked Birth-Infant Death Data from 2013–2017. The study population was restricted to non-anomalous singleton live births from women with pregestational or gestational diabetes, who labored and delivered at 37 0/7 to 41 6/7 weeks of gestation. The time of delivery was categorized as the first shift (7:00–15:00), the second shift (15:00–23:00), and the third shift (23:00–7:00). The primary outcome was a composite neonatal adverse outcome; the secondary outcome was a composite maternal adverse outcome. Multivariable Poisson regression models were used to estimate the association between the time of delivery and adverse outcomes (using adjusted relative risk [aRR] and 95% CI).

Results

Of 19.8 million live births during the study period, 3.3% (643,610) met the study inclusion criteria. The overall rate of composite neonatal and maternal adverse outcomes were 9.62 and 3.63 per 1000 live births, respectively.

Multivariable adjusted regression analysis showed that, compared to newborns delivered at the first shift, the risk of composite neonatal adverse outcome was modestly but significantly higher (aRR 1.19, 95% CI 1.12–1.27) in the third shift (23:00–7:00). There was no significant difference in the risk of composite maternal adverse outcomes between time shifts. In the sensitivity analysis stratified by the day of the week (weekday vs weekend), the results were consistent with the primary analyses.

Conclusion

Among term pregnancies complicated by diabetes, compared with delivery at 7:00–15:00, the risk of a composite neonatal adverse outcome is marginally but significantly higher if delivery occurs at the third shift (23:00–7:00).

2021-01327

Paternal country of origin and adverse neonatal outcomes in births to foreign-born women in Norway: A population-based cohort study. Antoun E, Kitaba NT, Titcombe P, et al (2020), PLoS Medicine vol 17, no 11, November 2020, e1003229

Background

Higher maternal plasma glucose (PG) concentrations, even below gestational diabetes mellitus (GDM) thresholds, are associated with adverse offspring outcomes, with DNA methylation proposed as a mediating mechanism. Here, we examined the relationships between maternal dysglycaemia at 24 to 28 weeks' gestation and DNA methylation in neonates and whether a dietary and physical activity intervention in pregnant women with obesity modified the methylation signatures associated with maternal dysglycaemia.

Methods and findings

We investigated 557 women, recruited between 2009 and 2014 from the UK Pregnancies Better Eating and Activity Trial (UPBEAT), a randomised controlled trial (RCT), of a lifestyle intervention (low glycaemic index (GI) diet plus physical activity) in pregnant women with obesity (294 contol, 263 intervention). Between 27 and 28 weeks of pregnancy, participants had an oral glucose (75 g) tolerance test (OGTT), and GDM diagnosis was based on diagnostic criteria recommended by the International Association of Diabetes and Pregnancy Study Groups (IADPSG), with 159 women having a diagnosis of GDM. Cord blood DNA samples from the infants were interrogated for genome-wide DNA methylation levels using the Infinium Human MethylationEPIC BeadChip array. Robust regression was carried out, adjusting for maternal age, smoking, parity, ethnicity, neonate sex, and predicted cell-type composition. Maternal GDM, fasting glucose, 1-h, and 2-h glucose concentrations following an OGTT were associated with 242, 1, 592, and 17 differentially methylated cytosine-phosphate-guanine (dmCpG) sites (false discovery rate (FDR) ≤ 0.05), respectively, in the infant's cord blood DNA. The most significantly GDM-associated CpG was cg03566881 located within the leucine-rich repeat-containing G-protein coupled receptor 6 (LGR6) (FDR = 0.0002). Moreover, we show that the GDM and 1-h glucose-associated methylation signatures in the cord blood of the infant appeared to be attenuated by the dietary and physical activity intervention during pregnancy; in the intervention arm, there were no GDM and two 1-h glucose-associated dmCpGs, whereas in the standard care arm, there were 41 GDM and 160 1-h glucose-associated dmCpGs. A total of 87% of the GDM and 77% of the 1-h glucose-associated dmCpGs had smaller effect sizes in the intervention compared to the standard care arm; the adjusted r2 for the association of LGR6 cg03566881 with GDM was 0.317 (95% confidence interval (CI) 0.012, 0.022) in the standard care and 0.240 (95% CI 0.001, 0.015) in the intervention arm. Limitations included measurement of DNA methylation in cord blood, where the functional significance of such changes are unclear, and because of the strong collinearity between treatment modality and severity of hyperglycaemia, we cannot exclude that treatment-related differences are potential confounders.

Conclusions

Maternal dysglycaemia was associated with significant changes in the epigenome of the infants. Moreover, we found that the epigenetic impact of a dysglycaemic prenatal maternal environment appeared to be modified by a lifestyle intervention in pregnancy. Further research will be needed to investigate possible medical implications of the findings.

Trial registration

ISRCTN89971375.

Full URL: https://doi.org/10.1371/journal.pmed.1003229

20210125-76*

Decreasing Insulin Requirements in Pregnancy with Preexisting or Gestational Diabetes: Management Practices

across Canada. Pihelgas A, Prior A, Ospina MB, et al (2021), JOGC [Journal of Obstetrics and Gynaecology Canada] vol 43, no 10, October 2021, pp 1180-1183.e1

Decreasing insulin requirements in pregnant women with preexisting or gestational diabetes has been attributed to placental insufficiency, which results in increased surveillance or early delivery. This practice is not evidence based. A 5-item questionnaire was administered electronically to a convenience sample of Canadian resident and staff obstetrician-gynaecologists and maternal-fetal medicine specialists. Practice patterns varied widely among the 142 survey respondents, and this variation did not correlate to their level of training. There is a paucity of evidence to guide the management of patients with decreasing insulin requirements, which is reflected in varied and possibly unnecessary clinical interventions. (Author)

20210125-47*

First trimester fasting plasma glucose screen in advanced maternal age women: a cost-effectiveness analysis. Waites BT, Walker AR, Skeith AA, et al (2022), Journal of Maternal-Fetal and Neonatal Medicine vol 35, no 21, 2022, pp 4123-4129

Background

The prevalence of preexisting type 2 diabetes mellitus (T2DM) in the United States is on the rise. Women of advanced maternal age (AMA, ≥35 years) are more likely to have preexisting T2DM in pregnancy because glucose intolerance increases with age. Diabetes in pregnancy is associated with significant maternal and neonatal morbidity and mortality, and earlier treatment initiation improves pregnancy outcomes. However, maternal age is not currently recognized as an independent risk factor that warrants diabetes screening prior to the traditional screen at 24-28 weeks gestation.

Objective

To evaluate the cost-effectiveness of screening all AMA women with a first trimester fasting plasma glucose (FPG) test for earlier diagnosis and management of preexisting T2DM.

Study design

A decision-analytic model was created to compare pregnancy outcomes in AMA women who undergo a first trimester FPG test vs third trimester oral glucose tolerance test alone. Probabilities were obtained from the literature. Outcomes examined included preeclampsia, preterm delivery, macrosomia, shoulder dystocia, brachial plexus injury (BPI), intrauterine fetal demise (IUFD), cerebral palsy, and neonatal death. The cost, quality-adjusted life-years (QALYs), and incremental cost-effectiveness ratio of the first trimester screening strategy were examined as well. Sensitivity analyses and a Monte Carlo simulation were performed to test the model's robustness.

Results

In AMA women, screening for preexisting T2DM in the first trimester with an FPG test resulted in fewer cases of preeclampsia, preterm delivery, BPI, IUFD, cerebral palsy, and neonatal death compared to performing a third trimester oral glucose tolerance test alone, and is cost-effective. Monte Carlo analysis incorporating the distribution of all probabilities showed that first trimester FPG screening remained cost-effective as long as the incremental cost of initiating diabetes treatment in the first trimester was less than $150,000 and the cost of the FPG screen was less than $2700.

Conclusion

Compared to third trimester oral glucose tolerance test alone, performing a first trimester FPG screen in AMA women is cost-saving and more effective. (Author)

2021-01238

Obstetric and perinatal outcomes for women with pre-existing diabetes in rural compared to metropolitan settings in Victoria, Australia. Williamson RL, McCarthy EA, Oats JJ, et al (2021), Australian and New Zealand Journal of Obstetrics and Gynaecology (ANZJOG) vol 61, no 3, June 2021, pp 373-379

Background

Pre-existing diabetes in pregnancy is associated with an increased risk of complications. Likewise, living in rural, regional and remote Victoria, Australia, is also associated with poorer health outcomes. There is a gap in the literature with regard to whether Victorian women with pre-existing diabetes experience a greater risk of adverse pregnancy outcomes compared to their metropolitan counterparts.

Aim

Our objective is to compare obstetric and perinatal outcomes for women with pre-existing diabetes delivering in rural vs metropolitan hospitals in Victoria, Australia.

Materials and Methods

Retrospective population-based study using routinely collected state-based data of singleton births to women with type 1 and type 2 diabetes who delivered in metropolitan (n = 3233) and rural hospitals (n = 693) in Victoria, Australia, between 2006–2015. Pearson's χ2 test, Fisher's exact test and MannWhitney U-test were used to compare obstetric and perinatal outcomes between metropolitan and rural locations.

Results

Delivery in a rural hospital was associated with higher rates of stillbirth (2.3% vs 1.1%, P = 0.027), macrosomia (25.9% vs 16.9%, P < 0.001), shoulder dystocia (8.4% vs 3.5%, P < 0.001) and admission to the neonatal intensive care unit/special care nursery (73.2% vs 59.3%, P < 0.001). Smoking (18.0% vs 8.9%, P < 0.001), overweight/obesity (P = 0.047) and socioeconomic disadvantage (P < 0.001) were more common in rural women.

Conclusions

Women with pre-existing diabetes who deliver in rural hospitals experience a greater risk of adverse perinatal outcomes and present with increased maternal risk factors. These results suggest a need to improve care for women with pre-existing diabetes in rural Victoria.

20210114-29*

Incident diabetes complications among women with type 1 diabetes based on parity. Polsky S, Foster NC, DuBose SN, et al (2022), Journal of Maternal-Fetal and Neonatal Medicine vol 35, no 24, 2022, pp 4629-4634

Objectives

To assess risk factors and incidence of diabetes complications in women with type 1 diabetes (T1D) based on parity.

Research design/methods

Data were collected from women (16-40 years old) in the T1D Exchange completing pregnancy/childbirth questionnaires during 2011-2013 and 2016-2018. Incidence of risk factors and diabetes complications were compared between women with a first pregnancy at/within 1-year of enrollment (n = 28) and never pregnant women by year 5 (n = 469).

Results

There was a trend for lower HbA1c (adjusted p = .14) and higher rates of overweight/obesity, triglyceride/HDL > 2, log (triglyercide/HDL), and hypertension among parous women compared with nulliparous women. There were no significant differences in rates of advanced nephropathy, albuminuria or cardiovascular disease.

Conclusions

Four-5 years after delivery, parous women with T1D tended to have lower HbA1c levels despite higher body mass indices and more frequent adverse lipid profiles and hypertension compared with nulliparous women. Further studies based on these trends are warranted. (Author)

2021-00810

Longitudinal assessment of ventricular strain, tricuspid and mitral annular plane systolic excursion (TAPSE and MAPSE) in fetuses from pregnancies complicated by diabetes mellitus. Lee-Tannock A, Hay K, Gooi A, et al (2021), European Journal of Obstetrics & Gynecology and Reproductive Biology vol 256, January 2021, pp 364-371

Objectives

To evaluate fetal cardiac function using myocardial deformation analyses, tricuspid annular plane systolic excursion (TAPSE), mitral annular plane systolic excursion (MAPSE) and diastolic function parameters in pregnancies complicated by maternal diabetes mellitus.

Methods

Myocardial deformation using velocity vector imaging (VVI), TAPSE, MAPSE and diastolic function was measured in 126 women with uncomplicated singleton pregnancies and 50 women with diabetes mellitus. Women underwent ultrasound scans every four weeks from recruitment (18–28 weeks gestational age) until delivery.

Results

Left ventricle strain and strain rate, right ventricle strain and strain rate, TAPSE, MAPSE and diastolic parameters were not different between the diabetic cohort and controls throughout gestation. We did not find any significant correlation between the fetal cardiac function parameters with parity or smoking status. There was however a significant difference in strain and strain rate values in the left ventricle, but not the right ventricle in women with BMI >30 kg/m 2, and reduced TAPSE values in this same group. Fetuses in the diabetes group had thicker interventricular septum (IVS) throughout gestation.

Conclusion

Myocardial deformation of the fetal left ventricle, as measured by VVI, and TAPSE were reduced in fetuses of mothers

in association with maternal obesity but not in women with diabetes mellitus. No significant differences in the fetal cardiac function parameters measured were different between the two groups, except for IVS thickness.

2021-00360

Prevalence of anxiety and depression symptoms in pregnant women with type 2 diabetes and the impact on glycaemic control. Ásbjörnsdóttir B, Vestgaard M, Do NC, et al (2021), Diabetic Medicine vol 38, no 3, March 2021, e14506

Aims

To study the prevalence of anxiety and depression symptoms in pregnant women with type 2 diabetes compared with pregnant women without diabetes. Secondly, to explore whether anxiety and/or depression symptoms in early pregnancy have an impact on glycaemic control and gestational weight gain.

Methods

A prospective cohort study of 90 consecutive singleton pregnant women with type 2 diabetes and 88 singleton pregnant women without diabetes. All women completed the Hospital Anxiety and Depression Scale questionnaire in early and late pregnancy. A score ≥8 in the anxiety or the depression scale was used to define anxiety and/or depression symptoms.

Results

Anxiety and/or depression symptoms were present in 40% of women with type 2 diabetes and 7% of women without diabetes in early pregnancy (Relative Risk = 5.87 (95% Confidence Interval: 2.60–13.22)). The figures were similar in late pregnancy. In women with type 2 diabetes and anxiety and/or depression symptoms in early pregnancy, HbA1c (mean ± SD) was 52 ± 14 vs. 49 ± 11 mmol/mol (6.9 ± 1.2 vs. 6.6 ± 1.0%), p = 0.31 in early pregnancy and 43 ± 8 vs. 40 ± 4 mmol/mol (6.1 ± 0.7 vs. 5.8 ± 0.4%), p = 0.04 in late pregnancy compared with women without symptoms. Gestational weight gain was similar in both groups.

Conclusions

In women with type 2 diabetes, 40% had anxiety and/or depression symptoms in early pregnancy. Women with these symptoms obtained less optimal glycaemic control in late pregnancy but similar gestational weight gain as the remaining women. (Author)

2021-00347

An Irish National Diabetes in Pregnancy Audit: aiming for best outcomes for women with diabetes. Egan AM, Brassill MJ, Brosnan E, et al (2020), Diabetic Medicine vol 37, no 12, December 2020, pp 2044-2049

Aims

The purpose of this study was to identify the number of pregnancies affected by pre-gestational diabetes in the Republic of Ireland; to report on pregnancy outcomes and to identify areas for improvement in care delivery and clinical outcomes.

Methods

Healthcare professionals caring for women with pre-gestational diabetes during pregnancy were invited to participate in this retrospective study. Data pertaining to 185 pregnancies in women attending 15 antenatal centres nationally were collected and analysed. Included pregnancies had an estimated date of delivery between 1 January and 31 December 2015.

Results

The cohort consisted of 122 (65.9%) women with Type 1 diabetes and 56 (30.3%) women with Type 2 diabetes. The remaining 7 (3.8%) pregnancies were to women with maturity-onset diabetes of the young (MODY) (n = 6) and post-transplant diabetes (n = 1). Overall women were poorly prepared for pregnancy and lapses in specific areas of service delivery including pre-pregnancy care and retinal screening were identified. The majority of pregnancies 156 (84.3%) resulted in a live birth. A total of 103 (65.5%) women had a caesarean delivery and 58 (36.9%) infants were large for gestational age.

Conclusions

This audit identifies clear areas for improvement in delivery of care for women with diabetes in the Republic of Ireland before and during pregnancy. (Author)

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2021-00346

Dietary intakes of women with Type 1 diabetes before and during pregnancy: a pre-specified secondary subgroup analysis among CONCEPTT participants. Neoh SL, Grisoni JA, Feig DS, et al (2020), Diabetic Medicine vol 37, no 11, November 2020, pp 1841-1848

Aim

To describe the dietary intakes of women with Type 1 diabetes before and during pregnancy.

Methods

This was a pre-specified subgroup analysis of CONCEPTT involving 63 women planning pregnancy and 93 pregnant women from 14 sites in England, Scotland and Ireland. Two hundred and forty-six 3-day food diaries (104 planning pregnancy, 142 pregnant) were matched to data source and food reference codes, and analysed using dietary software. Participants were informed that food diaries would be de-identified and used only for research purposes.

Results

Mean (sd) daily energy intake was 1588 (346) kcal and 1673 (384) kcal in women planning pregnancy and pregnant women respectively. Total carbohydrate intake was consistent with dietary guideline recommendations [180 (52) g planning pregnancy, 198 (54) g pregnant], but non-recommended sources (e.g. sugars, preserves, confectionery, biscuits, cakes) contributed to 46% of total daily carbohydrate intake. Fat consumption exceeded guideline recommendations [70 (21) g planning pregnancy, 72 (21) g pregnant]. Fibre [15.5 (5.3) g planning pregnancy, 15.4 (5.1) g pregnant], fruit and vegetable intakes [3.5 (2.2) and 3.1 (1.8) serves/day] were inadequate. Twelve women planning pregnancy (19%) and 24 pregnant women (26%) did not meet micronutrient requirements.

Conclusions

The diets of pregnant women from England, Scotland and Ireland are characterized by high fat, low fibre and poor-quality carbohydrate intakes. Fruit and vegetable consumption is inadequate, with one in four women at risk of micronutrient deficiencies. Further research is needed to optimize maternal nutrition for glycaemic control and for maternal and offspring health. (Author)

2021-00345

Undiagnosed type 2 diabetes during pregnancy is associated with increased perinatal mortality: a large population-based cohort study in Ontario, Canada. Lee D, Booth GL, Ray JG, et al (2020), Diabetic Medicine vol 37, no 10, October 2020, pp 1696-1704

Aim

To compare perinatal outcomes in women with undiagnosed diabetes with gestational diabetes alone, pre-existing diabetes and women without diabetes, and to identify risk factors which distinguish them from women with gestational diabetes alone.

Methods

This population-based cohort study included administrative data on all women who gave birth in Ontario, Canada, during 2002–2015. Maternal/neonatal outcomes were compared across groups using logistic regression, adjusting for confounders. A nested case control study compared women with undiagnosed type 2 diabetes with women with gestational diabetes alone to determine risk factors that would help identify these women.

Results

Among 995 990 women, 68 163 had gestational diabetes (6.8%) and, of those women with gestational diabetes,1772 had undiagnosed type 2 diabetes (2.6%). Those with undiagnosed type 2 diabetes were more likely to be older, from a lower income area, have parity > 3 and BMI ≥ 30 kg/m2 compared with gestational diabetes alone. Infants had a higher risk of perinatal mortality (OR 2.3 [1.6–3.4]), preterm birth (OR 2.6 [2.3–2.9]), congenital anomalies (OR 2.1 [1.7–2.5]), neonatal intensive care unit admission (OR 3.1 [2.8–3.5]) and neonatal hypoglycaemia (OR 406.0 [357–461]), which were similar to women with pre-existing diabetes. The strongest predictive risk factors included early gestational diabetes diagnosis, previous gestational diabetes and chronic hypertension.

Conclusions

Women diagnosed with gestational diabetes who develop diabetes within 1 year postpartum are at higher risk of adverse pregnancy outcomes, including perinatal mortality. This highlights the need for earlier diagnosis, preferably pre-pregnancy, and more aggressive treatment and surveillance of suspected type 2 diabetes during pregnancy.

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(Author)

2021-00344

Need for less tight glucose control in early pregnancy after embryogenesis due to high risk of maternal hypoglycaemia in women with pre-existing diabetes can be compensated by good control in late pregnancy. Hauffe F, Fauzan R, Schohe AL, et al (2020), Diabetic Medicine vol 37, no 9, September 2020, pp 1490-1498

Aim

Poor glucose control is associated with adverse outcomes in pregnancies with pre-existing diabetes. However, strict glucose control increases the risk of severe hypoglycaemia, particularly in the first trimester. Therefore, we aimed to investigate whether less tight glucose control in the first trimester determines adverse outcomes or can be compensated for by good control in late pregnancy.

Methods

Retrospective data were collected from 517 singleton pregnancies complicated by pre-existing diabetes delivering between 2010 and 2017. Three hundred and thirty-six pregnancies fulfilled the inclusion criteria of having available HbA1c values either pre-conception or in the first trimester (65% type 1 diabetes, 35% type 2 diabetes).

Results

Higher HbA1c values in the first trimester were associated with increasing rates of large for gestational age (LGA) neonates, preterm delivery or neonatal intensive care unit admissions. Multiple regression analysis demonstrated third trimester HbA1c, type 1 diabetes, multiparity and excess weight gain, but not first trimester HbA1c, to be independently predictive for LGA. Pre-eclampsia and third trimester HbA1c increased the risk for preterm delivery. If HbA1c was ≤ 42 mmol/mol (6.0%) in the third trimester, rates of adverse outcomes were not significantly higher even if HbA1c targets of ≤ 48 mmol/mol (6.5%) had not been met in the first trimester. Good first trimester glucose control did not modify the rates of adverse outcomes if HbA1c was > 42 mmol/mol (6.0%) in the third trimester.

Conclusions

Less tight glycaemic control, for example due to high frequency of severe hypoglycaemia in the first trimester, does not lead to increased adverse neonatal events if followed by tight control in the third trimester. Besides glycaemic control, excess weight gain is a modifiable predictor of adverse outcome.(Author)

2021-00342

High burden of cardiometabolic risk factors in spouses of Indian women with hyperglycaemia in pregnancy. Gupta Y, Goyal A, Kalaivani M, et al (2020), Diabetic Medicine vol 37, no 6, June 2020, pp 1058-1065

Aim

To evaluate the burden and association of cardiometabolic risk factors in the spouses of women with and without hyperglycaemia in pregnancy.

Methods

Women with (n = 204) and without (n = 197) hyperglycaemia in pregnancy, along with their spouses, participated in this cross-sectional study. The hyperglycaemia in pregnancy group included women with gestational diabetes and diabetes in pregnancy. A detailed questionnaire was completed for all participants (men and women), documenting relevant personal and medical history, along with biochemical investigations (men).

Results

A total of 401 couples were evaluated at the time point during the pregnancy of 24.7 ± 5.2 gestational weeks (mean ± sd). Dysglycaemia (prediabetes or diabetes), overweight/obesity (BMI ≥25 kg/m2) and metabolic syndrome were detected in 120 (58.9%), 123 (60.3%) and 98 spouses (48.3%) of women with hyperglycaemia in pregnancy, respectively. In the fully adjusted model, an increased risk of dysglycaemia [odds ratio 1.43 (95% CI 0.95–2.17); P = 0.088], overweight/obesity [odds ratio 1.49 (95% CI 0.98–2.27); P = 0.064] and metabolic syndrome [odds ratio 2.00 (95% CI 1.30–3.07); P = 0.001] was seen in the spouses of women with hyperglycaemia in pregnancy. The prevalence of these metabolic conditions was higher in spouses of women with diabetes in pregnancy compared to spouses of women with gestational diabetes mellitus.

Conclusions

A high burden of cardiometabolic risk factors was observed in the spouses of women with hyperglycaemia in

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pregnancy. The opportunity provided by pregnancy could be used by the healthcare system not only to improve the health of the woman and her offspring, but also her spouse. (Author)

2021-00341

A qualitative study exploring the factors that influence the uptake of pre-pregnancy care among women with Type 2 diabetes. Forde R, Collin J, Brackenridge A, et al (2020), Diabetic Medicine vol 37, no 6, June 2020, pp 1038-1048

Aim

To elicit the views and experiences of women with Type 2 diabetes and healthcare professionals relating to the pregnancy and pre-pregnancy care they have received or provided.

Methods

A qualitative study using in-depth semi-structured interviews with women with Type 2 diabetes (n=30) and healthcare professionals (n=22) from primary and specialist care. Women were purposively sampled to include different experiences of pregnancy and pre-pregnancy care. Data were transcribed verbatim and analysed thematically using Framework Analysis.

Results

The median age of the women was 37 years, and most were obese (median BMI 34.9 kg/m2), of black or Asian ethnicity (n=24, 80%) and from areas of high deprivation (n=21, 70%). Participating healthcare professionals were from primary (n=14), intermediate (n=4) and secondary (n=4) care. Seven themes expressing factors that mediate reproductive behaviour and care in women with Type 2 diabetes were identified at the patient, professional and system levels. Type 2 diabetes was generally perceived negatively by the women and the healthcare professionals. There was a lack of awareness about the pre-pregnancy care needs for this population, and communication between both groups was unhelpful in eliciting the reproductive intentions of these women. The themes also reveal a lack of systemic processes to incorporate pre-pregnancy care into the care of women with Type 2 diabetes, and consequently, health professionals in primary care have limited capacity to provide such support.

Conclusion

If the current high levels of unprepared pregnancies in women with Type 2 diabetes are to be reduced, the reproductive healthcare needs of this group need to be embedded into their mainstream diabetes management. (Author)

2021-00329

Which growth standards should be used to identify large- and small-for-gestational age infants of mothers with type 1 diabetes? A pre-specified analysis of the CONCEPTT trial. Meek CL, Corcoy R, Asztalos E, et al (2021), BMC Pregnancy and Childbirth vol 21, no 95, 29 January 2021

Background

A bicornuate uterus often results in infertility. While reconstructive procedures may facilitate pregnancy, spontaneous abortion or serious pregnancy complications may occur. We present a case of a bicornuate uterus with spontaneous conception after Strassman metroplasty; however, life-threatening complications during pregnancy occurred.

Case presentation

: A 38-year-old woman with a history of infertility presented for prenatal care at 6 weeks of gestation. She had conceived spontaneously after four failed in vitro fertilization and embryo transfer (IVF-ET) procedures, Strassman metroplasty for a complete bicornuate uterus, and two postoperative IVF-ET pregnancies that ended in embryo arrest. This pregnancy was uneventful until the patient presented with massive vaginal bleeding at 28 weeks of gestation and was diagnosed with placenta previa and placenta percreta. Bleeding was controlled after emergency Caesarean section and delivery of a healthy neonate. However, severe adhesions were noted as well as a rupture along the metroplasty scar. Two days later, on removal of the intrauterine gauze packing, severe hemorrhage resumed, and the uterus did not respond to oxytocin, hemabate, or carbetocin. Emergency hysterectomy was required.

Conclusions

Reconstructive surgical procedures for complete bicornuate uterus may allow patients to achieve spontaneous pregnancies. However, potential intrapartum complications include placenta implantation and postpartum hemorrhage, and the latter may be exacerbated as the uterus does not contract or respond to oxytocin or prostaglandin drugs. Patients should be counseled on the risks associated with pregnancy after Strassman

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metroplasty, and clinicians must be aware of potential severe complications.
Full URL: https://doi.org/10.1186/s12884-021-03540-y

2021-00245

Severe neonatal hypoglycaemia and intrapartum glycaemic control in pregnancies complicated by type 1, type 2 and gestational diabetes. Yamamoto JM, Donovan LE, Mohammad K, et al (2020), Diabetic Medicine vol 37, no 1, January 2020, pp 138-146

Aims
To determine if in-target intrapartum glucose control is associated with neonatal hypoglycaemia in women with type 1, type 2 or gestational diabetes.

Methods
This was a retrospective cohort study of pregnant women with diabetes and their neonates. The primary exposure was in-target glucose control, defined as all capillary glucose values within the range 3.5–6.5 mmol/l during the intrapartum period. The primary outcome, neonatal hypoglycaemia, was defined as treatment with intravenous dextrose therapy. Multiple logistic regression was used to examine the association between maternal intrapartum glycaemic control and neonatal hypoglycaemia, adjusting for covariates.

Results
Intrapartum glucose testing was available for 157 (86.3%), 267 (76.3%) and 3256 (52.4%) women with type 1, type 2 and gestational diabetes, respectively. In the univariate analysis, in-target glycaemic control was significantly associated with neonatal hypoglycaemia in women with gestational diabetes, but not in women with type 1 or 2 diabetes. However, after adjustment for important neonatal factors (large for gestational age, preterm delivery and infant sex), intrapartum in-target glycaemic control was not significantly associated with neonatal hypoglycaemia in women regardless of diabetes type [adjusted odds ratios 0.4 (95% CI 0.1, 1.4), 0.7 (95% CI 0.3, 1.3) and 0.7 (95% CI 0.5, 1.0) for women with type 1, type 2 and gestational diabetes, respectively].

Conclusions
There was no significant association between in-target glycaemic control and neonatal hypoglycaemia after adjustment for neonatal factors. Given the high risk of maternal hypoglycaemia and the resources required, future trials should consider whether more relaxed intrapartum glycaemic targets may be safer and yield similar neonatal outcomes. (Author)

2021-00236

Modelling potential cost savings from use of real-time continuous glucose monitoring in pregnant women with Type 1 diabetes. Murphy HR, Feig DS, Burrow-Sanchez JJ, et al (2019), Diabetic Medicine vol 36, no 12, December 2019, pp 1652-1658

Aim
To investigate potential cost savings associated with the use of real-time continuous glucose monitoring (RT-CGM) throughout pregnancy in women with Type 1 diabetes.

Methods
A budget impact model was developed to estimate, from the perspective of National Health Service England, the total costs of managing pregnancy and delivery in women with Type 1 diabetes using self-monitoring of blood glucose (SMBG) with and without RT-CGM. It was assumed that the entire modelled cohort (n = 1441) would use RT-CGM from 10 to 38 weeks' gestation (7 months). Data on pregnancy and neonatal complication rates and related costs were derived from published literature, national tariffs, and device manufacturers.

Results
The cost of glucose monitoring was £588 with SMBG alone and £1820 with RT-CGM. The total annual costs of managing pregnancy and delivery in women with Type 1 diabetes were £23 725 648 with SMBG alone, and £14 165 187 with SMBG and RT-CGM; indicating potential cost savings of approximately £9 560 461 from using RT-CGM. The principal drivers of cost savings were the daily cost of neonatal intensive care unit (NICU) admissions (£3743) and the shorter duration of NICU stay (mean 6.6 vs. 9.1 days respectively). Sensitivity analyses showed that RT-CGM remained cost saving, albeit to lesser extents, across a range of NICU costs and durations of hospital stay, and with varying numbers of daily SMBG measurements.

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Conclusions

Routine use of RT-CGM by pregnant women with Type 1 diabetes, would result in substantial cost savings, mainly through reductions in NICU admissions and shorter duration of NICU care. (Author)

2021-00206

Maternal glycaemic control and risk of neonatal hypoglycaemia in Type 1 diabetes pregnancy: a secondary analysis of the CONCEPTT trial. Yamamoto JM, Corcoy R, Donovan LE, et al (2019), Diabetic Medicine vol 36, no 8, August 2019, pp 1046-1053

Aims

To examine the relationship between maternal glycaemic control and risk of neonatal hypoglycaemia using conventional and continuous glucose monitoring metrics in the Continuous Glucose Monitoring in Type 1 Diabetes Pregnancy Trial (CONCEPTT) participants.

Methods

A secondary analysis of CONCEPTT involving 225 pregnant women and their liveborn infants. Antenatal glycaemia was assessed at 12, 24 and 34 weeks gestation. Intrapartum glycaemia was assessed by continuous glucose monitoring measures 24 hours prior to delivery. The primary outcome was neonatal hypoglycaemia defined as glucose concentration < 2.6 mmol/l and requiring intravenous dextrose.

Results

Neonatal hypoglycaemia occurred in 57/225 (25.3%) infants, 21 (15%) term and 36 (40%) preterm neonates. During the second and third trimesters, mothers of infants with neonatal hypoglycaemia had higher HbA1c [48 ± 7 (6.6 ± 0.6) vs. 45 ± 7 (6.2 ± 0.6); P = 0.0009 and 50 ± 7 (6.7 ± 0.6) vs. 46 ± 7 (6.3 ± 0.6); P = 0.0001] and lower continuous glucose monitoring time-in-range (46% vs. 53%; P = 0.004 and 60% vs. 66%; P = 0.03). Neonates with hypoglycaemia had higher cord blood C-peptide concentrations [1416 (834, 2757) vs. 662 (417, 1086) pmol/l; P < 0.00001], birthweight > 97.7th centile (63% vs. 34%; P < 0.0001) and skinfold thickness (P ≤ 0.02). Intrapartum continuous glucose monitoring was available for 33 participants, with no differences between mothers of neonates with and without hypoglycaemia.

Conclusions

Modest increments in continuous glucose monitoring time-in-target (5–7% increase) during the second and third trimesters are associated with reduced risk for neonatal hypoglycaemia. While more intrapartum continuous glucose monitoring data are needed, the higher birthweight and skinfold measures associated with neonatal hypoglycaemia suggest that risk is related to fetal hyperinsulinemia preceding the immediate intrapartum period. (Author)

2021-00194

Progression of Diabetic Retinopathy and Predictors of Its Development and Progression During Pregnancy in Patients With Type 1 Diabetes: A Report of 499 Pregnancies. Bourry J, Courteville H, Ramdane N (2021), Diabetes Care vol 44, no 1, January 2021, pp 181-187

OBJECTIVE Pregnancy has been associated with development and progression of diabetic retinopathy (DR), but incidence of DR remains unclear. We assessed DR progression rate and its predictors during pregnancies in patients with type 1 diabetes.

RESEARCH DESIGN AND METHODS We report the retrospective data from pregnancies in patients with type 1 diabetes followed in Lille, France (1997–2015). Eye examination was performed every 3 months or every month in case of severe nonproliferative retinopathy or progression. Progression was defined by DR degradation (≥1 stage of the Early Treatment Diabetic Retinopathy Study [ETDRS] classification); it included DR development and worsening in patients without and with prepregnancy DR, respectively.

RESULTS A total of 499 pregnancies in 375 patients were included; prepregnancy retinopathy was present in 30.3%. Progression, development, and worsening rates were 21.8%, 24.4% of those without retinopathy, and 15.9% of those with retinopathy, respectively. Development of sight-threatening retinopathy was rare. Progression mainly occurred in early or midpregnancy. Elevated prepregnancy HbA1c and duration of diabetes ≥10 years were predictors of DR progression. Among pregnancies with prepregnancy DR, continuous subcutaneous insulin infusion (CSII) tended to decrease the risk of DR progression. Among CSII-treated patients, those with prepregnancy DR had a significantly decreased risk of DR progression. Among the 270 pregnancies of women with any DR during pregnancy who returned for a postpartum ophthalmologic examination, the rate of progression was only 4.1% and the rate of regression was 9.3%.

CONCLUSIONS This study provides epidemiologic data on progression of retinopathy during pregnancy and will be useful for future guidelines for retinopathy screening. (Author)

2021-00193

Management of Diabetes in Pregnancy: Standards of Medical Care in Diabetes—2021. American Diabetes Association (2021), Diabetes Care vol 44, Supplement 1, January 2021, pp S200-S210

The American Diabetes Association (ADA) “Standards of Medical Care in Diabetes” includes the ADA's current clinical practice recommendations and is intended to provide the components of diabetes care, general treatment goals and guidelines, and tools to evaluate quality of care. Members of the ADA Professional Practice Committee, a multidisciplinary expert committee (https://doi.org/10.2337/dc21-SPPC), are responsible for updating the Standards of Care annually, or more frequently as warranted. For a detailed description of ADA standards, statements, and reports, as well as the evidence-grading system for ADA's clinical practice recommendations, please refer to the Standards of Care Introduction (https://doi.org/10.2337/dc21-SINT). Readers who wish to comment on the Standards of Care are invited to do so at professional.diabetes.org/SOC. (Author)

Full URL: https://doi.org/10.2337/dc21-S014

2021-00192

Core Outcome Sets for Studies of Diabetes in Pregnancy: A Review. Egan AM, Bogdanet D, Biesty L, et al (2020), Diabetes Care vol 43, no 12, December 2020, pp 3129-3125

Core Outcome Sets (COS) contain an agreed minimum set of outcomes to be measured and reported in all studies in a specific area, with the objective of standardizing outcome reporting. COS may minimize research waste by identifying outcomes important to key stakeholders, allowing for improved evidence synthesis, and facilitating translation of research findings to clinical practice. Over the past 5 years, there has been significant progress in developing COS relevant to studies of diabetes in pregnancy. This review summarizes work in this area, reviews the role of patient and public involvement in COS development, and suggests areas for future research. (Author)

2021-00191

Association of Maternal Prepregnancy Diabetes and Gestational Diabetes Mellitus With Congenital Anomalies of the Newborn. Wu Y, Liu B, Sun Y, et al (2020), Diabetes Care vol 43, no 12, December 2020, pp 2983-2990

OBJECTIVE To examine the association of maternal prepregnancy diabetes, gestational diabetes mellitus (GDM), and 12 subtypes of congenital anomalies of the newborn.

RESEARCH DESIGN AND METHODS We included 29,211,974 live births with maternal age ranging from 18 to 49 years old documented in the National Vital Statistics System in the U.S. from 2011 to 2018. Information on prepregnancy diabetes, GDM, and congenital anomalies was retrieved from birth certificates. Log-binomial regression was used to estimate risk ratios (RRs) and 95% CIs for congenital anomalies overall and by subtypes.

RESULTS Of the 29,211,974 live births, there were 90,061 infants who had congenital anomalies identified at birth. The adjusted RRs of congenital anomalies at birth were 2.44 (95% CI 2.33–2.55) for prepregnancy diabetes and 1.28 (95% CI 1.24–1.31) for GDM. The associations were generally consistent across subgroups by maternal age, race/ethnicity, prepregnancy obesity status, and infant sex. For specific subtypes of congenital anomalies, maternal prepregnancy diabetes or GDM was associated with an increased risk of most subtypes. For example, the adjusted RRs of cyanotic congenital heart disease were 4.61 (95% CI 4.28–4.96) for prepregnancy diabetes and 1.50 (95% CI 1.43–1.58) for GDM; the adjusted RRs of hypospadias were 1.88 (95% CI 1.67–2.12) for prepregnancy diabetes and 1.29 (95% CI 1.21–1.36) for GDM.

CONCLUSIONS Prepregnancy diabetes and, to a lesser extent, GDM were associated with several subtypes of congenital anomalies of the newborn. These findings suggest potential benefits of preconception counseling in women with preexisting diabetes or at risk for GDM for the prevention of congenital anomalies. (Author)

20201211-5*

ADIPS 2020 guideline for pre-existing diabetes and pregnancy. Rudland VL, Price SAL, Hughes R, et al (2020), Australian and New Zealand Journal of Obstetrics and Gynaecology (ANZJOG) vol 60, no 6, December 2020, pp E18-E52

This is the full version of the Australasian Diabetes in Pregnancy Society (ADIPS) 2020 guideline for pre-existing

diabetes and pregnancy. The guideline encompasses the management of women with pre-existing type 1 diabetes and type 2 diabetes in relation to pregnancy, including preconception, antepartum, intrapartum and postpartum care. The management of women with monogenic diabetes or cystic fibrosis-related diabetes in relation to pregnancy is also discussed. (Author)

20201130-49*

Characteristics of Stillbirths Associated With Diabetes in a Diverse U.S. Cohort. Page JM, Allshouse AA, Cassimatis I, et al (2020), Obstetrics & Gynecology vol 136, no 6, December 2020, pp 1095-1102

OBJECTIVE:

To characterize stillbirths associated with pregestational diabetes and gestational diabetes mellitus (GDM) in a large, prospective, U.S. case-control study.

METHODS:

A secondary analysis of stillbirths among patients enrolled in a prospective; multisite; geographically, racially, and ethnically diverse case-control study in the United States was performed. Singleton gestations with complete information regarding diabetes status and with a complete postmortem evaluation were included. A standard evaluation protocol for stillbirth cases included postmortem evaluation, placental pathology, clinical testing as performed at the discretion of the health care professional, and a recommended panel of tests. A potential cause of death was assigned to stillbirth cases using a standardized classification tool. Demographic and delivery characteristics among women with pregestational diabetes and GDM were compared with characteristics of women with no diabetes in pairwise comparisons using $\chi 2$ or two-sample t tests as appropriate. Sensitivity analysis was performed excluding pregnancies with genetic conditions or major fetal malformations.

RESULTS:

Of 455 stillbirth cases included in the primary analysis, women with stillbirth and diabetes were more likely to be older than 35 years and have a higher body mass index. They were also more likely to have a gestational hypertensive disorder than women without diabetes (28% vs 9.1%; P<.001). Women with pregestational diabetes had more large-for-gestational-age (LGA) neonates (26% vs 3.4%; P<.001). Stillbirths occurred more often at term in women with pregestational diabetes (36%) and those with GDM (52%). Maternal medical complications, including pregestational diabetes and others, were more often identified as a probable or possible cause of death among stillbirths with maternal diabetes (43% vs 4%, P<.001) as compared with stillbirths without diabetes.

CONCLUSION:

Compared with stillbirths in women with no diabetes, stillbirths among women with pregestational diabetes and GDM occur later in pregnancy and are associated with hypertensive disorders of pregnancy, maternal medical complications, and LGA. (Author)

Full URL: https://doi.org/10.1097/AOG.0000000000004117

20201119-27*

Maternal serum leptin, adiponectin, resistin and monocyte chemoattractant protein-1 levels in different types of diabetes mellitus. Kapustin RV, Chepanov SV, Babakov VN, et al (2020), European Journal of Obstetrics & Gynecology and Reproductive Biology vol 254, November 2020, pp 284-291

Objective

Evaluation of serum concentration of leptin, adiponectin, resistin, and MCP-1 in pregnant patients with different types of diabetes mellitus (DM) considering preconception planning and method of DM correction in 11-14th and 30-34th weeks of pregnancy.

Study design

Longitudinal, prospective study included 130 pregnant women divided into the following comparison groups: type 1 DM (T1DM, n = 40), type 2 DM (T2DM, n = 35), GDM (n = 40), and the control group (n = 15). The ELISA method defined the levels of leptin, resistin, adiponectin, and MCP-1 concentration in serum, which was assessed in 11-14th and 30-34th weeks of pregnancy. Statistical analysis was accomplished using SPSS 23.0 and 'Prism 8-GraphPad' software.

Results

The leptin level in the 1st trimester was the highest in T2DM insulin group compared to the control due to gestational age, hence in the 3rd trimester in all groups its serum concentrations appeared higher than in healthy patients (p = 0.0001). In the 1st trimester leptin levels directly correlated with women's BMI, newborns' weight and macrosomia rate, in the 3rd trimester - with OGTT levels, HbA1c, gestational hypertension, and preeclampsia rates. Resistin levels in the 1st and 3rd trimesters were increased in almost all DM groups compared to the control group (p = 0.0001). The study established direct positive correlation between resistin and HbA1c, birth weight, and preeclampsia. In the 1st trimester, adiponectin demonstrated the lowest levels in T2DM insulin compared to T1DM and the control group (p =

0.0001) while in the 3rd trimester, adiponectin levels declined alongside gestational age in DM patients and all the groups compared to the control group ($p < 0.05$). Adiponectin negatively correlated with BMI, OGTT levels, and preeclampsia rate. MCP-1 levels in T2DM appeared higher than in T1DM patients and the control group in the 1st trimester, whereas in the 3rd trimester MCP-1 declined, correlating with BMI, preeclampsia and OGTT levels.
Conclusion
High rate of adverse perinatal outcomes in diabetic pregnancy might be developed due to more severe metabolic failures and further disturbances of adipokines expression. (Author)

20201117-1*

More support for pregnant women and people with a learning disability with diabetes. NHS England (2020), London: NHS England 13 November 2020

Thousands more people with diabetes will no longer need to do painful finger prick tests and instead will have life changing technology to help manage their condition on the NHS. (Author)

Full URL: https://www.england.nhs.uk/2020/11/more-support-for-pregnant-women-and-people-with-a-learning-disability-with-diabetes/

20201116-66*

Omega-3 fatty acids plus vitamin for women with gestational diabetes or prediabetes: a meta-analysis of randomized controlled studies [Retracted]. Jiang L, Gao C, Yan P, et al (2022), Journal of Maternal-Fetal and Neonatal Medicine vol 35, no 16, 2022, pp 3135-3142

Introduction
Omega-3 fatty acids plus vitamin (e.g. vitamin D and E) may be beneficial to treat gestational diabetes mellitus (GDM), and we aimed to study the influence of omega-3 fatty acids plus vitamin versus placebo on the treatment efficacy of GDM.
Methods
We searched the databases including PubMed, Embase, and the Cochrane Central Register of Controlled Trials, and randomized controlled trials (RCTs) assessing the influence of omega-3 fatty acids and vitamins combination supplementation versus placebo on metabolic status of GDM were included.
Results
Five RCTs were included in the meta-analysis. Compared with control intervention for women with GDM or prediabetes, omega-3 fatty acids plus vitamin substantially reduced fasting plasma glucose (FPG, mean difference [MD] = -11.25; 95% confidence intervals [CI] = -13.73 to −8.77; $p < .00001$), insulin (MD=-6.16; 95% CI=-7.92 to −4.39; $p < .00001$), homeostasis model of assessment-insulin resistance (HOMA-IR, MD = 173.51; 95% CI = 164.72 to 182.30; $p < .00001$) and triglycerides (MD = 173.51; 95% CI = 164.72 to 182.30; $p < .00001$), as well as increased total antioxidant capacity (TAC, MD = 173.51; 95% CI = 164.72 to 182.30; $p < .00001$), but revealed no significant impact on total cholesterol (MD = 173.51; 95% CI = 164.72 to 182.30; $p < .00001$), low□density lipoprotein cholesterol (LDL-C, MD = 173.51; 95% CI = 164.72 to 182.30; $p < .00001$), preterm delivery (OR = 173.51; 95% CI = 164.72 to 182.30; $p < .00001$) or macrosomia > 4000 g (OR = 173.51; 95% CI = 164.72 to 182.30; $p < .00001$).
Conclusions
The supplementation of omega-3 fatty acids in combination with vitamin D or E can improve glycemic control, alleviate oxidative stress, and reduce triglycerides, but had no effects on total cholesterol, preterm delivery or macrosomia > 4000 g in women with GDM or prediabetes. (Author) [Retraction: Journal of Maternal-Fetal and Neonatal Medicine, vol 38, no 1, 2025, 2501451. https://doi.org/10.1080/14767058.2025.2501451]

20201112-30*

Insulin Dosing, Glycemic Control, and Perinatal Outcomes in Pregnancies Complicated by Type-2 Diabetes. Nadeau HCG, Maxted ME, Madhavan D, et al (2021), American Journal of Perinatology vol 38, no 6, May 2021, pp 535-543

Objective This study aimed to evaluate the prevalence of severe insulin resistance (insulin requirements ≥2 units/kg) at delivery and the relationship between severe insulin resistance, glycemic control, and adverse perinatal outcomes in pregnant women with type-2 diabetes mellitus.
Study Design This is a retrospective cohort study of women with type-2 diabetes mellitus who delivered between January 2015 and December 2017 at a tertiary academic medical center. Maternal demographic information, self-monitored blood sugars, and insulin doses were abstracted from the medical record. Multivariable logistic regression was used to identify maternal baseline characteristics associated with severe insulin resistance at delivery.
Results Overall 72/160 (45%) of women had severe insulin resistance. Women in the severe insulin resistance group demonstrated evidence of suboptimal glycemic control as evidenced by higher mean hemoglobin A1c (HbA1c) values

(7.2 [± 1.1] vs. 6.6 [± 1.3%], p = 0.003), higher mean fasting (104.0 [± 17.4] vs. 95.2 [± 11.7 mg/dL], p < 0.001) and postprandial glucose values (132.4 [± 17.2] vs. 121.9 [± 16.9 mg/dL]), p < 0.001), and a higher percentage of total glucose values that were elevated above targets (37.7 [95% confidence interval (CI): 26.8-50] vs. 25.6 [95% CI: 13.3-41.3%], p < 0.001). Maternal HbA1c ≥6.5% and insulin use prior to pregnancy were associated with a higher prevalence of severe insulin resistance, while Hispanic ethnicity and non-White race were associated with a lower prevalence of severe insulin resistance. The rates of adverse perinatal outcomes including large for gestational age (LGA) birth weight, cesarean delivery, and hypertensive disorders of pregnancy did not differ between groups. Conclusion Severe insulin resistance is common among pregnant women with type-2 diabetes, and it is associated with suboptimal glycemic control. Future studies are necessary to develop strategies to identify women with severe insulin resistance early in pregnancy and facilitate adequate insulin dosing. (Author)

20201021-28*

Translating Research on Diabetes and Obesity in Pregnancy Into Prevention: The 2019 Norbert Freinkel Award Lecture. Ferrara A (2020), Diabetes Care vol 43, no 11, November 2020, pp 2635-2642

Epidemiological studies on the intergenerational transmission of hyperglycemia and obesity via in utero exposure have established the scientific foundation for the vicious cycle of diabetes and obesity. The findings compel us to address an urgent public health question: how do we break this vicious cycle and implement upstream prevention strategies that are feasible for patients and health care delivery systems? To address this question, it is necessary to work across a continuum of translational research from basic science, epidemiology, and efficacy trials to pragmatic trials, which, along with evaluations of health programs, may lead to implementation of positive changes in clinical care. Three strategies for translating research on diabetes and obesity in pregnancy into prevention are discussed: 1) identifying diagnostic criteria of gestational diabetes mellitus (GDM) practicable in clinical settings to implement treatment and prevention, 2) examining trends in the prevalence of diabetes in pregnancy and related complications across racial/ethnic groups to plan prevention efforts, and 3) developing and evaluating scalable upstream diabetes and obesity prevention interventions. Upstream preventive interventions aimed at breaking the vicious cycle are discussed. Areas of future research needed to break the vicious cycle are identified. Evaluating the effectiveness of programs for the management of pregnancy hyperglycemia is necessary to reduce complications. Understanding racial/ethnic differences in the pathophysiology of GDM and its complications will be important for risk stratification. Pragmatic trials in real-world clinical settings for upstream prevention are needed to break the vicious cycle at the population level. Finally, leveraging basic science with intergenerational studies will inform targeted interventions. (Author)

Introduction

Full URL: https://doi.org/10.2337/dci19-0040

20201006-20*

Metformin in women with type 2 diabetes in pregnancy (MiTy): a multicentre, international, randomised, placebo-controlled trial. Feig DS, Donovan LE, Zinman B, et al (2020), Lancet Diabetes & Endocrinology vol 8, no 10, October 2020, pp 838-844

Background

Although metformin is increasingly being used in women with type 2 diabetes during pregnancy, little data exist on the benefits and harms of metformin use on pregnancy outcomes in these women. We aimed to investigate the effects of the addition of metformin to a standard regimen of insulin on neonatal morbidity and mortality in pregnant women with type 2 diabetes.

Methods

In this prospective, multicentre, international, randomised, parallel, double-masked, placebo-controlled trial, women with type 2 diabetes during pregnancy were randomly assigned from 25 centres in Canada and four in Australia to receive either metformin 1000 mg twice daily or placebo, added to insulin. Randomisation was done via a web-based computerised randomisation service and stratified by centre and pre-pregnancy BMI (<30 kg/m 2 or ≥30 kg/m 2) in a ratio of 1:1 using random block sizes of 4 and 6. Women were eligible if they had type 2 diabetes, were on insulin, had a singleton viable pregnancy, and were between 6 and 22 weeks plus 6 days' gestation. Participants were asked to check their fasting blood glucose level before the first meal of the day, before the last meal of the day, and 2 h after each meal. Insulin doses were adjusted aiming for identical glucose targets (fasting glucose <5·3 mmol/L [95 mg/dL], 2-h postprandial glucose <6·7 mmol/L [120 mg/dL]). Study visits were done monthly and patients were seen every 1-4 weeks as was needed for standard clinical care. At study visits blood pressure and bodyweight were measured; patients were asked about tolerance to their pills, any hospitalisations, insulin doses, and severe hypoglycaemia events; and glucometer readings were downloaded to the central coordinating centre. Participants, caregivers, and

outcome assessors were masked to the intervention. The primary outcome was a composite of fetal and neonatal outcomes, for which we calculated the relative risk and 95% CI between groups, stratifying by site and BMI using a log-binomial regression model with an intention-to-treat analysis. Secondary outcomes included several relevant maternal and neonatal outcomes. The trial was registered with ClinicalTrials.gov, NCT01353391.

Findings

Between May 25, 2011, and Oct 11, 2018, we randomly assigned 502 women, 253 (50%) to metformin and 249 (50%) to placebo. Complete data were available for 233 (92%) participants in the metformin group and 240 (96%) in the placebo group for the primary outcome. We found no significant difference in the primary composite neonatal outcome between the two groups (40% vs 40%; p=0·86; relative risk [RR] 1·02 [0·83 to 1·26]). Compared with women in the placebo group, metformin-treated women achieved better glycaemic control (HbA 1c at 34 weeks' gestation 41·0 mmol/mol [SD 8·5] vs 43·2 mmol/mol [-10]; 5·90% vs 6·10%; p=0·015; mean glucose 6·05 [0·93] vs 6·27 [0·90]; difference −0·2 [-0·4 to 0·0]), required less insulin (1·1 units per kg per day vs 1·5 units per kg per day; difference −0·4 [95% CI −0·5 to −0·2]; p<0·0001), gained less weight (7·2 kg vs 9·0 kg; difference −1·8 [-2·7 to −0·9]; p<0·0001) and had fewer caesarean births (125 [53%] of 234 in the metformin group vs 148 [63%] of 236 in the placebo group; relative risk [RR] 0·85 [95% CI 0·73 to 0·99]; p=0·031). We found no significant difference between the groups in hypertensive disorders (55 [23%] in the metformin group vs 56 [23%] in the placebo group; p=0·93; RR 0·99 [0·72 to 1·35]). Compared with those in the placebo group, metformin-exposed infants weighed less (mean birthweight 3156 g [SD 742] vs 3375 g [742]; difference −218 [-353 to −82]; p=0·002), fewer were above the 97th centile for birthweight (20 [9%] in the metformin group vs 34 [15%] in the placebo group; RR 0·58 [0·34 to 0·97]; p=0·041), fewer weighed 4000 g or more at birth (28 [12%] in the metformin group vs 44 [19%] in the placebo group; RR 0·65 [0·43 to 0·99]; p=0·046), and metformin-exposed infants had reduced adiposity measures (mean sum of skinfolds 16·0 mm [SD 5·0] vs 17·4 [6·2] mm; difference −1·41 [-2·6 to −0·2]; p=0·024; mean neonatal fat mass 13·2 [SD 6·2] vs 14·6 [5·0]; p=0·017). 30 (13%) infants in the metformin group and 15 (7%) in the placebo group were small for gestational age (RR 1·96 [1·10 to 3·64]; p=0·026). We found no significant difference in the cord c-peptide between groups (673 pmol/L [435] in the metformin group vs 758 pmol/L [595] in the placebo group; p=0·10; ratio of means 0·88 [0·72 to 1·02]). The most common adverse event reported was gastrointestinal (38 events in the metformin group and 38 events in the placebo group).

Interpretation

We found several maternal glycaemic and neonatal adiposity benefits in the metformin group. Along with reduced maternal weight gain and insulin dosage and improved glycaemic control, the lower adiposity and infant size measurements resulted in fewer large infants but a higher proportion of small-for-gestational-age infants. Understanding the implications of these effects on infants will be important to properly advise patients who are contemplating the use of metformin during pregnancy.

Funding

Canadian Institutes of Health Research, Lunenfeld-Tanenbaum Research Institute, University of Toronto. (Author)

20201002-41*

Prepregnancy Diabetes and Perinatal Mental Illness: A Population-Based Latent Class Analysis. Brown HK, Cairncross ZF, Lipscombe LL, et al (2020), American Journal of Epidemiology vol 189, no 6, June 2020, pp 573-582

We examined the risk of any perinatal mental illness associated with prepregnancy diabetes and identified how diabetes duration, complexity, and intensity of care affect this risk. We performed a population-based study of women aged 15-49 years with (n = 14,186) and without (n = 843,818) prepregnancy diabetes who had a singleton livebirth (Ontario, Canada, 2005-2015) and no recent mental illness. Modified Poisson regression estimated perinatal mental illness risk between conception and 1 year postpartum in women with versus without diabetes and in diabetes groups, defined by a latent class analysis of diabetes duration, complexity, and intensity-of-care variables, versus women without diabetes. Women with diabetes were more likely than those without to develop perinatal mental illness (18.1% vs. 16.0%; adjusted relative risk = 1.11, 95% confidence interval: 1.07, 1.15). Latent classes of women with diabetes were: uncomplicated and not receiving regular care (59.7%); complicated, with longstanding diabetes, and receiving regular care (16.4%); and recently diagnosed, with comorbidities, and receiving regular care (23.9%). Perinatal mental illness risk was elevated in all classes versus women without diabetes (adjusted relative risks: 1.09-1.12), but results for class 2 were nonsignificant after adjustment. Women with diabetes could benefit from preconception and perinatal strategies to reduce their mental illness risk. (Author)

20200928-42*

Redesigned Care Delivery for Insulin-Requiring Diabetes in Pregnancy Improves Perinatal Glycemic Control While Reducing Neonatal Intensive Care Admissions, Length of Stay, and Costs. Syrop CH, Wernimont SA, Fleener DK, et al (2021), Journal of Women's Health vol 30, no 4, April 2021, pp 557-568

Objective: We sought to improve perinatal glycemic control and downstream neonatal outcomes through redesigned ambulatory management for women with insulin-requiring diabetes in pregnancy.
Methods: To address gaps in perinatal glycemic management of women with insulin-requiring diabetes in pregnancy, redesigned care delivery (RCD) utilized integrated practice unit and minimally disruptive medicine concepts with incorporation of cellular-enabled glucose monitoring. Primary outcomes of RCD (N = 129) included hemoglobin A1c ([HbA1c], within RCD cohort), and gestational age (GA) at delivery, neonatal intensive care (NICU) admission, and NICU length of stay (LOS) compared with a preredesign care cohort (Pre-RCD; N = 122). Secondary outcomes included facility, payer reimbursement, and program costs. Generalized linear models assessed continuous variables while logistic regression methods assessed categorical outcomes.
Results: Utilizing RCD, 92% of women with an initial HbA1c <6.5% maintained glycemic control until delivery, and 67.2% with an initial HbA1c ≥6.5% achieved delivery levels <6.5%. NICU admissions and GA-adjusted LOS decreased significantly [Pre-RCD vs. RCD: NICU admissions, 41.0% vs. 27.3%, p < 0.024; NICU LOS (95% confidence interval [CI]), 21.9 (17.1-26.6) vs. 14.6 (9.1-20.1), p = 0.045]. Every 10 days of redesigned management decreased mean NICU LOS by 1 day. Mean payer neonatal reimbursements decreased over $18,000 per delivery (p = 0.08) compared with implementation costs of $1,942 per delivery.
Conclusion: Redesigned perinatal diabetes care with remote glucose monitoring demonstrated improved outcomes and value through downstream neonatal outcomes and lower payer costs. Therefore, subsequent dissemination and sustainability of similar programs' improved outcomes will likely require payer support. (Author)

20200925-30*

Pre-gestational diabetes during the COVID-19 pandemic in Bergamo, Italy. Dodesini AR, Galliani S, Ciriello E, et al (2020), International Journal of Gynecology & Obstetrics vol 151, no 2, November 2020, pp 295-296

Effective enforcement of lockdown measures, use of technology, and implementation of telemedicine may have significantly reduced the number of diabetic pregnant women who tested positive for COVID-19 in Bergamo, Italy. (Author)

20200911-25*

Adverse neonatal outcomes associated with pregestational diabetes mellitus in infants born preterm. Tse BC, Block B, Figueroa H, et al (2020), American Journal of Obstetrics & Gynecology MFM vol 2, no 4, November 2020, 100213

Background
Pregestational diabetes is associated with a higher risk of adverse pregnancy outcomes. Based on available data, it is unclear if infants born preterm to pregestational diabetes mothers are at higher risk of adverse outcomes compared to other preterm infants.
Objectives
The objective of this study is to quantify the neonatal complications associated with pregestational diabetes in infants born preterm.
Study Design
This was a retrospective cohort study of all non-anomalous singleton neonates born in Texas from 2006-2014. Analysis was limited to births between 24 and 36 weeks gestation and excluded multiple births, stillbirths, fetal congenital anomalies, neonates born to mothers with gestational diabetes, and neonates born to mothers with chronic hypertension. Results were stratified by pregestational diabetes status. Neonatal outcomes of interest included infant death, neonatal intensive care unit admission, low 5 minute Apgar scores, assisted ventilation >6hrs, surfactant administration and seizures. Multivariate logistic regression analysis was performed to estimate the association between pregestational diabetes and neonatal outcomes controlling for potential confounding variables
Results
After predefined exclusions, 277,210 births were analyzed of which 4,164 were to mothers with pregestational diabetes. The comparison group consisted of the non-diabetic mothers. The preterm infant mortality rate between the pregestational diabetic and non-diabetic group were similar. However, after adjusting for confounding variables there was an increased risk of infant mortality for preterm neonates born to pregestational diabetic mothers. In infants born preterm, pregestational diabetes was associated with an increased risk of infant death, low 5 minute Apgar score, prolonged assisted ventilation, surfactant requirement, and NICU admission. Neonates born before 34 weeks of gestation had an increased risk of assisted ventilation >6 hours, NICU admission, and seizure. Neonates of prediabetic mothers born in the late preterm period between 34-36 weeks gestation had increased risk of low Apgar score at 5 minutes, assisted ventilation >6 hours, surfactant use, and NICU admission.
Conclusions
Pregestational diabetes is associated with a higher risk of adverse neonatal outcomes in infants born preterm.

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RCM Information Services Limited is a subsidiary of The Royal College of Midwives

(Author)

20200910-45

Society for Maternal-Fetal Medicine Special Statement: Updated checklist for antepartum care of pregestational diabetes. Patient Safety and Quality Committee, Society for Maternal-Fetal Medicine, Hameed AB, et al (2020), American Journal of Obstetrics & Gynecology (AJOG) vol 223, no 5, November 2020, pp B2-B5

The Society for Maternal-Fetal Medicine presents a checklist for antenatal care of patients with type 1 and type 2 diabetes mellitus. The checklist includes the physical examination of lower extremities, the administration of low-dose aspirin and antepartum fetal surveillance starting at 32 weeks of gestation. (LDO)

20200910-36*

Association of pregnancy outcomes in women with type 2 diabetes treated with metformin versus insulin when becoming pregnant. Lin S-F, Chang S-H, Kuo C-F, et al (2020), BMC Pregnancy and Childbirth vol 20, no 512, 4 September 2020

Background

Metformin use in pregnancy is controversial because metformin crosses the placenta and the safety on the fetus has not been well-established. This retrospective study aimed to compare pregnancy outcomes in women with preexisting type 2 diabetes receiving metformin or standard insulin treatment.

Methods

The cohort of this population-based study includes women of age 20-44 years with preexisting type 2 diabetes and singleton pregnancies in Taiwan between 2003 and 2014. Subjects were classified into three mutually exclusive groups according to glucose-lowering treatments received before and after becoming pregnant: insulin group, switching group (metformin to insulin), and metformin group. A generalized estimating equation model adjusted for patient age, duration of type 2 diabetes, hypertension, hyperlipidemia, retinopathy, and aspirin use was used to estimate the adjusted odds ratio (aOR) and 95% confidence interval (CI) of adverse pregnancy outcomes.

Results

A total of 1166 pregnancies were identified in the insulin group (n = 222), the switching group (n = 318) and the metformin group (n = 626). The insulin group and the switching group had similar pregnancy outcomes for both the mother and fetus, including risk of primary cesarean section, pregnancy-related hypertension, preeclampsia, preterm birth (< 37 weeks), very preterm birth (< 32 weeks), low birth weight (< 2500 g), high birth weight (> 4000 g), large for gestational age, and congenital malformations. The metformin group had a lower risk of primary cesarean section (aOR = 0.57; 95% CI, 0.40-0.82) and congenital malformations (aOR, 0.51; 95% CI; 0.27-0.94) and similar risk for the other outcomes as compared with the insulin group.

Conclusions

Metformin therapy was not associated with increased adverse pregnancy outcomes in women with type 2 diabetes as compared with standard insulin therapy. (Author)

Full URL: https://doi.org/10.1186/s12884-020-03207-0

20200907-2*

Dietary glycemic index and glycemic load during pregnancy and offspring risk of congenital heart defects: a prospective cohort study. Schmidt AB, Lund M, Corn G, et al (2020), The American Journal of Clinical Nutrition vol 111, no 3, March 2020, pp 526-535

Background

Prepregnancy diabetes, especially when severely dysregulated, is associated with an increased risk of congenital heart defects in offspring. This suggests that glucose plays a role in embryonic heart development.

Objective

The aim was to investigate the association between midpregnancy dietary glycemic index (GI), glycemic load (GL), and sugar-sweetened beverages and the risk of congenital heart defects in the offspring.

Methods

Offspring of mothers from the Danish National Birth Cohort who filled out a food-frequency questionnaire (FFQ) covering midpregnancy dietary intake were included. Individual-level information on GI and GL, offspring congenital heart defects, and health and lifestyle covariates was linked. The association between GI and GL and offspring congenital heart defects was estimated by logistic regression. Further, we evaluated whether maternal intake of sugar-sweetened drinks increased the risk of offspring congenital heart defects.

Results

In total, 66,387 offspring of women who responded to the FFQ were included; among offspring, 543 had a congenital

heart defect. The adjusted OR (aOR) of congenital heart defects among offspring of mothers belonging to the highest versus the lowest GI quintile was 1.02 (95% CI: 0.78, 1.34; P-trend = 0.86). Results were similar for GL (aOR: 0.95; 95% CI: 0.72, 1.24). A high intake of sugar-sweetened carbonated beverages was associated with a statistically significant increased risk of offspring congenital heart defects (highest vs lowest intake-aOR: 2.41; 95% CI: 1.26, 4.64; P-trend = 0.03). No association was found with other types of beverages.

Conclusions

The study does not support an association between a high GI and GL in midpregnancy and increased offspring risk of congenital heart defects. Nevertheless, a statistically significant association between sugar-sweetened carbonated beverages and a moderately increased risk of offspring congenital heart defects was observed. (Author)

20200902-71

Evaluation of an Intrapartum Insulin Regimen for Women With Diabetes. Dude AM, Niznik CAPN, Peaceman AM, et al (2020), Obstetrics & Gynecology vol 136, no 2, August 2020, pp 411-416

OBJECTIVE:

To examine whether an insulin protocol for intrapartum glucose control among parturients with diabetes was associated with improved outcomes.

METHODS:

This is a retrospective cohort study of women with pregestational or gestational diabetes delivering a liveborn neonate at Northwestern Memorial Hospital. Before 2011, women with diabetes were given intravenous (IV) insulin or glucose during labor at the discretion of the on-call endocrinologist. In 2011, a standardized protocol was designed to titrate insulin and glucose infusions. Outcomes were compared between two time periods: January 2005-December 2010 (before implementation) and January 2012-December 2017 (after implementation) with 2011 excluded to account for a phase-in period. Maternal outcomes included intrapartum hyperglycemia (blood glucose greater than 125 mg/dL) and hypoglycemia (blood glucose less than 60 mg/dL). Neonatal outcomes included hypoglycemia (blood glucose less than 50 mg/dL), intensive care admission, and IV dextrose therapy. t tests, Wilcoxon rank sum tests, and $\chi 2$ tests were used for bivariable analyses. Linear and logistic multivariable regression were used to account for confounding factors.

RESULTS:

Of 3,689 women, 928 (25.2%) delivered before 2011. After protocol implementation, frequencies of both maternal intrapartum hyperglycemia (51.3% vs 37.9%) and hypoglycemia decreased (6.1% vs 2.5%), both P<.001; respective adjusted odds ratio [aOR] 0.64, 95% CI 0.54-0.77 and 0.50, 95% CI 0.33-0.78. The frequency of neonatal hypoglycemia, however, increased (36.6% vs 49.2%, P<.001; aOR 1.73, 95% CI 1.45-2.07). Admission to the neonatal intensive care unit and need for IV dextrose therapy were similar across time periods.

CONCLUSION:

A formal protocol to manage insulin and glucose infusions for parturients with diabetes was associated with improved intrapartum maternal glucose control, but an increased frequency of neonatal hypoglycemia. (Author)

20200826-27*

The lived experiences of midwifery care for women with diabetes: An integrative review. Wallace M, Stulz V (2020), Midwifery vol 89, October 2020, 102795

Background

Midwives provide care to women across the childbearing journey from pre-conception to the post-partum period in various clinical settings. Due to the increasing incidence of diabetic pregnancies, midwives are now in a position to support other health professionals, as part of a team, to reduce the stress and / or demand on the health care services.

Objective

This integrative review synthesises original research that explores the experiences and perceptions of midwives in the provision of care for women with diabetes.

Design

Integrative review.

Methods

Whittemore and Knafl's (2005) systematic approach was used to search for primary literature related to the research question. Studies meeting the following criteria were included: primary qualitative, quantitative and mixed methods research studies published in peer reviewed journals between January 2009 to October 2019. The population of interest being midwives or nurse-midwives and the outcomes of interest included their perceived role in the management of women with diabetes from the pre conceptual to the postpartum period. The methodological quality of the studies was assessed using the appropriate CASP (Critical Appraisal Skills Programmes, 2014) criteria for

qualitative and quantitative research studies. A robust search strategy was conducted using the following databases: EBCSO host (all data bases), Embase, Scopus, and Science Direct (see Table 1).
Findings
A total of 7275 articles were retrieved and ten papers were included in this review (five qualitative and five quantitative) that fulfilled the inclusion criteria. Two overarching themes were identified: professional and personal impacts on midwifery practice. The professional impact theme included three sub themes: organisational issues, professional development and holistic support. The personal impact theme also included three themes: limited diabetes knowledge, limited clinical practice skills and mental attitude.
Conclusions and implications for practice
The findings indicate that midwives need opportunities to learn and develop skills specific to their role so that each individual's needs can be met. These opportunities include provision of education at a university level, offering work based training and increasing the number of post registration courses targeted at midwives who are willing to upskill to provide appropriate care to women with diabetes. Courses are required to address the knowledge, attitudes to diabetes, appropriate assessment skills and innovative communication skills for midwives. (Author)

20200819-97*

Could the E/A ratio be included in the cardiological evaluation of the offspring of diabetic mothers? A case-control study in South Sardinia. Falqui SG, Bardanzellu F, Mecarini F, et al (2022), Journal of Maternal-Fetal and Neonatal Medicine vol 35, no 14, 2022, pp 2741-2750

Introduction
Diabetes mellitus (DM) is a chronic disease widespread in the world. Sardinia represents, together with Finland, the region with the highest incidence of type 1 DM (DM1), as well as a high prevalence of gestational DM (GDM).
Despite the improvement in obstetric surveillance, perinatal and long-term adverse outcomes are still frequent in the offspring of diabetic mothers.
During gestations complicated by DM, fetal heart is one of the most affected organ potentially undergoing structural heart defects or several degrees of fetal myocardium hypertrophy and impaired cardiac function.
Aim
The aim of our study was to evaluate, through echocardiographic examination, cardiac features and performance in a South Sardinian population of newborns of diabetic mothers comparing them to a group of control subjects.
Conclusions
In our sample, the E/A ratio resulted a significant marker of early diastolic dysfunction in asymptomatic neonates born by diabetic mothers, even if such result should be confirmed on larger samples. (Author)

20200819-52*

Antenatal Corticosteroids and Preterm Neonatal Morbidity and Mortality among Women with and without Diabetes in Pregnancy. Battarbee AN, Sandoval G, Grobman WA, et al (2022), American Journal of Perinatology vol 39, no 1, January 2022, pp 67-74

Objective The objective of this study was to determine whether antenatal corticosteroid exposure has a differential association with preterm neonatal morbidity among women with and without diabetes.
Study Design Secondary analysis of an observational cohort of 115,502 women and their neonates born in 25 U.S. hospitals (2008-2011). Women who delivered at 230/7 to 336/7 weeks' gestation and received antenatal corticosteroids were compared with those who did not receive antenatal corticosteroids. Women with a stillbirth and women who delivered a neonate that was not resuscitated were excluded. The primary outcome was neonatal respiratory distress syndrome or death within 48 hours. Secondary outcomes included composite neonatal morbidity (respiratory distress syndrome, necrotizing enterocolitis, grades 3-4 intraventricular hemorrhage, sepsis, or death) and mechanical ventilation. Multivariable modified Poisson regression was used to estimate the association between antenatal corticosteroid exposure and neonatal outcomes. Maternal diabetes (pregestational and gestational) was evaluated as a potential effect modifier, and sensitivity analyses were conducted to evaluate whether receipt of a partial, single, or multiple course(s) of antenatal corticosteroids influenced results.
Results A total of 4,429 women with 5,259 neonates met inclusion criteria: 3,716 (83.9%) women received antenatal corticosteroids and 713 (16.1%) did not. Of the 510 diabetic women (181 pregestational and 329 gestational), 439 (86.1%) received antenatal corticosteroids. Of the 3,919 nondiabetic women, 3,277 (83.6%) received antenatal corticosteroids. Antenatal corticosteroid exposure was not associated with respiratory distress syndrome or early death (adjusted relative risk [aRR] = 0.94, 95% confidence interval [CI]: 0.85-1.04), composite neonatal morbidity (aRR = 0.98, 95% CI: 0.89-1.07), or mechanical ventilation (aRR = 0.95, 95% CI: 0.86-1.05). There was no significant effect modification of maternal diabetes on the relationship between antenatal corticosteroids and neonatal outcomes (p >

0.05), and outcomes were similar in sensitivity analyses of partial, single, or multiple courses of corticosteroids.
Discussion Antenatal corticosteroid administered to reduce preterm neonatal morbidity does not appear to have a differential association among women with diabetes compared with those without. (Author)

20200819-131*

Is it suitable for DM diagnosis using an abnormal two-hour glucose value only after 24th gestational weeks in China.
Wei Y, Xhang Q, Juan J, et al (2022), Journal of Maternal-Fetal and Neonatal Medicine vol 35, no 6, 2022, pp 1075-1080

Objective

To investigate the postnatal outcomes of diabetes mellitus (DM) women diagnosed according to two-hour glucose value ≥11.1 mmol/L after 24th gestational weeks in China, and to evaluate if it is suitable for DM diagnosis using the criteria that two-hour glucose value ≥11.1 mmol/L after 24th gestational weeks only.

Research design and methods: We conducted a retrospective cohort study of the pregnant women with gestational hyperglycemia participated in gestational hyperglycemia day care and delivered in Peking University First Hospital from June 2016 to May 2018. A total of 168 women diagnosed with DM according to the criteria that two-hour glucose value ≥11.1 mmol/L after 24th gestational weeks were included, and 75 DM women did the oral glucose tolerance test (OGTT) from 6 weeks to 1 year postpartum. The general information collected and analyzed included age, prepregnancy body mass index (BMI), prepregnancy weight, gestational weight gain (GWG), OGTT value during pregnancy, OGTT value of postpartum, gestational weeks, and neonatal birth weight.

Results

There were 168 women diagnosed with DM according to the criteria that two-hour glucose value ≥11.1 mmol/L after 24th gestational weeks, and 75 (75/168, 44.6%) women underwent an OGTT from 6 weeks to 1 year postpartum. Among the women followed-up, 56 (56/75, 74.7%) women were diagnosed as hyperglycemia and 19 (19/75, 25.3%) women were diagnosed as normal glucose metabolism. In hyperglycemia women, there are eight (8/56, 10.7%) women diagnosed as DM, 24 (24/56, 32.0%) women diagnosed as impaired glucose tolerance (IGT), eight (8/56, 10.7%) women diagnosed as impaired fasting glucose (IFG), and 16 (16/56, 21.3%) women diagnosed as IFG and IGT. Compared with normal glucose metabolism women, the age of hyperglycemia women is higher significantly (34.8 ± 3.8 versus 32.7 ± 4.7). The incidence of IFG, pharmacy treatment, and the value of HbA1c is also higher in hyperglycemia women than the normal glucose metabolism women, in which it is not statistically significant but clinically significant.

Conclusion

In DM women diagnosed according to the criteria that two-hour glucose value ≥11.1 mmol/L after 24th gestational weeks, there were only eight (10.7%) women could meet DM diagnostic criteria according to the OGTT value of postpartum. Moreover, 25% women had normal OGTT value postpartum. Due to the characteristics of glucose metabolism in Asian population, an abnormal two-hour glucose value in OGTT may not be suitable to diagnose DM during pregnancy in China. (Author)

20200723-52*

In vivo: maternal betaine supplementation normalized fetal growth in diabetic pregnancy. Salahi P, Gharabaghi M, Rocky A, et al (2020), Archives of Gynecology and Obstetrics vol 302, no 4, October 2020, pp 837-844

Purpose

Diabetes alters maternal metabolism and can lead to aberrant fetal growth. In addition to insulin treatment, nutritional diet interventions are recommended for promoting fetal health against diabetes-induced adverse effects. Therefore, we conducted an in vivo study to investigate betaine efficacy on fetal development against maternal diabetes.

Methods

Thirty-two dams were divided into four equal groups: control (C), betaine supplementation (BS), diabetic pregnancy (DP) and diabetic pregnancy plus betaine supplementation (DP + BS). Fasting blood sugar (FBS) and body weight (BW) were monitored during pregnancy. After physiological delivery, dams glycated hemoglobin (HbA1c) concentrations were measured, followed by fetal development indices including litter size (LS), neonatal weight (NW) and crown-rump (CR). Also, maternal oxidative status was assessed by evaluating glutathione (GSH) content, glutathione peroxidase (GSH-Px) and catalase (CAT) activities, and malondialdehyde (MDA) concentration in the erythrocytes.

Results

Betaine supplementation significantly alleviated FBS and tended to recover BW loss. It also significantly decreased HbA1c values in dams of DP + BS compared to DP group. Normalized fetal indices such as LS, NW and CR under betaine supplementation were associated with a significant increase in GSH content and GSH-Px activity, as well as decreased MDA concentrations in erythrocytes of dams in the DP + BS versus the DP group, indicating improved redox balance in

the dams.
Conclusion
We indicated for the first time that betaine supplementation improved the maternal glucose metabolism and redox balance associated with normalized fetal growth. Nevertheless, further studies are required to investigate the mechanisms through which betaine protects fetal growth in diabetic pregnancy. (Author)

20200722-59*

Pilot Randomized Controlled Trial of Diabetes Group Prenatal Care. Carter EB, Barbier K, Hill PK, et al (2022), American Journal of Perinatology vol 39, no 1, January 2022, pp 45-53

Objective This study aimed to determine the feasibility and effectiveness of Diabetes Group Prenatal Care to increase patient engagement in diabetes self-care activities.
Study Design A pilot randomized controlled trial was conducted at two sites. Inclusion criteria were English or Spanish speaking, type 2 or gestational diabetes, 22 to 34 weeks of gestational age at first study visit, ability to attend group care at specified times, and willingness to be randomized. Exclusion criteria included type 1 diabetes, multiple gestation, major fetal anomaly, serious medical comorbidity, and serious psychiatric illness. Women were randomized to Diabetes Group Prenatal Care or individual prenatal care. The primary outcome was completion of diabetes self-care activities, including diet, exercise, blood sugar testing, and medication adherence. Secondary outcomes included antenatal care characteristics, and maternal, neonatal, and diabetes management outcomes. Analysis followed the intention-to-treat principle.
Results Of 159 eligible women, 84 (53%) consented to participate in the study and were randomized to group (n = 42) or individual (n = 42) prenatal care. Demographic characteristics were similar between study arms. Completion of diabetes self-care activities was similar overall, but women in group care ate the recommended amount of fruits and vegetables on more days per week (5.1 days/week ± 2.0 standard deviation [SD] in group care vs. 3.4 days ± 2.6 SD in individual care; p < 0.01) and gained less weight per week during the study period (0.2 lbs/week [interquartile range: 0-0.7] vs. 0.5 lbs/week [interquartile range: 0.2-0.9]; p = 0.03) than women in individual care. Women with gestational diabetes randomized to group care were 3.5 times more likely to have postpartum glucose tolerance testing than those in individual care (70 vs. 21%; relative risk: 3.5; 95% confidence interval: 1.4-8.8). Other maternal, neonatal, and pregnancy outcomes were similar between study arms.
Conclusion Diabetes group care is feasible and shows promise for decreasing gestational weight gain, improving diet, and increasing postpartum diabetes testing among women with pregnancies complicated by diabetes. (Author)

20200714-54*

Time trends in pregnancy-related outcomes among women with type 1 diabetes mellitus, 2004-2017. Helman S, James-Todd TM, Bellavia A, et al (2020), Journal of Perinatology vol 40, no 8, August 2020, pp 1145-1153

Objective
To examine time trends in US pregnant women with type 1 diabetes mellitus for maternal characteristics and pregnancy outcomes.
Study design
We abstracted clinical data from the medical records of 700 pregnant women from 2004 to 2017. For each time period, means and percentages were calculated. P values for trend were calculated using linear and logistic regression.
Results
HbA1c in each trimester was unchanged across the analysis period. The prevalence of nephropathy decreased from 4.8% to 0% (P = 0.002). Excessive gestational weight gain increased (P = 0.01). Gestation length also increased (P = 0.01), as did vaginal deliveries (P = 0.03). There were no change in birthweight over time (P = 0.07) and the percentage of neonates with macrosomia and large for gestational age (LGA) neonates also remained unchanged.
Conclusion
Obstetric guideline changes may have improved gestation length and mode of delivery; however, other outcomes need more attention, including excessive gestational weight gain, macrosomia, and LGA. (Author)
Full URL: https://doi.org/10.1038/s41372-020-0698-x

20200622-10*

Techniques of monitoring blood glucose during pregnancy for women with pre-existing diabetes (Cochrane Review). Jones LV, Ray A, Moy FM, et al (2019), The Cochrane Database of Systematic Reviews issue 5, 23 May 2019, Art. No: CD009613.

Background
There are a number of ways of monitoring blood glucose in women with diabetes during pregnancy, with

self-monitoring of blood glucose (SMBG) recommended as a key component of the management plan. No existing systematic reviews consider the benefits/effectiveness of different techniques of blood glucose monitoring on maternal and infant outcomes among pregnant women with pre-existing diabetes. The effectiveness of the various monitoring techniques is unclear. This review is an update of a review that was first published in 2014 and subsequently updated in 2017.

Objectives

To compare techniques of blood glucose monitoring and their impact on maternal and infant outcomes among pregnant women with pre-existing diabetes.

Search methods

For this update, we searched Cochrane Pregnancy and Childbirth's Trials Register, ClinicalTrials.gov, the WHO International Clinical Trials Registry Platform (ICTRP) (1 November 2018), and reference lists of retrieved studies.

Selection criteria

Randomised controlled trials (RCTs) and quasi-RCTs comparing techniques of blood glucose monitoring including SMBG, continuous glucose monitoring (CGM), automated telemedicine monitoring or clinic monitoring among pregnant women with pre-existing diabetes mellitus (type 1 or type 2). Trials investigating timing and frequency of monitoring were also eligible for inclusion. RCTs using a cluster-randomised design were eligible for inclusion but none were identified.

Data collection and analysis

Two review authors independently assessed study eligibility, extracted data and assessed the risk of bias of included studies. Data were checked for accuracy. The quality of the evidence was assessed using the GRADE approach.

Main results

This review update includes a total of 12 trials (944) women (type 1 diabetes: 660 women; type 2 diabetes: 113 women; type 1 or type 2 (unspecified): 171 women. The trials took place in Europe, the USA and Canada. Three of the 12 included studies are at low risk of bias, eight studies are at moderate risk of bias, and one study is at high risk of bias. Four trials reported that they were provided with the continuous glucose monitors free of charge or at a reduced cost by the manufacturer.

Continuous glucose monitoring (CGM) versus intermittent glucose monitoring, (four studies, 609 women)

CGM may reduce hypertensive disorders of pregnancy (pre-eclampsia and pregnancy-induced hypertension) (risk ratio (RR) 0.58, 95% confidence interval (CI) 0.39 to 0.85; 2 studies, 384 women; low-quality evidence), although it should be noted that only two of the four relevant studies reported data for this composite outcome. Conversely, this did not translate into a clear reduction for pre-eclampsia (RR 0.65, 95% CI 0.39 to 1.08; 4 studies, 609 women, moderate-quality evidence). There was also no clear reduction in caesarean section (average RR 0.94, 95% CI 0.75 to 1.18; 3 studies, 427 women; I2 = 41%; moderate-quality evidence) or large-for-gestational age (average RR 0.84, 95% CI 0.57 to 1.26; 3 studies, 421 women; I2 = 70%; low-quality evidence) with CGM. There was not enough evidence to assess perinatal mortality (RR 0.82, 95% CI 0.05 to 12.61, 71 infants, 1 study; low-quality evidence), or mortality or morbidity composite (RR 0.80, 95% CI 0.61 to 1.06; 1 study, 200 women) as the evidence was based on single studies of low quality. CGM appears to reduce neonatal hypoglycaemia (RR 0.66, 95% CI 0.48 to 0.93; 3 studies, 428 infants). Neurosensory disability was not reported.

Other methods of glucose monitoring

For the following five comparisons, self-monitoring versus a different type of self-monitoring (two studies, 43 women); self-monitoring at home versus hospitalisation (one study, 100 women), pre-prandial versus post-prandial glucose monitoring (one study, 61 women), automated telemedicine monitoring versus conventional system (three studies, 84 women), and constant CGM versus intermittent CGM (one study, 25 women), it is uncertain whether any of the interventions has any impact on any of our GRADE outcomes (hypertensive disorders of pregnancy, caesarean section, large-for-gestational age) because the quality of the evidence was found to be very low. This was due to evidence largely being derived from single trials, with design limitations and limitations with imprecision (wide CIs, small sample sizes, and few events). There was not enough evidence to assess perinatal mortality and neonatal mortality and morbidity composite. Other important outcomes, such as neurosensory disability, were not reported in any of these comparisons.

Authors' conclusions

Two new studies (406 women) have been incorporated to one of the comparisons for this update. Although the evidence suggests that CGM in comparison to intermittent glucose monitoring may reduce hypertensive disorders of pregnancy, this did not translate into a clear reduction for pre-eclampsia, and so this result should be viewed with caution. There was no evidence of a difference for other primary outcomes for this comparison. The evidence base for the effectiveness of other monitoring techniques analysed in the other five comparisons is weak and based on mainly single studies with very low-quality evidence. Additional evidence from large well-designed randomised trials is required to inform choices of other glucose monitoring techniques and to confirm the effectiveness of CGM. (Author)

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[This supersedes previous Cochrane Reviews, https://doi.org/10.1002/14651858.CD009613.pub3, 11 June 2017 and https://doi.org/10.1002/14651858.CD009613.pub2, 30 April 2014.]
Full URL: https://doi.org/10.1002/14651858.CD009613.pub4

20200622-1*

Screening tests for you and your baby: easy guides [Last updated 20 July 2021]. Public Health England (2020), Public Health England 19 June 2020

First published in February 2017, these 8 easy read guides explain the screening tests offered during and after pregnancy for people with learning disabilities. (Author, edited)
Full URL: https://www.gov.uk/government/publications/screening-tests-for-you-and-your-baby-easy-guides

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20200610-32*

Predictors of emergency cesarean section in women with preexisting diabetes. Fischer MB, Vestgaard M, Ásbjörnsdóttir B, et al (2020), European Journal of Obstetrics & Gynecology and Reproductive Biology vol 248, May 2020, pp 50-57

Objective
Preexisting diabetes in pregnancy is associated with a high risk of emergency cesarean section (CS), which is associated with increased risk of maternal and neonatal complications. Thus, the aim of this study was to identify possible predictors of emergency CS in women with preexisting diabetes.
Study design
This is a secondary analysis of a prospective observational study of 204 women with preexisting diabetes (118 with type 1 diabetes and 86 with type 2) with singleton pregnancies recruited at Rigshospitalet, Copenhagen, Denmark from August 2015 to February 2018. Mode of delivery (trial of labor or planned CS) was individually planned in late pregnancy based on clinical variables reflecting maternal and fetal health including glycemic control and ultrasonically estimated fetal weight. Univariate and multivariable analyses were performed to identify possible predictors of in labor emergency CS.
Results
Trial of labor was planned in 79 % (n = 162) of the women of whom 65 % (n = 105) were delivered vaginally and 35 % (n = 57) by an emergency CS, while the remaining 21 % (n = 42) were offered a planned CS. Nulliparity (adjusted odds ratio (aOR) 5.6 95 % CI 1.7-18.8), presence of a hypertensive disorder (aOR 2.8, 95 % CI 1.2-6.7) and previous CS (aOR 6.7, 95 % CI 1.5-28.9) were independently associated with an emergency CS. Maternal height was inversely associated with emergency CS (aOR 0.6 95 %, CI 0.5-0.9 per 5 cm decrease). Neither maternal HbA1c nor ultrasonically estimated fetal size in late pregnancy were associated with emergency CS. Women scheduled for a planned CS were characterized by poorer glycemic control and higher estimated fetal size than those offered a trial of labor.
Conclusion
Nulliparity, presence of a hypertensive disorder, previous CS and shorter maternal height were predictors of emergency CS in women with a planned trial of labor, whereas this not was the case for late pregnancy maternal Hba1c or fetal size estimated by ultrasound. (Author)

20200609-42*

Risk of severe maternal morbidity or death in relation to elevated hemoglobin A1c preconception, and in early pregnancy: A population-based cohort study. Davidson AJF, Park AL, Berger H, et al (2020), PLoS Medicine vol 17, no 5, 19 May 2020, e1003104

Background
The relation between prepregnancy average glucose concentration and a woman's risk of severe maternal morbidity (SMM) is unknown. The current study evaluated whether an elevated preconception hemoglobin A1c (A1c) is associated with SMM or maternal death among women with and without known prepregnancy diabetes mellitus (DM).
Methods and findings
A population-based cohort study was completed in Ontario, Canada, where there is universal healthcare. The main cohort included 31,225 women aged 16-50 years with a hospital live birth or stillbirth from 2007 to 2015, and who had an A1c measured within 90 days before conception, including 28,075 women (90%) without known prepregnancy DM. The main outcome was SMM or maternal mortality from 23 weeks' gestation up to 42 days postpartum. Relative risks (RRs) were generated using modified Poisson regression, adjusting for the main covariates of maternal age, multifetal pregnancy, world region of origin, and tobacco/drug dependence. The mean maternal age was 31.1 years. Overall, SMM or death arose among 682 births (2.2%). The RR of SMM or death was 1.16 (95% CI 1.14-1.19; p < 0.001) per 0.5%

increase in A1c and 1.16 (95% CI 1.13-1.18; p < 0.001) after adjusting for the main covariates. The adjusted relative risk (aRR) was increased among those with (1.11, 95% CI 1.07-1.14; p < 0.001) and without (1.15, 95% CI 1.02-1.29; p < 0.001) known prepregnancy diabetes, and upon further adjusting for body mass index (BMI) (1.15, 95% CI 1.11-1.20; p < 0.001), or chronic hypertension and prepregnancy serum creatinine (1.11, 95% CI 1.04-1.18; p = 0.002). The aRR of SMM or death was 1.31 (95% CI 1.06-1.62; p = 0.01) in those with a preconception A1c of 5.8%-6.4%, and 2.84 (95% CI 2.31-3.49; p < 0.001) at an A1c > 6.4%, each relative to an A1c < 5.8%. Among those without previously recognized prepregnancy diabetes and whose A1c was >6.4%, the aRR of SMM or death was 3.25 (95% CI 1.76-6.00; p < 0.001). Study limitations include that selection bias may have incorporated less healthy women tested for A1c, and BMI was unknown for many women.

Conclusions

Our findings indicate that women with an elevated A1c preconception may be at higher risk of SMM or death in pregnancy or postpartum, including those without known prepregnancy DM. (Author)

Full URL: https://doi.org/10.1371/journal.pmed.1003104

20200604-53*

Use of the modified myocardial performance index for evaluating fetal cardiac functions in pregestational diabetic pregnancy babies. Alanyali MO, Alkan F, Ulkumen BA, et al (2021), Journal of Obstetrics and Gynaecology vol 41, no 2, 2021, pp 187-192

The aim of this study is assessment of importance of use of the modified myocardial performance index (Mod-MPI) for the evaluation of foetal cardiac function in foetuses of women with pregestational diabetes mellitus (PDM). In this study, data of 30 pregnant patients aged 18-45 years diagnosed with PDM and 30 pregnant women aged 18-45 years with normal pregnancy and their babies were evaluated. Foetal echocardiographic and doppler measurements, foetal biometric measurements, umbilical artery and ductus venosus pulsatility indexes were measured in both PDM and control groups. The Mod-MPI was significantly higher in foetuses of PDM women. Many influences especially cardiac and postpartum complications are observed in infants of PDM women. The Mod-MPI is a simple and useful method for assessing foetal ventricular function. Our study has shown that PDM is associated with foetal ventricular dysfunction.

Impact statement

What is already known on this subject? Although MPI is frequently used in routine clinical assessment of neonates, it is not used adequately in foetuses. Many influences especially cardiac and postpartum complications are observed in infants of PDM women. However, there are few studies focussed specifically on the assessment of foetal cardiac function in PDM.

What do the results of this study add? MPI, which shows both diastolic and systolic functions is independent of ventricular anatomy and foetal heart rate, was found significantly higher in diabetic mother foetuses, can be said to be a valuable parameter in evaluating foetal cardiac functions globally.

What are the implications of these findings for clinical practice and/or further research? Our study has shown that foetuses PDM are associated with foetal ventricular dysfunction. For this MPI measurement can be routinely performed at foetal cardiac measurements in foetuses of PDM mothers. (Author)

20200603-42*

Concentrations of fatty acids among macrosomic neonates delivered by healthy women and women with type 1 diabetes mellitus. Ivanisevic M, Delmis K, Herman M, et al (2020), International Journal of Gynecology & Obstetrics 4 April 2020, online

Objective

To evaluate the concentration and profile of fatty acids (FA s) among macrosomic neonates delivered by healthy pregnant women and pregnant women with type 1 diabetes mellitus (T1DM).

Methods

A prospective study of women who delivered macrosomic neonates at a University Hospital Center, Zagreb, Croatia, 2016-2018. Maternal, umbilical vein, and arterial blood samples were collected immediately on delivery. After lipid extraction, total FA s in maternal, umbilical vein, and arterial serum samples were assessed by gas chromatography. Data were compared between women with T1DM and healthy control women.

Results

In total, 50 women were enrolled: 22 with T1DM and 28 control women. Neonates in the T1DM group had a higher ponderal index as compared with the control group (P =0.006). Umbilical vein insulin, insulin resistance, and leptin concentration were higher in the T1DM group than in the control group (all P <0.001). Umbilical vein serum concentrations of total saturated, monounsaturated, n-3 polyunsaturated, and n-6 polyunsaturated FA s were higher in the T1DM group (P =0.004, P <0.001, P =0.015, and P =0.014, respectively).

Conclusion

Macrosomic neonates delivered by women with T1DM had a higher Ponderal index, and higher concentrations of insulin, leptin, and FA s in the umbilical vein and artery as compared with control group newborns. (Author)

20200513-20

A values-based approach exploring how ethical and professional values influence midwifery care for a woman with Type 1 diabetes. Starkey N (2020), MIDIRS Midwifery Digest vol 30, no 2, June 2020, pp 203-208

Discusses the midwifery care of women with type 1 diabetes mellitus diagnosed prior to pregnancy. The author compares women's choice with the need for interventions in high-risk pregnancies. Suggests that individualised care, continuity of care and normal birth strategies can be used to make reasonable adjustments for high-risk women. (LDO)

20200506-47*

Adherence to self-glucose monitoring recommendations and perinatal outcomes in pregnancies complicated by diabetes mellitus. Wernimont SA, Sheng JS, Tymkowicz A, et al (2019), American Journal of Obstetrics & Gynecology MFM vol 1, no 3, August 2019, 100031

Background

Self-glucose monitoring is critical for the management of diabetes mellitus in pregnancy; yet, validated reports of adherence to testing recommendations and associated perinatal outcomes are limited.

Objective

Using cloud-based, self-glucose monitoring technology, we sought to answer the following questions: (1) Are there differences in the rates of testing adherence based on type of diabetes mellitus in pregnancy? (2) Is adherence to glucose monitoring recommendations associated with perinatal outcomes in pregnancies that are complicated by diabetes mellitus? We hypothesized that adherence to glucose testing recommendations varies by type of diabetes mellitus and that increased adherence to testing recommendations would be associated with improved perinatal outcomes.

Study Design

This single-center, prospective cohort study included women with type 2 diabetes mellitus and gestational diabetes mellitus who were enrolled in a perinatal diabetes program at <29 weeks gestation between December 2015 and June 2018. All women received a cellular-enabled glucometer that uploaded glucose values to a cloud-based, Health Insurance Portability and Accountability Act-compliant platform in real time that ensured transmission of accurate glucose values. The primary outcome was adherence to self-glucose monitoring recommendations. Four glucose checks were advised daily, and percentage of adherence was calculated. Secondary outcomes were preeclampsia, cesarean delivery, large-for-gestational-age neonates, and neonatal hypoglycemia. The study was powered to detect a 10% difference in the primary outcome of adherence to advised self-glucose monitoring by diabetes mellitus type. Adjusted risk ratios and 95% confidence intervals were generated with the use of logistic regression.

Results

This study included 103 eligible women. Baseline characteristics differed between groups, with women with type 2 diabetes mellitus having higher initial HgbA1c and body mass index when compared with women with gestational diabetes mellitus. No differences were noted in age or parity. Adherence was calculated over 20±6 weeks for women with type 2 diabetes mellitus compared with 9±4 weeks for women with gestational diabetes mellitus. Overall adherence to glucose monitoring was significantly less for women with type 2 diabetes mellitus compared with those with gestational diabetes mellitus. Mean testing adherence rates were 51%, 66%, and 70% for type 2 diabetes mellitus, and gestational diabetes mellitus, class A1 and A2, respectively (P=.016). We found that, for every 10% increase in adherence to testing recommendations, the odds of cesarean delivery, neonatal hypoglycemia, and large-for-gestational-age fetuses decreases by 15-20%. There was no association between adherence and rates of preeclampsia.

Conclusion

This study shows that overall adherence to testing recommendations differs by diabetes mellitus type and is associated with neonatal outcomes. Improved outcomes with higher adherence may reflect more timely medication adjustments in response to real-time glucose values. Programs aimed at improving adherence could prove beneficial. (Author)

Full URL: https://doi.org/10.1016/j.ajogmf.2019.100031

20200429-2*

Prevalence of diabetes in pregnancy among Indigenous women in Australia, Canada, New Zealand, and the USA: a

systematic review and meta-analysis. Voaklander B, Rowe S, Sanni O, et al (2020), The Lancet Global Health vol 8, no 5, May 2020, pp E681-E698

Background

Indigenous peoples in countries with similar colonial histories have disproportionate burdens of disease compared with non-Indigenous peoples. We aimed to systematically identify and collate studies describing the prevalence of pre-existing diabetes and gestational diabetes, and compare the prevalence of these conditions between Indigenous and non-Indigenous pregnant women in Australia, Canada, New Zealand, and the USA.

Methods

For this systematic review and meta-analysis, an information specialist did a comprehensive search of eight databases (Ovid MEDLINE, Ovid Embase, Ovid Global Health, CINAHL [EBSCO], Scopus, ProQuest Dissertations and Theses Global, PROSPERO, and the Wiley Cochrane Library) in June, 2019, for studies published between inception and June 25, 2019, without restrictions on language, publication type, or year of publication. Database searches were supplemented by grey literature searches of the Bielefield Academic Search Engine and Google Scholar, and the reference lists of relevant articles were also manually searched. We included observational epidemiological studies comparing the prevalence of pre-existing diabetes or gestational diabetes in Indigenous and non-Indigenous pregnant women in Australia, Canada, New Zealand, and the USA. Two independent reviewers assessed study eligibility and risk of bias. We used a standardised data extraction form to collect information from the published reports of eligible studies, and, if needed, we contacted authors for further information. We did a Mantel-Haenszel random-effects meta-analysis to obtain the pooled unadjusted prevalence odds ratios (PORs) of pre-existing diabetes and gestational diabetes in Indigenous women compared with non-Indigenous women. We stratified meta-analyses by country and type of diabetes. The study is registered with PROSPERO, number CRD42018095971.

Findings

Our search identified 1348 studies, of which 43 studies with 32 952 441 participants from Australia, Canada, New Zealand, and the USA were included in the systematic review, and 39 of these studies were included in the meta-analysis. 40 of the included studies used a cohort design. Pre-existing diabetes was more prevalent in Indigenous women than in non-Indigenous women, with pooled PORs ranging from 1·81 (95% CI 1·53-2·13) for women in the USA to 3·63 (2·35-5·62) for women in Australia. Similarly, gestational diabetes was more prevalent in Indigenous women than in non-Indigenous women, with PORs ranging from 1·42 (1·24-1·63) for women in Australia to 2·04 (1·46-2·84) for women in Canada. Risk of bias was low in 37·2% of studies, unclear in 34·8% of studies, and high in 27·9% of studies. Heterogeneity between studies was predominantly high (I2=97-100%), with one exception of moderate heterogeneity (I2=48%); however, the magnitude and direction of the PORs from individual studies indicated an association between pre-existing diabetes or gestational diabetes and indigeneity among pregnant women.

Interpretation

The prevalence of pre-existing diabetes and gestational diabetes was higher in Indigenous pregnant women than in non-Indigenous pregnant women in four countries (Australia, Canada, New Zealand and the USA) with similar histories of colonialism. These findings have implications for prenatal care services and the monitoring of Indigenous women in industrialised countries.

Funding

Canadian Institute of Health Research and the Women's and Children's Health Research Institute. (Author)

Full URL: https://doi.org/10.1016/S2214-109X(20)30046-2

20200416-16*

Very restricted carbohydrate (ketogenic) diet: A rare cause of a recurrent hypoglycemic-euglycemic diabetic ketoacidosis in the pregnancy. Yaron M, Shalit R, Kreiser D, et al (2020), European Journal of Obstetrics & Gynecology and Reproductive Biology vol 248, May 2020, pp 257-258

No abstract available.

20200327-11*

Insulin pumps and diabetes technologies in pregnancy: an overview for the obstetrician. Crabtree TSJ, Gazis A (2020), Obstetrics, Gynaecology and Reproductive Medicine vol 30, no 4, April 2020, pp 126-129

The use of technologies to support self-management of type 1 diabetes is growing, including in women pursuing pregnancy. Women with type 1 diabetes might use a variety of technologies to manage their diabetes before, during and after pregnancy. Innovations range from sensors that allow real-time monitoring of glucose to insulin pump therapy and to even more sophisticated technologies used by a smaller number of pioneers. Using these technologies during pregnancy requires a working knowledge of some key principles to ensure the safety of the woman and the

best possible outcome for her and the baby. In this review, we discuss some of these newer technologies, principles behind their use, common issues encountered in everyday practice and how to resolve these. (Author)

20200324-2*

Emma Doble: Living in a high-risk group for covid-19. Doble E (2020), BMJ 23 March 2020, online

Emma Doble, freelance patient editor for The BMJ. who is pregnant and has type 1 diabetes, describes what it is like being in a high risk group for covid-19. (MB)

Full URL: https://blogs.bmj.com/bmj/2020/03/23/emma-doble-living-in-a-high-risk-group-for-covid-19/

20200323-71*

Quantitative analysis of exercise among pregnant women with impaired glucose tolerance using pedometer data: An observational study. Ueno M, Takagi K, Tachibana Y, et al (2020), Journal of Obstetrics and Gynaecology Research vol 46, no 3, March 2020, pp 396-404

Aims

The aim of our study was to examine the feasibility of the use of a pedometer to quantify the amount of exercise and the relationship between the amount of exercise and carbohydrate metabolism in pregnant women with impaired glucose tolerance.

Methods

Seven pregnant women with impaired glucose tolerance (gestational diabetes: three, overt diabetes in pregnancy: one, pregestational diabetes type 2: three) were provided with pedometers. The relationship between pedometer data with blood glucose levels, maternal body weight, amount of insulin administered, blood hemoglobin A1c (HbA1c) levels, blood glycoalbumin levels and infant birth weight was investigated.

Results

When the 24-h-based data were examined, there was no correlation between the number of steps walked and blood glucose level immediately after walking, nor the average number of steps per day and the fasting blood glucose level in the next day. However, 4-week-based data showed that there was a negative correlation between the number of steps per day and the change in HbA1c level. Moreover, there was a negative correlation between the average number of steps per day and change in the maternal body weight. A 1-week-based data from five participants who were being administered insulin indicated that there was a negative correlation between the average number of steps per day and the total amount of insulin administered per day.

Conclusion

Active application of pedometers is suggested to be feasible to improve metabolic control in pregnant women with glucose intolerance through the quantification of their exercise. (Author)

20200323-115*

Complications of Antenatal Corticosteroids in Infants Born by Early Term Scheduled Cesarean Section. Gupta K, Rajagopal R, King F, et al (2020), Diabetes Care vol 43, no 4, April 2020, pp 906-908

OBJECTIVE To compare neonatal hypoglycemia and respiratory morbidity rates in pregnancies complicated by diabetes following early term scheduled cesarean section (ETSCS) with and without maternal corticosteroid administration.
RESEARCH DESIGN AND METHODS In a retrospective cohort study, women with any form of diabetes in pregnancy undergoing ETSCS were included. Primary outcomes were admission rates to the neonatal intensive care unit (NICU) for respiratory distress syndrome (RDS)/transient tachypnea of the newborn (TTN) and/or neonatal hypoglycemia.
RESULTS NICU admission rates for neonatal hypoglycemia were significantly higher (24.2% vs. 4.4%, P = 0.003) and RDS/TTN rates were nonsignificantly higher (15.2% vs. 7.2%, P = 0.209) following corticosteroid administration.
CONCLUSIONS Corticosteroids were not beneficial among women with any form of diabetes in pregnancy undergoing ETSCS and, indeed, may be harmful. In our hospital, we have ceased the use of corticosteroids for women under these circumstances. (Author)

20200323-113*

Pregnancy: Diabetes mellitus and gestational diabetes [written answer]. Northern Ireland Assembly (2020), Hansard Written question AQW 3380 / 17-22, 9 March 2020

The Minister for Health responds to a written question asked by Mrs Pat Cameron to the Northern Ireland Assembly regarding details of the number of pregnant women living with (i) type 1; (ii) type 2; and (iii) gestational diabetes in the last year. (JSM)

20200323-108*

Service evaluation of diabetes management during pregnancy in a regional maternity hospital: potential scope for increased self-management and remote patient monitoring through mHealth solutions. Alqudah A, McMullan P, Todd A, et al (2019), BMC Health Services Research vol 19, no 658, 13 September 2019

Background

Pre-gestational and gestational diabetes mellitus are common complications in pregnancy affecting one in six pregnancies. The maternity services are under significant strain managing the increasing number of complex pregnancies. This has an impact on patients' experience of antenatal care. Therefore, there is a clear need to address pregnancy care. One possible solution is to use home-based digital technology to reduce clinic visits and improve clinical monitoring.

Methods

The aim of this study was to evaluate the antenatal services provided to pregnant women with diabetes who were monitored at the joint metabolic and obstetric clinic at the Southern Health and Social Care Trust in Northern Ireland.

Results

The questionnaires were completed by sixty-three women, most of whom had gestational diabetes mellitus. Most of the participants were between 25 and 35 years of age (69.8%), had one or more children (65.1%) and spent over 2 h attending the clinics (63.9%); 78% of women indicated that their travel time to and from the clinic appointment was over 15 min. Over 70% of women used smartphones for health-related purposes. However, only 8.8% used smartphones to manage their health or diabetes. Less than 25% of the women surveyed expressed concerns about using digital technology from home to monitor various aspects of their health in pregnancy.

Conclusions

Overall, pregnant women who had or developed diabetes in pregnancy experience frequent hospital visits and long waiting times in the maternity clinics. Most of these pregnant women are willing to self-manage their condition from home and to be monitored remotely by the healthcare staff.

(Author)

Full URL: https://doi.org/10.1186/s12913-019-4471-9

20200320-19*

Routine use of antenatal nonstress tests in pregnant women with diabetes-What is the practice?. Jørgensen IL, Vestgaard M, Ásbjörnsdóttir B (2020), European Journal of Obstetrics & Gynecology and Reproductive Biology vol 248, May 2020, pp 89-94

Objective

Pregnancies complicated by maternal preexisting diabetes have a 4-5-fold increased risk of stillbirth, and consequently routine antenatal nonstress testing (NST) was implemented into clinical practice decades ago. Though, international guidelines lack consensus and recommend anything from twice weekly testing from 32 weeks to once weekly testing from 38 weeks. The objective of this study was to examine how routine antenatal NST was used in centers with specific interest and dedication in the care of pregnant women with preexisting diabetes.

Study Design

An electronic survey concerning the routine use of antenatal NST was sent to members of the European Diabetic Pregnancy Study Group (DPSG) between October 2016 and January 2017, representing in total 55 centers in 26 countries taking care of pregnant women with diabetes.

Results

Answers from 38 centers (69.1 % (38/55)) in 22 countries were received.

Based on real world information from these primarily European centers, anything from avoiding routine antenatal NST to testing twice weekly from early in third trimester in women with preexisting diabetes was reported. NST was commonly used (71.1 % of centers) if insulin treatment was needed. NST was also used among diet treated women with type 2 diabetes in several places. The use varied markedly within and between countries. The most common practice was routine NST once weekly from 32 weeks.

Conclusion

Among pregnant women with preexisting diabetes, routine antenatal testing practice with NST differs considerably both within and between countries. Studies examining the cost benefit of routine antenatal NST in pregnancies in women with the different types of diabetes are needed. (Author)

20200309-95*

Risk of congenital heart defects in offspring exposed to maternal diabetes mellitus: an updated systematic review

and meta-analysis. Chen L, Yang T, et al (2019), Archives of Gynecology and Obstetrics vol 300, no 6, December 2019. pp 1491-1506

Purpose
A systematic review and meta-analysis was performed to assess the risk of congenital heart defects (CHDs) and its specific phenotypes associated with maternal diabetes mellitus (DM) including pregestational diabetes mellitus (PGDM) and gestational diabetes mellitus (GDM).
Methods
PubMed, Embase, Medline, Google Scholar, Cochrane Libraries, China National Knowledge Infrastructure, Wanfang Database, Chinese Scientific Journals Fulltext Database and China Biology Medicine disc were searched from the inception dates to 15 December 2018, to identify case-control or cohort studies assessing the association between maternal DM and risk of CHDs. The exposure of interest was maternal DM; the outcomes of interest were CHDs and its specific phenotypes. Either a fixed- or a random-effects model was used to calculate the overall combined risk estimates. Subgroup analyses were performed to explore potential heterogeneity moderators.
Results
Total 52 studies, which involved 259,917 patients with CHDs among 16,929,835 participants, were included for analysis. Overall, mothers with DM compared with those without DM had a significantly higher risk of CHDs in offspring [odds ratios (OR) = 2.71, 95% confidence intervals (CI) 2.28-3.23]. When data were restricted to different types of DM, a significantly increased risk of CHDs was observed among mothers with PGDM (OR = 3.18, 95% CI 2.77-3.65) and GDM (OR = 1.98, 95% CI 1.66-2.36). Our study suggested the risk of CHDs was significantly higher among mothers with PGDM than those with GDM. Additionally, this study suggested maternal DM was significantly associated with most phenotypes of CHDs; of these, double outlet of the right ventricle (OR = 10.89; 95% CI 8.77-13.53), atrioventricular septal defect (OR = 5.74; 95% CI 3.20-10.27) and truncus arteriosus (OR = 5.06; 95% CI 2.65-9.65) were identified as the first three of the most common phenotypes of CHDs associated with maternal DM.
Conclusions
The maternal DM including PGDM and GDM are significantly associated with risk of CHDs and its most phenotypes. The PGDM seems to be more likely to cause CHDs in offspring than GDM. Further studies are needed to clarify the underlying mechanisms. (70 references) (Author)

20200309-44*

Acute hypoglycemia during cesarean delivery in a patient with type-1 diabetes mellitus. Ida M, Matsumura K, Kawaguchi M (2019), International Journal of Obstetric Anesthesia vol 39, August 2019, pp 144-145

No abstract available. (7 references)

20200309-114*

The effect of group prenatal care for women with diabetes on social support and depressive symptoms: a pilot randomized trial. Mazzoni S, Hill P, Briggs A, et al (2020), Journal of Maternal-Fetal and Neonatal Medicine vol 33, no 9, May 2020

Objective: To measure the impact of group prenatal care (GPC) on diabetes-specific peer support and depressive symptoms in women with pregnancies complicated by diabetes.
Materials and methods: This is a planned secondary analysis of a two-center pilot randomized controlled trial conducted at Denver health (DH) and Washington University in St. Louis (WU) including Spanish (DH) or English (WU) speaking women with type 2 or gestational diabetes. Women were randomized to diabetes GPC or individual prenatal care (IPC) in the resident diabetes clinic. Participants completed an Edinburgh Postnatal Depression Scale (EPDS) at randomization, at 38-week gestation and at 6-12 weeks postpartum. The diabetes support scale (DSS), which includes 12 questions answered on a Likert scale, was administered at 38 weeks. Analysis was by intention to treat (clincaltrials.gov#NCT02444325).
Results: A total of 84 women were consented and randomized. Six withdrew consent (two from each cohort) or were lost to follow-up (two from IPC), and three did not complete the 38-week assessment (two from GPC and one from IPC), resulting in primary outcome data available for 75 women: 38 in GPC and 37 in IPC. More women randomized to GPC reported composite positive peer support on the DSS (52.5 versus 26.3%; $p < .02$). There were no differences in EPDS scores, depression (EPDS >10), or rates of improved EPDS score from baseline to 38 weeks.
Conclusion: GPC for women with diabetes is associated with improved diabetes-specific peer social support with no significant impact on depressive symptoms.
Clinical trial registration: Clincaltrials.gov NCT02444 (17 references) (Author)

20200305-33*

Characterizing the Effects of Diabetes and Obesity on Insulin and Leptin Levels amongst Pregnant Women. Johnson AW, Snegovskikh D, Parikh L, et al (2020), American Journal of Perinatology vol 37, no 11, September 2020, pp 1094-1101

Objective In this study, we assess the impact of obesity and diabetes on maternal brain and periphery, as well as fetal exposure to insulin and leptin, and two hormones that play an important role in regulating energy homeostasis.

Study Design Fasting maternal plasma, fetal cord vein and artery plasma, and maternal cerebrospinal fluid (CSF) were collected in 37 women (12 lean, nondiabetic [prepregnancy body mass index (BMI): 22.9 ± 1.7 kg/m2]; 12 overweight/obese nondiabetic [BMI: 37.8 ± 7.3 kg/m2]; 13 gestational/type 2 diabetes mellitus [BMI: 29.8 ± 7.3 kg/m2]) with uncomplicated singleton pregnancies undergoing elective Cesarean delivery. HbA1C, insulin, glucose, and leptin levels were measured.

Results Compared with lean mothers, mothers with obesity and diabetes mellitus (DM) had significantly lower CSF-to-plasma ratios of insulin. Moreover, mothers with obesity and DM had significantly lower cord arterial and cord venous to maternal plasma ratios of insulin, but not leptin, compared with lean mothers. There were no differences in CSF and cord blood insulin and leptin levels between obese and DM mothers.

Conclusion Compared with lean individuals, mothers with obesity and DM have relative deficiencies in insulin exposure. The patterns observed in mothers with obesity and diabetes were similar highlighting the importance of the maternal metabolic environment in obesity and suggesting obese patients warrant further clinical focus. (32 references) (Author)

20200305-115*

Prevalence of type 2 diabetes mellitus compared between lean and overweight/obese patients with polycystic ovarian syndrome: a 5-year follow-up study. Chantrapanichkul P, Indhavivadhana S, Wongwananuruk T, et al (2020), Archives of Gynecology and Obstetrics vol 301, no 3, March 2020, pp 809-816

Purpose

To investigate the prevalence of type 2 diabetes mellitus (T2DM) at the 5-year follow-up after polycystic ovarian syndrome (PCOS) diagnosis compared between lean and overweight/obese groups.

Methods

This retrospective cohort study included 400 prediabetes PCOS women who attended our clinic. Participants were divided into either the lean group (body mass index [BMI]: < 23 kg/m2) or the overweight/obese group (BMI: ≥ 23 kg/m2). Patient demographic, clinical characteristics, metabolic profiles, and laboratory values were collected and compared between groups at baseline and during follow-up for 5 years.

Results

At the end of the follow-up, overweight/obese group had a higher risk for developing T2DM than lean group (11.5% vs. 0.5%, p < 0.001). Lean group had a lower incidence of hypertension (3% vs. 38.5%, p < 0.001) and dyslipidemia (35% vs. 53.5%, p < 0.001) than overweight/obese group. The factors found to be independently associated with increased risk for developing T2DM were BMI ≥ 23 kg/m2 (odds ratio [OR]: 1.075, p = 0.047), non-use of oral combined contraceptive pills (OR: 0.312, p = 0.028), and impaired fasting glucose at baseline (OR: 38.167, p < 0.001).

Conclusions

Overweight/obese PCOS patients were found to be at significantly higher risk for developing T2DM than lean PCOS patients. Higher BMI, IFG at baseline, and non-use of oral contraceptive pills found to be independent predictors of T2DM in PCOS. (Author)

20200228-51*

Dialysis in Pregnancy: Role of the Underlying Cause of Renal Failure on Peripartum Outcomes. Hoffman M, Sibai B (2020), American Journal of Perinatology vol 37, no 6, May 2020, pp 570-576

Objective Pregnancy on dialysis is rare and few studies in this population exist. Currently, pregnancy outcomes are thought to be related to dialysis intensity. We hypothesize women requiring dialysis due to diabetes or lupus will have worse pregnancy outcomes compared with other indications for dialysis.

Study Design All women receiving dialysis during pregnancy from 2012 to 2016 in a single health system were identified. Differences in perinatal outcomes among those with renal failure caused by diabetes or lupus and with other causes were evaluated.

Results Sixteen women were identified, seven with diabetes or lupus causing renal failure; the remaining nine women had hypertension, focal segmental glomerular sclerosis, polycystic kidney disease, congenital hypoplastic kidneys, or neurogenic bladder. The rates of composite maternal morbidity were similar among the two groups. Composite neonatal morbidity was higher in those with renal failure caused by diabetes or lupus compared with other causes (100% vs. 29%, p = 0.028).

Conclusion Despite similar dialysis intensity, the composite neonatal morbidity was higher in women with renal

failure caused by diabetes or lupus compared with other etiologies. Our findings suggest that pregnancy outcome in women receiving dialysis is dependent on both the intensity of dialysis as well as the etiology of renal failure. (38 references) (Author)

20200226-23*

Management of pregestational diabetes mellitus: a comparison of guidelines. Tsakiridis I, Mamopoulos A, Athanasiadis A, et al (2022), Journal of Maternal-Fetal and Neonatal Medicine vol 35, no 3, 2022, pp 423-432

Background: Pregestational diabetes is associated with adverse maternal and neonatal outcomes. The aim of this study was to summarize and compare evidence-based recommendations on pregestational diabetes and to focus especially on issues related to the management of this entity.

Materials and methods: A descriptive review of three recently published national guidelines on pregestational diabetes was conducted: the American Diabetes Association on 'Diabetes in Pregnancy: Standards of Medical Care in Diabetes - 2019,' the National Institute for Health and Care Excellence on 'Diabetes in pregnancy: management from preconception to the postnatal period' and the American College of Obstetricians and Gynecologists on 'Pregestational Diabetes Mellitus.' These guidelines were compared according to recommendations on management, during the preconception, antenatal, intrapartum and postpartum period.

Results: There were many similar recommendations regarding the preconception counseling, the antepartum assessment by specialists, the glycemic control target levels, the pharmacologic treatment and the postpartum period among the three guidelines. On the other hand, the American Diabetes Association makes no recommendations regarding fetal monitoring and obstetric management during pregnancy and the intrapartum period, while there are several similarities between the other two guidelines.

Conclusions: The adoption of an international consensus based on evidence - based guidelines will increase the awareness of the healthcare professionals on the management of pregestational diabetes, leading that way to more favorable perinatal outcomes. (Author)

20200221-29*

Endocrine disorders in pregnancy. Chong HP, Alazzani H, Boelaert K (2019), Obstetrics, Gynaecology and Reproductive Medicine vol 29, no 11, November 2019, pp 301-305

Endocrine disorders in pregnancy are common. Good outcomes can be achieved with multi-disciplinary care in pregnancy. The primary objective of this review is to provide the reader with an overview of national guidelines and where applicable, recent advances with regard to care of women with endocrine disorders in pregnancy. We have outlined care for a broad range of conditions ranging from diabetes and thyroid disorders, to the rarer conditions such as phaeochromocytoma. In addition to the reading list below, we would encourage the reader to keep up to date with reports from the United Kingdom Obstetric Surveillance Service (UKOSS) which studies a range of uncommon conditions in pregnancy as well as the confidential enquiry into maternal and child death [Mothers and Babies: Reducing Risk through Audits and Confidential Enquiries across the UK (MBRRACE-UK)]. The latter is especially useful for lessons learnt from past maternal deaths, the most common cause of which were indirect maternal deaths from pre-existing medical conditions.

(Author)

20200212-35*

Associations of Different Types of Maternal Diabetes and Body Mass Index With Offspring Psychiatric Disorders. Kong L, Nilsson IAK, Brismar K, et al (2020), JAMA Network Open vol 3, no 2, January 2020, e1920787

Key Points

Question Are different types of maternal diabetes, by themselves or in combination with maternal obesity, associated with an increased risk of offspring psychiatric disorders?

Findings In this cohort study of 647 099 births, non-insulin-treated pregestational type 2 diabetes in severely obese mothers was associated with several psychiatric disorders in their offspring, with an effect size lower than that for maternal insulin-treated pregestational diabetes but higher than that for gestational diabetes.

Meaning Maternal diabetes, mainly pregestational, in severely obese mothers may be associated with an excess risk of several psychiatric disorders in their offspring.

Importance Maternal obesity, pregestational type 1 and 2 diabetes, and gestational diabetes have been reported to increase the risk of autism spectrum disorder and attention-deficit/hyperactivity disorder in the mothers' offspring. However, the associations of maternal diabetes disorders and body mass index jointly with psychiatric disorders among offspring are less well documented, especially for type 2 diabetes.

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Objective To examine the associations of different types of maternal diabetes, separately and together with maternal obesity, with psychiatric disorders in the mothers' offspring.
Design, Setting, and Participants This population-based cohort study used data from nationwide registries in Finland encompassing all 649 043 live births occurring between 2004 and 2014. The study and data analysis were conducted from January 1, 2019, to July 5, 2019.
Exposures Maternal prepregnancy body mass index, insulin-treated pregestational diabetes, and pregestational type 2 diabetes and gestational diabetes without insulin treatment.
Main Outcomes and Measures Psychiatric diagnoses and prescription of psychotropic drugs among the mothers' offspring. Cox proportional hazards models were adjusted for birth year, sex, mode of delivery, maternal age, number of fetuses, parity, mother's country of birth, mother's marital status, maternal smoking, maternal psychiatric disorder, and maternal systemic inflammatory disease.
Results The mean (SD) age of mothers was 30.20 (5.37) years; 357 238 of 394 302 mothers (90.6%) were born in Finland. Of the 647 099 births studied, 4000 fetuses (0.62%) were exposed to maternal insulin-treated pregestational diabetes, 3724 (0.57%) were exposed to type 2 diabetes, and 98 242 (15.18%) were exposed to gestational diabetes; 34 892 offspring (5.39%) later received a diagnosis of a mild neurodevelopmental or psychiatric disorder. Non-insulin-treated type 2 diabetes in severely obese mothers, compared with normal-weight mothers without diabetes, was associated with psychiatric disorders in the offspring (hazard ratio, 1.97; 95% CI, 1.64-2.37), although with a lower effect size than that for severely obese mothers with insulin-treated pregestational diabetes (hazard ratio, 2.71; 95% CI, 2.03-3.61). The largest effect sizes were found for mood disorders, attention-deficit/hyperactivity disorder and conduct disorders, and autism. Gestational diabetes in severely obese mothers had a lower overall effect size (hazard ratio, 1.61; 95% CI, 1.50-1.72). Diabetes in normal-weight mothers was not associated with psychopathologic disorders in the offspring.
Conclusions and Relevance Severe obesity in mothers with diabetes was associated with an increased overall risk for psychiatric disorders in their offspring. The risk was highest for those exposed to insulin-treated pregestational diabetes, followed by non-insulin-treated type 2 diabetes and gestational diabetes. These findings may have implications for managing pregnancies. (41 references) (Author)
Full URL: https://doi.org/10.1001/jamanetworkopen.2019.20787

20200212-33

Postpartum Readmissions Among Women With Diabetes. Mourad M, Wen T, Friedman AM, et al (2020), Obstetrics & Gynecology vol 135, no 1, January 2020, pp 80-89

OBJECTIVE:
To estimate whether women with diabetes are at risk for 60-day postpartum readmissions and associated complications.
METHODS:
The Nationwide Readmissions Database from 2010 to 2014 was analyzed to determine risk for 60-day postpartum readmissions among women with type 1 diabetes mellitus (DM), type 2 DM, gestational diabetes mellitus (GDM), and unspecified DM compared with women with no diabetes. Secondary outcomes included evaluating risk for overall severe maternal morbidity during readmissions, as well as wound complications, acute diabetic complications such as diabetic ketoacidosis, venous thromboembolism, and hypertensive diseases of pregnancy. Billing data were used to ascertain both exposures and outcomes. Adjusted log-linear regression models including demographic, hospital, medical and obstetric, and hospital factors were performed with adjusted risk ratios (aRRs) and with 95% Cis as measures of association.
RESULTS:
Of an estimated 15.7 million delivery hospitalizations, 1.1 million occurred among women with diabetes, of whom 3.2% had type 1 DM, 9.1% type 2 DM, 86.6% GDM, and 1.1% unspecified diabetes. Compared with women without diabetes (1.5% risk for readmission), risk for readmission was significantly higher for women with type 1 DM (4.4%), unspecified diabetes (4.0%), type 2 DM (3.9%), and GDM (2.0%) (P<.01). After adjusting for hospital, demographic, medical, and obstetric risk factors, type 1 DM (aRR 1.77, 95% CI 1.69-1.87), type 2 DM (aRR 1.46, 95% CI 1.42-1.51), unspecified (aRR 1.73, 95% CI 1.59-1.89) and gestational diabetes (aRR 1.16, 95% CI 1.14-1.17) retained increased risk. Among women with diabetes public insurance, lower ZIP code income quartiles, and hospitals with high safety net burdens were associated with higher risk for readmission. In both unadjusted and adjusted analyses, all diabetes diagnoses were associated with readmissions for wound complications, hypertensive diseases of pregnancy, and severe maternal morbidity.
CONCLUSION:
Although overall risk for readmission is low, pregnancies complicated by pregestational diabetes in particular are at increased risk. Women in this high-risk group should receive coordinated care and be monitored closely in the

postpartum period. (21 references) (Author)

20200204-16*

Maternal Gestational Diabetes and Type 2 Diabetes During Pregnancy and Risk of Childhood Asthma in Offspring.
Martinez MP, Lin J, Chow T, et al (2020), The Journal of Pediatrics vol 219, April 2020, pp 173-179.e1

Objective

To examine maternal preexisting type 2 diabetes (T2D) and gestational diabetes mellitus (GDM) on risk of childhood asthma.

Study design

This retrospective birth cohort study included 97 554 singletons born in 2007-2011 within hospitals from a single integrated healthcare system. Children were prospectively followed from age 5 until December 31, 2017, using electronic medical records. Relative risks of childhood asthma associated with maternal diabetes in utero were estimated by hazard ratios using Cox regression adjusting for potential confounders.

Results

There were 3119 children (3.2%) who were exposed to preexisting T2D and 9836 (10.1%) to GDM. Among mothers with GDM, 3380 (34.4%) were dispensed antidiabetic medication during pregnancy. During a median of 7.6 years (IQR, 6.3-9.0 years) after birth, 15 125 children (15.5%) were diagnosed with asthma after age 5. Maternal diabetes interacted with maternal asthma history to affect child's asthma risk (P = .05). Among children without maternal asthma (n = 89 487), the adjusted hazard ratios for childhood asthma were 1.21 (95% CI, 1.08-1.36; P < .001) for exposure to T2D, 1.12 (95% CI, 1.01-1.25; P = .04) for GDM requiring antidiabetic medications, and 1.01 (95% CI, 0.93-1.10; P = .82) for GDM not requiring medications compared with no diabetes during pregnancy. The corresponding hazard ratios were 1.53 (95% CI, 1.19-1.96; P < .001), 1.11 (95% CI, 0.65-1.46; P = .44), and 0.84 (95% CI, 0.66-1.08; P = .17) among children without maternal asthma (n = 8067). Gestational age at GDM diagnosis was not associated with childhood asthma (P = .27).

Conclusions

The risk of childhood asthma was predominately observed for exposure to preexisting T2D, small for GDM requiring medication, and not increased for GDM not requiring medication during pregnancy, compared with no diabetes during pregnancy. (Author)

20200131-17*

Association between maternal pregestational diabetes mellitus and spina bifida: A population-based case-control study, Finland, 2000-2014. Mowla S, Gissler M, Raisanen S, et al (2020), Birth Defects Research vol 112, no 2, 15 January 2020, pp 186-195

Background

Maternal pregestational diabetes mellitus (PGDM) is a known risk factor for neural tube defects. We examined the association between maternal PGDM and spina bifida in the offspring using PGDM status from medical records in Finland.

Methods

We conducted a nationally representative, multiregistry, population-based case-control study in Finland. Cases were included if they were live or stillborn infants and diagnosed with spina bifida and delivered between years 2000 and 2014 in Finland. Controls were Finnish infants without spina bifida or other major structural birth defects and delivered during the same time period as cases. Clinical and demographic data were obtained by linking multiple national health registers and census. Crude and adjusted odds ratios (ORs) and 95% confidence intervals (CI) for PGDM were estimated using logistic regression analysis. Interaction by maternal obesity was examined.

Results

Our study included 181 spina bifida cases (61% isolated) and 876,672 controls. Overall, 2.2% percent of all case, and 0.5% of control mothers, had PGDM during pregnancy. Maternal PGDM was significantly associated with an increased odds of spina bifida (adjusted OR 4.35; 95% CI 1.37, 13.82). A similar association was found in our subanalysis on isolated spina bifida cases (adjusted OR 4.41; 95% CI 1.07, 18.24). There was no significant interaction by maternal obesity.

Conclusions

Maternal PGDM was positively associated with spina bifida in Finland, and maternal obesity did not modify this effect. We lacked information on maternal PGDM for electively terminated and spontaneously aborted cases; results should be interpreted with caution. (Author)

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20200129-15*

Cerebral and peripheral tissue oxygenation in stable neonates: Absent influence of cardiac function. Bruckner M, Binder-heschi C, Schwaberger B, et al (2020), Acta Paediatrica vol 109, no 8, August 2020, pp 1560-1569

Aim

Cardiac function is a major factor for tissue perfusion and therefore may affect the tissue oxygen saturation. Aim was to analyse possible associations between cardiac function parameters and cerebral and peripheral tissue oxygenation in neonates on the first day after birth.

Methods

For the present study, we analysed secondary outcome parameters of a previously performed prospective single centre observational study. The prospective study was conducted at the Medical University of Graz, Austria between September 2011 and June 2013. We included preterm and term neonates who were admitted to the neonatal intensive care unit and in whom simultaneous near-infrared spectroscopy measurements and echocardiography were obtained on the first day after birth. Cardiac function parameters were correlated to cerebral and peripheral tissue oxygen saturation and cerebral and peripheral fractional tissue oxygen extraction at the time of echocardiography.

Results

A total of 60 neonates of whom 47 were preterm and 13 were term (median gestational age: 34; IQR 33-35 weeks, mean birth weight: 2276 ± 774 grams) were included. There were no statistically significant correlations between cardiac function parameters and regional tissue oxygenation parameters.

Conclusion

In the present study, we found no correlation between regional tissue oxygenation and parameters of cardiac function in cardio-circulatory stable neonates on the first day after birth. (28 references) (Author)

20200116-6*

Perceptions and behaviors related to contraceptive use in the postpartum period among women with pregestational diabetes mellitus. Britton LE, Berry DC: Crandell JL, et al (2020), JOGNN: Journal of Obstetric, Gynecologic and Neonatal Nursing vol 49, no 2, March 2020, pp 154-166

Objective

To describe perceptions and behaviors related to contraception and preconception care and to test the association between these perceptions and contraceptive use in the postpartum period among women with pregestational diabetes mellitus.

Design

Cross-sectional, descriptive survey.

Setting

Three high-risk obstetric clinics in the Southeastern United States.

Participants

Fifty-five women who were 18 years or older with pregestational Type 1 or Type 2 diabetes mellitus.

Methods

Between 4 and 8 weeks after birth, we used investigator-developed items and psychometrically validated scales to measure participants' perceptions and behaviors related to contraception and preconception care. We dichotomized use of contraception in the postpartum period as procedure/prescription or nonprescription/no method. We used multiple logistic regression to test the hypothesis that perceptions are associated with contraceptive use.

Results

When data were collected 4 to 8 weeks after birth, almost half (49%, n = 27) of the participants had resumed sexual activity; however, most (95%, n = 52) did not want another pregnancy in the next 18 months. Fifty-six percent (n = 31) of participants used procedure/prescription contraception, and 44% (n = 24) used nonprescription/no method. Those who perceived contraception use and preconception care to be beneficial were more likely to use procedure/prescription contraception (adjusted odds ratio = 1.52; 95% confidence interval [1.07, 2.17]).

Conclusion

When caring for women in the postpartum period, providers should be mindful that women's perceptions of the benefits of contraception and preconception care may have implications for whether their use aligns with their reproductive goals and optimizes outcomes for future pregnancies. (50 references) (Author)

20191224-4*

Dietary Patterns of Insulin Pump and Multiple Daily Injection Users During Type 1 Diabetes Pregnancy. Neoh SL, Yamamoto JM, Feig DS, et al (2020), Diabetes Care vol 43, no 1, January 2020, pp e5-e7

Correspondence comparing insulin pump therapy with multiple daily injections (MDI) for pregnant women with type 1

diabetes. (JSM) (5 references) (Author)
Full URL: https://doi.org/10.2337/dc19-1908

20191224-1*

Urinary and Serum Angiogenic Markers in Women With Preexisting Diabetes During Pregnancy and Their Role in Preeclampsia Prediction. Zen M, Padmanabhan S, Zhang K, et al (2020), Diabetes Care vol 43, no 1, January 2020, pp 67-73

OBJECTIVE To determine the correlation between urinary and serum placental growth factor (PlGF) and investigate the predictive value as pregnancy progresses of urinary PlGF compared with serum PlGF, soluble fms-like tyrosine kinase 1 (sFLT-1), and the sFLT-1-to-PlGF ratio for the outcome of preeclampsia in women with preexisting diabetes.
RESEARCH DESIGN AND METHODS A multicenter prospective cohort study was conducted of 158 women with preexisting insulin-requiring diabetes (41 with type 1 and 117 with type 2). Urinary PlGF and serum PlGF, sFLT-1, and the sFLT-1-to-PlGF ratio were assessed four times (14, 24, 30, and 36 weeks' gestation), and the association with the outcome of preeclampsia was investigated.
RESULTS A correlation between urinary and serum PlGF was demonstrated from 24 weeks' gestation onward ($P < 0.001$). At all time points, those who developed preeclampsia had lower serum PlGF levels ($P < 0.05$), and receiver operating characteristic curves demonstrated that serum PlGF in this cohort performed better than the serum sFLT-1-to-PlGF ratio as a predictive test for preeclampsia. Preconception HbA1c ≥6.5% (48 mmol/mol) was an important discriminative predictor for preeclampsia ($P = 0.01$).
CONCLUSIONS This study prospectively describes the longitudinal changes in urinary PlGF alongside serum angiogenic markers throughout pregnancy in women with preexisting diabetes. We demonstrate correlation between urinary and serum PlGF and that in women with preexisting diabetes in pregnancy, serum PlGF is a better predictor of preeclampsia than the sFLT-1-to-PlGF ratio. (Author)
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20191223-4*

Management of Diabetes in Pregnancy: Standards of Medical Care in Diabetes-2020. American Diabetes Association (2020), Diabetes Care vol 43, suppl 1, January 2020, pp S183-S192

The American Diabetes Association (ADA) 'Standards of Medical Care in Diabetes' includes the ADA's current clinical practice recommendations and is intended to provide the components of diabetes care, general treatment goals and guidelines, and tools to evaluate quality of care. Members of the ADA Professional Practice Committee, a multidisciplinary expert committee (https://doi.org/10.2337/dc20-SPPC), are responsible for updating the Standards of Care annually, or more frequently as warranted. For a detailed description of ADA standards, statements, and reports, as well as the evidence-grading system for ADA's clinical practice recommendations, please refer to the Standards of Care Introduction (https://doi.org/10.2337/dc20-SINT). Readers who wish to comment on the Standards of Care are invited to do so at professional.diabetes.org/SOC. (Author)
Full URL: https://doi.org/10.2337/dc20-S014

20191217-10*

Use of Antidiabetic drugs during pregnancy among U.S. women with Livebirth deliveries in the Mini-Sentinel system. Mott K, Reichman ME, Toh S, et al (2019), BMC Pregnancy and Childbirth vol 19, no 441, 27 November 2019

Background
As the prevalence of diabetes mellitus increases in the population, the exposure to antidiabetic drugs (ADDs) during pregnancies is expected to grow, as has been seen over the last decade. The objective of this study was to estimate the prevalence of ADD use during pregnancy among women in the Mini-Sentinel Distributed Database (MSDD) who delivered a liveborn infant.
Methods
We identified qualifying livebirth pregnancies among women aged 10 to 54 years in the MSDD from 2001 to 2013. ADD use was estimated using outpatient pharmacy dispensing claims and days-supplied among three cohorts: all livebirth pregnancies, pregnancies among women with pre-existing diabetes, and pregnancies among women without prior ADD use.
Results
Among the 1.9 million pregnancies in the MSDD that resulted in a livebirth from 2001 to 2013, 4.4% were exposed to an ADD. Of the 15,606 pregnancies (0.8%) with pre-existing diabetes, 92.8% were also exposed during the pregnancy period. The most commonly used product in these pregnancies was insulin (75.6% of pregnancies). In contrast, in pregnancies of women without prior ADD use, the most commonly used products were glyburide and insulin, and

most of these users were diagnosed with gestational diabetes.
Conclusions
Patterns of ADD use during pregnancy described here, along with changes in disease incidence and management, highlight the importance of continuing surveillance of ADD utilization patterns and examining the safety and effectiveness of these products in pregnancy.
(19 references) (Author) [Please note: this article is a digital version which may undergo minor changes in the future]
Full URL: https://doi.org/10.1186/s12884-019-2609-8

20191204-10*

Guideline no. 393 - diabetes in pregnancy. Berger H, Gagnon R, Sermer M (2019), JOGC [Journal of Obstetrics and Gynaecology Canada] vol 41, no 12, December 2019, pp 1814-1825.e1
Objectives
This guideline reviews the evidence relating to the diagnosis and obstetrical management of diabetes in pregnancy.
Outcomes
The outcomes evaluated were short and long-term maternal outcomes including pre-eclampsia, Caesarean section, future diabetes and other cardiovascular complications; and fetal outcomes including congenital anomalies, stillbirth, macrosomia, birth trauma, hypoglycemia and long-term effects.
Evidence
Published literature was retrieved through searches of PubMed and The Cochrane Library using appropriate controlled vocabulary (MeSH terms 'diabetes' and 'pregnancy'). Where appropriate, results were restricted to systematic reviews, randomized control trials/controlled clinical trials, and observational studies. There were no date limits but results were limited to English or French language materials.
Values
The quality of evidence was rated using the criteria described in the Report of the Canadian Task Force on Preventive Health Care. (86 references) (Author) [Erratum: JOGC [Journal of Obstetrics and Gynaecology Canada], vol 42, no 10, October 2020, p 1288. https://doi.org/10.1016/j.jogc.2020.08.012]

20191125-33*

The association between family history of diabetes mellitus and offspring long-term neurological hospitalisation. Moscovici K, Wainstock T, Sheiner E, et al (2019), Acta Paediatrica 16 November 2019, online
Aim
The aim of the present study was to determine whether being born to non-diabetic mother with a family history of diabetes mellitus (DM) is associated with higher rates of long-term neurological hospitalisations of the offspring.
Methods
A retrospective analysis of all live births and paediatric hospitalisations at Soroka University Medical Center between 1991 and 2014 was performed. Family history of DM was collected from prepartum women using anamnesis. During the study period, 208 728 deliveries met the inclusion criteria, and of them 8.2% (n = 17 040) were of non-diabetic mothers with family history of DM. Rates of neurological hospitalisation with or without family history were analysed.
Results
Offspring born to non-diabetic mothers with family history of DM had higher rates of neurological hospitalisations. The cumulative incidence of long-term neurological hospitalisations was higher as compared with those without family history of DM (log-rank test P = .007). Neurological hospitalisations was higher by 13% in the study group, after controlling for confounders such as maternal age, maternal obesity, hypertensive disorders, birth weight and caesarean delivery. (adjusted odds ratio 1.13, 95% confidence interval 1.04-1.23).
Conclusion
Being born to a non-diabetic mother with a family history of DM is independently associated with higher long-term neurological hospitalisations of the offspring.
(30 references) (Author) [Please note: this article is a digital version which may undergo minor changes in the future]

20191107-1*

Timing of delivery in women with diabetes: a population based study. Metcalfe A, Hutcheon JA, Sabr Y, et al (2020), Acta Obstetricia et Gynecologica Scandinavica vol 99, no 3, March 2020, pp 341-9
Introduction
Women with diabetes, and their infants, have an increased risk of adverse events due to excess fetal growth. Earlier delivery, when fetuses are smaller, may reduce these risks. This study aimed to evaluate the week-specific risks of

maternal and neonatal morbidity/ mortality to assist with obstetrical decision making.
Material and methods
In this population-based cohort study, women with type 1 diabetes (n=5,889), type 2 diabetes (n=9,422) and gestational diabetes (n=138,917) and a comparison group without diabetes (n=2,553,243) who delivered a singleton infant at ≥36 completed weeks of gestation between 2004-2014 were identified from the Canadian Institute of Health Information's Discharge Abstract Database. Multivariate logistic regression was used to determine the week-specific rates of severe maternal and neonatal morbidity/mortality among women delivered iatrogenically versus those undergoing expectant management.
Results
For all women, the absolute risk of severe maternal morbidity/mortality was low, typically impacting less than 1% of women and there was no significant difference in gestational age-specific severe maternal morbidity/mortality between iatrogenic delivery and expectant management among women with any form of diabetes. Among women with gestational diabetes, iatrogenic delivery was associated with an increased risk of neonatal morbidity/mortality compared with expectant management at 36 and 37 weeks (76.7 and 27.8 excess cases per 1000 deliveries, respectively), and a lower risk of neonatal morbidity/mortality at 38, 39 and 40 weeks gestation (7.9, 27.3 and 15.9 fewer cases per 1000 deliveries, respectively). Increased risks of severe neonatal morbidity following iatrogenic delivery compared with expectant management were also observed for women with type 1 diabetes at 36 (98.3 excess cases per 1000 deliveries) and 37 weeks (44.5 excess cases per 1000 deliveries) and for women with type 2 diabetes at 36 (77.9 excess cases per 1000 deliveries) weeks.
Conclusions
The clinical decision regarding timing of delivery is complex and contingent on maternal-fetal wellbeing, including adequate glycemic control. This study suggests that delivery at 38, 39, or 40 weeks may optimize neonatal outcomes among women with diabetes. (Author)

20191023-83*

Evaluation of the Effects of Delayed Cord Clamping in Infants of Diabetic Mothers. Korkut S, Oguz Y, Bozkaya D, et al (2021), American Journal of Perinatology vol 38, no 3, February 2021, pp 242-247

Objective To investigate the effect of delayed cord clamping (DCC) in infants of diabetic mothers.
Study Design Women who had diabetes throughout their pregnancy and gave birth at 37 weeks of gestation or later were included in the study along with their babies. Early cord clamping was performed as soon as possible after birth, while DCC was performed by clamping 60 second after birth. The two groups were compared in terms of venous hematocrit (htc) levels and rates of hypoglycemia, jaundice requiring phototherapy, and respiratory distress.
Results Venous htc levels at postnatal 6 and 24 hours were significantly higher in the DCC group (p = 0.0001). Polycythemia rates were higher in the DCC group at both 6 and 24 hours, but partial exchange transfusion (PET) was not needed in either group. There were no differences between the groups with regard to the rates of hypoglycemia or jaundice requiring phototherapy. Rate of admission to the neonatal intensive care unit (NICU) was lower in the DCC group.
Conclusion Although DCC increased the rate of polycythemia, it did not result in PET requirement. Moreover, DCC reduced the severity of respiratory distress and the rate of admission to NICU due to respiratory distress. (35 references) (Author)

20191023-29

Reporting of offspring data in diabetes, HIV infection and hypertension trials during pregnancy: a systematic review. Aurich B, Martin-Montoya T, Zhang D, et al (2020), Archives of Disease in Childhood: Fetal and Neonatal Edition vol 105, no 2, March 2020, pp F215-F221

Background Clinical trials are conducted during pregnancy to evaluate benefits and risks of medicines for mother and child. The safety of maternal treatments is a key issue for healthcare professionals and parents.
Objective To analyse offspring data reported in clinical trials in pregnant women with diabetes, HIV infection or hypertension (three of the most common diseases in women of childbearing potential) and either treated prior to pregnancy for these chronic diseases or diagnosed and treated during pregnancy.
Methods PubMed and Embase (1 January 1997 to 31 December 2017) were searched for drug trials in pregnant women with diabetes, HIV infection or hypertension. Titles and abstracts were screened, followed by a full-text review of eligible articles. Inclusion criteria were interventional clinical trials in pregnant women treated with medication and full text in English. Trial characteristics, maternal and offspring data were extracted. Data were summarised by disease and study. Twelve key items were considered for the offspring.
Results Overall, 196 articles reporting 132 clinical trials (diabetes n=55; HIV n=59; hypertension n=18) were included.

Key offspring data were frequently not reported, for example, number of births (diabetes: 22/55, 40%; HIV: 14/59, 24%; hypertension: 10/18, 56%). Congenital malformations were often not reported with sufficient detail (diabetes: 40/55, 73%; HIV: 39/59, 66%; hypertension: 17/18, 94%). Similar observations were made for other key items (eg, fetal losses, neonatal deaths).
Conclusion Under-reporting of key data for the offspring was frequent in publications of clinical trials in pregnant women with diabetes, HIV infection or hypertension making the assessment of the benefit-risk ratio of treatment options during pregnancy difficult. (35 references) (Author)

20191021-15*

Diabetes: a metabolic and reproductive disorder in women. Thong EP, Codner E, Laven JSE, et al (2019), The Lancet Diabetes & Endocrinology 18 October 2019, online

Reproductive dysfunction is a common but little studied complication of diabetes. The spectrum of reproductive health problems in diabetes is broad, and encompasses delayed puberty and menarche, menstrual cycle abnormalities, subfertility, adverse pregnancy outcomes, and potentially early menopause. Depending on the age at diagnosis of diabetes, reproductive problems can manifest early on in puberty, emerge later when fertility is desired, or occur during the climacteric period. Historically, women with type 1 diabetes have frequently had amenorrhoea and infertility, due to central hypogonadism. With the intensification of insulin therapy and improved metabolic control, these problems have declined, but do persist. Additional reproductive implications of contemporary diabetes management are now emerging, including polycystic ovary syndrome and hyperandrogenism, which are underpinned by insulin action on the ovary. The sharp rise in type 2 diabetes incidence in youth suggests that more women of reproductive age will encounter diabetes-related reproductive problems in their lifetimes. With an ever increasing number of young women living with diabetes, clinicians need to be aware of and equipped for the challenges of navigating reproductive health concerns across the lifespan. (166 references) (Author)

20191008-18

The association of pregestational and gestational diabetes with severe neonatal morbidity and mortality. Battarbee AN, Ventakesh KK, Aliaga S, et al (2020), Journal of Perinatology vol 40, no 2, February 2020, pp 232-239

Objective
To estimate the association between maternal diabetes and severe neonatal morbidity.
Study design
Retrospective cohort study of nonanomalous neonates born 240−416 weeks' gestation from two large multisite U.S. cohorts, Cesarean Registry and Consortium on Safe Labor. The exposure was pregestational versus gestational versus no diabetes. The composite neonatal outcome included respiratory distress syndrome, mechanical ventilation, necrotizing enterocolitis, grade 3-4 intraventricular hemorrhage, and death. Multivariable logistic regression estimated the association between diabetes and neonatal morbidity.
Result
Of 196,006 eligible neonates, 2993 (1.5%) were born to mothers with pregestational diabetes and 10,549 (5.4%) with gestational diabetes. Pregestational diabetes was associated with higher odds of neonatal morbidity versus gestational diabetes (aOR 2.27, 95% CI 1.95−2.64), as well as no diabetes (aOR 1.96, 95% CI 1.63−2.35). Gestational diabetes was associated with higher odds of neonatal morbidity versus no diabetes (aOR 1.16, 95% CI 1.04−1.30).
Conclusion
Pregestational and gestational diabetes are risk factors for severe neonatal morbidity.
(30 references) (Author)

20191002-1*

Preconception diabetes mellitus and adverse pregnancy outcomes in over 6.4 million women: A population-based cohort study in China. Wei Y, Xu Q, Yang H, et al (2019), PLoS Medicine voll 16, no 10, 1 October 2019, e1002926

Background
Diabetes mellitus (DM) increases the risk of adverse maternal and neonatal outcomes, and optimization of glycemic control during pregnancy can help mitigate risks associated with diabetes. However, studies seldom focus precisely on maternal blood glucose level prior to pregnancy. We aimed to evaluate the associations between preconception blood fasting plasma glucose (FPG) level and subsequent pregnancy outcomes.
Methods and findings
We conducted a population-based retrospective cohort study among 6,447,339 women aged 20-49 years old who participated in National Free Pre-Pregnancy Checkups Project and completed pregnancy outcomes follow-up between

2010 and 2016 in China. During the preconception health examination, serum FPG concentration was measured, and self-reported history of DM was collected. Women were classified into three groups (normal FPG group: FPG < 5.6 mmol/L and no self-reported history of DM; impaired fasting glucose [IFG]: FPG 5.6-6.9 mmol/L and no self-reported history of DM; and DM: FPG ≥ 7.0 mmol/L or self-reported history of DM). The primary outcomes were adverse pregnancy outcomes, including spontaneous abortion, preterm birth (PTB), macrosomia, small for gestational age infant (SGA), birth defect, and perinatal infant death. Logistic regression model was used to calculate odds ratio (OR) and 95% confidence interval (CI) after adjusting for confounding variables. The mean age of women was 25.24 years, 91.47% were of Han nationality, and 92.85% were from rural areas. The incidence of DM and IFG was 1.18% (76,297) and 13.15% (847,737), respectively. Only 917 (1.20%) women reported a history of DM (awareness of their DM status), of whom 37.28% (337) had an elevated preconception FPG level (≥ 5.6 mmol/L), regarded as noncontrolled DM. A total of 1,005,568 (15.60%) women had adverse pregnancy outcomes. Compared with women with normal FPG, women with IFG had higher risks of spontaneous abortion (OR 1.08; 95% CI 1.06-1.09; P < 0.001), PTB (1.02; 1.01-1.03; P < 0.001), macrosomia (1.07; 1.06-1.08; P < 0.001), SGA (1.06; 1.02-1.10; P = 0.007), and perinatal infant death (1.08; 1.03-1.12; P < 0.001); the corresponding ORs for women with DM were 1.11 (95% CI 1.07-1.15; P < 0.001), 1.17 (1.14-1.20; P < 0.001), 1.13 (1.09-1.16; P < 0.001), 1.17 (1.04-1.32; P = 0.008), and 1.59 (1.44-1.76; P < 0.001). Women with DM also had a higher risk of birth defect (OR 1.42; 95% CI 1.15-1.91; P = 0.002). Among women without self-reported history of DM, there was a positive linear association between FPG levels and spontaneous abortion, PTB, macrosomia, SGA, and perinatal infant death (P for trend <0.001, <0.001, <0.001, 0.001, <0.001). Information about hypoglycemic medication before or during pregnancy was not collected, and we cannot adjust it in the analysis, which could result in underestimation of risks. Data on 2-hour plasma glucose level and HbA1c concentration were not available, and the glycemic control status was evaluated according to FPG value in women with DM.

Conclusions

Women with preconception IFG or DM had higher risk of adverse pregnancy outcomes, including spontaneous abortion, PTB, macrosomia, SGA, and perinatal infant death. Preconception glycemic control through appropriate methods is one of the most important aspects of preconception care and should not be ignored by policy makers. (26 references) (Author)

Full URL: https://doi.org/10.1371/journal.pmed.1002926

20190925-28*

Association of Birth Weight With Type 2 Diabetes and Glycemic Traits: A Mendelian Randomization Study. BIRTH-GENE (BIG) Study Working Group (2019), JAMA Network Open vol 2, no 9, 20 September 2019, e1910915

Key Points

Question Is birth weight associated with type 2 diabetes and glycemic traits?

Findings This mendelian randomization study found that a 1-SD decrease in birth weight due to the genetic risk score was associated with a higher risk of type 2 diabetes among European and East Asian populations. In addition, a 1-SD decrease in birth weight was associated with a 0.189-SD increase in fasting glucose concentration, but not with fasting insulin, 2-hour glucose, or hemoglobin A1c level.

Meaning A genetic predisposition to lower birth weight was associated with an increased risk of type 2 diabetes and increased fasting glucose, suggesting potential mechanisms through which perturbation of the antenatal and early-life environment affect predisposition to diabetes in later life.

Importance Observational studies have shown associations of birth weight with type 2 diabetes (T2D) and glycemic traits, but it remains unclear whether these associations represent causal associations.

Objective To test the association of birth weight with T2D and glycemic traits using a mendelian randomization analysis.

Design, Setting, and Participants This mendelian randomization study used a genetic risk score for birth weight that was constructed with 7 genome-wide significant single-nucleotide polymorphisms. The associations of this score with birth weight and T2D were tested in a mendelian randomization analysis using study-level data. The association of birth weight with T2D was tested using both study-level data (7 single-nucleotide polymorphisms were used as an instrumental variable) and summary-level data from the consortia (43 single-nucleotide polymorphisms were used as an instrumental variable). Data from 180 056 participants from 49 studies were included.

Main Outcomes and Measures Type 2 diabetes and glycemic traits.

Results This mendelian randomization analysis included 49 studies with 41 155 patients with T2D and 80 008 control participants from study-level data and 34 840 patients with T2D and 114 981 control participants from summary-level data. Study-level data showed that a 1-SD decrease in birth weight due to the genetic risk score was associated with higher risk of T2D among all participants (odds ratio [OR], 2.10; 95% CI, 1.69-2.61; P = 4.03 × 10−5), among European participants (OR, 1.96; 95% CI, 1.42-2.71; P = .04), and among East Asian participants (OR, 1.39; 95% CI, 1.18-1.62; P = .04).

Similar results were observed from summary-level analyses. In addition, each 1-SD lower birth weight was associated with 0.189 SD higher fasting glucose concentration (β = 0.189; SE = 0.060; P = .002), but not with fasting insulin, 2-hour glucose, or hemoglobin A1c concentration.
Conclusions and Relevance In this study, a genetic predisposition to lower birth weight was associated with increased risk of T2D and higher fasting glucose concentration, suggesting genetic effects on retarded fetal growth and increased diabetes risk that either are independent of each other or operate through alterations of integrated biological mechanisms. (53 references) (Author)
Full URL: https://doi.org/10.1001/jamanetworkopen.2019.10915

20190925-17*

Longitudinal changes in adipokines and free leptin index during and after pregnancy in women with obesity.
Andersson-Hall U, Svedin P, Svensson H, et al (2019), International Journal of Obesity 24 September 2019, online
Objective
Detailed data on adipokines and body composition during and after pregnancy in women of different BMI categories are lacking. Furthermore, adipokine regulation during pregnancy and the factors contributing to gestational insulin resistance are not completely understood. The objective was to longitudinally determine adipokine levels, body composition, and insulin sensitivity during and after pregnancy in women of healthy weight (HW) and with obesity (OB), and identify factors associated with insulin resistance.
Design
Women (30 HW, 19 OB) underwent blood sampling and body composition examination, by air-displacement plethysmography, longitudinally during pregnancy (trimesters 1, 2, 3) and after pregnancy (6, 12, 18 months postpartum). Serum leptin, soluble leptin receptor (sOB-R), and adiponectin levels were measured and free leptin index (FLI) and homeostatic model assessment of insulin resistance (HOMA-IR) determined.
Results
Fat mass and leptin increased during pregnancy in the HW ($p < 0.01$) but not in the OB group. sOB-R increased during pregnancy in both groups ($p < 0.001$). Thus, FLI was unchanged in HW throughout pregnancy but reduced in OB ($p = 0.001$), although consistently higher in OB. Adiponectin decreased in both groups during pregnancy ($p < 0.001$ for HW, $p = 0.01$ for OB). After pregnancy, adiponectin increased in both groups, but more markedly in OB where it reached trimester 1 levels. Multivariable regression identified FLI as the variable most strongly associated with HOMA-IR in all trimesters, but not after pregnancy.
Conclusions
Leptin, sOB-R, adiponectin, and FLI undergo marked changes during and after pregnancy with differences in women of different BMI. We suggest that leptin activity is regulated by its soluble receptor and that this is an important factor for optimizing fat mass and insulin sensitivity during pregnancy. (48 references) (Author)

20190923-6*

Congenital Anomalies in Offspring of Maternal Glucokinase-Maturity-Onset Diabetes of the Young: A Case Report.
Rudland VL, Pinner J, Ross GP (2019), Diabetes Care vol 42, no 10, October 2019, pp e162-e163
Presents the case of a 24-year-old European woman who had diet-controlled diabetes since the age of 15. Describes the management of her condition prior to and during her first pregnancy, when she was given insulin therapy from 13 weeks' gestation, resulting in the birth of a baby boy at 37 weeks. The baby had neonatal jaundice and bilateral vesicoureteral reflux which was treated with reimplantation surgery. Her second pregnancy was managed in a similar way, with insulin therapy administered from 4 weeks, resulting in the birth of a baby girl following induction of labour at 40 weeks' gestation; the mother experienced persisitent fasting hyperglycemia. Genetic testing confirmed glucokinase-maturity-onset diabetes of the young (GCK-MODY),. During her third pregnancy, her diabetes was managed by diet alone. Following obstructed labour at 40 weeks, she gave birth by caesarean section to a baby boy with trivial pulmonary valve stenosis. Subsequent genetic testing of all three children revealed that the second child had inherited the GCK mutation, but her brothers had not. (5 references) (JSM)

20190923-21*

Diabetes during pregnancy modifies the association between birth weight and education: a whole-of-population study. Smithers LG, Mittinty MN, Dekker G, et al (2019), Diabetes Care vol 42, no 9, September 2019, pp e143-e145
Presents the results of a study examining whether diabetes during pregnancy modifies the association between birth weight and school achievement at eight years of age. After analysing deidentified administrative data linking perinatal data to children's school assessments, it was concluded that children born in the highest quintile of birth weight for

gestational age (BWGA) with mothers who have diabetes during pregnant, are likely to experience poorer scholastic achievement. (Author, edited)

20190923-12*

Increased Insulin Requirements in Twin Pregnancy in Type 1 Diabetes. De Fønss S, Ovesen PG, Fuglsang J (2019), Diabetes Care vol 42, no 10, October 2019, pp e164-e165

Summarises the findings of a retrospective case-control study to ascertain the insulin requirements of diabetic women during twin pregnancy. The study comprised 27 twin pregnant women and 81 singleton pregnant women with type 1 diabetes. Results indicate that increased insulin is required in twin pregnancy in type 1 diabetes during the second trimester and early (but not late) in the third trimester, an observation that can be used by caregivers to optimise glycaemic control for this group of women. (JSM)

20190911-57*

Missed Opportunities for Early Diabetes Screening in Pregnancy. Battarbee AN, Cavallini M, Keller C, et al (2021), American Journal of Perinatology vol 38, no 1, January 2021, pp 23-27

Objective To identify characteristics of women at risk of undiagnosed type 2 diabetes mellitus (T2DM) that fail to receive early pregnancy screening.

Study Design This was a retrospective case-control study of at-risk women who initiated care at the University of North Carolina at Chapel Hill at <21 weeks from January 2015 to December 2015. In 2013, the American College of Obstetricians and Gynecologists and the American Diabetes Association recommended women with prior GDM, glucose intolerance, or body mass index (BMI) ≥ 30 kg/m2 receive early pregnancy screening for undiagnosed T2DM. We defined early screening as 1-hour 50-g glucose challenge test or hemoglobin A1c at <21 weeks' gestation. Cases were women who did not have early screening, and controls were women who did. Modified Poisson regression with robust error variance estimated relative risks of factors associated with missed early screening.

Results Of the 1,932 women who initiated care at <21 weeks, 257 (13%) women were at risk of undiagnosed T2DM and, thus, candidates for early screening. However, 129 (50.2%) women were not screened. Higher BMI and prior GDM were associated with a lower relative risk of missed screening.

Conclusion Higher BMI and prior GDM increased the likelihood of early diabetes screening, but only half of at-risk women were screened. Provider education and best practice alert systems are needed to increase screening for undiagnosed T2DM.

(22 references) (Author)

20190911-48*

Basal Insulin Analogs versus Neutral Protamine Hagedorn for Type 2 Diabetics. Bartal MF, Ward C, Refuerzo JS, et al (2020), American Journal of Perinatology vol 37, no 1, January 2020, pp 30-36

Objective To determine whether basal insulin analogs reduce the rate of composite neonatal morbidity compared with neutral protamine Hagedorn (NPH) in women with type 2 diabetes mellitus (T2DM).

Study Design This was a retrospective cohort study of women with T2DM and singleton pregnancy at a single tertiary center. Primary outcome was a composite neonatal morbidity of any of the following: shoulder dystocia, large for gestational age, neonatal intensive care unit admission, neonatal hypoglycemia, or respiratory distress syndrome. Secondary outcomes were rates of maternal hypoglycemic events, hypertensive disorders, preterm birth, and primary cesarean delivery. Adjusted relative risk (aRR) and 95% confidence intervals (CI) were calculated.

Results Of 233 women with T2DM that met the inclusion criteria, 114 (49%) were treated with basal insulin analogs and 119 (51%) with NPH. The rate of composite neonatal morbidity was similar between groups (73 vs. 60%; aRR: 1.18; 95% CI: 0.92-1.51). There were no differences in the rates of maternal adverse outcomes between the groups. Basal insulin analog was associated with a lower rate of primary cesarean delivery as compared with NPH (21 vs. 36%; aRR: 0.44; 95% CI: 0.25-0.78).

Conclusion Among pregnant women with T2DM managed with either basal or NPH insulin regimen, the rates of composite neonatal morbidity and maternal complications were similar.

(28 references) (Author)

20190910-10*

Progression to type 2 diabetes mellitus and associated risk factors after hyperglycemia first detected in pregnancy: A cross-sectional study in Cape Town, South Africa. Chivese T, Norris SA, Levitt NS (2019), PLoS Medicine vol 16, no 9, 9 September 2019, e1002865

Background
Global data indicate that women with a history of hyperglycemia first detected in pregnancy (HFDP) are at up to 7 times risk of progressing to type 2 diabetes mellitus (T2DM) compared with their counterparts who have pregnancies that are not complicated by hyperglycemia. However, there are no data from the sub-Saharan African region, which has the highest projected rise in diabetes prevalence globally. The aim of this study was to determine the proportion of women who progress to T2DM and associated risk factors 5 to 6 years after HFDP in Cape Town, South Africa.
Methods and findings
All women with HFDP, at a major referral hospital in Cape Town, were followed up 5 to 6 years later using a cross-sectional study. Each participant had a 75 g oral glucose tolerance test; anthropometric measurements and a survey were administered. A total of 220 participants were followed up. At this time, their mean age was 37.2 years (SD 6.0). Forty-eight percent (95% CI 41.2-54.4) progressed to T2DM, 5.5% (95% CI 3.1-9.4) had impaired fasting glucose, and 10.5% (95% CI 7.0-15.3) had impaired glucose tolerance. Of the participants who progressed to T2DM, 47% were unaware of their diabetes status. When HFDP was categorized post hoc according to WHO 2013 guidelines, progression in the diabetes in pregnancy (DIP) group was 81% (95% CI 70.2-89.0) and 31.3% (95% CI 24.4-39.3) in the gestational diabetes mellitus (GDM) category. Factors associated with risk of progression to T2DM were; at follow-up: waist circumference (odds ratios [OR] 1.1, 95% CI 1.0-1.1, p = 0.007), hip circumference (OR 0.9, 95% CI 0.8-1.0, p = 0.001), and BMI (OR 1.1, 95% CI 1.0-1.3, p = 0.001), and at baseline: insulin (OR 25.8, 95% CI 3.9-171.4, p = 0.001) and oral hypoglycaemic treatment during HFDP (OR 4.1, 95% CI 1.3-12.9, p = 0.018), fasting (OR 2.7, 95% CI 1.5-4.8, p = 0.001), and oral glucose tolerance test 2-hour glucose concentration at HFDP diagnosis (OR 4.3, 95% CI 2.4-7.7, p 0.001). Our findings have limitations in that we did not include a control group of women without a history of HFDP.
Conclusions
The progression to T2DM in women with previous HFDP found in this study highlights the need for interventions to delay or prevent progression to T2DM after HFDP. In addition, interventions to prevent HFDP may also contribute to reducing the risk of T2DM. (59 references) (Author)
Full URL: https://doi.org/10.1371/journal.pmed.1002865

20190906-35*

Prevalence of hyperglycemia in pregnancy and influence of body fat on development of hyperglycemia in pregnancy among pregnant women in urban areas of Arusha region, Tanzania. Msollo SS, Martin HD, Mwanri AW, et al (2019), BMC Pregnancy and Childbirth vol 19, no 315, 28 August 2019

Background
Hyperglycemia in pregnancy is a medical condition resulting from either pre-existing diabetes or insulin resistance developed during pregnancy. This study aimed to determine the prevalence of hyperglycemia in pregnancy and influence of body fat percentage and other determinants on developing hyperglycemia in pregnancy among women in Arusha District, Tanzania.
Methods
A cross-sectional study was conducted between March and December 2018 at selected health facilities in Arusha District involving 468 pregnant women who were not known to have diabetes before pregnancy. Blood glucose was tested by Gluco-Plus™ using the World Health Organization criteria at fasting and 2 h after consuming 75 g of glucose dissolved in 300 ml of water. Body fat was measured using a bioelectric impedance analyzer, mid-upper arm circumference using a regulated tape, weight using SECA™, blood pressure using a GT-868UF Geratherm™ machine, and height using a stadiometer. Demographic and maternal characteristics were collected through face to face interviews using a structured questionnaire.
Results
The participants' mean age was 28 years (SD ± 6), mid-upper arm circumference 27 cm (SD ± 3.7), body fat 33.72% (SD ± 7.2) and pre-pregnancy body mass index 25.6 kg/m2 (SD ± 5.5). One-third of participants had mid-upper arm circumferences ≥28 cm with 25% being overweight and 22.7% obese before pregnancy. Prevalence of hyperglycemia in pregnancy was 16.2% (n = 76) of which 13% had gestational diabetes and 3.2% diabetes in pregnancy. Hyperglycemia in pregnancy was significantly associated with body fat percentage (AOR 1.33; 95% CI: 1.22-1.44), family history of Type 2 diabetes mellitus (AOR 6.95, 95% CI: 3.11-15.55), previous delivery of babies ≥4 kg (AOR 2.3, 95% CI: 1.00-5.28), mid-upper arm circumference ≥ 28 cm (AOR 1.2, 95% CI: 1.09-1.32), and Type 2 diabetes mellitus symptoms (AOR 2.83, 95% CI: 1.53-6.92).
Conclusion
The prevalence of hyperglycemia in pregnancy was high, particularly among women with history of delivering ≥4-kg babies, increased body fat, mid-upper arm circumference, symptoms and/or family history of Type 2 diabetes

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mellitus. These findings identify opportunities to further explore the utility of body fat percentage and other determinants for rapid screening and management of hyperglycemia in pregnancy.
(47 references) (Author) [Please note: this article is a digital version which may undergo minor changes in the future]
Full URL: https://doi.org/10.1186/s12884-019-2463-8

20190905-30*

Maternal and neonatal outcomes following a diabetic pregnancy within the context of HIV. Soepnel LM, Nicolaou V, Huddle KRL, et al (2019), International Journal of Gynecology & Obstetrics vol 147, no 3, December 2019, pp 404-412

Objective

To characterize the demographics, comorbidities, management, and outcomes of pregnant women with pre-gestational and gestational diabetes (GDM), including overt and true GDM, taking into account HIV infection and the influence of exposure to oral hypoglycemic agents (OHAs).

Methods

A review of medical records of 1071 diabetic pregnancies (between 2012 and 2018) at a tertiary hospital in South Africa.

Results

Of the women, 43% had GDM, 19% had type 1 diabetes (T1DM), and 38% had type 2 diabetes (T2DM). Each group had a mean initial body mass index (BMI) > 25 kg/m2. Despite poor initial HbA1c for pre-gestational groups, over 90% of the cohort achieved glycemic control by the time of delivery. The rate of prematurity was 30.9%. Perinatal mortality (PNM) was 5.1% for the pre-gestational group and 1.8% for GDM. Of the cohort, 23.9% was HIV infected. PNM was higher in the HIV-infected pregnancies (9.4%) than non-HIV exposed pregnancies (1.8%, P<0.001). The macrosomia rate was higher in the glibenclamide-exposed group than the insulin-alone group (12.2% vs 0%, P=0.025).

Conclusion

Obesity is a significant predictor for macrosomia and was high in all groups. In a low-/middle-income country setting with a high prevalence of HIV and high usage of OHAs as an alternative to insulin therapy, HIV might be associated with higher PNM and glibenclamide with increased rates of macrosomia, which warrants further exploration. (Author)

20190829-33*

Diabetic women 'need blood sugar support to prevent stillbirth. Mitchell G (2019), Nursing Times 30 July 2019

Diabetic women are four to five times more likely to have a stillborn baby than those without the condition, a new study has found. (Author)

20190828-98*

Specific birth defects in pregnancies of women with diabetes: National Birth Defects Prevention Study, 1997-2011. Tinker SC, Gilboa SM, Moore CA, et al (2020), American Journal of Obstetrics & Gynecology (AJOG) vol 222, no 2, February 2020, pp 176.e1-176.e11

Background

Diabetes is associated with an increased risk for many birth defects and is likely to have an increasing impact on birth defect prevalence due to the rise in diabetes in the United States in recent decades. One of the first analyses in which specific birth defects were assessed for their relationship with both pregestational and gestational diabetes used data from the initial six years of the National Birth Defects Prevention Study. That analysis reported strong associations for pregestational diabetes with several birth defects, but few exposures among some of the less common birth defects led to unstable estimates with wide confidence intervals. Since that analysis, the study continued to collect data for another eight years, including information on approximately 19,000 additional cases and 6,900 additional controls.

Objectives

Our objective was to use data from the National Birth Defects Prevention Study, the largest population-based birth defects case-control study in the United States, to provide updated and more precise estimates of the association between diabetes and birth defects, including some defects not previously assessed.

Study Design

We analyzed data on deliveries from October 1997 through December 2011. Mothers of case and control infants were interviewed about their health conditions and exposures during pregnancy, including diagnosis of pregestational (type 1 or type 2) diabetes before the index pregnancy or gestational diabetes during the index pregnancy. Using logistic regression, we separately assessed the association between pregestational and gestational diabetes with specific categories of structural birth defects for which there were at least three exposed case infants. For birth defect categories for which there were at least five exposed case infants, we calculated odds ratios adjusted for maternal

body mass index, age, education, race/ethnicity, and study site; for defect categories with three or four exposed cases we calculated crude odds ratios.

Results

Pregestational diabetes was reported by 0.6 percent of mothers of control infants (71 / 11,447) and 2.5 percent of mothers of case infants (775 / 31,007). Gestational diabetes during the index pregnancy was reported by 4.7 percent of mothers of control infants (536 / 11,447) and 5.3 percent of mothers of case infants (1,653 / 31,007). Pregestational diabetes was associated with strong, statistically significant odds ratios (range: 2.5 to 80.2) for 46 of 50 birth defects considered. The largest odds ratio was observed for sacral agenesis (adjusted OR [aOR]: 80.2; 95% CI: 46.1, 139.3). A greater than 10-fold increased risk was also observed for holoprosencephaly (aOR: 13.1; 95% CI: 7.0, 24.5), longitudinal limb deficiency (aOR: 10.1; 95% CI: 6.2, 16.5), heterotaxy (aOR: 12.3; 95% CI: 7.3, 20.5), truncus arteriosus (aOR: 14.9; 95% CI: 7.6, 29.3), atrioventricular septal defect (aOR: 10.5; 95% CI: 6.2, 17.9), and single ventricle complex (aOR: 14.7; 95% CI: 8.9, 24.3).For gestational diabetes, statistically significant odds ratios were fewer (12 of 56) and of smaller magnitude (range: 1.3 to 2.1; 0.5 for gastroschisis).

Conclusions

Pregestational diabetes is associated with markedly increased risk for many specific births defects. Because glycemic control before pregnancy is associated with a reduced risk for birth defects, ongoing quality care for persons with diabetes is an important opportunity for prevention. (23 references) (Author)

20190813-21

Diabetes, pregnancy and mental health: a tricky triad. Mills LS (2019), British Journal of Midwifery vol 27, no 8, August 2019, pp 491-496

Pregnancy can be a difficult for any woman, but adding diabetes into the equation may increase stress. Women who develop mental health issues either before or during pregnancy can have an even more difficult time and health professionals need to be able to support and manage these issues in order to guide these women safely through their pregnancy and beyond. (Author)

20190812-4*

Optimal timing of prenatal ultrasound in predicting birth weight in diabetic pregnancies. Nash CM, Woolcott C, O'Connell C, et al (2020), JOGC [Journal of Obstetrics and Gynaecology Canada] vol 42, no 1, January 2020, pp 48-53

Objective

This study sought to determine the optimal timing of ultrasound in the third trimester to predict birth weight accurately in diabetic women with a singleton pregnancy.

Methods

A retrospective cohort study of all diabetic women with a singleton pregnancy treated in Halifax, Nova Scotia, was performed. Estimated fetal weight was derived from ultrasound measures using the Hadlock2 equation. The Mongelli equation was used to predict birth weight. The association between gestational age at ultrasound and accuracy of predicted birth weight was assessed, with accuracy as a continuous variable representing the difference between predicted and actual birth weight and as a categorical variable (with four gestational age categories) representing whether predicted birth weight was within, over, or under 250 g of actual birth weight

Results

The cohort of 943 women comprised 121 (12.8%) with type 1 diabetes, 111 (11.7%) with type 2 diabetes, and 711 (75.4%) with gestational diabetes. Ultrasound scans performed at term were the most accurate in predicting birth weight. At this gestational age, the mean difference between predicted and actual birth weight was −30 g (95% confidence interval −109 to −48). After adjusting for maternal body mass index, age, smoking, type of diabetes, and interval between ultrasound examination and delivery, accuracy improved as gestational age at ultrasound increased (P = 0.005). The odds of underpredicting or overpredicting birth weight were not significantly affected by the timing of the ultrasound examination.

Conclusion

Because the predictive accuracy of ultrasound prediction of birth weight improves with gestational age, fetal growth assessment at term is recommended to aid with delivery planning in women with diabetes. (19 references) (Author)

20190805-37*

Methods of Glycemic Control and Neonatal Outcomes after Antenatal Corticosteroid Administration among Women with Pregestational Diabetes. Battarbee AN, Anderson SB, Tita ATN, et al (2020), American Journal of Perinatology vol 37, no 13, November 2020, pp 1351-1356

Objective
The objective of this study was to evaluate the association between the method of maternal glycemic control after antenatal corticosteroid, administration and maternal hyperglycemia and neonatal morbidity among women with diabetes.
Study Design
This was a retrospective cohort study of women with pregestational diabetes who received antenatal corticosteroids and delivered in <34 weeks. The primary maternal outcome was adequate glycemic control, defined as <50% of glucose values above goal (fasting <100 mg/dL, 2-hour postprandial <120 mg/dL, or <115 mg/dL on insulin infusion). The primary neonatal outcome was composite morbidity (continuous positive airway pressure, mechanical ventilation, intraventricular hemorrhage, or death). Demographic characteristics and outcomes were compared by the method of glycemic control and neonatal morbidity using chi-square test, Fisher's exact test, Mann-Whitney U-test, and Student's t-test, as appropriate.
Results
Of 52 eligible women, only 1 (1.9%) had adequate maternal glycemic control. There was no significant association between the method of glycemic control and maternal hyperglycemia or neonatal morbidity. There was no association between maternal glucose and neonatal morbidity; however, neonates with composite morbidity were more likely to be born to women who received less insulin.
Conclusion
Maternal glycemic control among women with diabetes was poor after the antenatal corticosteroid administration, regardless of glycemic control method. Neither the method of maternal glycemic control nor the degree of control was associated with neonatal morbidity.
(18 references) (Author)

20190730-7*

Diabetic women more likely to have stillborn baby, study finds. Anon (2019), BBC News 30 July 2019

Reports on a new study (1) which suggests that diabetic women are more than four times as likely to have a stillbirth than women without the condition. 1. Mackin ST et al. Factors associated with stillbirth in women with diabetes. Diabetologia, 29 July 2019. (CI)

Full URL: https://www.bbc.co.uk/news/uk-scotland-49155894

20190730-5*

Factors associated with stillbirth in women with diabetes. Mackin ST, Nelson SM, Wild SH, et al (2019), Diabetologia 29 July 2019, online

Aims/hypothesis
Stillbirth risk is increased in pregnancy complicated by diabetes. Fear of stillbirth has major influence on obstetric management, particularly timing of delivery. We analysed population-level data from Scotland to describe timing of stillbirths in women with diabetes and associated risk factors.
Methods
A retrospective cohort of singleton deliveries to mothers with type 1 (n = 3778) and type 2 diabetes (n = 1614) from 1 April 1998 to 30 June 2016 was analysed using linked routine care datasets. Maternal and fetal characteristics, HbA1c data and delivery timing were compared between stillborn and liveborn groups.
Results
Stillbirth rates were 16.1 (95% CI 12.4, 20.8) and 22.9 (95% CI 16.4, 31.8) per 1000 births in women with type 1 (n = 61) and type 2 diabetes (n = 37), respectively. In women with type 1 diabetes, higher HbA1c before pregnancy (OR 1.03 [95% CI 1.01, 1.04]; p = 0.0003) and in later pregnancy (OR 1.06 [95% CI 1.04, 1.08]; p < 0.0001) were associated with stillbirth, while in women with type 2 diabetes, higher maternal BMI (OR 1.07 [95% CI 1.01, 1.14]; p = 0.02) and pre-pregnancy HbA1c (OR 1.02 [95% CI 1.00, 1.04]; p = 0.016) were associated with stillbirth. Risk was highest in infants with birthweights <10th centile (sixfold higher born to women with type 1 diabetes [n = 5 stillbirths, 67 livebirths]; threefold higher for women with type 2 diabetes [n = 4 stillbirths, 78 livebirths]) compared with those in the 10th-90th centile (n = 20 stillbirths, 1685 livebirths). Risk was twofold higher in infants with birthweights >95th centile born to women with type 2 diabetes (n = 15 stillbirths, 402 livebirths). A high proportion of stillborn infants were male among mothers with type 2 diabetes (81.1% vs 50.5% livebirths, p = 0.0002). A third of stillbirths occurred at term, with highest rates in the 38th week (7.0 [95% CI 3.7, 12.9] per 1000 ongoing pregnancies) among mothers with type 1 diabetes and in the 39th week (9.3 [95% CI 2.4, 29.2]) for type 2 diabetes.
Conclusions/interpretation
Maternal blood glucose levels and BMI are important modifiable risk factors for stillbirth in diabetes. Babies at

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extremes of weight centiles are at most risk. Many stillbirths occur at term and could potentially be prevented by change in routine care and delivery policies. (Author)
Full URL: https://doi.org/10.1007/s00125-019-4943-9

20190729-27*

Evaluation of prenatal diabetes mellitus and other risk factors for craniofacial microsomia. Siebold B, Heike CL, Leroux BG, et al (2019), Birth Defects Research vol 111, no 11, 1 July 2019, pp 649-658

Objectives

Craniofacial microsomia (CFM) is a congenital condition that typically involves hypoplasia of the ear and jaw. It is often associated with adverse effects such as hearing loss and sleep-disordered breathing. There is little research on its etiology.

Methods

We conducted a case-control study from maternal interview data collected from mothers of infants with and without CFM. The study included 108 children with and 84 children without CFM. Logistic regression with adjustment for demographic factors was used to evaluate associations between maternal exposures of interest and risk for CFM overall, as well as for different phenotypic sub-groups of children on the CFM spectrum.

Results

We found a statistically significant association between diabetes mellitus (DM) and CFM (OR 4.01, 95% CI 1.6-10.5). The association was slightly attenuated after adjustment for BMI. Higher parity was also associated with increased risk for CFM (OR 2.0, 95% CI 1.0-4.0). Vitamin A consumption and/or liver consumption was associated with a 70% lower risk compared with non-users (OR 0.3, 95% 0.1-0.8). Maternal age at the time of pregnancy was not associated with CFM.

Conclusions

These analyses contribute evidence linking maternal DM with an elevated risk of having an infant with CFM, which is consistent with previous research and adds to the body of knowledge about the strength of this association. Further study is warranted to understand the potential mechanisms underlying the effect of DM in the developing embryo. (Author)

20190729-26*

Risk factors associated with the development of double-inlet ventricle congenital heart disease. Paige SL, Yang W, Priest JR, et al (2019), Birth Defects Research vol 111, no 11, 1 July 2019, pp 640-648

Background

Congenital heart disease (CHD) is the most common birth defect group and a significant contributor to neonatal and infant death. CHD with single ventricle anatomy, including hypoplastic left heart syndrome (HLHS), tricuspid atresia (TA), and various double-inlet ventricle (DIV) malformations, is the most complex with the highest mortality. Prenatal risk factors associated with HLHS have been studied, but such data for DIV are lacking.

Methods

We analyzed DIV cases and nonmalformed controls in the National Birth Defects Prevention Study, a case-control, multicenter population-based study of birth defects. Random forest analysis identified potential predictor variables for DIV, which were included in multivariable models to estimate effect magnitude and directionality.

Results

Random forest analysis identified pre-pregnancy diabetes, history of maternal insulin use, maternal total lipid intake, paternal race, and intake of several foods and nutrients as potential predictors of DIV. Logistic regression confirmed pre-pregnancy diabetes, maternal insulin use, and paternal race as risk factors for having a child with DIV. Additionally, higher maternal total fat intake was associated with a reduced risk.

Conclusions

Maternal pre-pregnancy diabetes and history of insulin use were associated with an increased risk of having an infant with DIV, while maternal lipid intake had an inverse association. These novel data provide multiple metabolic pathways for investigation to identify better the developmental etiologies of DIV and suggest that public health interventions targeting diabetes prevention and management in women of childbearing age could reduce CHD risk. (Author)

20190715-8*

Systemic endocrinopathies (thyroid conditions and diabetes): impact on postnatal life of the offspring. Nattero-Chávez L, Luque-Ramírez M, Escobar-Morreale HF (2019), Fertility and Sterility vol 111, no 6, June 2019, pp 1076-1091

Fetal programming may influence childhood and adult life, determining the risk of specific diseases. During earlier

stages of pregnancy, the transfer of maternal thyroid hormones to the fetus is vital for adequate neurologic development. The presence of severe maternal thyroid dysfunction, particularly severe iodine deficiency, is devastating, leading to irreversible neurologic sequelae. Moreover, mild maternal thyroid conditions, such as a mild-to-moderate iodine deficiency, may also lead to milder neurologic and behavioral conditions later during the life of the offspring. Maternal dysglycemia due to pregestational or gestational diabetes mellitus is another common situation in which fetal development encounters a hostile environment. Hyperglycemia in utero may trigger metabolic conditions in the offspring, including abnormalities of glucose tolerance and weight excess. Physicians assisting pregnant women have to be aware about these conditions, because they may go unnoticed if not properly screened. Because an early diagnosis and appropriate management may prevent most of the possible negative consequences for the progeny, the prevention, early diagnosis, and proper management of these endocrine conditionsshould be offered to all women undergoing pregnancy. Here, we comprehensively review the current evidence about the effects of maternal thyroid dysfunction and maternal dysglycemia on the cognitive function and carbohydrate metabolism in the offspring, two prevalent conditions of utmost importance for the child's health and development. (210 references) (Author)
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20190712-31*

Maternal glycemic control in diabetic pregnancies and neurodevelopmental outcomes in preschool aged children. A prospective cohort study. Griffith RJ, Harding JE, McKinlay CJD, et al (2019), Early Human Development vol 130, March 2019, pp 101-108

Highlights

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Neurosensory impairment is common in children born to diabetic mothers.

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Neurosensory impairment was not associated with maternal glycemic control.

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There was no interaction effect of sex or neonatal hypoglycemia on this relationship. (Author)

20190710-19

Diabetes in pregnancy: a practical guide for midwives. Surendran A, Dixon D, Whyte M (2019), British Journal of Midwifery vol 27, no 7, July 2019, pp 413-419

Diabetes is a growing concern. With the rising incidence of obesity in the younger people, the incidence of diabetes has also increased. This has resulted in more women of childbearing age attending antenatal clinic with a diagnosis of either pre-existing or gestational diabetes. Management of these women is vital to avoid complications in both the mother and the child during pregnancy and childbirth. This article aims to provide a concise guide to the management of diabetes in pregnancy for midwives, who are often the first point of contact for these women. (26 references) (Author)

20190702-37

Drugs to Control Diabetes During Pregnancy. Feghali MN, Umans JG, Catalano PM (2019), Clinics in Perinatology vol 46, no 2, June 2019, pp 257-272

Diabetes is a common complication of pregnancy associated with both short- and long-term adverse maternal and offspring effects. All types of diabetes in pregnancy are increasing in prevalence. Treatment of diabetes in pregnancy, targeting glycemic control, improves both maternal and offspring outcomes, albeit imperfectly for many women. Pharmacologic treatment recommendations differ between pregestational and gestational diabetes. Improved treatment of diabetes in pregnancy will need to consider maternal disease heterogeneity and comorbidities as well as long-term offspring outcomes. In this review, the authors summarize recent clinical studies to highlight established pharmacologic treatments for diabetes in pregnancy and provide suggestions for further research. (99 references) (Author)

20190628-3*

Turning conceptual systems maps into dynamic simulation models: An Australian case study for diabetes in pregnancy. Freebairn L, Atkinson J-A, Osgood ND, et al (2019), PLoS ONE vol 14, no 6, 27 June 2019, e0218875

Background

System science approaches are increasingly used to explore complex public health problems. Quantitative methods,

such as participatory dynamic simulation modelling, can mobilise knowledge to inform health policy decisions. However, the analytic and practical steps required to turn collaboratively developed, qualitative system maps into rigorous and policy-relevant quantified dynamic simulation models are not well described. This paper reports on the processes, interactions and decisions that occurred at the interface between modellers and end-user participants in an applied health sector case study focusing on diabetes in pregnancy.
Methods
An analysis was conducted using qualitative data from a participatory dynamic simulation modelling case study in an Australian health policy setting. Recordings of participatory model development workshops and subsequent meetings were analysed and triangulated with field notes and other written records of discussions and decisions. Case study vignettes were collated to illustrate the deliberations and decisions made throughout the model development process.
Results
The key analytic objectives and decision-making processes included: defining the model scope; analysing and refining the model structure to maximise local relevance and utility; reviewing and incorporating evidence to inform model parameters and assumptions; focusing the model on priority policy questions; communicating results and applying the models to policy processes. These stages did not occur sequentially; the model development was cyclical and iterative with decisions being re-visited and refined throughout the process. Storytelling was an effective strategy to both communicate and resolve concerns about the model logic and structure, and to communicate the outputs of the model to a broader audience.
Conclusion
The in-depth analysis reported here examined the application of participatory modelling methods to move beyond qualitative conceptual mapping to the development of a rigorously quantified and policy relevant, complex dynamic simulation model. The analytic objectives and decision-making themes identified provide guidance for interpreting, understanding and reporting future participatory modelling projects and methods. (75 references) (Author)
Full URL: https://doi.org/10.1371/journal.pone.0218875

20190626-7*

Diabetic ketoacidosis among pregnant and non-pregnant women: a comparison of morbidity and mortality. Rougerie M, Czuzoj-Shulman N, Abenhaim HA (2019), Journal of Maternal-Fetal and Neonatal Medicine vol 32, no 16, 2019, pp 2649-2652
Purpose: Diabetic ketoacidosis (DKA) is a critical diagnosis that can cause severe morbidity and mortality in the diabetic population. Although it is rare in pregnancy, the aim of this study is to compare DKA in pregnant women with age-matched non-pregnant women to determine if outcomes are influenced by pregnancy.
Materials and methods: A population-based age-matched retrospective cohort was carried out using data from the Healthcare Cost and Utilization Project Nationwide Inpatient Sample from 1999 to 2013. Pregnant patients with DKA were age-matched with non-pregnant controls also admitted with DKA at a ratio of 1:10. Severe morbidities and mortality were compared among the two groups. Logistic regression was used to adjust for baseline characteristics and comorbidities.
Results: We identified 4661 cases of DKA in pregnancy during our study period, which were age-matched to 46,610 non-pregnant controls. Pregnant women with DKA were more likely to stay in hospital for >3 d (odds ratios (OR) 2.15, 95% CI 2.06-2.25) and had more associated renal failure (OR 2.86, 95% CI 1.76-4.55); however, they were less likely to require ventilation (OR 0.70, 95% CI 0.62-0.79), experience systemic inflammatory response syndrome (OR 0.53, 95% CI 0.38-0.73), or seizures (OR 0.49, 95% CI 0.42-0.57). Among pregnant women, rates of coma (0.04%) and death (0.17%, OR 0.23, 95% CI 0.14-0.39) were lower than previously reported and lower than non-pregnant women.
Conclusion: Pregnant women with DKA are admitted to hospital for longer periods than non-pregnant controls and are at higher risk for renal failure but otherwise have better outcomes and less mortality than non-pregnant controls. (27 references) (Author)

20190618-66*

Using the novel approach of an artificial pancreas to manage Type 1 diabetes mellitus in pregnancy. Lefkovits Y, Stewart Z, Murphy H (2019), European Medical Journal vol 4, no 2, 2019, pp 110-117
Recent National Institute for Health and Care Excellence (NICE) guidelines suggest that insulin pump therapy should be used in pregnant women with Type 1 diabetes mellitus (T1DM) who do not achieve optimal glycaemic control with multiple daily injection (MDI) therapy. Furthermore, a landmark trial has confirmed that prospective continuous glucose monitoring (CGM) may be beneficial for women using both MDI and insulin pumps during pregnancy, with positive effects on neonatal outcomes. More recently, overnight use of an artificial pancreas (AP) with a model-predictive control algorithm has been shown to improve the amount of time women spend within the

overnight glucose target range (3.5-7.8 mmol/L) during pregnancy. However, preliminary studies where the AP is used day and night have shown a high degree of interindividual variability in response to the intervention, and further randomised trials are needed to understand which women are suitable candidates for CGM, insulin pump, and AP technology. It is understood that improvements in maternal glycaemic control can minimise the risk of adverse neonatal outcomes. Given the substantial improvements in glycaemic control with AP use outside of pregnancy, the recent advances in AP technology provide hope that AP systems will improve the effectiveness of continuous subcutaneous insulin infusion and CGM during pregnancy. Further research is needed to evaluate whether AP can optimise glucose control and neonatal outcomes in T1DM pregnancy. This paper will discuss emerging technologies available for the management of T1DM in pregnancy. (49 references) (Author)

Full URL: https://www.emjreviews.com/diabetes/article/using-the-novel-approach-of-an-artificial-pancreas-to-manage-type-1-diabetes-mellitus-in-pregnancy/

20190611-30*

Pharmacologic treatment of diabetes in pregnancy. Bishop KC, Harris BS, Boyd BK, et al (2019), Obstetrical and Gynecological Survey vol 74, no 5, May 2019, pp 289-297

Importance: Diabetes affects 6% to 9% of pregnancies, with gestational diabetes mellitus accounting for more than 90% of cases. Pregestational and gestational diabetes are associated with significant maternal and fetal risks; therefore, screening and treatment during pregnancy are recommended. Recommendations regarding the preferred treatment of diabetes in pregnancy have recently changed, with slight differences between American College of Obstetricians and Gynecologists (ACOG) and the Society for Maternal-Fetal Medicine (SMFM) recommendations.

Objective: Our review discusses the diagnosis, management, and treatment of pregestational and gestational diabetes with the oral hypoglycemic agents metformin and glyburide as well as insulin. We also review the evidence for the safety and efficacy of these medications in pregnancy.

Evidence Acquisition: Articles were obtained from PubMed, the ACOG Practice Bulletin on Gestational Diabetes Mellitus, and the SMFM statement on the pharmacological treatment of gestational diabetes.

Results: Insulin does not cross the placenta and has an established safety profile in pregnancy and is therefore considered a first-line treatment for gestational diabetes. Metformin and glyburide have also been shown to be relatively safe in pregnancy but with more limited long-term data. Regarding maternal and fetal outcomes, metformin is superior to glyburide and similar to insulin.

Conclusions and Relevance: Insulin is the preferred pharmacologic treatment according to ACOG. However, SMFM has stated that outcomes with metformin are similar, and it may also be considered as first-line therapy. Both agree that the available data show that metformin is safer and superior to glyburide, and glyburide is no longer recommended as a first-line therapy for the treatment of gestational diabetes.

Target Audience Obstetricians and gynecologists, family physicians.

Learning Objectives: After completing this activity, the learner should be better able to compare the maternal/fetal risks associated with glyburide, metformin, and insulin therapy; describe how to initiate insulin therapy (dosing and type of insulin) in patients who fail initial management; and explain the intrapartum and postpartum treatment of preexisting and gestational diabetes. (Author)

20190607-7*

Congenital heart defects in offspring of women with Type 2 diabetes - a systematic review. Slot A, Eriksen NB, Ringholm L, et al (2019), Danish Medical Journal vol 66, no 6, June 2019, A5543

INTRODUCTION: The risk of congenital heart defects in the offspring of women with Type 2 diabetes is only sparsely described. The aim of this review was to estimate the prevalence of congenital heart defects in offspring of women with Type 2 diabetes in comparison to offspring of women with Type 1 diabetes and to offspring of the background population.

METHODS: This systematic review followed the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) guidelines. A literature search was performed in the PubMed, Embase and Cochrane databases. Studies were included if they were published from 2007 to 2018, comprised a minimum of 200 offspring of women with Type 2 diabetes and examined the prevalence of congenital heart defects.

RESULTS: Five cohort studies with a total of 23,845 offspring of women with Type 2 diabetes were included. The studies were heterogeneous with respect to method of diagnosis and whether terminated pregnancies were included, and a meta-analysis could not be performed. The mean prevalence of congenital heart defects was 44 (range: 26-65) per 1,000 offspring. The mean relative risk was 0.82 (range: 0.53-1.01) compared with offspring of women with Type 1 diabetes, and 3.83 (range: 2.53-5.49) compared with the background population. A positive association was described between the prevalence of congenital heart defects and the maternal glycated

haemoglobin level, but not with medical treatment.
CONCLUSIONS: The risk of congenital heart defects among offspring of women with Type 2 diabetes was comparable to that of offspring of women with Type 1 diabetes and almost four times higher than in the background population.
(20 references) (Author)
Full URL: http://ugeskriftet.dk/dmj/congenital-heart-defects-offspring-women-type-2-diabetes-systematic-review

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20190605-28*

Prevalence of type 2 diabetes mellitus in women of childbearing age in Africa during 2000-2016: a systematic review and meta-analysis. Chivese T, Werfalli MM, Magodoro I, et al (2019), BMJ Open vol 9, no 5, May 2019, e024345

Objectives The aim of this research was to estimate the prevalence of type 2 diabetes mellitus (T2DM), impaired fasting glucose (IFG) and impaired glucose tolerance (IGT), in African women of childbearing age.
Study design Systematic review and meta-analysis of relevant African studies published from January 2000 to December 2016.
Data sources We searched several databases, including EMBASE, MEDLINE, CINAHL, grey literature and references of included studies.
Setting Studies carried out in African communities or any population-based studies were included.
Participants We included studies, carried out in Africa, with non-pregnant women of childbearing age. Studies must have been published between the years 2000 and 2016.
Outcomes The primary outcome was prevalent T2DM. The secondary outcomes were IFG and IGT.
Data extraction and synthesis Two reviewers independently extracted data and, using the adapted Hoy risk of bias tool, independently assessed for risk of bias. We used random-effects meta-analysis models to pool prevalence estimates across studies. We used Cochran's Q statistic and the I2 statistic to assess heterogeneity.
Results A total of 39 studies from 27 countries were included, totaling 52 075 participants, of which 3813 had T2DM. The pooled prevalence of T2DM was 7.2% (95% CI 5.6% to 8.9%) overall and increased with age. The pooled prevalence was 6.0% (95% CI 4.2% to 8.2%) for impaired fasting glycemia while the prevalence of IGT ranged from 0.9% to 37.0% in women aged 15-24 and 45-54 years, respectively. Substantial heterogeneity across studies was not explained by major studies characteristics such as period of publication, rural/urban setting or whether a study was nationally representative or not.
Conclusion This review highlights the need for interventions to prevent and control diabetes in African women of childbearing age, in view of the significant prevalence of T2DM and prediabetes. (Author)

20190517-25*

Follow-up study of neurodevelopment in 2-year-old infants who had suffered from neonatal hypoglycemia. Qiao L-X, Wang J, Yan J-H, et al (2019), BMC Pediatrics vol 19, no 133, 25 April 2019

Background
Neonatal hypoglycemia is tightly related to adverse neurodevelopmental and brain injury outcomes.
Methods
A total of 195 infants who were born from diabetic mothers with a low blood glucose level (< 2.6 mM) within 0.5 h after birth were enrolled in this prospective cohort study. Of these, 157 infants who had neonatal hypoglycemia (group A) were followed up, and this group was further divided into A1 [blood glucose concentration (BGC) < 2.6 mM at < 2 h after birth], A2 (BGC < 2.6 mM at 2-24 h after birth), and A3 (BGC < 2.6 mM at > 24 h after birth). A total of 144 infants whose mothers had no high risk for gestational diabetes mellitus were followed up as the control group during the same period. The neurodevelopment of the infants was evaluated by the Gesell scoring method.
Results
The adaptability in the A2 and A3 subgroups was significantly lower than that in the control group (73.9 ± 6.6 vs. 87.9 ± 11.2; 71.5 ± 8.9 vs. 87.9 ± 11.2, respectively). There were significantly more mothers who used insulin during the perinatal period in A3 than in A1 and A2 (31% vs. 2%; 31% vs. 7.9%, respectively). The mothers of babies in subgroups A2 and A3 gained more weight than those of the control group (15.3 ± 1.9 kg vs. 11.1 ± 2.2 kg; 14.8 ± 2.6 kg vs. 11.1 ± 2.2 kg, respectively).
Conclusions
Long and repeated neonatal hypoglycemia caused poor adaptability. The babies of mothers who used insulin or had a high weight gain during pregnancy were associated with severe or persistent neonatal hypoglycemia.
(32 references) (Author) [Please note: this article is a digital version which may undergo minor changes in the future]
Full URL: https://doi.org/10.1186/s12887-019-1509-4

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20190516-42*

Management of Preexisting Diabetes in Pregnancy: A Review. Alexopoulos A-S, Blair R, Peters AL (2019), JAMA (Journal of the American Medical Association) vol 321, no 18, May 2019, pp 1811-1819

Key Points

Question What are evidence-based approaches to managing preexisting diabetes in pregnancy?

Findings Management considerations vary depending on whether women are in the preconception, pregnancy, or postpartum stage. Optimization of glycemic control prior to pregnancy is a very important step, with a target hemoglobin A1c of less than 6.5% at conception. Insulin is the cornerstone of pharmacotherapy for women with type 1 and type 2 diabetes. Attention to nutrition as well as comorbidities, including obesity, nephropathy, and hypertension, is essential.

Meaning Management of diabetes in pregnant women requires careful attention to glycemic control, medication regimens, and comorbidities and planning throughout all stages before, during, and after pregnancy.

Abstract

Importance The presence of preexisting type 1 or type 2 diabetes in pregnancy increases the risk of adverse maternal and neonatal outcomes, such as preeclampsia, cesarean delivery, preterm delivery, macrosomia, and congenital defects. Approximately 0.9% of the 4 million births in the United States annually are complicated by preexisting diabetes.

Observations Women with diabetes have increased risk for adverse maternal and neonatal outcomes, and similar risks are present with type 1 and type 2 diabetes. Both forms of diabetes require similar intensity of diabetes care. Preconception planning is very important to avoid unintended pregnancies and to minimize risk of congenital defects. Hemoglobin A1c goals are less than 6.5% at conception and less than 6.0% during pregnancy. It is also critical to screen for and manage comorbid illnesses, such as retinopathy and nephropathy. Medications known to be unsafe in pregnancy, such as angiotensin-converting enzyme inhibitors and statins, should be discontinued. Women with obesity should be screened for obstructive sleep apnea, which is often undiagnosed and can result in poor outcomes. Blood pressure goals must be considered carefully because lower treatment thresholds may be required for women with nephropathy. During pregnancy, continuous glucose monitoring can improve glycemic control and neonatal outcomes in women with type 1 diabetes. Insulin is first-line therapy for all women with preexisting diabetes; injections and insulin pump therapy are both effective approaches. Rates of severe hypoglycemia are increased during pregnancy; therefore, glucagon should be available to the patient and close contacts should be trained in its use. Low-dose aspirin is recommended soon after 12 weeks' gestation to minimize the risk of preeclampsia. The importance of discussing long-acting reversible contraception before and after pregnancy, to allow for appropriate preconception planning, cannot be overstated.

Conclusions and Relevance Preexisting diabetes in pregnancy is complex and is associated with significant maternal and neonatal risk. Optimization of glycemic control, medication regimens, and careful attention to comorbid conditions can help mitigate these risks and ensure quality diabetes care before, during, and after pregnancy. (Author)

20190515-73*

The joint effects of obesity and pregestational diabetes on the risk of stillbirth. Browne K, Park BY, Goetzinger KR, et al (2021), Journal of Maternal-Fetal and Neonatal Medicine vol 34, no 3, 2021, pp 332-338

Objective: Obesity and pregestational diabetes (PGDM) may interact to further increase the risk of stillbirth than either risk factors independently. The objective of this study was to determine the risk of stillbirth in pregnancies complicated by both conditions.

Method: This was a retrospective cohort analysis of singleton nonanomalous births using the updated Texas vital records database between 2006 and 2014. Gestational diabetes and hypertensive diseases were additionally excluded from analysis. Analysis was stratified into 10 strata based on BMI class: underweight, normal weight, overweight, obese and morbidly obese, and PGDM. Furthermore, gestational age was stratified into the four periods for analysis: 24-33, 34-36, 37-39, and 40-42 weeks. The rate of stillbirth per 10,000 pregnancies were calculated for each stratum. The risks of stillbirth associated with each BMI class and PGDM were compared to normal weight nondiabetic pregnancies for each gestational period using proportional hazard regression models.

Result: After all exclusions, 3,097,123 births remained for analysis, including 5997 stillbirths. The overall rate of stillbirth increased from 15.0 per 10,000 pregnancies in normal weight pregnancies to 26.7 per 10,000 pregnancies in the morbidly obese group. The rate of stillbirth further increased with coexistence of PGDM to 119.9 per 10,000 pregnancies in the normal weight group and 209.8 per 10,000 pregnancies in the morbidly obese group. Compared to normal weight nondiabetic pregnancies the overall adjusted hazard ratio (aHR) of stillbirth associated with morbid obesity without PGDM was 1.57 [1.38, 1.79]. However, when further complicated by PGDM, the aHR was 6.67 [5.05, 8.81] in normal weight pregnancies and 12.86 [9.36, 17.67] in morbidly obese pregnancies. The highest risk of stillbirth

was seen between 37 and 39 weeks, when the aHR in the diabetic normal weight group was 9.63 [5.65, 16.40] and the aHR in the diabetic morbidly obese group was 25.34 [15.58, 41.22].
Conclusion: PGDM and obesity both independently increased the risk of stillbirth. The joint effect of obesity and PGDM is stronger than the summation or multiplication of the individual effects of each risk factor. (Author)

20190513-63*

Endocrine Emergencies in Obstetrics. Goodier CG (2019), Clinical Obstetrics and Gynecology vol 62, no 2, June 2019, pp 339-346

Endocrine emergencies in pregnancy can be life threatening and are associated with increased morbidity for both the mother and fetus. Thyroid storm, diabetic ketoacidosis, and hypercalcemic crisis require a high clinical suspicion, rapid treatment, and multidisciplinary care to ensure best outcomes. Critical care consultation and intensive care unit admission are often warranted. Fetal testing may initially be concerning; however often improves with correction of the underlying metabolic derangement(s) and delivery is generally avoided until maternal status improves. (26 references) (Author)

Full URL: https://journals.lww.com/clinicalobgyn/Fulltext/2019/06000/Endocrine_Emergencies_in_Obstetrics.16.aspx

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20190510-12*

Controversy: antenatal corticosteroids. Thevathasan I, Said JM (2019), O & G vol 21, no 1, Autumn 2019, pp 21-23

Looks at the use of antenatal corticosteroids in Australia and New Zealand in a variety of situations, including the use of repeat doses, use in the late preterm period and its use in special populations, such as in women with diabetes. (25 references) (JSM)

Full URL: https://www.ogmagazine.org.au/wp-content/uploads/2019/02/Autumn-2019-For-Web.pdf

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20190509-4*

Obstetric and perinatal outcomes in pregnancies complicated by diabetes, and control pregnancies, in Kronoberg, Sweden. Stogianni A, Lendahls L, Landin-Olsson M, et al (2019), BMC Pregnancy and Childbirth vol 19, no 159, 7 May 2019

Background
Diabetes during pregnancy is an increasingly common metabolic disorder, associated with significantly increased risks for both mother and child. Aim of this study was to compare maternal and perinatal outcomes in women with pregestational (PDM) type 1 (T1DM), type 2 diabetes (T2DM), gestational diabetes mellitus (GDM) and compare these to pregnancies not complicated with diabetes. This study also evaluated a specifically organized care-model mostly involving specialist diabetes nurses.
Methods
Retrospective population-based records review 2009-2012. Rates of maternal (preeclampsia, pre-term delivery, cesarean section (CS)) and fetal outcomes (large for gestational age (LGA), macrosomia, congenital malformations/intrauterine death) were assessed and potential predisposing or contributing factors as maternal age, ethnicity, obesity, weight gain, parity, HbA1c levels, insulin types and doses.
Results
Among 280 pregnancies 48 were PDM, 97 GDM and 135 without diabetes. Within the group with diabetes, early-pregnancy BMI was higher ($p = 0.0001$), pregnancy weight gain lower (11.1 ± 6.7 kg vs 13.1 ± 7.1 kg, $p = 0.005$), more delivered preterm ($p = 0.0001$), by CS ($p = 0.05$), and had more LGA neonates ($p = 0.06$) than the group without diabetes. Among pregnancies with diabetes, GDM mothers gained less weight (9.9 kg vs 13.5 kg) ($p = 0.006$), and rates of CS ($p = 0.03$), preterm deliveries ($p = 0.001$) and LGA ($p = 0.0001$) were not increased compared to PDM; More T1DM infants were LGA, 60% vs. 27% in T2DM. In pregnancies with diabetes obesity, excessive weight gain and multiparity were associated with increased risk of LGA neonates, and mother's type of diabetes and gestational week were associated with higher rates of CS.
Conclusion
Weight gain during pregnancy was lower in pregnancies with diabetes and prevalence of LGA, CS and preterm deliveries in GDM was not elevated, also for T2DM, except increased prevalence of LGA in T1DM that warrants increased clinical attention, indicating that this model of antenatal diabetes care may have contributed to improved maternal and fetal outcomes.
(37 references) (Author) [Please note: this article is a digital version which may undergo minor changes in the future]

Full URL: https://doi.org/10.1186/s12884-019-2269-8

20190425-72*

Association between a medical nutrition therapy program and eating behavior with gestational weight gain in women with diabetes. Garduño-Alanis A, Torres-Mejía G, Nava-Díaz P, et al (2020), Journal of Maternal-Fetal and Neonatal Medicine vol 33, no 24, 2020, pp 4049-4054

Introduction: To assess the association of medical nutrition therapy (MNT) consultations and eating behavior with gestational weight gain (GWG) in Mexican women with type 2 diabetes mellitus (T2DM) and gestational diabetes mellitus (GDM).

Material and methods: Cross-sectional study conducted at (Blinded for Review) from 2013 to 2014. Fifty-seven patients with T2DM or GDM were invited to participate. The dependent variable was GWG and the main independent variables were MNT and eating behaviors. Data were obtained from medical records or interviews. Multiple linear regression models were used to assess associations.

Results: Per each additional MNT consultation, GWG was reduced by 1.2 kg (β = −1.2; 95% CI: −2, −0.3; p = .007). After adjusting for age, in women with normal pregestational weight, for each unit, increase in the EE behavior index, there was a GWG increase of 2.8 kg (β = 2.8; 95% CI: 1.2, 4.4; p = .003).

Conclusions: This study reinforces the need for additional research to determine how eating behaviors are related to GWG during pregnancy. (Author)

20190425-40*

Hyperglycemia recognised in early pregnancy is phenotypically type 2 diabetes mellitus not gestational diabetes mellitus: a case control study. Agha-Jaffar R, Oliver NS, Kostoula M, et al (2020), Journal of Maternal-Fetal and Neonatal Medicine vol 33, no 23, 2020, pp 3977-3983

Objective: Gestational diabetes mellitus is defined as 'diabetes recognized in the second or third trimester that is not clearly overt diabetes'. Evidence relating to women with hyperglycemia early in pregnancy is limited. We aimed to evaluate women diagnosed with hyperglycemia early in pregnancy (eGDM) and compared them to those with pregestational established type 2 diabetes mellitus (T2DM) and gestational diabetes diagnosed routinely at 24-28-week gestation (rtGDM) to determine if the length of exposure to hyperglycemia adversely affected outcomes.

Methods: Forty consecutive women with eGDM who attended a multidisciplinary antenatal clinic were reviewed. Two separate BMI-matched control groups were identified, recognized pregestational T2DM (n = 80) and rtGDM (n = 80). Baseline demographics and outcomes were compared.

Results: A higher proportion of women in the eGDM and T2DM group required insulin and the incidence of hypertensive disorders was similarly increased compared with the rtGDM group (88.6, 77.0 versus 8.1%, p < .001 and 42.5%, 37.5 versus 12.5% p < .001, respectively). The proportion of infants born small for gestational age varied (eGDM 11.1%, T2DM 13.0%, and rtGDM 2.5%, p=.049). Postpartum, 7.5% of eGDM women were diagnosed with T2DM versus 1.3% in the rtGDM group (p<.001).

Conclusions: These novel data demonstrate that the length of exposure to glucose adversely affects materno-foetal outcomes independent of maternal adiposity. (Author)

20190416-83*

Diabetes in pregnancy in associations with perinatal and postneonatal mortality in First Nations and non-Indigenous populations in Quebec, Canada: population-based linked birth cohort study. Chen L, Wang W, Auger N, et al (2019), BMJ Open vol 9, no 4, April 2019, e025084

Objective Both pregestational and gestational diabetes mellitus (PGDM, GDM) occur more frequently in First Nations (North American Indians) pregnant women than their non-Indigenous counterparts in Canada. We assessed whether the impacts of PGDM and GDM on perinatal and postneonatal mortality may differ in First Nations versus non-Indigenous populations.

Design A population-based linked birth cohort study.

Setting and participants 17 090 First Nations and 217 760 non-Indigenous singleton births in 1996-2010, Quebec, Canada.

Main outcome measures Relative risks (RR) of perinatal and postneonatal death. Perinatal deaths included stillbirths and neonatal (0-27 days of postnatal life) deaths; postneonatal deaths included infant deaths during 28-364 days of life.

Results PGDM and GDM occurred much more frequently in First Nations (3.9% and 10.7%, respectively) versus non-Indigenous (1.1% and 4.8%, respectively) pregnant women. PGDM was associated with an increased risk of perinatal death to a much greater extent in First Nations (RR=5.08[95% CI 2.99 to 8.62], p<0.001; absolute risk (AR)=21.6 [8.6-34.6] per 1000) than in non-Indigenous populations (RR=1.76[1.17, 2.66], p=0.003; AR=4.2[0.2, 8.1] per 1000). PGDM was associated with an increased risk of postneonatal death in non-Indigenous (RR=3.46[1.71, 6.99], p<0.001; AR=2.4[0.1, 4.8] per 1000) but not First Nations (RR=1.16[0.28, 4.77], p=0.35) infants. Adjusting for maternal and

pregnancy characteristics, the associations were similar. GDM was not associated with perinatal or postneonatal death in both groups.
Conclusions The study is the first to reveal that PGDM may increase the risk of perinatal death to a much greater extent in First Nations versus non-Indigenous populations, but may substantially increase the risk of postneonatal death in non-Indigenous infants only. The underlying causes are unclear and deserve further studies. We speculate that population differences in the quality of glycaemic control in diabetic pregnancies and/or genetic vulnerability to hyperglycaemia's fetal toxicity may be contributing factors. (Author)
Full URL: https://doi.org/10.1136/bmjopen-2018-025084

20190405-14*

Improving pregnancy outcomes in women with diabetes mellitus: modern management. Ringholm L, Damm P, Mathiesen ER (2019), Nature Reviews Endocrinology 4 April 2019, online

Women with pre-existing (type 1 or type 2) diabetes mellitus are at increased risk of pregnancy complications, such as congenital malformations, preeclampsia and preterm delivery, compared with women who do not have diabetes mellitus. Approximately half of pregnancies in women with pre-existing diabetes mellitus are complicated by fetal overgrowth, which results in infants who are overweight at birth and at risk of birth trauma and, later in life, the metabolic syndrome, cardiovascular disease and type 2 diabetes mellitus. Strict glycaemic control with appropriate diet, use of insulin and, if necessary, antihypertensive treatment is the cornerstone of diabetes mellitus management to prevent pregnancy complications. New technology for managing diabetes mellitus is evolving and is changing the management of these conditions in pregnancy. For instance, in Europe, most women with pre-existing diabetes mellitus are treated with insulin analogues before and during pregnancy. Furthermore, many women are on insulin pumps during pregnancy, and the use of continuous glucose monitoring is becoming more frequent. In addition, smartphone application technology is a promising educational tool for pregnant women with diabetes mellitus and their caregivers. This Review covers how modern diabetes mellitus management with appropriate diet, insulin and antihypertensive treatment in patients with pre-existing diabetes mellitus can contribute to reducing the risk of pregnancy complications such as congenital malformations, fetal overgrowth, preeclampsia and preterm delivery. (Author)

20190403-44*

Associations of Maternal Diabetes and Body Mass Index With Offspring Birth Weight and Prematurity. Kong L, Nilsson IAK, Gissler M, et al (2019), JAMA Pediatrics vol 173, no 4, April 2019, pp 371-378

Key Points
Question Are maternal diabetes disorders, alone or with maternal underweight or obesity, associated with the offspring being large for gestational age and/or preterm at birth?
Findings In this cohort study of 649 043 births, maternal diabetes treated with insulin was associated with a high risk for the offspring to be large and/or preterm at birth, regardless of prepregnancy body mass index, whereas type 2 diabetes not treated with insulin was associated with a mild to moderate, albeit statistically significant, risk that was stronger in mothers who were obese or severely obese. Gestational diabetes was associated with mild increases in birth size.
Meaning Maternal diabetes, mainly when treated with insulin, appears to be associated with a greater risk for large birth weight and preterm offspring.
Abstract
Importance Maternal obesity, pregestational type 1 diabetes, and gestational diabetes have been reported to increase the risks for large birth weight and preterm birth in offspring. However, the associations for insulin-treated diabetes and non-insulin-treated type 2 diabetes, as well as the associations for joint diabetes disorders and maternal body mass index, with these outcomes are less well documented.
Objective To examine associations of maternal diabetes disorders, separately and together with maternal underweight or obesity, with the offspring being large for gestational age and/or preterm at birth.
Design, Setting, and Participants This population-based cohort study used nationwide registries to examine all live births (n = 649 043) between January 1, 2004, and December 31, 2014, in Finland. The study and data analysis were conducted from April 1, 2018, to October 10, 2018.
Exposures Maternal prepregnancy body mass index, pregestational diabetes with insulin treatment, pregestational type 2 diabetes without insulin treatment, and gestational diabetes.
Main Outcomes and Measures Offspring large for gestational age (LGA) at birth and preterm delivery. Logistic regression models were adjusted for offspring birth year; parity; and maternal age, country of birth, and smoking status.

Results Of the 649 043 births, 4000 (0.62%) were delivered by mothers who had insulin-treated diabetes, 3740 (0.57%) by mothers who had type 2 diabetes, and 98 568 (15.2%) by mothers who had gestational diabetes. The mean (SD) age of mothers was 30.15 (5.37) years, and 588 100 mothers (90.6%) were born in Finland. Statistically significant interactions existed between maternal body mass index and diabetes on offspring LGA and prematurity (insulin-treated diabetes: LGA F = 3489.0 and prematurity F = 1316.4 [P < .001]; type 2 diabetes: LGA F = 147.3 and prematurity F = 21.9 [P < .001]; gestational diabetes: LGA F = 1374.6 and prematurity F = 434.3 [P < .001]). Maternal moderate obesity, compared with normal-weight mothers with no diabetes, was associated with a mildly increased risk of having an offspring LGA (1069 [3.5%] vs 5151 [1.5%]; adjusted odds ratio [aOR], 2.45; 95% CI, 2.29-2.62), and mothers with insulin-treated diabetes had markedly elevated risks of having an offspring LGA (1585 [39.6%] vs 5151 [1.5%]; aOR, 43.80; 95% CI, 40.88-46.93) and a preterm birth (1483 [37.1%] vs 17 481 [5.0%]; aOR, 11.17; 95% CI, 10.46-11.93). Mothers who were moderately obese with type 2 diabetes were at increased risks of LGA (132 [16.4%] vs 5151 [1.5%]; aOR, 12.44; 95% CI, 10.29-15.03) and prematurity (83 [10.3%] vs 17 481 [5.0%]; aOR, 2.14; 95% CI, 1.70-2.69). Mothers who were moderately obese with gestational diabetes had a milder risk of LGA (1195 [6.7%] vs 5151 [1.5%]; aOR, 4.72; 95% CI, 4.42-5.04). Among spontaneous deliveries, the risks were strongest for moderately preterm births, but insulin-treated diabetes was associated with an increased risk also for very and extremely preterm births. Conclusions and Relevance Maternal insulin-treated diabetes appeared to be associated with markedly increased risks for LGA and preterm births, whereas obesity in mothers with type 2 diabetes had mild to moderately increased risks; these findings may have implications for counseling and managing pregnancies. (Author)

20190320-24

The effects of expressing antenatal colostrum in women with diabetes in pregnancy: A retrospective cohort study.
Casey JRR, Banks J, Braniff K, et al (2019), Australian and New Zealand Journal of Obstetrics and Gynaecology (ANZJOG) vol 59, no 6, December 2019, pp 811-818

Background
Some women with diabetes in pregnancy express and store colostrum in the antenatal period for the purposes of preventing and treating neonatal hypoglycaemia.
Aims
Our primary aim was to compare rates of neonatal hypoglycaemia in babies born to mothers who express and store antenatal colostrum to babies born to mothers who do not.
Materials and methods
Retrospective cohort study involving 357 women with diabetes in pregnancy, who had live, singleton births delivered after 36 weeks gestation, in a regional hospital in North Queensland (2014-2015). Multivariable binary logistic regression modelling identified independent characteristics associated with primary outcomes.
Results
Eighty women (23%) expressed antenatal colostrum and 223 (62%) did not. One hundred and thirty-one babies (37%) were diagnosed with hypoglycaemia. Aboriginal and Torres Strait Islander women were less likely to express than Caucasian women (odds ratio (OR) 0.10, 95% confidence interval (CI) 0.01-0.77). There were no significant differences in the rates of hypoglycaemia, or median blood glucose levels in babies born to mothers who expressed antenatal colostrum compared to babies born to mothers who did not express. Babies born to mothers who expressed were significantly less likely to receive formula in hospital compared to babies born to mothers who did not (OR 0.12, 95% CI 0.05-0.32).
Conclusions
We found no independent association of expressing antenatal colostrum on rates of neonatal hypoglycaemia or median blood glucose levels. Expressing antenatal colostrum may have some benefits to the newborn such as reduced formula consumption in hospital. Further research into other methods of reducing neonatal hypoglycaemia appears warranted.
(26 references) (Author)

20190306-45*

Abstracts of the Diabetes UK Professional Conference 2019: Pregnancy. Diabetes UK Professional Conference 2019 (2019), Diabetic Medicine vol 36, no S1, March 2019, pp 22-24

Summary of abstracts from the Diabetes UK Professional Conference 2019 relating to pregnancy, including glucose control in women with gestational diabetes; preconception diabetes management; the risks and incidence of Type 2 diabetes for women with gestational diabetes; cost savings from introducing continuous glucose monitoring for pregnant women with Type 1 diabetes; and the progression of autoantibody positive gestational diabetes to Type 1 diabetes. (CAP)

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20190305-46*

An audit on a routine antenatal nonstress testing program in pregnant women with preexisting diabetes. Jørgensen IL, Vestgaard M, Àsbjörnsdóttir B, et al (2019), Acta Obstetricia et Gynecologica Scandinavica vol 98, no 9, September 2019, pp 1148-56

Introduction

The objective was to evaluate the effectiveness of routine (planned) antenatal nonstress tests (NSTs) in pregnant women with preexisting diabetes.

Material and methods

A retrospective single-center study of 642 consecutive pregnancies in women with preexisting diabetes who gave birth to a singleton ≥ 22 weeks. Weekly planned NSTs were commenced at 33-35 weeks. In pregnancies with maternal-fetal complications, the initiation and frequency of the planned NST were individualized. Daily maternal assessment of fetal activity was recommended from 28 weeks, and decreased fetal activity indicated an unplanned NST. Data were collected from medical records and local and regional databases.

Results

In total, 3016 planned NSTs were performed, with a median of 5 (range 0-12) tests per pregnancy. Ninety-five planned NSTs (3.1%) were abnormal, a finding confirmed by retesting the same day in eight cases (8.4%), thus leading to delivery. Complications were present in seven of these eight pregnancies, while no fetal movements for the last three days was reported when the planned NST was performed in the eighth pregnancy. When specifically asked, five of the eight women stated that they had observed decreased fetal activity preceding the planned NST. In 86 pregnancies (13.4%), maternal perception of decreased fetal activity indicated in total 127 unplanned NSTs. The combination of decreased fetal activity and further obstetrical assessment led to delivery in 10 of these pregnancies (11.6%). One stillbirth occurred at 37 weeks in a pregnancy complicated by fetal achondroplasia and polyhydramnios, where the weekly planned NSTs had been normal, giving a stillbirth rate of 1.6/1000.

Conclusions

Routine use of planned antenatal NSTs does not appear to be indicated in pregnancies in women with preexisting diabetes in the absence of maternal-fetal complications.

(Author)

20190226-60*

Pregnancy And Neonatal Diabetes Outcomes in Remote Australia: the PANDORA study-an observational birth cohort. Maple-Brown L, Lee I-L, Longmore D, et al (2019), International Journal of Epidemiology vol 48, no 1, February 2019, pp 307-318

Background

In Australia's Northern Territory, 33% of babies are born to Indigenous mothers, who experience high rates of hyperglycemia in pregnancy. We aimed to determine the extent to which pregnancy outcomes for Indigenous Australian women are explained by relative frequencies of diabetes type [type 2 diabetes (T2DM) and gestational diabetes (GDM)].

Methods

This prospective birth cohort study examined participants recruited from a hyperglycemia in pregnancy register. Baseline data collected were antenatal and perinatal clinical information, cord blood and neonatal anthropometry. Of 1135 women (48% Indigenous), 900 had diabetes: 175 T2DM, 86 newly diagnosed diabetes in pregnancy (DIP) and 639 had GDM. A group of 235 women without hyperglycemia in pregnancy was also recruited.

Results

Diabetes type differed for Indigenous and non-Indigenous women (T2DM, 36 vs 5%; DIP, 15 vs 7%; GDM, 49 vs 88%, $p < 0.001$). Within each diabetes type, Indigenous women were younger and had higher smoking rates. Among women with GDM/DIP, Indigenous women demonstrated poorer birth outcomes than non-Indigenous women: large for gestational age, 19 vs 11%, $p = 0{\cdot}002$; neonatal fat 11.3 vs 10.2%, $p < 0.001$. In the full cohort, on multivariate regression, T2DM and DIP were independently associated (and Indigenous ethnicity was not) with pregnancy outcomes.

Conclusions

Higher rates of T2DM among Indigenous women predominantly contribute to absolute poorer pregnancy outcomes among Indigenous women with hyperglycemia. As with Indigenous and minority populations globally, prevention or delay of type 2 diabetes in younger women is vital to improve pregnancy outcomes and possibly to improve the long-term health of their offspring. (Author)

20190221-84*

Caudal regression syndrome in a fetus of a glucokinase-maturity-onset diabetes of the young pregnancy. Taylor RAM,

Mackie A, Mogra R, et al (2019), Diabetic Medicine vol 36, no 2, February 2019, pp 252-255

Background

Glucokinase-maturity-onset diabetes of the young (GCK-MODY) is a form of diabetes caused by heterozygous inactivating mutations in the GCK gene. Affected individuals maintain their fasting glucose levels at a higher set point (5.4-8.3 mmol/l) than the general population. Hyperglycaemia in women with Type 1 or Type 2 diabetes is known to confer increased risk of fetal congenital abnormalities. The association between GCK-MODY and congenital abnormalities, however, remains uncertain.

Case report

A 35-year-old woman in her third pregnancy was diagnosed with gestational diabetes at 13 weeks' gestation (fasting blood glucose 6.0 mmol/L, 1-h blood glucose 9.2 mmol/l, 2-h blood glucose 7.3 mmol/l). The morphology scan at 19+2 weeks' gestation showed a Type III sacral agenesis. The woman elected to terminate the pregnancy. Her postpartum oral glucose tolerance test was suggestive of GCK-MODY (fasting blood glucose 7.4 mmol/l, 1-h blood glucose 9.3 mmol/l, 2-h blood glucose 7.3 mmol/l). Mutation analysis of the GCK gene identified a novel heterozygous GCK missense mutation, p.V199M, classified as likely pathogenic, providing molecular confirmation of the suspected GCK-MODY diagnosis.

Discussion

Sacral agenesis is a rare form of sacral abnormality affecting 0.005% to 0.1% of pregnancies. It is a subtype of the caudal regression sequence, a cardinal feature of diabetic embryopathy. This case raises the question as to whether hyperglycaemia in GCK-MODY may increase the risk of fetal caudal regression syndrome as reported in women with pre-existing diabetes mellitus. Improved diagnostic rates of GCK-MODY, and MODY registers that include pregnancy outcomes, are important to further elucidate risk of congenital abnormalities in GCK-MODY. (Author)

20190221-82*

The association between vascular complications during pregnancy in women with Type 1 diabetes and congenital malformations. Samii L, Kallas-Koeman M, Donovan LE, et al (2019), Diabetic Medicine vol 36, no 2, February 2019, pp 237-242

Aims

To assess the association between vascular complications of diabetes and the risk of congenital malformations in pregnant women with Type 1 diabetes.

Methods

We conducted an observational retrospective cohort study in women with Type 1 diabetes who received care consecutively from three tertiary care diabetes-in-pregnancy clinics in Calgary, Alberta, Canada. Multivariable logistic regression was used to assess the association between vascular complications (retinopathy, nephropathy and pre-existing hypertension) and congenital malformations in offspring of women with Type 1 diabetes.

Results

Of 232 women with Type 1 diabetes, 49 (21%) had at least one vascular complication and there were 52 babies with congenital malformations. Maternal age (31.8 ± 5.0 vs. 29.4 ± 4.7 years, $P < 0.01$), diabetes duration (20.9 ± 6.7 vs. 11.2 ± 7.4 years, $P < 0.01$) and pre-eclampsia rate (12.5% vs. 1.3%, $P < 0.01$) were higher in mothers with vascular complications than in those without. Multivariable analyses showed that vascular complications were not associated with an increased risk of congenital malformations (odds ratio 1.16, 95% confidence interval 0.46 to 2.88).

Conclusions

Vascular complications are common, occurring in one-fifth of pregnant women with Type 1 diabetes, and in this study do not appear to be associated with an increased risk of congenital malformations in children. (Author)

20190221-73*

Higher rates of large-for-gestational-age newborns mediated by excess maternal weight gain in pregnancies with Type 1 diabetes and use of continuous subcutaneous insulin infusion vs multiple dose insulin injection. Hauffe F, Schaefer-Graf UM, Fauzan R, et al (2019), Diabetic Medicine vol 36, no 2, February 2019, pp 158-166

Aims

To compare glycaemic control, maternal and neonatal outcomes in pregnancies with Type 1 diabetes, managed either by continuous subcutaneous insulin infusion, multiple daily insulin injection or switch from multiple daily insulin injection (MDI) to continuous subcutaneous insulin infusion (CSII) in early pregnancy.

Research design and methods

Data from 339 singleton pregnancies were retrospectively reviewed. HbA1c values were measured preconception and in each trimester. In a secondary analysis, use of CSII pre-pregnancy was compared with initiation of CSII during pregnancy.

Results

MDI was used in 140 pregnancies (41.3%) and CSII was used in 199 (58.7%), including 34 pregnancies (10.0%) during which the women switched to CSII. In pregnancies during which CSII was used duration of diabetes [median (interquartile range) 16.0 (8.0-23.0) years vs 11.0 (5.5-17.5) years; P<0.001] was longer, and the Institute of Medicine recommendations for appropriate weight gain were exceeded more often (64.8% vs. 50.8%; P=0.01). CSII use and pre-pregnancy BMI were independent predictors of excess weight gain. There was no difference in glucose control, but CSII was associated with higher birth weight [median (interquartile range) 3720 (3365-4100) g vs 3360 (3365-4100) g; P<0.001] and higher large-for-gestational-age (LGA) rate (44.7% vs. 33.6%; P=0.04) than MDI. HbA1c concentration in the third trimester and excess weight gain were predictive of LGA infants [odds ratio 2.33 (95% CI 1.54-3.51); P<0.001 and 1.89 (95% CI 1.02-3.51); P=0.04]. In pregnancies where CSII therapy was initiated in the first trimester and in those with pre-pregnancy use, similar glucose control and outcome was achieved.

Conclusions

There was no advantage of CSII with respect to glycaemic control and neonatal outcomes. The rate of LGA neonates was higher in the CSII group, possibly mediated by excess maternal weight gain, which was more frequent than in women treated with MDI. (Author)

20190214-63*

Postpartum placental CT angiography in normal pregnancies and in those complicated by diabetes mellitus. Thunbo MØ, Sinding M, Bogaard P, et al (2018), Placenta vol 69, September 2018, pp 20-25

Introduction

Pregnancy complicated by diabetes mellitus (DM) is a central obstetric problem often complicated by fetal macrosomia and increased risk of intrapartum asphyxia. This risk might be explained by fetoplacental vascular abnormalities. This study aimed to investigate the fetoplacental vascular volume by placental CT angiography in normal pregnancies and in pregnancies complicated by type 1 DM (T1DM), diet controlled gestational DM (GDMd), and insulin treated gestational DM (GDMi).

Methods

Postpartum, barium contrast enhanced placental CT angiography was performed in 27 normal pregnancies and 25 DM pregnancies (8 T1DM, 8 GDMd, and 9 GDMi). The fetoplacental vascular volume/placenta weight (FVV/PW)-ratio and fetoplacental vascular volume/birth weight (FVV/BW)-ratio of each diabetic group were compared to the normal group with multiple regression analysis adjusted for GA. In all pregnancies a standardized histopathological placental examination was performed postpartum.

Results

In normal pregnancies, the fetoplacental vascular volume increased with GA ($p < 0.001$), placental weight ($p < 0.001$), and birth weight ($p < 0.001$). In T1DM and GDMi pregnancies, the gestational age adjusted placental weight and the birth weight were increased when compared to normal pregnancies ($p < 0.05$). The FVV/BW-ratio was significantly reduced in both T1DM and GDMi pregnancies when compared to normal pregnancies ($p = 0.003$ and $p = 0.009$, respectively).

Discussion

This study demonstrates, that in insulin treated DM pregnancies the fetus as well as the placenta is larger than normal. However, despite a large placenta, a relatively smaller fetoplacental vascular volume supplies the macrosomic fetus. This finding might explain why fetuses from insulin treated DM pregnancies have high vulnerability to intrauterine and intrapartum asphyxia. (Author)

20190205-91*

The prevalence of congenital malformations is still higher in pregnant women with pregestational diabetes despite near-normal HbA1c: a literature review. Eriksen NB, Damm P, Mathiesen ER, et al (2019), Journal of Maternal-Fetal and Neonatal Medicine vol 32, no 8, 2019, pp 1225-1229

Aims/hypothesis: We assessed the association between congenital malformations and maternal hyperglycemia in pregnant women with pregestational (type 1 or type 2) diabetes and investigated if the rate of congenital malformations was similar in women with near-normal glycemic control compared to the background population. We also assessed the association between congenital malformations and maternal hyperglycemia in pregnant women with pregestational diabetes with special focus on women with near-normal HbA1c in early pregnancy.

Materials and methods: This is a literature review based on an electronic literature search of the databases PubMed, Cochrane, Embase and Web of Science conducted in July 2017 using the search terms diabetes, pregnancy, HbA1c or glycemic control and congenital anomaly or congenital anomaly. We included original papers in English published after 1997 with data on congenital malformations and HbA1c in at least 250 women with pregestational diabetes.

Results: Nine papers with in total 6225 women with type 1 diabetes and 2334 women with type 2 diabetes were

included. The prevalence of congenital malformations was 6.4% in women with type 1 diabetes and 4.3% in women with type 2 diabetes and for the combined group of women with pregestational diabetes, the relative risk compared to the background population was 3.2. In women with HbA1c < 53 mmol/mol (7.0%) in early pregnancy or HbA1c 53-64 mmol/mol (7.0-8.0%) the prevalence of congenital malformations was 4.3 and 3.7%, respectively, with a relative risk of 2.2 and 1.9, respectively.
Conclusions: In pregnant women with pregestational diabetes the prevalence of congenital abnormalities was threefold higher in women with pregestational diabetes compared to the background population. However, HbA1c below 53 mmol/mol (7.0%) in early pregnancy was also associated with a two times increased risk of congenital malformations compared to the background population. (27 references) (Author)

20190124-202*

Obesity and abnormal glucose tolerance in the offspring of mothers with diabetes. Kawasaki M, Arata N, Ogawa Y (2018), Current Opinion in Obstetrics and Gynecology vol 30, no 6, December 2018, pp 361-368

Purpose of review
Type 2 diabetes and obesity during childhood, puberty, and adulthood have become more common. This trend presents a global problem in terms of public health and health economics. Associations between intrauterine exposure to hyperglycemia, obesity, and abnormal glucose tolerance (AGT) in offspring have been reported in populations at high risk of diabetes such as Pima Indians, but these associations have not been established in other groups. In this review, we summarize the evidence on obesity and AGT in the offspring of mothers with diabetes.
Recent findings
Although there are many reports indicating that the incidence of obesity or overweight is higher in the offspring of mothers with gestational diabetes, there is no consensus on whether maternal prepregnancy obesity has a larger impact than intrauterine exposure to hyperglycemia. While the risk of AGT or type 2 diabetesin the offspring of mothers with gestational diabetes is thought to increase after puberty, the incidence of AGT is elevated by the age of 7 years in the offspring of mothers with untreated gestational diabetes. Maternal gestational diabetes is a risk factor for AGT or type 2 diabetes independent of maternal prepregnancy BMI. When the offspring of women who had gestational diabetes and received therapeutic intervention in two randomized controlled studies were followed, the prevalence of obesity and impaired fasting glucose was lower in some 7-year-old girls, but the effect of maternal intervention was limited. The risk of obesity or overweight is higher in the offspring of mothers with type 1 diabetes, even after adjustment for maternal prepregnancy BMI. The risk of type 2 diabetes in such offspring is also higher. Although the offspring of mothers with type 2 diabetes are likely to be at high risk for type 2 diabetes, there are only limited reports supporting this hypothesis.
Summary
Intrauterine exposure to hyperglycemia is associated with obesity and AGT among offspring. The present review suggests that these associations might depend on the type of maternal diabetes, that is, the timing and degree of exposure to hyperglycemia. There are only a small number of studies on the effect of therapeutic interventions for maternal diabetes on metabolism in the offspring. (Author)

20190124-109*

Association of uterine rupture with pregestational diabetes in women undergoing trial of labor after cesarean delivery. McLaren Jr RA, Ndubizu C, Atallah F, et al (2020), Journal of Maternal-Fetal and Neonatal Medicine vol 33, no 16, 2020, pp 2697-2703

Objective: To evaluate the association of pregestational diabetes with uterine rupture during a trial of labor with one prior cesarean delivery.
Study design: A retrospective study of women undergoing a trial of labor after cesarean. The study group consisted of women with pregestational diabetes and the control group was women without pregestational diabetes. Primary outcome was a uterine rupture. Data were extracted from the USA. Natality Database from 2012 to 2016. Maternal and neonatal outcomes were analyzed. Multivariable logistic regression analysis was used to estimate risks of uterine rupture and maternal and neonatal outcomes.
Results: There were 359,504 women undergoing labor after cesarean, with 3508 women with pregestational diabetes and 355,996 without. The prevalence of uterine rupture among women with pregestational diabetes undergoing labor after cesarean was 0.5%, while among women without pregestational diabetes, it was 0.2% (adjusted odds ratio [OR] 2.03 [95% CI 1.18-3.51]; p = .01). There was an increased risk of unplanned hysterectomy among pregnancies complicated by pregestational diabetes (adjusted OR 3.06 [95% CI 1.41-6.66]).
Conclusion: Women undergoing a trial of labor, who have pregestational diabetes had a higher rate of uterine rupture than women without a history of pregestational diabetes. (Author)

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20190123-61*

Health care and risk of adverse pregnancy outcomes among diabetic women: an updated meta-analysis. Xie GH, Zheng Z, Liu T, et al (2019), Archives of Gynecology and Obstetrics vol 299, no 3, March 2019, pp 891-9

Purpose

Diabetic women appear to have adverse pregnancy outcomes. Although there were two meta-analyzes that examined the association between health care and adverse pregnancy outcomes, their results were limited because they only included congenital anomaly and perinatal mortality, and they did not clarify the detailed situations of diabetes and health care. This meta-analysis aims to completely evaluate the effects of health care in improving adverse pregnancy outcomes among diabetic mothers.

Methods

CNKI, EMBASE, Web of Science, and PubMed databases were searched for eligible studies up to December 2017, without any restrictions. Relevant cohort studies characterizing the relationship between health care and adverse pregnancy outcomes were selected for inclusion in the meta-analysis. We also screened the reference list of relevant studies. The fixed-effect models or random-effect models were used to calculate the risk estimates. The potential sources of heterogeneity were explored by stratified and sensitivity analyzes.

Results

Twenty-one studies with 6685 cases were included in our analysis. Health care was associated with significantly decreased risk of congenital anomaly (RR 0.237; 95% CI 0.166-0.338), perinatal death (RR 0.457; 95% CI 0.294-0.712), large for gestational age (LGA) (RR 0.794; 95% CI 0.640-0.986), and neonatal hypoglycemia (RR 0.672; 95% CI 0.486-0.929). Publication bias was not found in most results, with the exception of congenital anomaly and small for gestational age (SGA).

Conclusion

Health care is associated with decreased risk of congenital anomaly, perinatal death, LGA, neonatal hypoglycemia. (Author)

20190123-18

Causes of stillbirths in diabetic and gestational diabetes pregnancies at a NSW tertiary referral hospital. Wang M, Athayde N, Padmanabhan S, et al (2019), Australian and New Zealand Journal of Obstetrics and Gynaecology (ANZJOG) vol 59, no 4, August 2019, pp 561-566

Background

Diabetes in pregnancy may result in stillbirth or neonatal death.

Aim

This audit examined stillbirths of mothers with pre-existing diabetes in pregnancy (DIP) and gestational diabetes (GDM) to determine maternal and diabetic characteristics implicated in these deaths.

Materials and Methods

A retrospective cohort study was conducted to identify stillbirths occurring in diabetic pregnancies at Westmead Hospital during 2006-2017. Medical records were reviewed to obtain data relating to maternal factors, diabetes history, glycaemic control and cause of death.

Results

There were 37 women (seven with type 1 diabetes [T1DM], 11 with type 2 diabetes [T2DM] and 19 with GDM) who had 38 stillbirths. The leading cause of stillbirth was lethal congenital malformations in nine cases, followed by placental and umbilical abnormalities in six, intra-uterine growth restriction (IUGR) in six, and obstetric factors in four cases. Malformations were predominantly cardiovascular (n = 7), musculoskeletal (n = 5) and gastrointestinal (n = 4). There was no difference in the proportion of stillbirths related to malformations between the DIP and GDM groups (P = 0.22). In the pre-conception period or first trimester, all T1DM subjects and all but two T2DM subjects had HbA1c >7% or there was no measurement. HbA1c was >7% in 6/7 T1DM subjects and 7/11 T2DM subjects at some stage during the pregnancy.

Conclusion

Stillbirth remains a problem in diabetic pregnancy in the 21st century. Lethal malformations, placental abnormalities and IUGR were the leading causes of stillbirth related to diabetes. Pre-conception counselling and planning to achieve better glycaemic control in pregnancy needs to be improved. (Author)

20190122-7*

Development and standardization of an improved type 1 diabetes genetic risk score for use in newborn screening and

incident diagnosis. Sharp SA, Rich SS, Wood AR, et al (2019), Diabetes Care vol 42, no 2, February 2019, pp 200-207

OBJECTIVE Previously generated genetic risk scores (GRSs) for type 1 diabetes (T1D) have not captured all known information at non-HLA loci or, particularly, at HLA risk loci. We aimed to more completely incorporate HLA alleles, their interactions, and recently discovered non-HLA loci into an improved T1D GRS (termed the 'T1D GRS2') to better discriminate diabetes subtypes and to predict T1D in newborn screening studies.

RESEARCH DESIGN AND METHODS In 6,481 case and 9,247 control subjects from the Type 1 Diabetes Genetics Consortium, we analyzed variants associated with T1D both in the HLA region and across the genome. We modeled interactions between variants marking strongly associated HLA haplotypes and generated odds ratios to create the improved GRS, the T1D GRS2. We validated our findings in UK Biobank. We assessed the impact of the T1D GRS2 in newborn screening and diabetes classification and sought to provide a framework for comparison with previous scores.

RESULTS The T1D GRS2 used 67 single nucleotide polymorphisms (SNPs) and accounted for interactions between 18 HLA DR-DQ haplotype combinations. The T1D GRS2 was highly discriminative for all T1D (area under the curve [AUC] 0.92; P < 0.0001 vs. older scores) and even more discriminative for early-onset T1D (AUC 0.96). In simulated newborn screening, the T1D GRS2 was nearly twice as efficient as HLA genotyping alone and 50% better than current genetic scores in general population T1D prediction.

CONCLUSIONS An improved T1D GRS, the T1D GRS2, is highly useful for classifying adult incident diabetes type and improving newborn screening. Given the cost-effectiveness of SNP genotyping, this approach has great clinical and research potential in T1D. (35 references) (Author)

Full URL: http://care.diabetesjournals.org/content/42/2/200

20190122-10*

Cognitive, neurological, and behavioral features in adults with KCNJ11 neonatal diabetes. Bowman P, Day J, Torrens L, et al (2019), Diabetes Care vol 42, no 2, February 2019, pp 215-224

OBJECTIVE Central nervous system (CNS) features in children with permanent neonatal diabetes (PNDM) due to KCNJ11 mutations have a major impact on affected families. Sulfonylurea therapy achieves outstanding metabolic control but only partial improvement in CNS features. The effects of KCNJ11 mutations on the adult brain and their functional impact are not well understood. We aimed to characterize the CNS features in adults with KCNJ11PNDM compared with adults with INS PNDM.

RESEARCH DESIGN AND METHODS Adults with PNDM due to KCNJ11 mutations (n = 8) or INSmutations (n = 4) underwent a neurological examination and completed standardized neuropsychological tests/questionnaires about development/behavior. Four individuals in each group underwent a brain MRI scan. Test scores were converted to Z scores using normative data, and outcomes were compared between groups.

RESULTS In individuals with KCNJ11 mutations, neurological examination was abnormal in seven of eight; predominant features were subtle deficits in coordination/motor sequencing. All had delayed developmental milestones and/or required learning support/special schooling. Half had features and/or a clinical diagnosis of autism spectrum disorder. KCNJ11 mutations were also associated with impaired attention, working memory, and perceptual reasoning and reduced intelligence quotient (IQ) (median IQ KCNJ11 vs. INS mutations 76 vs. 111, respectively; P = 0.02). However, no structural brain abnormalities were noted on MRI. The severity of these features was related to the specific mutation, and they were absent in individuals with INSmutations.

CONCLUSIONS KCNJ11 PNDM is associated with specific CNS features that are not due to long-standing diabetes, persist into adulthood despite sulfonylurea therapy, and represent the major burden from KCNJ11 mutations. (Author)

20190108-8*

Preconception care and contraceptive use among Australian women with diabetes mellitus. Hibbert EJ, Chalasani S, Kozan P, et al (2018), Australian Journal of General Practice vol 47, no 12, December 2018, online

Background and objectives:

Effective contraception is important for pregnancy planning and reducing adverse pregnancy outcomes in women with diabetes mellitus (DM). The aim of this study was to explore preconception care practices and contraception use among women with DM.

Methods:

The study used a cross-sectional structured questionnaire to survey women with DM aged 16-49 years in Nepean Blue Mountains Local Health District (NBMLHD), a Western Sydney tertiary referral centre.

Results:

A total of 107 of 215 (49.7%) women completed the questionnaire. While 80.4% were aware of DM-related pregnancy

risks, preconception advice was reported by only 46.8% of the 47 previously or currently pregnant women. Most women had used condoms (87.2%) and/or the combined oral contraceptive pill (74.4%). Many did not know if intrauterine contraception (61.7%) or contraceptive implants (43.7%) were safe in DM.
Discussion:
Despite being aware of the risks of DM in pregnancy, less than half of the women had sought preconception care, and many had poor knowledge of the most reliable contraceptive methods. (25 references) (Author)
Full URL: https://www1.racgp.org.au/ajgp/2018/december/preconception-care-and-contraceptive-use-among-wom

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20190108-42*

ACOG Practice Bulletin No. 201: Pregestational Diabetes Mellitus. American College of Obstetricians and Gynecologists (2018), Obstetrics & Gynecology vol 132, no 6, December 2018

Pregestational diabetes mellitus represents one of the most challenging medical complications of pregnancy because of the need for frequent monitoring and adjustment of medications as well as the potential for maternal and fetal complications. This document provides an overview of the current understanding of pregestational diabetes mellitus and suggests management guidelines during pregnancy. Because few well-designed studies have been performed, many of the guidelines are based on expert and consensus opinion. This document has been updated to reflect current data on pregestational diabetes. This Practice Bulletin is updated with summary information to counsel and manage women with pregestational diabetes before and during pregnancy, more recent literature reflecting experience with continuous subcutaneous insulin infusion during pregnancy, an expanded section on the role of oral hypoglycemic agents in pregnancy, and the option of long-acting reversible contraception during the postpartum period. [Replaces Practice Bulletin Number 60, March 2005]. (Author)

20181220-40*

Adipose Tissue Inflammation and Adrenomedullin Overexpression Contribute to Lipid Dysregulation in Diabetic Pregnancies. Dong Y, Chauhan M, Betancourt A, et al (2018), The Journal of Clinical Endocrinology and Metabolism vol 103, no 10, October 2018, pp 3810-3818

Context
Impaired maternal lipid metabolism in gestational diabetes mellitus (GDM) has detrimental effects on maternal health and fetal growth. We previously reported the excessive expression of adrenomedullin (ADM) and its receptors in GDM adipose tissues compared with normal glucose-tolerant pregnancies. In the present study, we determined the mechanisms underlying enhanced expression of ADM and its receptors.
Design
Omental adipose tissue (OAT) samples were collected from women during cesarian section of term pregnancy with nonoverweight (NOW; n = 9), overweight (OW; n = 8), obese (OBS; n = 10), and GDM (n = 10) status.
Results
The expression of ADM and its receptors was greater in OATs from GDM than from women who were NOW, OW, and OBS. The expression of adipokines, leptin, and resistin were significantly increased, but adiponectin was decreased in OATs from patients with GDM compared with those without GDM. Macrophage infiltration and TNF-α expression were greater in OAT from pregnant women with GDM than in pregnant women without GDM. Furthermore, TNF-α dose dependently increased mRNA for ADM and its receptor components calcitonin receptor-like receptor and receptor activity-modifying proteins 2 and 3 in OAT explants from women who were NOW. Human adipocytes treated with ADM significantly increased glycerol release in culture medium, and the increases of glycerol in culture medium of OAT from women with GDM were attenuated by ADM antagonists, ADM22-52.
Conclusions
Increased macrophage infiltration and TNF-α expression in adipose tissue from GDM, but not from OBS, tissues stimulate ADM and its receptor overexpression, leading to enhanced lipolysis and hyperlipidemia. This might contribute to fetal macrosomia and adiposity in diabetic pregnancies. (Author)

20181220-102*

Fetal brain development in diabetic pregnancies and normal controls. Gründahl FR, Hammer K, Braun J, et al (2018), Journal of Perinatal Medicine vol 46, no 7, October 2018, pp 797-803

Objective:
To compare the fetal brain structures assessed in routine sonographic scans during the second and third trimesters in diabetic and normal pregnancies.
Methods:

In this retrospective study, we measured the head circumference (HC), the transversal diameter of the cerebellum (TCD) and the sizes of the cisterna magna (CM), the cavum septi pellucidi (CSP) and the lateral ventricles (LV) in stored sonographic scans between 20 and 41 weeks of gestation. We compared 231 fetuses of diabetic mothers (diabetic group) to 231 fetuses of normal pregnancies (control group) matched by gestational age. The diabetic group was divided into three subgroups: pre-existing maternal diabetes, diet-controlled gestational diabetes and insulin-dependent gestational diabetes.
Results:
The mean widths of the CSP and LV were larger in fetuses of diabetic mothers in comparison with the controls (P<0.001, P<0.001; respectively). The sizes of HC, CM and TCD were similar in both groups. These results were consistent across the three subgroups.
Conclusions:
Diabetes is associated with altered fetal brain development. We would like to introduce the increased widths of CSP and LV as potential markers for gestational diabetes. (25 references) (Author)

20181219-16*

Type 2 diabetes mellitus in pregnancy: The impact of maternal weight and early glycaemic control on outcomes.
Bashir M, Dabbous Z, Baagar K, et al (2019), European Journal of Obstetrics & Gynecology and Reproductive Biology vol 233, February 2019, pp 53-57
Objectives:
To study the pregnancy outcomes in women with type 2 diabetes mellitus (T2DM) and to relate these to maternal risk factors.
Methods:
We conducted a retrospective study of 419 women with T2DM (index group)- who attended our diabetes in pregnancy clinic at the Hamad Women's Hospital, Doha, between March 2015 and December 2016 -and 1419 normoglycaemic women (control group).
Results:
Compared with the controls, T2DM women were older (mean age 34.7 ± 6.9 vs 29.6 ± 5.5 years; p < 0.001) and had a higher BMI (34.5 ± 6.7 vs 28.8 ± 6.1 kg/m2; p < 0.001). The incidence of macrosomia, shoulder dystocia and stillbirth were similar in the two groups, while that of pre-term labour, pre-eclampsia, caesarean section (CS), large for gestational age (LGA), neonatal ICU (NICU) admission, and neonatal hypoglycaemia were significantly higher in the T2DM compared to the control group (p < 0.05). Multivariate regression analysis showed that first trimester HbA1C was associated with an increased risk of LGA (OR 1.17; 95% CI [1.01-1.36]), pre-eclampsia (OR 1.26; 95% CI [1.02-1.54]), neonatal hypoglycaemia (OR 1.32; 95% CI 1.10-1.60) and NICU admission (OR 1.32; 95% CI 1.10-1.60). Pre-pregnancy BMI was associated with increased risk of LGA (OR 1.04; 95%CI [1.00-1.08]), macrosomia (OR 1.06; 95%CI [1.00-1.12]) and CS (OR 1.05; 95% CI [1.01-1.09]). Last trimester HbA1c was associated with an increased risk of LGA [OR 1.53, 95% CI [1.13-2.10)] and CS (OR 1.37, 95% CI [1.01-1.87]).
Conclusion:
T2DM is associated with adverse pregnancy outcomes compared to the normal control in Qatar. Maternal obesity and glycaemic control before and during pregnancy are the main determinants of pregnancy outcomes in women with T2DM. (27 references) (Author)

20181213-135*

Maternal diabetes mellitus as a risk factor for high blood pressure in late childhood: a prospective birth cohort study.
MIranda JO, Cerqueira RJ, Barros H, et al (2019), Hypertension vol 73, no 1, January 2019, pp e1-e7
Intrauterine fetal conditions can have lifelong cardiovascular effects. The impact of maternal diabetes mellitus on children's cardiovascular profile is not well established. The goal of this study was to explore the association between maternal diabetes mellitus and offspring's blood pressure (BP) ≤10 years of age. Generation XXI is a prospective birth cohort, which enrolled 8301 mother-offspring pairs, including 586 (7.1%) children of diabetic mothers. The associations between maternal diabetes mellitus and BP at 4, 7, and 10 years of age was modeled using linear regression. A mixed-effects model was built to assess differences in BP variation over time. Path analysis was used to quantify effects of potential mediators. Maternal diabetes mellitus was associated with higher BP in offspring at the age of 10 (systolic: β, 1.48; 95% CI, 0.36-2.59; and diastolic: β, 0.86; 95% CI, 0.05-1.71). This association was independent of maternal perinatal characteristics, and it was mediated by child's body mass index and, to a lesser extent, by gestational age, type of birth, and birth weight (indirect effect proportion, 73%). No significant differences in BP were found at 4 and 7 years of age. Longitudinal analysis showed an accelerated systolic BP increase on maternal diabetes mellitus group (β, 1.16; 95% CI, 0.03-2.28). These finding were especially relevant in males, suggesting sex differences

in the mechanisms of BP prenatal programing. Our results provide further evidence that maternal diabetes mellitus is associated with high BP late in childhood, demonstrating a significant role of child's body mass in the pathway of this association. (36 references) (Author)

20181213-121*

Rationale, design, and methods for the Medical Optimization and Management of Pregnancies with Overt Type 2 Diabetes (MOMPOD) study. Berry DC, Davis Thomas S, Dorman KF, et al (2018), BMC Pregnancy and Childbirth vol 18, no 488, 12 December 2018

Background

Annually in the US, over 100,000 pregnant women with overt type 2 diabetes give birth. Strict maternal glycemic control is the key to optimizing infant outcomes. Medical treatment of type 2 diabetes in pregnancy is generally restricted to insulin, as data on the safety and efficacy of oral hypoglycemic agents in pregnancy are limited. However, over one-third of infants born to women with type 2 diabetes experience an adverse outcome, such as premature delivery, large-for-gestational age, hypoglycemia, hyperbilirubinemia, or birth trauma, suggesting that current treatment regimens fall short of optimizing outcomes. Metformin is the pharmacologic treatment of choice for type 2 diabetes outside of pregnancy. Metformin is favored over insulin because it results in less weight gain, fewer hypoglycemic episodes, and is administered orally rather than injected. However, metformin is not typically used for treatment of type 2 diabetes complicating pregnancy, mainly because no large clinical studies have been conducted to examine its use in this context.

Methods/design

This is a randomized double-blind multi-center clinical trial of insulin plus metformin versus insulin plus placebo for the treatment of type 2 diabetes complicating pregnancy. A total of 1200 women with type 2 diabetes will be randomized between 10 weeks 0 days' and 20 weeks 6 days' gestation and followed until 30 days after delivery. Neonate outcomes will be followed until 30 days of age. The primary aim is to compare the effect of insulin and metformin versus insulin and placebo on composite adverse neonatal outcomes, comprising perinatal mortality, preterm delivery, neonatal hypoglycemia, hyperbilirubinemia, large-for-gestational age small for gestational age, low birth weight, and/or birth trauma. Key secondary aims are to compare treatment groups for neonatal fat mass and rate of maternal hypoglycemia. Additional aims are to assess the side effects and safety of insulin and metformin among pregnant women with overt type 2 diabetes and to compare gestational weight gain among women treated with metformin plus insulin versus insulin alone.

Discussion

Successful completion of this study will result in high-quality, contemporary evidence for management of overt type 2 diabetes complicating pregnancy to improve neonatal outcomes.

Trial registration

NCT02932475 (05/17/2016).

(14 references) (Author) [Please note: this article is a digital version which may undergo minor changes in the future]

Full URL: https://doi.org/10.1186/s12884-018-2108-3

20181127-13*

Preconceptions and awareness of good glycemic control, pregnancy contraindications, and maternal and fetal adverse events in Sudan. Dafa Elseed EBD, Khougali HS (2019), International Journal of Gynecology & Obstetrics vol 144, no 2, February 2019, pp 233-235

Objective:

to investigate the preconception awareness and attitude of pregnant women with gestational diabetes about glycemic control and complication of diabetes in pregnancy in Sudan.

Method:

A cross-sectional hospital based study was conducted among 119 pregnant women with gestational diabetes at 1st, 2nd and 3rd trimester who had received pregnancy care services at Omdurman Maternity Hospital, Khartoum, Sudan, between January 2016 and June 2017.

Results:

A total of 119 ladies were enrolled, (49.6%) of the ladies their BMI were between (25-29), Most of the patient had diabetes for 1-5 years (74.4%), women with GDM were (46%), and women with pre-existing DM were (54%). Diabetic women who use insulin were (51%). About (82%) of participants do not know the signs of hypoglycemia. (85%) do not know the effect of diabetes on maternal and fetal outcome. (72%) of participants know well about their insulin dose, and (69%) had no plan to reduce their weight. (73%) of the participants with DM had no regular medical follow up out of pregnancy, (39.4%) of participants had had co-existing disorders in their previous pregnancy other than DM.

Conclusion:
the knowledge among the diabetic Sudanese women about GDM and its complication was low. (Author)

20181122-56*

Maternal arterial stiffness and fetal cardiovascular physiology in diabetic pregnancy. Moodley S, Arunamata A, Stauffer KJ, et al (2018), Ultrasound in Obstetrics and Gynecology vol 52, no 5, November 2018, pp 654-661

Objectives
In mothers with pregestational or gestational diabetes, abnormal arterial stiffness (stiffer arteries) has been reported. The impact of abnormal maternal arterial stiffness on placental and fetal cardiovascular physiology is unknown. The purpose of this study was to determine the impact of maternal diabetes on maternal arterial stiffness and the association with fetal cardiovascular physiology as measured by fetal echocardiography.
Methods
Between December 2013 and January 2017 a prospective study was conducted on diabetic (but otherwise healthy) and non-diabetic, healthy pregnant mothers aged 18-40 years at 20-28 weeks' gestation who had a normal fetal cardiac echocardiogram and obstetric ultrasound. Clinical data were collected by means of a patient questionnaire and measurement of blood pressure, height, weight, arterial augmentation index (AIx) and placental and fetal cardiovascular parameters were collected by fetal echocardiography. Descriptive statistics were calculated. Comparisons were made using parametric and non-parametric tests between controls and diabetic mothers.
Results
Twenty-three healthy pregnant controls and 43 diabetic pregnant women (22 with pregestational and 21 with gestational diabetes) were included in the study. Maternal AIx was higher in those with diabetes than in healthy controls (12.4 ± 10.6% vs 4.6 ± 7.9%; P = 0.003). Fetal aortic valve (AoV) velocity time integral (VTI) was higher in fetuses whose mothers had diabetes than in those with non-diabetic mothers (7.7 ± 1.9 cm vs 6.3 ± 3.0 cm; P = 0.022). Left ventricular (LV) myocardial performance index (MPI) was lower in diabetic pregnancies than in controls (0.40 ± 0.09 vs 0.46 ± 0.11; P = 0.021). Umbilical artery (UA) resistance index (RI) was lower in diabetic pregnancies with glycated hemoglobin (HbA1c) levels ≥ 6.5% than in those with HbA1c levels < 6.5% (0.69 ± 0.06, n = 15 vs 0.76 ± 0.08, n = 21; P = 0.009) but not at higher HbA1C cut-offs. No correlation between AIx and AoV-VTI, LV-MPI or UA-RI was found.
Conclusions
Arterial stiffness is higher in pregnant women with diabetes than in controls. Fetuses of diabetic mothers show altered cardiovascular parameters, with higher AoV-VTI and lower LV-MPI, which are markers of myocardial function. Placental function assessed by UA-RI was normal despite differences between groups. Arterial stiffness did not correlate with placental or fetal cardiovascular variables. Instead, the findings are likely to represent a shared response to the environment of abnormal glucose metabolism. The clinical significance of these findings is yet to be determined. Copyright © 2017 ISUOG. Published by John Wiley & Sons Ltd. (Author)

20181122-17*

Maternal Gestational Diabetes Mellitus, Type 1 Diabetes, and Type 2 Diabetes During Pregnancy and Risk of ADHD in Offspring. Xiang AH, Wang X, Martinez MP, et al (2018), Diabetes Care vol 41, no 12, December 2018, pp 2502-2508

OBJECTIVE To examine the relative importance of maternal preexisting type 1 diabetes (T1D), preexisting type 2 diabetes (T2D), and gestational diabetes mellitus (GDM) on risk of attention deficit/hyperactivity disorder (ADHD) in offspring.
RESEARCH DESIGN AND METHODS This retrospective birth cohort study included 333,182 singletons born in 1995-2012 within Kaiser Permanente Southern California hospitals. Children were prospectively followed through electronic medical records from age 4 years. Relative risks of ADHD associated with diabetes exposures in utero were estimated by hazard ratios (HRs) using Cox regression with adjustment for potential confounders. For GDM, timing of exposure was evaluated by gestational age at diagnosis and severity was assessed by the need for antidiabetes medication treatment during pregnancy.
RESULTS A total of 37,878 (11.4%) children were exposed to diabetes (522 exposed to T1D, 7,822 T2D, and 29,534 GDM). During a median of 4.9 years (interquartile range 2.2, 9.6) of follow-up after age 4 years, 17,415 (5.2%) children were diagnosed with ADHD. ADHD risk was not associated with GDM taken as a whole (P = 0.50) or with gestational age at GDM diagnosis (P = 0.16). However, the risk was significantly greater for the GDM requiring versus not requiring antidiabetes medications (P < 0.001). Compared with children unexposed to diabetes, the adjusted HRs for ADHD in children were 1.57 (95% CI 1.09-2.25) for exposure to T1D, 1.43 (1.29-1.60) for T2D, 1.26 (1.14-1.41) for GDM requiring antidiabetes medications, and 0.93 (0.86-1.01) for GDM not requiring medications.
CONCLUSIONS The hierarchy of risks suggests that severity of maternal diabetes (T1D vs. T2D vs. GDM requiring antidiabetes medications) influences the risk of ADHD in offspring of mothers with diabetes. (Author)

20181122-16*

Pumps or Multiple Daily Injections in Pregnancy Involving Type 1 Diabetes: A Prespecified Analysis of the CONCEPTT Randomized Trial. Feig DS, Corcoy R, Donovan LE, et al (2018), Diabetes Care vol 41, no 12, December 2018, pp 2471-2479

OBJECTIVE To compare glycemic control, quality of life, and pregnancy outcomes of women using insulin pumps and multiple daily injection therapy (MDI) during the Continuous Glucose Monitoring in Women With Type 1 Diabetes in Pregnancy Trial (CONCEPTT).

RESEARCH DESIGN AND METHODS This was a prespecified analysis of CONCEPTT involving 248 pregnant women from 31 centers. Randomization was stratified for pump versus MDI and HbA1c. The primary outcome was change in HbA1c from randomization to 34 weeks' gestation. Key secondary outcomes were continuous glucose monitoring (CGM) measures, maternal-infant health, and patient-reported outcomes.

RESULTS At baseline, pump users were more often in stable relationships (P = 0.003), more likely to take preconception vitamins (P = 0.03), and less likely to smoke (P = 0.02). Pump and MDI users had comparable first-trimester glycemia: HbA1c 6.84 ± 0.71 vs. 6.95 ± 0.58% (51 ± 7.8 vs. 52 ± 6.3 mmol/mol) (P = 0.31) and CGM time in target (51 ± 14 vs. 50 ± 13%) (P = 0.40). At 34 weeks, MDI users had a greater decrease in HbA1c (−0.55 ± 0.59 vs. −0.32 ± 0.65%, P = 0.001). At 24 and 34 weeks, MDI users were more likely to achieve target HbA1c (P = 0.009 and P = 0.001, respectively). Pump users had more hypertensive disorders (P = 0.011), mainly driven by increased gestational hypertension (14.4 vs. 5.2%; P = 0.025), and more neonatal hypoglycemia (31.8 vs. 19.1%, P = 0.05) and neonatal intensive care unit (NICU) admissions >24 h (44.5 vs. 29.6%; P = 0.02). Pump users had a larger reduction in hypoglycemia-related anxiety (P = 0.05) but greater decline in health/well-being (P = 0.02).

CONCLUSIONS In CONCEPTT, MDI users were more likely to have better glycemic outcomes and less likely to have gestational hypertension, neonatal hypoglycemia, and NICU admissions than pump users. These data suggest that implementation of insulin pump therapy is potentially suboptimal during pregnancy. (35 references) (Author)

Full URL: http://care.diabetesjournals.org/content/41/12/2471

20181121-4

Diabetes mellitus and lower genital tract tears after vaginal birth: a cohort study. Strand-Holm KM, Fuglsang J, Ovesen PG, et al (2019), Midwifery vol 69, February 2019, pp 121-127

Highlights:

•Nulliparous women with Type 1 Diabetes Mellitus with no previous cesarean sectionexperienced a higher risk of episiotomies compared to women without Diabetes Mellitus

•Women with Diabetes Mellitus with no previous cesarean section did not experience an increased risk of anal sphincter injury compared to women without Diabetes Mellitus.

•Women with Diabetes Mellitus with no previous cesarean section may give birth vaginallywithout a generally higher risk of lower genital tract tears compared to women without Diabetes Mellitus.

Introduction

: Diabetes Mellitus in pregnancy is increasing. No existing studies have examined Diabetes Mellitus as the primary exposure for lower genital tract tears after vaginal birth. The objective was to study the association between Diabetes Mellitus (all types combined), Type 1 Diabetes Mellitus, Type 2 Diabetes Mellitus and Gestational Diabetes Mellitus and lower genital tract tears after vaginal birth.

Material and methods

: A register-based cohort study of women with singleton pregnancy and without a previous cesarean section at near-term (≥ 35+0 weeks) and term (≥ 37+0 weeks) gestational age, n = 31,297 at Aarhus University Hospital, Denmark from 1 January 2004 to 31 December 2012. The associations between Diabetes Mellitus and lower genital tract tears were analysed using a fixed multiple logistic regression analyses.

Results

: Approximately 32,000 women were eligible for the study; 796 women had diabetes (2.5 %) and 1,318 experienced anal sphincter injury (4.3 %). The overall risk of lower genital tract tears was similar among women with a diagnosis of diabetes (Type1 Diabetes Mellitus, Type 2 Diabetes Mellitus, and Gestational Diabetes Mellitus) compared to women without diabetes, except for nulliparous women with Type1 Diabetes Mellitus who experienced a higher risk of episiotomies, crude and adjusted odds ratios (OR 2.13, 95 % CI 1.14-3.97) and (OR 2.48, 95 % CI 1.21-5.10), respectively.

Conclusions

: Women with Diabetes Mellitus without a previous cesarean section who gave birth vaginally to a single child at term or near term did not experienced an increased risk of lower genital tract tears. However, nulliparous women with Type 1 Diabetes Mellitus experienced a higher risk of episiotomy. These results may be used to individualised

counselling of women with Diabetes Mellitus regarding mode of birth and may reduce worries about genital tract tears in women with Diabetes Mellitus considering vaginal birth. (32 references) (Author)

20181114-4*

Association between maternal diabetes, being large for gestational age and breast-feeding on being overweight or obese in childhood. Kaul P, Bowker SL, Savu A, et al (2018), Diabetologia 13 November 2018, online

Aims/hypothesis

This study aimed to examine the association of maternal diabetes, being large for gestational age (LGA) and breast-feeding with being overweight or obese in pre-school-aged children.

Methods

Data on height and weight at the time of their pre-school (age 4-6 years) immunisation visit between January 2009 and August 2017, as well as breast-feeding status in the first 5 months of life, for 81,226 children born between January 2005 and August 2013 were linked with maternal hospitalisation and outpatient records and birth registry data. Children were grouped into six categories based on maternal diabetes status during pregnancy (no diabetes, gestational diabetes or pre-existing diabetes) and birthweight (appropriate for gestational age [AGA] or LGA). WHO criteria were used to identify children who were overweight or obese.

Results

There were 69,506 children in the no diabetes/AGA group (control), 5926 in the no diabetes/LGA group, 4563 in the gestational diabetes/AGA group, 573 in the gestational diabetes/LGA group, 480 in the pre-existing diabetes/AGA group and 178 in the pre-existing diabetes/LGA group. The rate of being overweight/obese at pre-school age ranged from 20.5% in the control group to 42.9% in the gestational diabetes/LGA group. The adjusted attributable risk per cent for LGA alone (39.4%) was significantly higher than that for maternal gestational diabetes (16.0%) or pre-existing diabetes alone (15.1%); the risk for the combinations of gestational diabetes/LGA and pre-existing diabetes/LGA were 50.1% and 39.1%, respectively. Further stratification of the pre-existing diabetes groups found the prevalence of being overweight/obese was 21.2% in the type 1/AGA group, 31.4% in the type 1/LGA group (similar to those in the no diabetes groups), 26.7% in the type 2/AGA group and 42.5% in the type 2/LGA group. Breast-feeding was associated with a lower likelihood of being overweight/obese in childhood in all groups except gestational diabetes/LGA and pre-existing diabetes/LGA (both type 1 and type 2).

Conclusion/interpretation

LGA is a stronger marker for risk of being overweight/obese in early childhood, compared with maternal diabetes during pregnancy. Rates of being overweight/obese in childhood were highest in LGA children born to mothers with gestational diabetes or pre-existing type 2 diabetes. Breast-feeding was associated with a lower risk of being overweight/obese in childhood in the majority of children; however, this association was not maintained in LGA children of mothers with diabetes. (Author) [Please note: this article is a digital version which may undergo minor changes in the future]

20181107-56

Pregnancy outcomes for women with pre-pregnancy diabetes mellitus in Australian populations, rural and metropolitan: A review. McCarthy EA, Williamson R, Shub A (2019), Australian and New Zealand Journal of Obstetrics and Gynaecology (ANZJOG) vol 59, no 2, April 2019, pp 183-194

Background

Historically, pre-pregnancy diabetes (PPDM) is a recognised risk factor for poor pregnancy outcome. Co-existing pathology and adverse social determinants including rural-metropolitan inequities in health and healthcare access may confer additional risks. Multidisciplinary care before, during and after pregnancy can improve outcomes for women with PPDM and their infants. The extent to which rural Australian women and their families share in improved outcomes is unknown. We aimed to summarise maternal characteristics and pregnancy outcomes for women with PPDM, including women in rural settings and examine applications of existing clinical guidelines to rural Australian practice.

Methods

We sought English language population and cohort studies about PPDM using Medline, Embase, PubMed, Australian epidemiological and international clinical practice guidelines.

Results

Women with PPDM are changing: older, more obese, of lower parity, less likely to smoke, more likely to have type 2 rather than type 1 diabetes and shorter duration of PPDM. Women with PPDM continue to experience excess adverse pregnancy outcomes, including maternal morbidity, complicated birth, perinatal loss, congenital anomalies and mother-infant separation. On face value, clinical guidelines appear relevant to women living in rural settings but there

are only a few, conflicting outcome studies for rural women with PPDM.
Conclusions
PPDM is changing. A significant minority live in rural locations, and although perinatal mortality/morbidity seems to be improving, it is unclear if this is also true for rural women due to a lack of recent Australian studies. Further research is necessary to achieve excellence everywhere for women with PPDM and their babies. (Author)

20181025-39*

Association between Sonographic Estimated Fetal Weight and the Risk of Cesarean Delivery among Nulliparous Women with Diabetes in Pregnancy. Dude AM, Grobman WA, Yee LM (2018), American Journal of Perinatology vol 35, no 13, November 2018, pp 1297-1302

Objective
The objective of this study was to examine the association between an ultrasound-estimated fetal weight (US-EFW) and mode of delivery among nulliparous diabetic women.
Study Design
This is a retrospective cohort study of nulliparous women with medication-requiring gestational or pregestational diabetes who delivered term, singleton gestations following a trial of labor. We determined whether having had an US-EFW within 35 days of delivery was associated with cesarean delivery.
Results
Of 304 women who met the eligibility criteria, 231 (76.0%) had an US-EFW within 35 days of delivery. An US-EFW was associated with increased likelihood of intrapartum cesarean (51.5% for those with an ultrasound vs. 27.4% for those without, $p < 0.001$); this finding persisted even when controlling for birth weight and other confounding factors (adjusted odds ratio: 2.23, 95% confidence interval: 1.16-4.28). Among women with a recent US-EFW, a diagnosis of a large-for-gestational-age (LGA) fetus was associated with overall intrapartum cesarean frequency (65.2% for women with an LGA fetus vs. 46.1% for those without, $p = 0.009$), but this association did not remain significant in multivariable models.
Conclusion
An US-EFW within 35 days of delivery among nulliparous women with medication-requiring diabetes was positively associated with intrapartum cesarean delivery.
(23 references) (Author)

20181024-3*

Diabetes [written answer]. House of Commons (2018), Hansard Written question 179122, 15 October 2018

Steve Brine responds to a written question asked by George Howarth to the Secretary of State for Health and Social Care, regarding what guidance his Department has issued to (a) GPs, (b) GP practice nurses, (c) diabetes nurse specialists, (d) diabetologists and (e) psychology and psychiatric specialists on the treatment of Type 1 diabetes in each of the last five years. (JSM)

Full URL: https://www.parliament.uk/business/publications/written-questions-answers-statements/written-question/Commons/2018-10-15/179122/

20181023-10*

Diabetes: Pregnancy [written answer]. House of Commons (2018), Hansard Written question 178473, 12 October 2018

Steve Brine responds to a written question asked by Keith Vaz to the Secretary of State for Health and Social Care, regarding what estimate he has made of the number of pregnant women with diabetes that have taken 5mg of folic acid a day until the end of the 12th week of pregnancy. (JSM)

Full URL: https://www.parliament.uk/business/publications/written-questions-answers-statements/written-question/Commons/2018-10-12/178473/

20181018-41*

Development of an integrated, district-wide approach to pre-pregnancy management for women with pre-existing diabetes in a multi-ethnic population. Sina M, MacMillan F, Dune T, et al (2018), BMC Pregnancy and Childbirth vol 18, no 402, 15 October 2018

Background
Poor diabetes management prior to conception, results in increased rates of fetal malformations and other adverse pregnancy outcomes. We describe the development of an integrated, pre-pregnancy management strategy to improve pregnancy outcomes among women of reproductive age with diabetes in a multi-ethnic district.

Methods
The strategy included (i) a narrative literature review of contraception and pre-pregnancy interventions for women with diabetes and development of a draft plan; (ii) a chart review of pregnancy outcomes (e.g. congenital malformations, neonatal hypoglycaemia and caesarean sections) among women with type 1 diabetes (T1D) (n = 53) and type 2 diabetes (T2D) (n = 46) between 2010 and 2015 (iii) interview surveys of women with T1D and T2D (n = 15), and local health care professionals (n = 13); (iv) two focus groups (n = 4) and one-to-one interviews with women with T1D and T2D from an Australian background (n = 5), women with T2D from cultural and linguistically diverse (CALD) (n = 7) and indigenous backgrounds (n = 1) and partners of CALD women (n = 3); and (v) two group meetings, one comprising predominantly primary care, and another comprising district-wide multidisciplinary inter-sectoral professionals, where components of the intervention strategy were finalised using a Delphi approach for development of the final plan.
Results
Our literature review showed that a range of interventions, particularly multifaceted educational programs for women and healthcare professionals, significantly increased contraception uptake, and reduced adverse outcomes of pregnancy (e.g. malformations and stillbirth). Our chart-review showed that local rates of adverse pregnancy outcomes were similarly poor among women with both T1D and T2D (e.g. major congenital malformations [9.1% vs 8.9%] and macrosomia [34.7% vs 24.4%]). Challenges included lack of knowledge among women and healthcare professionals relating to diabetes management and limited access to specialist pre-pregnancy care. Group meetings led to a consensus to develop a district-wide approach including healthcare professional and patient education and a structured approach to identification and optimisation of self-management, including contraception, in women of reproductive age with diabetes.
Conclusions
Sufficient evidence exists for consensus on a district-wide strategy to improve pre-pregnancy management among women with pre-existing diabetes.
(50 references) (Author) [Please note: this article is a digital version which may undergo minor changes in the future]
Full URL: https://doi.org/10.1186/s12884-018-2028-2

20181010-38*

New Diabetes Canada clinical practice guidelines for diabetes and pregnancy - what's changed?. Keely E, Berger H, Feig DS (2018), JOGC [Journal of Obstetrics and Gynaecology Canada] vol 40, no 11, November 2018, pp 1484-1489
Every 5 years Diabetes Canada, previously called the Canadian Diabetes Association, produces comprehensive, evidence-based guidelines for the diagnosis and management of diabetes. This includes the care of pregnant women. The new 2018 guidelines were published April 2018 in the Canadian Journal of Diabetes,1 and the full version is available online at www.diabetes.ca. (19 references) (Author)

20181004-42*

47-Fold rise of diabetes in childbearing age Chilean women: Markov model and cost-effectiveness of prevention of birth defects. Olmos P, Borzone G, Poblete A (2018), Journal of Obstetrics and Gynaecology Research vol 44, no 9, September 2018, pp 1719-1730
Aim
Prevalence of type 2 diabetes mellitus (T2DM) during childbearing age in Chile had a 47-fold rise in 7 years, reaching 120 844 women, half of which are unaware of their condition. We aimed to project pregnancies and births among Chilean women of childbearing age (WCBA) with T2DM and report the incidence of birth defects and the associated years of life lost and lifetime costs.
Methods
Markov model of cohort of WCBA with T2DM (WCBA-DM) with a 20-year time horizon (2018-2037), using data from previous studies. Two scenarios were assessed: scenario A: no universal detection of T2DM and scenario B: universal screening of T2DM using glycosylated hemoglobin levels. Both lifetime costs and disability-adjusted life years (DALY) were calculated with a 5% discount rate (US$ of 2017).
Results
In scenario A, 12 163 infants with birth defects could be born among the analyzed cohort, resulting in 243 260 years of life lost, 296 652 DALY and in lifetime costs of US$ 1 957 657 966. In scenario B, the first three figures could be reduced by 70.4% to 3599 infants with birth defects, 71 980 years of life lost and 87 794 DALY. Due to the addition of diabetes screening and new patient costs to scenario B, there would be a lesser reduction (67.3%) in total lifetime costs, to US$ 640 669 296.
Conclusion

Screening of diabetes in WCBA would yield a 20-year reduction of 70.4% in the number of infants with birth defects, years of life lost and DALY. Total lifetime costs could be reduced by 67.3%. (Author)

20181002-73*

How Adequate are Macro- and Micronutrient Intake in Pregnant Women with Diabetes Mellitus? A Study from South India. Joseph M, Gupta RD, Shetty S, et al (2018), Journal of Obstetrics and Gynecology of India vol 68, no 5, October 2018, pp 400-407

Background

Diabetes is the most common condition in pregnancy with a worldwide prevalence of 16.9%.

Aim

To determine the adequacy of the nutrient intake of pregnant women with diabetes mellitus.

Methods

This is a cross-sectional study of 85 pregnant women who met the diagnostic inclusion criteria for diabetes mellitus (gestational and pre-gestational diabetes mellitus) and who were being managed at the outpatient clinic of a tertiary care teaching hospital. Their demography, clinical characteristics (from updated medical records), anthropometric measures (using standard procedures), nutrient intake and meal pattern (obtained using 24 h recall, food frequency and their log diaries) were collected.

Results

The mean age of the group was 29.9 + 4.5 years, 54% were in the second trimester of pregnancy with a mean glycosylated haemoglobin level of 6.3 + 1.4%. The mean BMI indicated that 47% of them were in the obese grade 1 category. Insulin was used in one-third of the population. The overall macronutrient and micronutrient intakes of the population were below the recommended daily allowances for Indians (60-70% of RDA). There was a deficit in the intake of calories, fibre, proteins, iron, calcium, carotene, folic acid, thiamine, riboflavin and niacin. Between the two groups, the pre-GDM women had a significantly better nutrient intake and this could be attributed to a greater exposure to nutrition counselling that they have received during the earlier part of their diabetes care.

Conclusion

The gestational period should be viewed as a window of opportunity to modify dietary patterns and introduce healthy lifestyle practices for the woman and her family. (18 references) (Author)

20180926-26*

Maternal insulin resistance, triglycerides and cord blood insulin are not determinants of offspring growth and adiposity up to 5 years: a follow-up study. Meyer DM, Brei C, Stecher L, et al (2018), Diabetic Medicine vol 35, no 10, October 2018, pp 1399-1403

Aims

Metabolic dysregulation in utero may influence fetal metabolism and early growth. We previously investigated relationships between maternal indices of glucose homeostasis and triglycerides as well as cord blood insulin with offspring anthropometry up to 2 years. The aim of this analysis was to follow these relationships up to the age of 5 years.

Methods

Associations between maternal metabolic variables of glucose and lipid metabolism measured at 32 weeks' gestation and cord blood insulin with growth and body composition of 162 offspring aged 3-5 years were explored. Both indirect (i.e. body weight, BMI percentiles, sum of four skinfold thicknesses) and direct (i.e. ultrasonography, magnetic resonance imaging in a subgroup) measurement techniques were employed.

Results

Maternal metabolic indices were largely unrelated to child body composition. Cord blood insulin was negatively associated with fat mass and lean body mass at 3 years in unadjusted analyses, and the sum of four skinfold thicknesses and body fat percentage in adjusted analyses, whereas the association with lean body mass was no longer observed. An inverse relationship between cord blood insulin and weight gain up to 5 years was observed in girls only with small effect sizes.

Conclusions

Results from this follow-up do not provide convincing evidence that these markers are independently related to offspring growth and adiposity in early childhood. Although cord blood insulin was weakly inversely related to weight gain in girls at 5 years, we cannot conclude that the observed changes in outcomes are clinically meaningful. (Author)

20180926-20*

A perspective on the accuracy of blood glucose meters during pregnancy. Immanuel J, Simmons D (2018), Diabetes Care vol 41, no 10, October 2018, pp 2053-2058

Blood glucose monitoring is fundamental for hyperglycemia management during pregnancy, but are the devices up to the job? Studies assessing the accuracy of 10 commercially available glucose meters during pregnancy showed that although >98-99% of the meter values were in the acceptable zones of the error grid for the majority of the meters, the meter performance varied, with the majority showing positive bias and a few showing minimal negative bias. The mean difference between meter and laboratory plasma values varied between −0.33 and 0.73 mmol/L. Three meters showed deviations from laboratory results with a change in maternal hematocrit levels. No meters had a total analytical error <5%, and no studies evaluated meters using recent International Organization for Standardization 15197:2013 criteria. The Continuous Glucose Monitoring in Women With Type 1 Diabetes in Pregnancy Trial (CONCEPTT) recently showed that an antenatal continuous glucose monitoring system (CGMS), as an adjunct to capillary monitoring, was associated with a lower incidence of large-for-gestational-age babies, fewer neonatal intensive care unit admissions (>24 h), and a lower incidence of neonatal hypoglycemia. The flash glucose monitoring system shows good accuracy in pregnant women but has not been marketed widely in the U.S. We suggest that meters cannot be assumed to be sufficiently accurate during pregnancy and that manufacturers should ensure a total error <5%, with bias and imprecision <2% during pregnancy. Large studies are needed to evaluate the usefulness of CGMS among pregnant women with type 2 diabetes and gestational diabetes mellitus. (Author)

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20180920-111*

Apgar Scores at 10 Minutes and Outcomes in Term and Late Preterm Neonates with Hypoxic-Ischemic Encephalopathy in the Cooling Era. Ayrapetyan M, Talekar K, Schwabenbauer K, et al (2019), American Journal of Perinatology vol 36, no 5, April 2019, pp 545-554

Objective

To determine the short-term outcomes (abnormal brain magnetic resonance imaging [MRI]/death) in infants born with a 10-minute Apgar score of 0 who received therapeutic hypothermia and compare them with infants with higher scores.

Study Design

This is a retrospective review of 293 neonates (gestational age ≥ 35 weeks) born between November 2006 and October 2015 admitted with hypoxic-ischemic encephalopathy who received therapeutic hypothermia. Results of brain MRIs were assessed by the basal ganglia/watershed scoring system. Short-term outcomes were compared between infants with Apgar scores of 0, 1 to 4, and ≥5 at 10 minutes.

Results

Eight of 17 infants (47%) with an Apgar of 0 at 10 minutes survived, having 4 (24%) without abnormalities on the brain MRI and 7 (41%) without severe abnormalities. There was no significant difference in the combined outcomes of 'death/abnormal MRI' and 'death/severe abnormalities on the MRI' between infants with Apgar scores of 0 and 1 to 4. Follow-up data were available for six of eight surviving infants, and none had moderate or severe neurodevelopmental impairment.

Conclusion

In the cooling era, 47% of infants with no audible heart rate at 10 minutes and who were admitted to the neonatal intensive care unit survived; 24% without abnormalities on the brain MRI and 41% without severe abnormalities. (29 references) (Author)

20180917-20*

Pregnancy outcome in patients with pregestational and gestational diabetes attending Groote Schuur Hospital, Cape Town, South Africa. Van Zyl H, Levitt NS (2018), South African Medical Journal (SAMJ) vol 108, no 9, pp 772-776

Background. The burden of diabetes mellitus (DM) has increased dramatically worldwide. The association between poorly controlled DM and poor pregnancy outcomes has been well described.

Objectives. To describe the pregnancy outcomes of patients with pregestational and gestational DM attending Groote Schuur Hospital, Cape Town, South Africa.

Methods. A retrospective audit was undertaken of all women with pregestational and gestational DM (GDM) who attended Groote Schuur Hospital obstetric care from 1 September 2010 to 31 August 2011. Information routinely collected at booking and during the rest of pregnancy was entered onto a data abstraction form. Patients diagnosed with GDM were further subdivided into two groups, GDM and impaired glucose tolerance (IGT), depending on the oral glucose tolerance test results.

Results. A total of 725 diabetic pregnancies were managed: 35 women had type 1 DM (T1DM), 194 had type 2 DM

(T2DM), 192 had GDM and 304 had IGT. The median glycated haemoglobin (HbA1c) value at booking was highest for T1DM, followed by T2DM and lastly GDM. Overall, 10.7% of women had pre-existing hypertension and 9.8% developed pre-eclampsia (PET). The preterm delivery rate (before 38 weeks) was 68.8% for women with T1DM, 38.7% for those with T2DM, 34.9% for those with GDM and 22.4% for those with IGT. The caesarean section rate exceeded 50% in all groups. The overall perinatal mortality rate was 2.5% (25/1 000 births) for the study population, with T1DM and T2DM contributing most deaths (6.4% and 4.2%). The overall rate of congenital malformations was 2.4% (n=18 cases), but the rate was 5.7% for patients with T1DM and 4.6% for those with T2DM.
Conclusion. The audit demonstrated outcomes similar to those in the developed world, with major congenital malformations, unexplained stillbirths and PET accounting for the majority of perinatal deaths. Stricter control with the aim of achieving lower or normal HbA1c levels before conception may be the only intervention that could bring about change. (16 references) (Author)
Full URL: http://www.samj.org.za/index.php/samj/article/view/12397/8598

20180913-78*

Management of Diabetes in the Intrapartum and Postpartum Patient. Dude A, Niznik CM, Szmuilowicz ED, et al (2018), American Journal of Perinatology vol 35, no 11, September 2018, pp 1119-1126

Achieving maternal euglycemia in women with pregestational and gestational diabetes mellitus is critical to decreasing the risk of neonatal hypoglycemia, as maternal blood glucose levels around the time of delivery are directly related to the risk of hypoglycemia in the neonate. Many institutions use continuous insulin and glucose infusions during the intrapartum period, although practices are widely variable. At Northwestern Memorial Hospital, the 'Management of the Perinatal Patient with Diabetes' policy and protocol was developed to improve consistency of management while also allowing individualization appropriate for the patient's specific diabetic needs. This protocol introduced standardized algorithms based on maternal insulin requirements to drive real-time maternal glucose control during labor as well as provided guidelines for postpartum glycemic control. This manuscript describes the development and implementation of this protocol to encourage other institutions to adopt a standardized protocol that allows highly individualized intrapartum care to women with diabetes. (14 references) (Author)

20180831-5*

Software-guided insulin dosing improves intrapartum glycemic management in women with diabetes mellitus. Dinglas C, Muscat J, Adams T, et al (2018), American Journal of Obstetrics & Gynecology (AJOG) vol 218, no 2, August 2018, pp 191.e1-6

Background:
During labor, maintenance of maternal euglycemia is critical to decrease the risk of neonatal hypoglycemia and associated morbidities. When continuous intravenous insulin infusion is needed, standardized insulin dosing charts have been used for titration of insulin to maintain glucose in target range. The GlucoStabilizer software program (Indiana University Health Inc, Indianapolis, IN) is a software-guided insulin dosing system that calculates the dose of intravenous insulin that is needed based on metabolic parameters, target glucose concentration, and an individual's response to insulin. Although this tool has been validated and shown to reduce both hypoglycemia and errors in critical care settings, the utility of this software has not been examined in obstetrics.
Objective:
The purpose of this study was to determine whether the use of intravenous insulin dosing software in women with pregestational or gestational diabetes mellitus that requires intrapartum insulin infusion can improve the rate of glucose concentration in target range (70-100 mg/dL; 3.9-5.5 mmol/L) at the time delivery.
Study Design:
We performed a retrospective cohort study comparing laboring patients with diabetes mellitus that required insulin infusion who were dosed by standard insulin dosing chart vs the GlucoStabilizer software program from January 2012 to December 2017. The GlucoStabilizer software program, which was implemented in May 2016, replaced the standard intravenous insulin dosing chart. Inclusion criteria were women with pregestational or gestational diabetes mellitus who were treated with an intravenous insulin infusion intrapartum for at least 2 hours. Maternal characteristics, glucose values in labor, and neonatal outcomes were extracted from delivery and neonatal records. The primary outcome was the percentage of women who achieved the target glucose range (defined as a blood glucose between 70-100 mg/dL; 3.9-5.5 mmol/L) before delivery. Parametric and nonparametric statistics were used to compare both groups; a probability value of <.05 was considered statistically significant.
Results:
We identified 22 patients who were dosed by a standard insulin dosing chart and 11 patients who were dosed by the GlucoStabilizer software program during intrapartum management. The GlucoStabilizer software program was

superior in achieving glucose values in target range at delivery (81.8% vs 9.1%; P<.001) compared with standard insulin dosing without increasing maternal hypoglycemia (0% vs 4.3%; P=.99). Patients whose insulin dosing was managed by the GlucoStabilizer software program also had lower mean capillary blood glucose values compared with the standard insulin infusion (102.9±5.9 mg/dL [5.7±0.33 mmol/L] vs 121.7±5.9 mg/dL [6.8±0.33 mmol/L]; P=.02). Before the initiation of the infusion, both groups demonstrated mean capillary blood glucose values outside of target range (122.6±8.8 mg/dL [6.7±0.49 mmol/L] for the GlucoStabilizer software program vs 131.9±10.1 mg/dL [7.3±0.56 mmol/L] for standard insulin treatment group; P=not significant). There were no significant differences in baseline maternal characteristics between the groups or neonatal outcomes.

Conclusion:

This study is the first to demonstrate that the use of software-guided intravenous insulin dosing in obstetrics can improve intrapartum glycemic management without increasing hypoglycemia in women with both pregestational and gestational diabetes mellitus that is treated with an insulin infusion. (Author)

20180823-26*

Association of Gestational Diabetes and Type 2 Diabetes Exposure In Utero With the Development of Type 2 Diabetes in First Nations and Non-First Nations Offspring. Wicklow BA, Sellers EAC, Sharma AK, et al (2018), JAMA Pediatrics vol 172, no 8, August 2018, pp 724-731

Importance

Type 2 diabetes is increasing worldwide, disproportionately affecting First Nations (FN) people. Identifying early-life determinants of type 2 diabetes is important to address the intergenerational burden of illness.

Objective

To investigate the association of in utero exposure to gestational diabetes and type 2 diabetes, stratified by FN status, with the development of type 2 diabetes in offspring.

Design, Setting, and Participants

This cohort study was derived from the linkage of a pediatric diabetes clinical database and a population-based research data repository in Manitoba, Canada. Mother-infant dyads with a hospital birth or midwifery report in the data repository between April 1, 1984, and April 1, 2008, were identified. The dates of analysis were August through December 2017. Children identified with type 1 diabetes, monogenic diabetes, or secondary diabetes were excluded.

Exposures

Primary exposures included maternal gestational diabetes or type 2 diabetes and FN status.

Main Outcomes and Measures

The primary outcome was incident type 2 diabetes in offspring by age 30 years.

Results

In this cohort study of 467 850 offspring (mean follow-up, 17.7 years; 51.2% male), FN status and diabetes exposure were associated with incident type 2 diabetes in offspring after adjustment for sex, maternal age, socioeconomic status, birth size, and gestational age. Type 2 diabetes exposure conferred a greater risk to offspring compared with gestational diabetes exposure (3.19 vs 0.80 cases per 1000 person-years, P < .001). Compared with no diabetes exposure, any diabetes exposure accelerated the time to the development of type 2 diabetes in offspring by a factor of 0.74 (95% CI, 0.62-0.90) for gestational diabetes and a factor of 0.50 (95% CI, 0.45-0.57) for type 2 diabetes. First Nations offspring had a higher risk compared with non-FN offspring (0.96 vs 0.14 cases per 1000 person-years, P < .001). First Nations offspring had accelerated type 2 diabetes onset by a factor of 0.52 (95% CI, 0.49-0.55) compared with non-FN offspring. Neither interaction between FN and type 2 diabetes (0.92; 95% CI, 0.80-1.05) nor interaction between FN and gestational diabetes (0.97; 95% CI, 0.77-1.20) was significant (P = .21 and P = .75, respectively).

Conclusions and Relevance

Important differences exist in offspring risk based on type of diabetes exposure in utero. These findings have implications for future research and clinical practice guidelines, including early pregnancy screening and follow-up of the offspring. (Author)

20180816-9*

Glycemic control and healthcare utilization following pregnancy among women with pre-existing diabetes in Navajo Nation. Ho J, Bachman-Carter K, Thorkelson S, et al (2018), BMC Health Services Research vol 18, no 629, 10 August 2018

Background

Native American communities experience greater burden of diabetes than the general population, including high rates of Type 2 diabetes among women of childbearing age. Diabetes in pregnancy is associated with risks to both the mother and offspring, and glycemic control surrounding the pregnancy period is of vital importance.

Methods

A retrospective chart review was conducted at a major Navajo Area Indian Health Service (IHS) hospital, tracking women with pre-existing diabetes who became pregnant between 2010 and 2012. Logistic regression was performed to find patient-level predictors of our desired primary outcome-having hemoglobin A1c (HbA1c) consistently < 8% within 2 years after pregnancy. Descriptive statistics were generated for other outcomes, including glycemic control and seeking timely IHS care.
Results
One hundred twenty-two pregnancies and 114 individuals were identified in the dataset. Baseline HbA1c was the only covariate which predicted our primary outcome (OR = 1.821, 95% CI = 1.184-2.801). Examining glycemic control among pregnancies with complete HbA1c data (n = 59), 59% were controlled before, 85% during, and 34% after pregnancy. While nearly all women received care in the immediate postpartum period, only 49% of women visited a primary care provider and 71% had HbA1c testing in the 2 years after pregnancy.
Conclusions
This is the first analysis of outcomes among women with diabetes in pregnancy in Navajo Nation, the largest reservation and tribal health system in the United States. Our findings demonstrate the positive impact of specialized prenatal care in achieving glycemic control during pregnancy, while highlighting the challenges in maintaining glycemic control and continuity of healthcare after pregnancy.
(33 references) (Author) [Please note: this article is a digital version which may undergo minor changes in the future]
Full URL: https://doi.org/10.1186/s12913-018-3434-x

20180816-38*

The impact of extremes of maternal age on maternal and neonatal pregnancy outcomes in women with pregestational diabetes mellitus. Walker AR, Waites BT, Caughey AB (2020), Journal of Maternal-Fetal and Neonatal Medicine vol 33, no 3, 2020, pp 437-441

Background:. Diabetes mellitus (DM) during pregnancy increases the risk for many complications such as preeclampsia and cesarean section. Teen (age <20) and advanced maternal age (AMA, age ≥35) pregnancies are both at increased risk for maternal and neonatal morbidity and mortality. Understanding the risks and complications unique to teen and AMA women with pregestational DM is imperative to providing care and improving outcomes.
Objective:. This study sought to determine how maternal and neonatal outcomes are affected by pregestational DM in teen and AMA pregnancies.
Study design:. This is a retrospective cohort study of 1.58 million pregnancies in California from 2005 through 2008s, of which 10,034 diabetic women with nonanomalous, singleton pregnancies were identified. Women with gestational DM were excluded. Maternal outcomes examined include preeclampsia, placental abruption, chorioamnionitis, preterm delivery, and cesarean section. Neonatal outcomes include size for gestational age, birth weight >4000 g, shoulder dystocia, brachial plexus injury, jaundice, and intrauterine fetal demise (IUFD). Multivariate regression analyses and chi-squared test were used for statistical comparisons and a p-value of less than .05 was used to indicate statistical significance.
Results:. Compared to women of age 20-34 years with pregestational DM as the reference group, women <20 years old with DM had higher rates of preeclampsia (aOR 1.72; 95% CI 1.29-2.29; p-value < .001) and lower rates of cesarean delivery (aOR 0.63; 95% CI 0.47-0.85; p < .001). Neonates of teen mothers were more likely to be large for gestational age (LGA; > 90%ile; aOR 1.60; 95% CI 1.14-2.23; p = .006), whereas neonates in the maternal age category of 35-39 years had lower rates of LGA >90%ile (aOR 0.81; 95% CI 0.70-0.92; p = .001). Odds of IUFD were greatest in women age 35-39 years old (aOR 1.73; 95% CI 1.05-2.85; p = .031). Analysis examining women >40 years old showed no statistically significant difference in outcomes.
Conclusion: Pregnancy outcomes in women with pregestational diabetes differ depending on maternal age category. Teens are at higher risk for preeclampsia and LGA neonates, but at lower risk for cesarean. Women aged 35-39 years are at higher risk for cesarean delivery, are less likely to have LGA neonates, and more likely to experience IUFD. Understanding the etiologies behind these differences may lead to improvements in these clinical outcomes.
(Author)

20180814-67*

The Risk of Offspring Psychiatric Disorders in the Setting of Maternal Obesity and Diabetes. Kong L, Norstedt G, Schalling M, et al (2018), Pediatrics vol 142, no 3, September 2018

BACKGROUND: Prenatal exposure to metabolic disturbances is associated with increased risk of offspring neurodevelopmental impairment and autism spectrum disorder, while little is known about the joint effect of maternal obesity and diabetes. With this study, we aim to assess the joint effect of maternal obesity and diabetes on the risk for offspring psychiatric and mild neurodevelopmental disorders.

METHODS: Nationwide registries were used to link data of all live births in Finland between 2004 and 2014 (n = 649 043). Cox proportional hazards modeling adjusting for potential confounders was applied to estimate the effect of maternal obesity, pregestational diabetes mellitus (PGDM), and gestational diabetes mellitus, as well as their joint effects, on the outcomes of offspring psychiatric and mild neurodevelopmental diagnoses and offspring prescription of psychotropic drugs.
RESULTS: Among mothers without diabetes, severely obese mothers had 67% to 88% increased risk of having a child with mild neurodevelopmental disorders (hazard risk ratio [HR] = 1.69; 95% confidence interval [CI] = 1.54-1.86), attention-deficit/hyperactivity disorder or conduct disorder (HR = 1.88; 95% CI = 1.58-2.23), and psychotic, mood, and stress-related disorders (HR = 1.67; 95% CI = 1.31-2.13) compared with mothers with a normal BMI. PGDM implied a further risk increase for all groups of psychiatric diagnoses with onset in childhood or adolescence in mothers with severe obesity. Marked effects were found particularly for autism spectrum disorder (HR = 6.49; 95% CI = 3.08-13.69), attention-deficit/hyperactivity disorder and conduct disorder (HR = 6.03; 95% CI = 3.23-11.24), and mixed disorders of conduct and emotions (HR = 4.29; 95% CI = 2.14-8.60). Gestational diabetes mellitus did not increase the risk highly for these offspring disorders.
CONCLUSIONS: Maternal PGDM combined with severe maternal obesity markedly increases the risk of several children's psychiatric and mild neurodevelopmental disorders.
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20180809-90*

Permanent neonatal diabetes: combining sulfonylureas with insulin may be an effective treatment. MIsra S, Vedovato N, Cliff E, et al (2018), Diabetic Medicine vol 35, no 9, September 2018, pp 1291-1296

Background:
Permanent neonatal diabetes caused by mutations in the KCNJ11 gene may be managed with high-dose sulfonylureas. Complete transfer to sulfonylureas is not successful in all cases and can result in insulin monotherapy. In such cases, the outcomes of combining sulfonylureas with insulin have not been fully explored. We present the case of a woman with diabetes due to a KCNJ11 mutation, in whom combination therapy led to clinically meaningful improvements.
Case:
A 22-year-old woman was found to have a KCNJ11 mutation (G334V) following diagnosis with diabetes at 3 weeks. She was treated with insulin-pump therapy, had hypoglycaemia unawareness and suboptimal glycaemic control. We assessed the in vitro response of the mutant channel to tolbutamide in Xenopus oocytes and undertook sulfonylurea dose-titration with C-peptide assessment and continuous glucose monitoring. In vitro studies predicted the G334V mutation would be sensitive to sulfonylurea therapy [91 ± 2% block (n = 6) with 0.5 mM tolbutamide]. C-peptide increased following a glibenclamide test dose (from 5 to 410 pmol/l). Glibenclamide dose-titration was undertaken: a lower glibenclamide dose did not reduce blood glucose levels sustainably, but at 1.2 mg/kg/day insulin delivery was reduced to 0.1 units/h. However, when insulin was stopped, hyperglycaemia ensued. Glibenclamide was further increased (2 mg/kg/day), but once-daily long-acting insulin was still required to maintain glycaemia. This resulted in improved HbA1c of 52 mmol/mol (6.9%), restoration of hypoglycaemia awareness and reduced glycaemic variability.
Conclusion:
In people with KCNJ11 mutations causing permanent neonatal diabetes, and where complete transfer is not possible, consideration should be given to dual insulin and sulfonylurea therapy. (Author)

20180731-101*

Impact of late pregnancy haemoglobin A1c at 29-30 weeks' gestation on adverse pregnancy outcomes among women with pre-existing diabetes: a retrospective analysis. Yong SL, Ng BK, Mohd Yassin MAJ, et al (2018), Journal of Obstetrics and Gynaecology vol 38, no 4, May 2018, pp 461-465

This study was to assess the relationship between late pregnancy haemoglobin A1C (HbA1C) at 29-30 weeks of gestation and adverse pregnancy outcomes (APOs) in 272 pregnant women with pre-existing diabetes. HbA1C ≥6.1% was associated with significantly increased risk of preterm delivery, Caesarean section, large for gestational age (LGA), neonatal respiratory distress, neonatal hypoglycaemia, and composite adverse neonatal outcome ($p < .05$). The risk of pre-eclampsia increased significantly at the lower HbA1C cut-off of > 5.6% ($p = .039$). Reduction of HbA1C cut-off from 6.1% to 5.6% improved the sensitivity but reduced the specificity for prediction of APOs. Overall, the receiver operating characteristic (ROC) curves demonstrated the moderate predictive value of late pregnancy HbA1C for APOs. In conclusion, elevated late pregnancy HbA1C levels at 29-30 gestational weeks had a negative impact on APOs in pregnant women with pre-existing diabetes. However, HbA1C cut-off levels of neither ≥6.1% nor >5.6% were ideal for predicting APOs. Impact statement What is already known on this subject: Poorly controlled diabetes is associated

with adverse pregnancy outcomes (APOs). Periconceptual haemoglobin A1C (HbA1C) correlates well with the risk of foetal anomaly but is not predictive of APOs at time of delivery. New evidence suggested that late pregnancy HbA1C is predictive of APOs but the definitions of a late pregnancy gestational week and target HbA1Ccutpoint remain in doubt. What the results of this study add: This study investigated the relationship between late pregnancy HbA1C levels at 29-30 weeks of gestation and the APOs among pregnant women with pre-existing diabetes. Late pregnancy HbA1C ≥ 6.1% correlated with the risk of APOs but the increased risk of pre-eclampsia only became significant at the lower cut-off of >5.6%. Reducing HbA1C cut-off from 6.1% to 5.6% improved the sensitivity but reduced the specificity for prediction of APOs. Overall, late pregnancy HbA1C had a moderate predictive value for APOs. What the implications are of these findings for clinical practice and/or further research: HbA1C cut-off levels of neither ≥6.1% nor >5.6% were ideal in predicting APOs among pregnant women with pre-existing diabetes. As HbA1C levels tend to drop in pregnancy, caution should be taken when interpreting HbA1C in pregnancy. More multi-centred studies are required to explore the respective glycaemic target for each APO and to determine the ideal timing for late pregnancy HbA1C measurement. (17 references) (Author)

20180725-68*

Oxidative stress and DNA damage in newborns born to mothers with hyperglycemia - a prospective cohort study. Dulasi Durga K, Adhisivam B, Vidya G, et al (2018), Journal of Maternal-Fetal and Neonatal Medicine vol 31, no 18, 2018, pp 2396-2401

Background: Hyperglycemic mothers have increased oxidative stress during pregnancy, which can adversely affect the outcome in their neonates.

Objectives: To measure the oxidative stress and DNA damage in newborns born to mothers with hyperglycemia and correlate their immediate outcome with the amount of oxidative stress and DNA damage.

Methods: This prospective cohort study conducted in a tertiary care teaching hospital, South India included three groups - newborns born to pregestational diabetic mothers, gestational diabetic mothers, and euglycemic mothers with 24 newborns in each. Oxidative stress parameters - malondialdehyde (MDA), total antioxidant capacity (TAC), and DNA damage (comet assay) were assessed in umbilical cord blood. Association between these parameters and immediate neonatal outcome among three groups were studied.

Results: Newborns born to diabetic mothers had more MDA levels and DNA damage compared to euglycemic mothers. There was a positive correlation between comet parameters and MDA levels. There was an inverse correlation between comet parameters and TAC. Newborns born to diabetic mothers were at high risk to develop respiratory distress syndrome, hypoglycemia, and sepsis.

Conclusions: Newborns born to diabetic mothers had increased oxidative stress and DNA damage compared to those born to mothers with euglycemia. (Author)

20180724-50*

Association of Thyroid Dysfunction and Autoimmunity in Pregnant Women with Diabetes Mellitus. Konar H, Sarkar M, Roy M (2018), Journal of Obstetrics and Gynecology of India vol 68, no 4, August 2018, pp 283-288

Purpose

This study was undertaken to find out the proportion of women with thyroid dysfunction in pregnancy complicated by diabetes mellitus; to find out the association, if any, of thyroid dysfunction and of antithyroid peroxidase (anti-TPO) antibodies during pregnancy in women with pregestational (PGDM) and gestational diabetes mellitus (GDM); and to find out the maternal and perinatal outcomes of pregnancies complicated by both diabetes mellitus and thyroid dysfunction.

Methods

A cross-sectional observational study was conducted in a tertiary care teaching hospital in Kolkata, India, for a period of 1 year. Sixty-four pregnant women with diabetes, both PGDM and GDM, were recruited from the antenatal clinic. They were managed and followed up till 6 weeks postpartum. Their plasma glucose levels were estimated, and thyroid function was evaluated periodically. All relevant data were recorded and analyzed statistically.

Results

Most (81.25%) women had GDM. Forty percent women suffered from some form of thyroid disorder, mostly (37.5%) hypothyroidism. Thyroid dysfunction was not associated with the type of diabetes mellitus (GDM or PGDM) ($p > 0.05$). The higher rate of anti-TPO titers was observed in pregnancies with PGDM compared to pregnancies with GDM; however, this difference was not statistically associated ($p > 0.05$). All pregnant women with combined endocrinopathy delivered by cesarean section, and the most common neonatal complication observed was jaundice.

Conclusions

Thyroid disorders are quite common during pregnancy complicated by diabetes mellitus. The study findings warrant

routine screening for thyroid abnormalities in diabetic pregnant women. These women have increased rate of maternal and neonatal complications. (9 references) (Author)

20180723-10*

Intensive Glycemic Treatment During Type 1 Diabetes Pregnancy: A Story of (Mostly) Sweet Success!. Murphy H (2018), Diabetes Care vol 41, no 8, August 2018, pp 1563-1571

Studies from Scotland and Canada confirm large increases in the incidence of pregnancies complicated by pregestational type 1 diabetes (T1D). With this increased antenatal workload comes more specialization and staff expertise, which may be important as diabetes technology use increases. While euglycemia remains elusive and obstetrical intervention (earlier delivery, increased operative deliveries) is increasing, there have been some notable successes in the past 5-10 years. These include a decline in the rates of congenital anomaly (Canada) and stillbirths (U.K.) and substantial reductions in both maternal hypoglycemia (both moderate and severe) across many countries. However, pregnant women with T1D still spend ?30-45% of the time (8-11 h/day) hyperglycemic during the second and third trimesters. The duration of maternal hyperglycemia appears unchanged in routine clinical care over the past decade. This ongoing fetal exposure to maternal hyperglycemia likely explains the persistent rates of large for gestational age (LGA), neonatal hypoglycemia, and neonatal intensive care unit (NICU) admissions in T1D offspring. The Continuous Glucose Monitoring in Women With Type 1 Diabetes in Pregnancy Trial (CONCEPTT) found that pregnant women using real-time continuous glucose monitoring (CGM) spent 5% less time (1.2 h/day) hyperglycemic during the third trimester, with clinically relevant reductions in LGA, neonatal hypoglycemia, and NICU admissions. This article will review the progress in our understanding of the intensive glycemic treatment of T1D pregnancy, focusing in particular on the recent technological advances in CGM and automated insulin delivery. It suggests that even with advanced diabetes technology, optimal maternal dietary intake is needed to minimize the neonatal complications attributed to postprandial hyperglycemia. (48 references) (Author)

Full URL: https://doi.org/10.2337/dci18-0001

20180718-6*

Managing hyperglycaemia during antenatal steroid administration, labour and birth in pregnant women with diabetes. Dashora U, Murphy HR, Temple RC, et al (2018), Diabetic Medicine vol 35, no 8, August 2018, pp 1005-1010

Optimal glycaemic control before and during pregnancy improves both maternal and fetal outcomes. This article summarizes the recently published guidelines on the management of glycaemic control in pregnant women with diabetes on obstetric wards and delivery units produced by the Joint British Diabetes Societies for Inpatient Care and available in full
at www.diabetes.org.uk/joint-british-diabetes-society and https://abcd.care/joint-british-diabetes-societies-jbds-inpatient-care-group. Hyperglycaemia following steroid administration can be managed by variable rate intravenous insulin infusion (VRIII) or continuous subcutaneous insulin infusion (CSII) in women who are willing and able to safely self-manage insulin dose adjustment. All women with diabetes should have capillary blood glucose (CBG) measured hourly once they are in established labour. Those who are found to be higher than 7 mmol/l on two consecutive occasions should be started on VRIII. If general anaesthesia is used, CBG should be monitored every 30 min in the theatre. Both the VRIII and CSII rate should be reduced by at least 50% once the placenta is delivered. The insulin dose needed after delivery in insulin-treated Type 2 and Type 1 diabetes is usually 25% less than the doses needed at the end of first trimester. Additional snacks may be needed after delivery especially if breastfeeding. Stop all anti-diabetes medications after delivery in gestational diabetes. Continue to monitor CBG before and 1 h after meals for up to 24 h after delivery to pick up any pre-existing diabetes or new-onset diabetes in pregnancy. Women with Type 2 diabetes on oral treatment can continue to take metformin after birth. (Author)

20180718-19*

Periconception glycaemic control in women with type 1 diabetes and risk of major birth defects: population based cohort study in Sweden. Ludvigsson JF, Neovius M, Söderling J, et al (2018), BMJ vol 362, no 8160, 5 July 2018

Objective To examine the association between maternal type 1 diabetes and the risk of major birth defects according to levels of glycated haemoglobin (HbA1C) within three months before or after estimated conception.
Design Population based historical cohort study using nationwide health registers.
Setting Sweden, 2003-15.
Participants 2458 singleton liveborn infants of mothers with type 1 diabetes and a glycated haemoglobin measurement within three months before or after estimated conception and 1 159 865 infants of mothers without diabetes.

Main outcome measures Major cardiac and non-cardiac birth defects according to glycated haemoglobin levels.
Results 122 cases of major cardiac defects were observed among 2458 infants of mothers with type 1 diabetes. Compared with 15 cases of major cardiac defects per 1000 infants of mothers without diabetes, the rates among infants of mothers with type 1 diabetes were 33 per 1000 for a glycated haemoglobin level of <6.5% (adjusted risk ratio 2.17, 95% confidence interval 1.37 to 3.42), 49 per 1000 for 6.5% to <7.8% (3.17, 2.45 to 4.11), 44 per 1000 for 7.8% to <9.1% (2.79, 1.90 to 4.12), and 101 per 1000 for ≥9.1% (6.23, 4.32 to 9.00). The corresponding adjusted risk differences were 17 (5 to 36), 32 (21 to 46), 26 (13 to 46), and 77 (49 to 118) cases of major cardiac defects per 1000 infants, respectively. 50 cases of major non-cardiac defects were observed among infants of mothers with type 1 diabetes. Compared with 18 cases of major non-cardiac defects per 1000 infants of mothers without diabetes, the rates among infants of mothers with type 1 diabetes were 22 per 1000 for a glycated haemoglobin level of <6.5% (adjusted risk ratio 1.18, 0.68 to 2.07), 19 per 1000 for 6.5% to <7.8% (1.01, 0.66 to 1.54), 17 per 1000 for 7.8% to <9.1% (0.89, 0.46 to 1.69), and 32 per 1000 for ≥9.1% (1.68, 0.85 to 3.33).
Conclusion Among liveborn infants of mothers with type 1 diabetes, increasingly worse glycaemic control in the three months before or after estimated conception was associated with a progressively increased risk of major cardiac defects. Even with glycated haemoglobin within target levels recommended by guidelines (<6.5%), the risk of major cardiac defects was increased more than twofold. The risk of major non-cardiac defects was not statistically significantly increased at any of the four glycated haemoglobin levels examined; the study had limited statistical power for this outcome and was based on live births only. (Author)
Full URL: https://doi.org/10.1136/bmj.k2638

20180711-9*

Stopping type 1 diabetes from birth. Roberts M (2018), BBC News 11 July 2018

Reports on research to prevent high risk babies from developing type 1 diabetes. About one in every 100 babies has genes that put them at increased risk of developing type 1, insulin-dependent diabetes; the heel prick blood test that is routinely done on newborns could detect these genes. Researchers are hoping to screen 30,000 babies in this way and pregnant women in South East England are currently being recruited for the trial. During the trial, parents will give their children insulin powder daily from the age of six months until the age of three to train their immune system and potentially offer life-long protection. (CAP)
Full URL: https://www.bbc.co.uk/news/health-44777939

20180704-24*

Maternal diabetes mellitus and timing of pubertal development in daughters and sons: a nationwide cohort study.
Lauridsen LLB, Arendt LH, Ernst A, et al (2018), Fertility and Sterility vol 110, no 1, July 2018, pp 35-44

Objective
To study the association between maternal diabetes and timing of pubertal development in daughters and sons.
Design
Prospective cohort study.
Setting
Not applicable.
Patient(s)
A total of 15,822 mother-child pairs included in the Danish National Birth Cohort and the Puberty Cohort with prospectively collected, register-based and self-reported information on maternal diabetes and self-reported information on pubertal development.
Intervention(s)
None.
Main Outcome Measure(s)
Adjusted mean monthly difference in age at attaining pubertal milestones in children born of mothers with diabetes compared with children born of mothers without diabetes.
Result(s)
A total of 502 children were born of mothers with diabetes during pregnancy. In daughters exposed to gestational diabetes mellitus, we observed advanced onset in all pubertal milestones. The associations were statistically significant with regard to pubic hair Tanner stage 2 (−4.8 months) (95% confidence interval [CI] −7.7, −2.0), pubic hair Tanner stage 3 (−2.2 months) (95 % CI −4.4, 0.0), pubic hair Tanner stage 5 (−6.0 months) (95% CI −10.8, −1.2), and menarche (−2.5 months) (95 % CI −4.9, 0.0). We observed no tendencies between maternal type 1 or type 2 diabetes mellitus and pubertal development in daughters. We observed no associations between maternal diabetes and pubertal development in sons.

Conclusion(s)
Our findings suggest that gestational diabetes mellitus may accelerate the pubertal development in daughters. Our results did not support an association between type 1 or type 2 diabetes mellitus and daughters' pubertal development, as well as between any type of maternal diabetes and sons' pubertal development. (36 references) (Author)

20180628-49*

Day-and-Night Closed-Loop Insulin Delivery in a Broad Population of Pregnant Women With Type 1 Diabetes: A Randomized Controlled Crossover Trial. Stewart ZA, Wilinska ME, Hartnell S, et al (2018), Diabetes Care vol 41, no 7, July 2018, pp 1391-1399

OBJECTIVE Despite advances in technology, optimal glucose control remains elusive and neonatal complications remain ubiquitous in type 1 diabetes (T1D) pregnancy. Our aim was to examine the safety, efficacy, and longer-term feasibility of day-and-night closed-loop insulin delivery.
RESEARCH DESIGN AND METHODS We recruited 16 pregnant women (mean [SD]: age 32.8 [5.0] years, T1D duration 19.4 [10.2] years, HbA1c 8.0% [1.1], and BMI 26.6 [4.4] kg/m2) to an open-label, randomized, crossover trial. Participants completed 28 days of closed-loop and sensor-augmented pump (SAP) insulin delivery separated by a washout period. Afterward, participants could continue to use the closed-loop system up to 6 weeks postpartum. The primary end point was the proportion of time with glucose levels within the target range (63-140 mg/dL).
RESULTS The proportion of time with glucose levels within target was comparable during closed-loop and SAP insulin delivery (62.3 vs. 60.1% [95% CI −4.1 to 8.3]; P = 0.47). Mean glucose and time spent hyperglycemic >140 mg/dL also did not differ (131.4 vs. 131.4 mg/dL [P= 0.85] and 36.6 vs. 36.1% [P = 0.86], respectively). During closed-loop, fewer hypoglycemic episodes occurred (median 8 [range 1-17] vs. 12.5 [1-53] over 28 days; P = 0.04) and less time at <63 mg/dL (1.6 vs. 2.7%; P = 0.02). Hypoglycemia <50 mg/dL (0.24 vs. 0.47%; P = 0.03) and low blood glucose index (1.0 vs. 1.4; P = 0.01) were lower. Less nocturnal hypoglycemia (2300-0700 h) during closed-loop therapy (1.1 vs. 2.7%; P = 0.008) and a trend toward higher overnight time in target (67.7 vs. 60.6%; P = 0.06) were found.
CONCLUSIONS Closed-loop insulin delivery was associated with comparable glucose control and significantly less hypoglycemia than SAP therapy. Larger, longer-duration multicenter trials are now indicated to determine clinical efficacy of closed-loop insulin delivery in T1D pregnancy and the impact on neonatal outcomes. (Author)

20180628-45*

The Human Placenta in Diabetes and Obesity: Friend or Foe? The 2017 Norbert Freinkel Award Lecture. Desoye G (2018), Diabetes Care vol 41, no 7, July 2018, pp 1362-1369

The placenta plays a key role in sustaining fetal growth and development. Due to its position between mother and fetus, it is exposed to changes in the intrauterine environment in both circulations. The relative influence of changes in those circulations depends on the period of gestation. Early in pregnancy, maternal influences prevail and may affect the complex biological processes characteristic for this pregnancy period, such as placentation, early cell differentiation, and spiral artery remodeling. It is still unclear whether the placenta early in pregnancy is a friend or foe for the fetus. Later in pregnancy, when the fetal circulation is gradually establishing, fetal signals gain importance in regulating placental structure and function. Many of the placental alterations seen at term of pregnancy are the result of fetoplacental interactions often driven by fetal signals associated with maternal diabetes or obesity. These alterations, such as hypervascularization or enhanced cholesterol removal from placental endothelial cells, can be regarded as adaptations to maintain homeostasis at the fetoplacental interface and, thus, to protect the fetus. However, extreme conditions such as poorly controlled diabetes or pronounced obesity may exceed placental homeostatic capacity, with potentially adverse consequences for the fetus. Thus, in late pregnancy, the placenta acts mostly as a friend as long as the environmental perturbations do not exceed placental capacity for mounting adaptive responses. (67 references) (Author)
Full URL: https://doi.org/10.2337/dci17-0045

20180627-9*

Maternal Type 1 Diabetes and Risk of Autism in Offspring. Xiang AH, Wang X, Martinez MP, et al (2018), JAMA (Journal of the American Medical Association) vol 320, no 1, July 3 2018, pp 89-91

Maternal preexisting type 2 diabetes (T2D) and gestational diabetes mellitus (GDM) diagnosed by 26 weeks' gestation have been associated with increased risk of autism spectrum disorder (ASD) in offspring.1 However, little is known about ASD risk associated with maternal preexisting type 1 diabetes (T1D). We extend previous observations by examining the risk of ASD in offspring associated with maternal T1D, T2D, and GDM. (5 references) (Author)

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20180626-68*

Metformin exposure in first trimester of pregnancy and risk of all or specific congenital anomalies: exploratory case-control study. Given JE, Loane M, Garne E, et al (2018), BMJ vol 361, no 8159, 30 June 2018

Objective To investigate whether exposure to metformin during the first trimester of pregnancy, for diabetes or other indications, increases the risk of all or specific congenital anomalies.

Design Population based exploratory case-control study using malformed controls. Cases of 29 specific subgroups of non-genetic anomalies, and all non-genetic anomalies combined, were compared with controls (all other non-genetic anomalies or genetic syndromes).

Setting 11 EUROmediCAT European congenital anomaly registries surveying 1 892 482 births in Europe between 2006 and 2013.

Participants 50 167 babies affected by congenital anomaly (41 242 non-genetic and 8925 genetic) including live births, fetal deaths from 20 weeks' gestation, and terminations of pregnancy for fetal anomaly.

Main outcome measure Odds ratios adjusted for maternal age, registry, multiple birth, and maternal diabetes status.

Results 168 babies affected by congenital anomaly (141 non-genetic and 27 genetic) were exposed to metformin, 3.3 per 1000 births. No evidence was found for a higher proportion of exposure to metformin during the first trimester among babies with all non-genetic anomalies combined compared with genetic controls (adjusted odds ratio 0.84, 95% confidence interval 0.55 to 1.30). The only significant result was for pulmonary valve atresia (adjusted odds ratio 3.54, 1.05 to 12.00, compared with non-genetic controls; 2.86, 0.79 to 10.30, compared with genetic controls).

Conclusions No evidence was found for an increased risk of all non-genetic congenital anomalies combined following exposure to metformin during the first trimester, and the one significant association was no more than would be expected by chance. Further surveillance is needed to increase sample size and follow up the cardiac signal, but these findings are reassuring given the increasing use of metformin in pregnancy. (62 references) (Author)

20180626-55*

Prevalence and predictive factors of early postpartum diabetes among women with gestational diabetes in a single-center cohort. Coetzee A, Mason D, Hall DR, et al (2018), International Journal of Gynecology & Obstetrics vol 142, no 1, July 2018, pp 54-60

Objective

To determine the prevalence of diabetes at 6-12 weeks postpartum among women with gestational diabetes mellitus (GDM), and to identify prenatal postpartum diabetes predictors.

Methods

In the present prospective cohort study, glucose statuses of consecutive women newly diagnosed with hyperglycemia during pregnancy were evaluated at 6-12 weeks postpartum between November 1, 2015, and November 1, 2016, at Tygerberg Hospital, Cape Town, South Africa. Women with known diabetes were excluded.

Results

There were 78 patients included; 36 (46%) patients had abnormal postpartum glucose values (21 [27%] diabetes; 15 [19%] pre-diabetes) and 29 (37%) had overt diabetes in pregnancy. In univariate analyses, GDM diagnosis before 24 weeks of pregnancy (P<0.001), degree of hyperglycemia at diagnosis (P=0.001), need for insulin (P=0.001), glycosylated hemoglobin (HbA1c) in the month preceding delivery (P=0.006), older than 36 years (P=0.039), family history of diabetes (P=0.048), and preterm labor (P=0.039) were risk factors for postpartum diabetes. Multivariate analyses confirmed family history of diabetes (OR 7.45, 95% CI 1.05-52.76; P=0.044), HbA1c at diagnosis (OR 5.33, 95% CI 2.25-12.60; P<0.001), and age (OR 8.8, 95% CI 1.35-58.45; P=0.023), as robust predictors of diabetes after GDM.

Conclusion

The high prevalence of diabetes supports early postpartum oral glucose tolerance testing. Several women had undiagnosed diabetes. The risk factors identified could be useful for prenatal risk stratification. (Author)

20180625-21*

Increased fetal epicardial fat thickness: A novel ultrasound marker for altered fetal metabolism in diabetic pregnancies. Akkurt MO, Ozhan OM, Crimmins DO, et al (2018), Journal of Clinical Ultrasound vol 46, no 6, July/August 2018, pp 397-402

Objective

To evaluate whether fetal epicardial fat thickness (EFT) differs in diabetic and nondiabetic pregnant women.

Methods

Retrospective case-control study of pregnancies between 24 and 36 weeks complicated by preexisting (PDM) or gestational (GDM) diabetes mellitus, matched one to one with controls for body mass index and gestational age (GA).

Epicardial fat was identified as the hypoechogenic area between myocardium and visceral pericardium over the right ventricle and its thickness was measured by a single observer blinded to clinical condition and outcomes. A linear regression analysis was performed to assess the relationship between GA and EFT, and regression lines were compared between diabetics and controls.

Results

53 PDM and 53 GDM pregnant women were matched with controls. With the exception of maternal age, the demographics were similar among groups. EFT increased significantly with advancing gestation in both diabetics and controls ($P < 0.0001$) and was significantly greater in diabetics than in controls ($P < 0.0001$). The best fit lines were different between diabetics (EFT = 0.05 × GA + 0.07 mm; R2 = 0.70) and controls (EFT = 0.07 × GA + 0.04 mm; R2 = 0.93) ($P < 0.0001$).

Conclusion

Fetal EFT was greater in diabetics than in nondiabetics, and even greater in pregestational diabetics. EFT maybe an additional and/or earlier marker to identify early changes in fetal metabolism before accelerated fetal growth and polyhydramnios is apparent. (Author)

20180614-37*

Peripartum fetal distress in diabetic women: a retrospective case-cohort study. Castelijn B, Hollander KWP, Hensbergen JF, et al (2018), BMC Pregnancy and Childbirth vol 18, no 228, 14 June 2018

Background

Major concerns of pregnancies complicated by diabetes mellitus are an increased risk of adverse perinatal outcome. The objective of this study was to analyse the rate of fetal distress during labor in women with type 1, type 2 and gestational diabetes compared to control women.

Methods

A retrospective case-cohort study was conducted at the VU University Medical Center, Amsterdam; a tertiary care hospital. 117 women with type 1 diabetes, 59 women with type 2 diabetes, 303 women with gestational diabetes and 15,260 control women were included, who delivered between March 2004 and February 2014. Linear and logistic regression analyses were used to compare maternal and pregnancy characteristics. Risk of fetal distress and perinatal asphyxia was assessed by multiple regression analyses, adjusted for confounding factors as age, smoking, parity, previous cesarean section, hypertensive disorder, pre-eclampsia, prematurity, induction of labor and macrosomia. Main outcome measure was fetal distress, defined either as clinical indication for instrumental or cesarean delivery; or low umbilical artery pH (UA pH), or admission to neonatal unit (NU).

Results

The indication for instrumental or cesarean delivery in women with type 1 and type 2 diabetes mellitus was more frequently based on fetal distress as compared to controls (adjusted OR 2.76 CI 1.74-4.40 and adjusted OR 2.31 CI 1.19-4.51, respectively). In comparison with the control group, infants of women with type 1 diabetes had an increased risk of UA pH < 7.20 (adjusted OR 1.88 CI 1.23-2.87) or UA pH < 7.10 (adjusted OR 3.35 CI 1.79-6.27). Also, infants of women with type 1 diabetes were at increased risk for admission to NU as compared to infants of control women (OR 8.07 CI 4.75-13.70).

Conclusions

Women with type 1 and type 2 diabetes are at increased risk of fetal distress during labor as compared to controls. (38 references) (Author) [Please note: BMC initially publishes articles in a provisional format. If there is a note on the document to indicate that it is still provisional, it may undergo minor changes]

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20180614-20*

Aspirin Effect on Adverse Pregnancy Outcomes Associated With Stage 1 Hypertension in a High-Risk Cohort. Hauspurg A, Sutton EF, Catov JM, et al (2018), Hypertension vol 72, no 1, July 2018, pp 202-207

Recently, the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines revised the recommendations for diagnosis of chronic hypertension. The new classification system includes a diagnosis of stage 1 hypertension in adults with blood pressures 130 to 139/80 to 89 mm Hg. We sought to compare outcomes among women at high risk for preeclampsia with stage 1 hypertension and assessed whether women with stage 1 hypertension had benefit from aspirin treatment compared with high-risk normotensive women. We performed a secondary analysis of the high-risk aspirin trial and included women with prior preeclampsia or diabetes mellitus. Among these women, 827 (81%) were classified as normotensive, whereas 193 (19%) were classified as stage 1 hypertensive. Among women receiving placebo, preeclampsia occurred significantly more often in women with stage 1 hypertension compared with normotensive high-risk women after adjustment for maternal age and body mass

index (39.1% versus 15.1%; risk ratio, 2.49; 95% confidence interval, 1.74-3.55). Further, women with stage 1 hypertension had a significant risk reduction related to aspirin prophylaxis (risk ratio, 0.61; 95% confidence interval, 0.39-0.94) that was not seen in normotensive high-risk women (risk ratio, 0.97; 95% confidence interval, 0.70-1.34). Application of the American College of Cardiology/American Heart Association guidelines in a high-risk population demonstrates that in the setting of other risk factors, the presence of stage 1 hypertension is associated with a significantly increased risk of preeclampsia when compared with high-risk normotensive women. These findings emphasize the importance of recognition of stage 1 hypertension as an additive risk factor in women at high risk for preeclampsia and the benefit of aspirin. (Author)

20180611-5*

Parity increases insulin requirements in pregnant women with type 1 diabetes. Skajaa GØ, Fuglsang J, Kampmann U, et al (2018), The Journal of Clinical Endocrinology and Metabolism vol 103, no 6, June 2018, pp 2302-2308

Context

Tight glycemic control throughout pregnancy in women with type 1 diabetes is crucial, and knowledge about which factors that affect insulin sensitivity could improve the outcome for both mother and offspring.

Objective

To evaluate insulin requirements in women with type 1 diabetes during pregnancy and test whether parity affects insulin requirements.

Design

Observational cohort study consisting of women with type 1 diabetes who gave birth at Aarhus University Hospital, Denmark, from 2004 to 2014.

Main Outcome Measure

Daily insulin requirement (the hypothesis that parity could affect insulin resistance was formulated before data collection).

Results

A total of 380 women with a total of 536 pregnancies were included in the study. Mean age was 31.1 years, and prepregnancy hemoglobin A1c was 60 mmol/mol. Parity was as follows: P0, 43%; P1, 40%; P2, 14%; and P3+4, 3%. Insulin requirements from weeks 11 to 16 decreased significantly by 4% (P = 0.0004) and rose from week 19 to delivery with a peak of 70% (P < 0.0005) at weeks 33 to 36. Overall, insulin requirements increased significantly with parity. The unadjusted differences between P0 and P1, P2, and P3+4 were 9% (P < 0.0005), 12% (P < 0.0005), and 23% (P < 0.0011), respectively. After adjustment for confounders, differences were 13% (P < 0.0005), 20% (P < 0.0005), and 36% (P < 0.0005). We also observed an adjusted difference between P1 and P3+4 of 20% (P < 0.0012).

Conclusions

The data show changes in insulin requirements from week to week in pregnancy and indicate that insulin requirements increase with parity. This suggests that the patient's parity probably should be considered in choosing insulin dosages for pregnant women with type 1 diabetes. (Author)

20180529-6*

Association between Sonographic Estimated Fetal Weight and the Risk of Cesarean Delivery among Nulliparous Women with Diabetes in Pregnancy. Dude AM, Grobman WA, Yee LM (2018), American Journal of Perinatology 4 May 2018, eFirst

Objective

The objective of this study was to examine the association between an ultrasound-estimated fetal weight (US-EFW) and mode of delivery among nulliparous diabetic women.

Study Design

This is a retrospective cohort study of nulliparous women with medication-requiring gestational or pregestational diabetes who delivered term, singleton gestations following a trial of labor. We determined whether having had an US-EFW within 35 days of delivery was associated with cesarean delivery.

Results

Of 304 women who met the eligibility criteria, 231 (76.0%) had an US-EFW within 35 days of delivery. An US-EFW was associated with increased likelihood of intrapartum cesarean (51.5% for those with an ultrasound vs. 27.4% for those without, p < 0.001); this finding persisted even when controlling for birth weight and other confounding factors (adjusted odds ratio: 2.23, 95% confidence interval: 1.16-4.28). Among women with a recent US-EFW, a diagnosis of a large-for-gestational-age (LGA) fetus was associated with overall intrapartum cesarean frequency (65.2% for women with an LGA fetus vs. 46.1% for those without, p = 0.009), but this association did not remain significant in multivariable models.

Conclusion
An US-EFW within 35 days of delivery among nulliparous women with medication-requiring diabetes was positively associated with intrapartum cesarean delivery. (23 references) (Author)

20180529-54*

Pregestational Diabetes in Pregnancy. Sugrue R, Zera C (2018), Obstetrics and Gynecology Clinics of North America vol 45, no 2, June 2018, pp 315-331

Diabetes is a common chronic condition in women of reproductive age. Preconception care is crucial to reducing the risk of adverse maternal and fetal outcomes, such as hypertensive disorders, abnormal fetal growth, traumatic delivery and stillbirth, associated with poor glycemic control. Insulin is the preferred medication to optimize glucose control in women with pregestational diabetes. Frequent dose adjustments are needed during pregnancy to achieve glycemic goals, and team-based multidisciplinary care may help. Postpartum care should include lactation support, counseling on contraceptive options, and transition to primary care. (111 references) (Author)

20180525-11*

Diabetes During Pregnancy: Surveillance, Preconception Care, and Postpartum Care. Kim SY, Deputy NP, Robbins CL (2018), Journal of Women's Health vol 27, no 5, May 2018, pp 536-541

Diabetes during pregnancy can adversely affect the health of women and infants. In this report, we provide an overview of the state of the science, and highlight Centers for Disease Control and Prevention (CDC) activities related to (1) surveillance of preexisting and gestational diabetes mellitus (GDM); (2) preconception care for women with preexisting diabetes; (3) postpartum diabetes screening among women with GDM-affected pregnancies; and (4) preventing the progression to Type 2 diabetes among women with GDM-affected pregnancies through lifestyle intervention programs. Improving preconception care, increasing postpartum diabetes screening rates, and promoting lifestyle interventions in the postpartum period all provide opportunities to improve the health of women and their infants. (56 references) (Author)

Full URL: https://www.liebertpub.com/doi/10.1089/jwh.2018.7052

20180523-3*

Maternal diabetes alters the development of ductus venosus shunting in the fetus. Lund A, Ebbing C, Rasmussen S, et al (2018), Acta Obstetricia et Gynecologica Scandinavica vol 97, no 8, August 2018, pp 1032-40

Introduction
Despite adequate glycemic control, the risks of fetal macrosomia and perinatal complications are increased in diabetic pregnancies. Adjustments of the umbilical venous (UV) distribution, including increased ductus venosus (DV) shunting, can be important fetal compensatory mechanisms, but the impact of pregestational diabetes on UV and DV flow is not known.
Material and methods
In this prospective study, 49 women with pregestational diabetes mellitus underwent monthly ultrasound examinations from gestational week 20 to 36. The blood velocity and the mean diameters of the UV and DV were used for calculating blood flow volumes. The development of the UV flow, DV flow and DV shunt fraction (% of UV blood shunted through the DV) was compared with a reference population, and the effect of HbA1c on the DV flow was assessed.
Results
The UV flow was larger in pregnancies with pregestational diabetes mellitus than in low-risk pregnancies ($p<0.001$), but smaller when normalized for fetal weight ($p=0.036$). The distributional pattern of the DV flow developed differently in diabetic pregnancies, particularly during the third trimester, being smaller ($p=0.007$), also when normalized for fetal weight ($p<0.001$). Correspondingly the DV shunt fraction was reduced ($p<0.0001$), most prominently at 36 weeks. There were negative relations between the maternal HbA1c and the DV flow velocity, flow volume and shunt fraction.
Conclusions
In pregnancies with pregestational diabetes mellitus, prioritized UV distribution to the fetal liver, and lower DV shunt capacity, both reduce the compensatory capability of the fetus and may represent an augmented risk during hypoxic challenges during late pregnancy and birth. (Author)

20180515-84*

Cesarean section and diabetes during pregnancy: An NSW population study using the Robson classification. Zeki R,

Oats JJN, Wang AY, et al (2018), Journal of Obstetrics and Gynaecology Research vol 44, no 5, May 2018, pp 890-898

Aim

The aim of this study was to identify the main contributors to cesarean section (CS) among women with and without diabetes during pregnancy using the Robson classification and to compare CS rates within Robson groups.

Methods

A population-based cohort study was conducted of all women who gave birth in New South Wales, Australia, between 2002 and 2012. Women with pregestational diabetes (types 1 and 2) and gestational diabetes mellitus (GDM) were grouped using the Robson classification. Adjusted odd ratios (AOR) and 95% confidence intervals (CI) were calculated using multivariable logistic regression.

Results

The total CS rate was 53.6% for women with pregestational diabetes, 36.8% for women with GDM and 28.5% for women without diabetes. Previous CS contributed the most to the total number of CS in all populations. For preterm birth, the contribution to the total was 20.5% for women with pregestational diabetes and 5.7% for women without diabetes. Compared to women without diabetes, for nulliparous with pregestational diabetes, the odds of CS was 1.4 (95% CI, 1.1-1.8) for spontaneous labor and 2.0 (95% CI, 1.7-2.3) for induction of labor.

Conclusion

A history of CS was the main contributor to the total CS. Reducing primary CS is the first step to lowering the high rate of CS among women with diabetes. Nulliparous women were more likely to have CS if they had pregestational diabetes. This increase was also evident in all multiparous women giving birth. The high rate of preterm births and CS reflects the clinical issues for women with diabetes during pregnancy. (Author)

20180508-12*

Metformin in the first trimester and risks for specific birth defects in the National Birth Defects Prevention Study.

Dukhovny S, Van Bennekom CM, Gagnon DR, et al (2018), Birth Defects Research vol 110, no 7, April 2018, pp 579-586

Background

We assessed associations between first-trimester metformin use for pregestational diabetes and specific major birth defects.

Methods

We compared risks associated with first-trimester metformin use by diabetic women to nondiabetic women on no diabetes medication; we calculated crude odds ratios by exact logistic regression and adjusted by inverse probability weighting. Confounding by diabetes was assessed by comparing risks for metformin-exposed diabetic women to those for insulin-exposed diabetics and nondiabetics treated with metformin for subfertililty.

Results

Among 9,279 nonmalformed controls and 24,375 malformed cases, diabetics who used metformin (with or without insulin) had increased adjusted odds ratios (aORs) for several birth defects associated with diabetes. However, women treated with metformin for subfertility had aORs similar to or lower than those for diabetic metformin users, and many approximated the null. For atrial septal defect secundum, anorectal defects, and limb reduction defects, the estimates for metformin when used for subfertility were 2-3-fold.

Conclusion

While metformin use for diabetes was associated with an increased risk of many birth defects, when metformin was used for subfertility most defects had aORs that approximated the null, while only three defects had modestly increased aORs, two of which had lower confidence bounds that included the null. Our study does not suggest that metformin poses an appreciable risk for major birth defects, but further studies are necessary. (Author)

20180503-83*

Identifying Fetal Growth Disorders Using Ultrasonography in Women With Diabetes. Dude AM, Yee LM (2018), Journal of Ultrasound in Medicine vol 37, no 5, May 2018, pp 1103-1108

Objectives

We evaluated the ability of third-trimester ultrasonography (US) to diagnose disorders of fetal growth among women with diabetes mellitus.

Methods

This work was a retrospective cohort study of women with diabetes who delivered term singleton neonates at a single academic medical center and who had a US examination within 5 weeks of delivery. We characterized the sensitivity, specificity, positive predictive value, and negative predictive value of US to detect large-for-gestational age (LGA) and small-for-gestational age (SGA) infants. Large and small for gestational age were defined as a US estimated fetal weight of greater than 90% and less than 10%, respectively, based on the Hadlock formula (Radiology 1991;

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181:129-133); US estimates of LGA or SGA were compared with postnatal findings of LGA or SGA based on gestational age-based weight percentiles. Test characteristics were analyzed for the total cohort and by the type of diabetes. We compared the areas under the curve for receiver operating characteristic curves for different types of diabetes.
Results
Of 521 women, 3 (0.6%) screened positive for SGA, and 64 (12.3%) delivered an SGA neonate. In contrast, 129 (24.8%) screened positive for LGA, and 61 (11.7%) delivered an LGA neonate. The receiver operating characteristic curves did not differ significantly for different types of diabetes (P = .68).
Conclusions
Ultrasonography in women with diabetes and term or late preterm pregnancies has high specificity but poor sensitivity for SGA and a low positive predictive value for LGA. The diagnostic capability of US to detect fetal growth abnormalities did not differ significantly by the type of diabetes. (Author)

20180423-9*

Type 1 diabetes in parents and risk of attention deficit/hyperactivity disorder in offspring: a population-based study in Sweden. Ji J, Chen T, Sundquist J, et al (2018), Diabetes Care vol 41, no 4, April 2018, pp 770-774

OBJECTIVE To explore whether a family history of type 1 diabetes (T1D) is associated with an increased incidence of attention deficit/hyperactivity disorder (ADHD) in offspring.
RESEARCH DESIGN AND METHODS Individuals with T1D were identified from the nationwide Swedish National Hospital Discharge Register and Swedish Outpatient Register in Sweden and were linked to the Swedish Multi-Generation Register to identify their offspring. Cox regression was used to calculate the hazard ratio (HR) of ADHD in offspring of patients with T1D compared with the general population.
RESULTS A total of 15,615 individuals were born after their parents were diagnosed with T1D. After a set of confounding factors was controlled for, offspring of T1D patients had a significantly increased risk of ADHD with an HR of 1.29 (95% CI 1.15-1.42). Maternal T1D was associated with an enhanced risk of ADHD (HR 1.35 [95% CI 1.18-1.55]) compared with paternal T1D (HR 1.20 [95% CI 1.03-1.41]), but the difference was not statistically significant.
CONCLUSIONS In this retrospective cohort study, we found that a parental history of T1D was associated with a 29% increased risk of being diagnosed with ADHD. However, the underlying mechanisms need to be explored in future studies. (Author)

20180410-15*

Morbidity Associated with Fetal Macrosomia among Women with Diabetes Mellitus. Jenner ZB, O'Neil Dudley AE, Mendez-Figueroa H, et al (2018), American Journal of Perinatology volume 35, no 5, April 2018, pp 515-520

Objective
This article aims to compare the composite maternal and neonatal morbidities (CMM and CNM, respectively) between macrosomic (≥4,000 g) and nonmacrosomic (<4,000 g) newborns among women with diabetes mellitus (DM).
Methods
Maternal demographic and peripartum outcome data (N = 1,260) were collected from a retrospective cohort. CMM included chorioamnionitis/endometritis, wound infection, shoulder dystocia, eclampsia, pulmonary edema, admission for hypoglycemia, 3rd/4th degree perineal laceration, and death. CNM included 5-minute Appearance, Pulse, Grimace, Activity and Respiration (APGAR) score of <4, neonatal intensive care unit (NICU) admission, respiratory distress syndrome, mechanical ventilation, intraventricular hemorrhage grade III/IV, necrotizing enterocolitis stage II/III, hypoglycemia, hypocalcemia, bronchopulmonary dysplasia, sepsis, seizures, hyperbilirubinemia, and death. Multivariable Poisson regression models with robust error variance were used to calculate adjusted relative risk (aRR) and 95% confidence interval (CI).
Results
The study population consisted of 967 subjects, including 854 (88.3%) nonmacrosomic and 113 (11.7%) macrosomic infants. After adjustment, the risk of CMM was higher among macrosomic deliveries (aRR = 4.08, 95% CI = 2.45-6.80). The risk of CNM was also higher among macrosomic deliveries (aRR = 1.77, 95% CI = 1.39-2.24). Macrosomia was associated with an increased risk in NICU admission, hypoglycemia, and hyperbilirubinemia.
Conclusion
Among DM deliveries, macrosomia was associated with a fourfold higher risk of CMM and almost twofold higher risk of CNM. (20 references) (Author)

20180403-43*

Effects of gestational and pregestational diabetes mellitus on the foetal heart: a cross-sectional study. Dervisoglu P,

Kosecik M, Kumbasar S (2018), Journal of Obstetrics and Gynaecology vol 38, no 3, April 2018, pp 408-412

We examined the foetal cardiac structural and functional characteristics in diabetic pregnancies versus non-diabetic, healthy pregnancies. Between August 2015 and April 2016, 32 pregnant women with pregestational diabetes, 36 pregnant women with gestational diabetes, and 42 healthy pregnant women were scheduled to have foetal echocardiograms to assess cardiac structure and function. In the diabetic groups, the foetal interventricular septum (IVS) thickness was significantly greater than in non-diabetics ($p < .05$) but none had an IVS >2 SD from normal. The peak velocity of tricuspid E, and the E/A ratio were significantly lower in the diabetic groups ($p < .05$). Tricuspid valve Ea values and the Ea/Aa ratio were lower in the diabetic group than in the control group ($p < .05$) but there was no significant difference between the pre-GDM and GDM groups ($p > .05$). Interventricular septal hypertrophy is the most common structural abnormality in diabetic pregnancies. These changes do not pose a risk to the foetal unless they cause functional impairment. Thus, we believe that it is important for diabetic pregnant women to be monitored for foetal cardiac diastolic dysfunction. (25 references) (Author)

20180322-1*

Research digest: updates on diabetes in pregnancy. Sattar N, Preiss D (2018), The Lancet Diabetes & Endocrinology vol 6, no 4, April 2018, p 272

Provides an update on recent research into the long-term risks for type 2 diabetes, hypertension and cardiovascular outcomes in women with a history of gestational diabetes and pregnancy outcomes in mothers with type 1 and type 2 diabetes over a 15 year period from 1998 onwards using electronic record linkage. (MB)

Full URL: http://www.thelancet.com/journals/landia/article/PIIS2213-8587(18)30076-7/fulltext

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20180316-22*

Sulfonylurea vs insulin therapy in individuals with sulfonylurea-sensitive permanent neonatal diabetes mellitus, attributable to a KCNJ11 mutation, and poor glycaemic control. Stanik J, Dankovcikova A, Barak L, et al (2018), Diabetic Medicine vol 35, no 3, March 2018, pp 386-391

Background

Therapy with sulfonylurea is preferable to insulin in the majority of individuals with KCNJ11mutations, but not all of these people achieve target levels of HbA1c in long-term follow-up. We aimed to compare sulfonylurea therapy with insulin treatment in two sulfonylurea-sensitive individuals with a KCNJ11 mutation who had poorly controlled permanent neonatal diabetes mellitus.

Case report

We report on two individuals with a KCNJ11 mutation (p.R201H) who are currently aged 35 (SVK1) and 21 years (SVK2). These individuals were switched from insulin to sulfonylurea in 2005. Data from the first 4 (SVK2) and 8 years (SVK1) of the follow-up showed improved diabetes control and increased quality of life for both individuals. During the following years, however, both individuals failed to retain good diabetes control (HbA1c ≤ 53 mmol/mol; 7.0%). We therefore changed the therapy to a combination of insulin and sulfonylurea in both individuals, or to insulin monotherapy in SVK1, and compared the effects on HbA1c with those of sulfonylurea monotherapy. HbA1c levels in both individuals worsened after adding insulin to sulfonylurea [67 mmol/mol (8.3%) vs 77 mmol/mol (9.2%) in SVK1 and 106 mmol/mol (11.8%) vs 110±19 mmol/mol (12.2±1.7%) in SVK2], and after switching to only insulin therapy in SVK1 [57 mmol/mol (7.4%) vs 62 mmol/mol (7.8%)] when compared with sulfonylurea monotherapy.

Discussion

Our data show that sulfonylurea monotherapy might be preferable to insulin in people with permanent neonatal diabetes mellitus sensitive to sulfonylurea even when HbA1c is above target. (Author)

20180316-21*

Pregnancy in Diabetes: challenges and opportunities for improving pregnancy outcomes. Murphy HR, Bell R: Dornhorst A, et al (2018), Diabetic Medicine vol 35, no 3, March 2018, pp 292-299

Our aim was to review the data from the National Pregnancy in Diabetes (NPID) audit, and to identify the challenges and opportunities for improving pregnancy outcomes in women with diabetes. We reviewed three years of NPID data and relevant diabetes and obstetric literature, and found that there has been little change in pregnancy preparation or outcomes over the past 3 years, with substantial clinic-to clinic variations in care. Women with Type 2 diabetes remain less likely to take 5 mg preconception folic acid (22.8% vs. 41.8%; $P < 0.05$), and more likely to take potentially harmful medications (statin and/or ACE inhibitor 13.0% vs. 1.8%; $P < 0.05$) than women with Type 1 diabetes. However, women with Type 1 diabetes are less likely to achieve the recommended glucose control target of HbA1c < 48 mmol/mol (6.5%) (14.9% vs. 38.1%; $P < 0.05$). The following opportunities for improvement were identified. First, the need to

integrate reproductive health into the diabetes care plans of all women with diabetes aged 15-50 years. Second, to develop more innovative approaches to improve uptake of pre-pregnancy care in women with Type 2 diabetes in primary care settings. Third, to integrate insulin pump, continuous glucose monitoring and automated insulin delivery technologies into the pre-pregnancy and antenatal care of women with Type 1 diabetes. Fourth, to improve postnatal care with personalized approaches targeting women with previous pregnancy loss, congenital anomaly and perinatal mortality. A nationwide commitment to delivering integrated reproductive and diabetes healthcare interventions is needed to improve the health outcomes of women with diabetes. (Author)

20180316-19*

Continuous glucose monitoring in pregnant women with Type 1 diabetes: benefits for mothers, using pumps or pens, and their babies. Feig DS, Murphy HR (2018), Diabetic Medicine vol 35, no 4, April 2018, special issue, pp 430-435

Aims

To review the current literature on the use of continuous glucose monitoring during pregnancy in women with Type 1 diabetes.

Methods

We searched the literature for randomized controlled trials using continuous glucose monitoring during pregnancy in women with Type 1 diabetes.

Results

Three randomized trials were found and discussed in this review. One UK study found a reduction in large-for-gestational-age infants; however, only masked continuous glucose monitoring was used in that study. A Danish study used intermittent real-time continuous glucose monitoring and found no differences. The present authors conducted the CONCEPTT trial, in which pregnant women and women planning pregnancy were randomized to receive continuous glucose monitoring or standard care. We found a greater drop in HbA1c, more time spent in the target range, and a reduction in some adverse neonatal outcomes in women using continuous glucose monitoring. Numbers-needed-to-treat to prevent a large-for-gestational-age infant, a neonatal intensive care unit admission for >24 h, and a neonatal hypoglycaemia event were low. These findings were seen in both injection and pump users and across all countries. Possible reasons for differences in study findings are discussed. In addition, several issues need further study. Glycaemic variability and differences in dietary intake may also have played a role. Despite excellent glycaemic control, babies continue to be large. More research is needed to understand the role of glucose targets and the dynamic placental processes involved in fetal growth.

Conclusions

The use of continuous glucose monitoring in women with Type 1 diabetes in pregnancy is associated with improved glycaemic control and neonatal outcomes. Further research examining the glycaemic and non-glycaemic variables involved in fetal growth and the cost-benefit of using continuous glucose monitoring in pregnancy is warranted. (Author)

20180315-2*

Remodeling of the cardiovascular circulation in fetuses of mothers with diabetes: A fetal computational model analysis. Kulkarni A, Garcia-Canadilla P, Khan A, et al (2018), Placenta vol 63, March 2018, pp 1-6

Highlights

•Fetuses of diabetic mothers are known to have morphologic and functional abnormalities in the myocardium and placenta.

•This study demonstrates with a lumped model of the fetal circulation that blood flow in fetuses of diabetic mothers is redistributed.

•There is increased flow to the placenta and decreased flow to the brain with associated lower stroke volume.

•These findings may have long-term impact on the postnatal health and brain development in these fetuses.

Aims

Myocardial structural and functional abnormalities are known to occur in fetuses of mothers with diabetes mellitus (FMDM). The main aim of this investigation was to explore the cardiovascular circulatory patterns in FMDM using a validated lumped computational model of the cardiovascular system.

Methods

This was a multi-institutional study involving FMDM compared to fetuses of maternal controls (FC). Fetal echocardiographic Doppler data from left and right ventricular outflow tracts, aortic isthmus, middle cerebral and umbilical arteries were fitted into a validated fetal circulation computational model to estimate patient-specific placental and vascular properties. Non-parametric comparisons were made between resistances, compliances and

flows in the brain and placenta in FMDM and FC.
Results
Data from 23 FMDM and 31 FC were fitted into the model. In FMDM, compared to FC, placental relative resistance was lower (0.59 ± 0.50 versus 0.91 ± 0.41; p < .05) with higher brain relative resistance (2.36 ± 1.65 versus 1.60 ± 0.85; p < .05). Middle cerebral artery flow was lower in FMDM than FC (0.12 ± 0.14 vs. 0.27 ± 0.21 ml/min; p 0.04) with a lower cerebral-placental flow ratio. Combined stroke volume was lower in FMDM (3.65 ± 2.05 ml) than FC (4.97 ± 2.45 ml) (p 0.04).
Conclusions
Blood flow is redistributed in FMDM to the placenta, away from the brain. This alteration may play a role in the postnatal health of these fetuses.
(25 references) (Author)

20180314-88*

Maternal glycoregulation in pregnancies complicated by diabetes mellitus in the prediction of fetal echography findings and perinatal outcomes. Babovic I, Arandjelovic M, Plesinac S, et al (2018), Journal of Obstetrics and Gynaecology Research vol 44, no 3, March 2018, pp 432-439

Aim
We aimed to determine maternal hemoglobin A1c (HbA1c) levels and pregestational body mass index (BMI) as the predictors of glycemic control and its importance for fetal echography findings and perinatal outcomes in pregnancies complicated by diabetes mellitus (DM).
Methods
Our intention was to evaluate how BMI and HbA1c levels might be used to predict fetal interventricular septum (IVS) thickness, atrioventricular inflow early diastole (E)/ atrial systole (A) velocity ratio, and perinatal outcomes. Patients in the 38th gestational week were divided into three groups according to their insulin therapy: (i) patients with gestational diabetes mellitus (GDM) treated only with dietary changes (GDM group, n = 32); (ii) patients with GDM treated with insulin therapy (DM2 group, n = 27); and (iii) patients with type 1 DM (DM1 group, n = 22).
Results
In the DM1 group, we found statistically significant correlations between BMI and IVS thickness (P = 0.036), HbA1c and IVS thickness, as well as the mitral E/A velocity ratio (P = 0.013 vs P = 0.007). In this group, HbA1c showed a statistically significant correlation to neonatal birth weight (P = 0.037) and BMI influenced on appearance respiratory distress syndrome in neonates in DM1 group (P = 0.027). The values of HbA1c predict neonatal respiratory distress syndrome in DM2 and GDM groups (P = 0.036).
Conclusion
As good predictors of maternal glycoregulation, BMI and HbA1c levels determine fetal echography findings as well as neonatal outcomes in pregnancies complicated by DM. (Author)

20180314-57*

Prenatal, obstetric and perinatal factors associated with the development of childhood-onset type 2 diabetes. Halipchuk J, Temple B, Dart A, et al (2018), Canadian Journal of Diabetes vol 42, no 1, February 2018, pp 71-77

OBJECTIVE:
To explore associations among prenatal, obstetric and perinatal factors and the development of childhood-onset type 2diabetes.
METHODS:
This retrospective, case-control study utilized administrative data housed at the Manitoba Centre for Health Policy. De-identified health records were examined from a sample of 270 children (aged 10 to 17 years at time of diagnosis) with type 2 diabetes and 1341 children without type 2 diabetes matched for age, sex and geographic location. Patients and control subjects were linked to their de-identified biological mothers' health records. Prenatal, obstetric and perinatal factors were investigated. Univariate and multivariable conditional regression analyses were conducted to identify key factors associated with the development of type 2 diabetes in children.
RESULTS:
The mean age at diagnosis was 13.1 years, and 61% of patients were girls. The majority (71.1%) of children with type 2 diabetesresided in rural areas. Exposure to maternal pregestational diabetes increased the odds of childhood-onset type 2 diabetes nearly 6-fold, and exposure to gestational diabetes carried a 4-fold increased risk. Breastfeeding was found to be protective, decreasing the risk of childhood-onset type 2 diabetes (odds ratio = 0.52, 95% confidence interval = 0.36-0.74). Low maternal income was

significantly associated with development of childhood-onset type 2 diabetes (odds ratio = 6.67, 95% confidence interval = 3.01-14.79).
CONCLUSIONS:
Health and social policies and programs are needed to provide financial, educational and clinical resources that target women whose pregnancies are affected by poverty, type 2 diabetes or gestational diabetes. Breastfeeding should be encouraged to aid in the prevention of childhood-onset type 2 diabetes. (Author)

20180313-48*

Insulin Delivery Method and Admission for Glycemic Control in Pregnant Women with Type 1 Diabetes Mellitus. Sperling JD, Maggio L, Has P, et al (2018), American Journal of Perinatology vol 35, no 3, March 2018, pp 209-214

Objective To determine if there was a difference in glycemic control admissions or perinatal outcomes in women with type 1 diabetes mellitus (DM) treated with multiple daily injections (MDIs) versus continuous subcutaneous insulin infusion (CSII).
Materials and Methods This was a retrospective cohort study of women with type 1 DM with a singleton gestation who delivered between 2006 and 2014 at a tertiary hospital and received care at a dedicated DM clinic. Women who used MDI were compared with those who used CSII. The primary outcome was glycemic control admission during pregnancy. Secondary outcomes included adverse perinatal outcomes.
Results There were a total of 156 women; 107 treated with MDI and 49 with CSII. Women treated with MDI had higher rates of glycemic control admissions versus those treated with CSII (68.2 vs. 30.6%, $p < 0.001$). Adjusting for age, ethnicity, public insurer, duration of DM, first recorded hemoglobin A1c (HbA1c), and DM comorbidities, the likelihood of admission remained higher in women on MDI versus CSII (AOR 5.9 [1.7-20.6]). Women treated with MDI had higher rates of postprandial hypoglycemia. Other perinatal outcomes were similar between the groups.
Conclusion Women with type 1 DM treated with MDI were more likely to have glycemic control admissions and postprandial hypoglycemia than those treated with CSII.
(22 references) (Author)

20180313-115*

Transitional hemodynamics in infants of diabetic mothers by targeted neonatal echocardiography, electrocardiography and peripheral flow study. Schierz IAM, Pinello G, Piro E, et al (2018), Journal of Maternal-Fetal and Neonatal Medicine vol 31, no 12, 2018, pp 1578-1585

Objective: Metabolic alterations of intrauterine environment in diabetes mellitus (DM) lead to fetal cardiac dysfunctions that can persist after birth. The aim of the study was to assess the cardiovascular adaptation in infants born to diabetic mothers (IDM) with different degrees of glycometabolic control, in relation to revised guidelines for diagnosis of DM and quality improvements in neonatal care.
Materials and methods: An observational case-control study was conducted on IDM with gestational, type 1 and type 2 DM. Relevant maternal and neonatal anamnestic, clinical and laboratory data were analyzed. Electrocardiographic and echocardiographic analyses, including structural and systo-diastolic evaluation, were performed.
Results: In 68 IDM enrolled, we observed a lower incidence of negative perinatal outcome than expected. Comparing to non-IDM, they presented larger fetal shunts, higher pulmonary pressures, early and atrial wave velocities. At 72 hours, kinesis and heart rate variability remained low. Cerebral blood flow velocities were higher. The most serious impairment of transition was in pregestational IDM.
Conclusion: Maternal DM impaired neonatal transitional hemodynamics also in asymptomatic IDM with good glycometabolic control. These results confirm the need for an early cardiologic and cerebrovascular evaluation, to identify IDM with delayed maturation at risk of worse long-term metabolic, cardiovascular, and neurodevelopmental outcome.
(30 references) (Author)

20180305-13*

Prediabetes in pregnancy, can early intervention improve outcomes? A feasibility study for a parallel randomised clinical trial. Hughes RCE, Rowan J, Williman J (2018), BMJ Open vol 8, no 3, March 2018, e018493

Objective Measurement of glycated haemoglobin (HbA1c) in early pregnancy is routine in New Zealand to identify women with diabetes and prediabetes. However, the benefit of early intervention in women with prediabetes is inconclusive. Our aim was to test the feasibility of a two-arm parallel randomised controlled trial of standard care versus early intervention in pregnancies complicated by prediabetes.
Setting Two tertiary referral centres in New Zealand.

Participants Women <14 weeks' gestation and HbA1c ≥5.9%-6.4% (41-46 mmol/mol) measured at booking, without pre-existing diabetes.
Interventions Randomisation was done by remote web-based allocation into one of two groups. Women in the early intervention group attended an antenatal diabetes clinic, commenced daily home blood glucose monitoring, and medication was prescribed if lifestyle measures failed to maintain target blood glucose levels. Controls received lifestyle education, continued standard care with their midwife and/or obstetrician, and were asked to perform a 75 g oral glucose tolerance test at 24 weeks' gestation with a referral to clinic if this test was positive. Both groups received lifestyle questionnaires at recruitment and in late pregnancy.
Outcome measures Recruitment rate, adherence to protocol and validation of potential primary outcomes.
Results Recruitment rates were lower than expected, especially in Māori and Pacific women. Non-adherence to allocated treatment protocol was significant, 42% (95% CI 24% to 61%) in the early intervention group and 30% (95% CI 16% to 51%) in controls. Caesarean section and pre-eclampsia were signalled as potential primary outcomes, due to both the high observed incidence in the control group and ease of measurement.
Conclusions For a future definitive trial, extending the gestation of eligibility and stepped-wedge cluster randomisation may overcome the identified feasibility issues. Consistent with published observational data, pre-eclampsia and emergency caesarean section could be included as primary outcome measures, both of which have a significant impact on maternal and neonatal morbidity and healthcare costs. (15 references) (Author)
Full URL: http://bmjopen.bmj.com/content/8/3/e018493

20180302-16*

Perinatal mortality in Japanese women diagnosed with gestational diabetes mellitus and diabetes mellitus. Morikawa M, Sugiyama T, Sagawa N, et al (2017), Journal of Obstetrics and Gynaecology Research vol 43, no 11, November 2017, pp 1700-1707
Aims
The objective of this study was to determine how many pregnant Japanese women with diabetes mellitus (DM)/gestational diabetes mellitus (GDM) experience perinatal mortality in the presence of fetal anomalies.
Methods
Our investigation included data from 205 secondary/tertiary obstetric facilities located widely in Japan. The Japan Ministry of Health, Labour and Welfare Vital Statistics of Japan was used for comparison.
Results
Of 237 941 women giving birth at 205 hospitals, 1796 (0.8%) and 13 037 (5.5%) had DM and GDM, respectively. The perinatal mortality rates (per 1000 births) were 10.6 (19/1796) for women with DM, 5.2 (68/13037) for women with GDM, and 3.7 (7612/2039504) for the general Japanese population. Detailed information was available for 63 (72%) of the 87 perinatal deaths occurring in women with diabetes including DM and GDM; fetal anomalies were associated with 40% (25/63) of perinatal deaths, exceeding 16% (1211/7612) in the general Japanese population ($P < 0.0001$). The leading four fetal anomalies associated with perinatal mortality in women with diabetes were fetal trisomy (6 cases: 1 of trisomy-13 and 5 of trisomy-18), non-immune hydrops fetalis (5 cases), cardiac deformities (3 cases) and holoprosencephaly (2 cases).
Conclusions
Perinatal mortality was more likely to occur in women with glucose intolerance. In the Japanese infants that succumbed to perinatal mortality, fetal anomaly was more prevalent in those born to women with a glucose intolerance than in those born to the general population. (Author)

20180301-8*

Aquaporins and fetal membranes from diabetic parturient women: expression abnormalities and regulation by insulin. Bouvier D, Rouzaire M, Marceau G, et al (2018), The Journal of Clinical Endocrinology and Metabolism vol 100, no 10, October 2015, pp E1270-E1279
Context:
During pregnancy, aquaporins (AQPs) expressed in fetal membranes are essential for controlling the homeostasis of the amniotic volume, but their regulation by insulin was never explored in diabetic women.
Objective:
The aim of our study was to investigate the involvement of AQPs 1, 3, 8, and 9 expressed in fetal membranes in diabetic parturient women and the control of their expression by insulin.
Design and Participants:
From 129 fetal membranes in four populations (controls, type 1, type 2 [T2D], and gestational diabetes [GD]), we established an expression AQP profile. In a second step, the amnion was used to study the control of the expression and functions of AQPs 3 and 9 by insulin.

Main Outcomes and Measures:
The expression of transcripts and proteins of AQPs was studied by quantitative RT-PCR and ELISA. We analyzed the regulation by insulin of the expression of AQPs 3 and 9 in the amnion. A tritiated glycerol test enabled us to measure the impact of insulin on the functional characteristics. Using an inhibitor of phosphatidylinositol 3-kinase, we analyzed the insulin intracellular signaling pathway.
Results:
The expression of AQP3 protein was significantly weaker in groups T2D and GD. In nondiabetic fetal membranes, we showed for the amnion (but not for the chorion) a significant repression by insulin of the transcriptional expression of AQPs 3 and 9, which was blocked by a phosphatidylinositol 3-kinase inhibitor.
Conclusion:
In fetal membranes, the repression of AQP3 protein expression and functions observed in vivo is allowed by the hyperinsulinism described in pregnant women with T2D or GD. (29 references) (Author)
Full URL: https://academic.oup.com/jcem/article/100/10/E1270/2835738

20180226-15*

Insulin analogues use in pregnancy among women with pregestational diabetes mellitus and risk of congenital anomaly: a retrospective population-based cohort study. Wang H, Wender-Ozegowska E, Garne E, et al (2018), BMJ Open vol 8, no 2, February 2018, e014972

Objectives To evaluate the risk of major congenital anomaly associated with first-trimester exposure to insulin analogues compared with human insulin in offspring of women with pregestational diabetes.
Design and setting A population-based cohort of women with pregestational diabetes (n=1661) who delivered between 1996 and 2012 was established retrospectively from seven European regions covered bythe European Surveillance of Congenital Anomalies (EUROCAT) congenital anomaly registries.
Primary outcome measures The risk of non-chromosomal major congenital anomaly in live births, fetal deaths and terminations for a fetal anomaly exposed to insulin analogues in the first trimester of pregnancy was compared with the risk in those exposed to human insulin only.
Results During the first trimester, 870 fetuses (52.4%) were exposed to human insulin only, 397 fetuses (23.9%) to insulin analogues only and 394 fetuses (23.7%) to both human insulin and insulin analogues. The risk of major congenital anomaly in fetuses exposed to insulin analogues only was lower than those exposed to human insulin only; the relative risk adjusted for glycaemic control and region was 0.56 (95% CI 0.29 to 1.06). The significantly lower risk related to exposure of insulin analogues only was observed in congenital heart defects: adjusted relative risk 0.14 (95% CI 0.03 to 0.62).
Conclusions In this retrospective population-based cohort study across Europe, first-trimester exposure to insulin analogues did not increase the risk of major congenital anomaly compared with exposure to human insulin. A possible lower risk of congenital heart defects among fetuses exposed to insulin analogues only deserves further investigation. (30 references) (Author)
Full URL: http://bmjopen.bmj.com/content/8/2/e014972

20180221-135*

Well-being, diabetes management and breastfeeding in mothers with type 1 diabetes - An explorative analysis. Linden K, Berg M, Adolfsson A, et al (2018), Sexual & Reproductive Healthcare vol 15, March 2018, pp 77-82

Highlights
•The following was found at up to 6 months after childbirth in mothers with type 1 diabetes.
•The majority reported fairly good well-being.
•One-quarter reported a low sense of coherence.
•One-third requested more professional support to manage their diabetes.
Objectives
The aim was to explore and investigate associations between well-being, diabetes management and breastfeeding in mothers with type 1 diabetes mellitus (T1DM) up to six months postpartum.
Methods
An explorative analysis of self-reported questionnaires measuring general well-being, sense of coherence, self-efficacy of diabetes management and experiences of diabetes management during breastfeeding, which were distributed to 155 mothers with T1DM at two months and at six months after childbirth. The questionnaires were answered by 128 (82.5%) at two months and 137 (88.4%) at six months after birth. Statistical analysis included; descriptive statistics, Wilcoxon sign-rank test, sign test and Spearman's correlation coefficient (rs).
Results

The majority of the mothers had fairly high levels of general well-being and diabetes management but a quarter had a low sense of coherence at both two and six months after birth. A weak association was found between more unstable blood glucose levels and lower general well-being at two months postpartum, but no other associations with erratic glycaemia was found. Those with lower grades of general well-being and sense of coherence had a higher need of professional support to manage their diabetes than they were offered, at both two and six months.
Conclusion
To develop more optimal care routines for mothers with T1DM after childbirth, further studies are needed to identify those most in need of additional support.
(35 references) (Author)
Full URL: https://www.sciencedirect.com/science/article/pii/S1877575617302616

20180213-74*

Maternal Diabetes Mellitus and Genital Anomalies in Male Offspring: A Nationwide Cohort Study in 2 Nordic Countries. Arendt LH, Lindhard MS, Henriksen TB, et al (2018), Epidemiology vol 29, no 2, March 2018, pp 280-289

Background: Pre-existing diabetes has been associated with an increased risk of congenital malformations overall, but studies on genital anomalies in boys are conflicting and possible causal mechanisms are not well understood. Previous studies have mainly assessed pregestational and gestational diabetes in combination. Yet considering the vulnerable time windows for the genital anomalies, associations could well differ between types of diabetes and between the 2 genital anomalies and we therefore aimed to study this further.
Methods: A population-based cohort study of 2,416,246 singleton live-born boys from Denmark (1978-2012) and Sweden (1987-2012) was carried out using Danish and Swedish register-based data. Using Cox regression models, we estimated hazard ratios for hypospadias and cryptorchidism according to maternal diabetes. We considered type and severity of diabetes, as well as timing of diagnosis in relation to birth.
Results: Pregestational type 1 diabetes was associated with a higher risk of both genital anomalies. The highest risks were seen for boys of mothers with diabetic complications (hazard ratio for hypospadias = 2.33 [95% confidence interval, 1.48, 3.66] and hazard ratio for cryptorchidism = 1.92 [95% confidence interval, 1.39, 2.65]). Gestational diabetes was associated with slightly increased risks of both genital anomalies.
Conclusions: These results are consistent with the hypothesis that poor glycemic control may interfere with fetal genital development in the critical early period of organogenesis. Given the widespread and increasing occurrence of diabetes, these results are of public health importance. (Author)

20180212-10*

Planned birth at or near term for improving health outcomes for pregnant women with pre-existing diabetes and their infants (Cochrane Review). (Assessed as up-tod-date: 15 August 2017). Biesty LM, Egan AM, Dunne F, et al (2018), Cochrane Database of Systematic Reviews Issue 2, 2018

Background
Pregnant women with pre-existing diabetes (Type 1 or Type 2) have increased rates of adverse maternal and neonatal outcomes. Current clinical guidelines support elective birth, at or near term, because of increased perinatal mortality during the third trimester of pregnancy.
This review replaces a review previously published in 2001 that included 'diabetic pregnant women', which has now been split into two reviews. This current review focuses on pregnant women with pre-existing diabetes (Type 1 or Type 2) and a sister review focuses on women with gestational diabetes.
Objectives
To assess the effect of planned birth (either by induction of labour or caesarean birth) at or near term gestation (37 to 40 weeks' gestation) compared with an expectant approach, for improving health outcomes for pregnant women with pre-existing diabetes and their infants. The primary outcomes relate to maternal and perinatal mortality and morbidity.
Search methods
We searched Cochrane Pregnancy and Childbirth's Trials Register, ClinicalTrials.gov, the WHO International Clinical Trials Registry Platform (ICTRP) (15 August 2017), and reference lists of retrieved studies.
Selection criteria
We planned to include randomised trials (including those using a cluster-randomised design) and non-randomised trials (e.g. quasi-randomised trials using alternate allocation) which compared planned birth, at or near term, with an expectant approach for pregnant women with pre-existing diabetes.
Data collection and analysis
Two of the review authors independently assessed study eligibility. In future updates of this review, at least two of

the review authors will extract data and assess the risk of bias in included studies. We will also assess the quality of the evidence using the GRADE approach.

Main results

We identified no eligible published trials for inclusion in this review.

We did identify one randomised trial which examined whether expectant management reduced the incidence of caesarean birth in uncomplicated pregnancies of women with gestational diabetes (requiring insulin) and with pre-existing diabetes. However, published data from this trial does not differentiate between pre-existing and gestational diabetes, and therefore we excluded this trial.

Authors' conclusions

In the absence of evidence, we are unable to reach any conclusions about the health outcomes associated with planned birth, at or near term, compared with an expectant approach for pregnant women with pre-existing diabetes. This review demonstrates the urgent need for high-quality trials evaluating the effectiveness of planned birth at or near term gestation for pregnant women with pre-existing (Type 1 or Type 2) diabetes compared with an expectant approach. (Author)

20180208-94*

Hospital differences in special care nursery use for newborns of gestational diabetic mothers. Danilack VA, Muri JH, Savitz DA, et al (2016), Journal of Maternal-Fetal and Neonatal Medicine vol 29, no 18, 2016, pp 3045-3050

Objective: Relatively healthy newborns of mothers with gestational diabetes mellitus (GDM) sometimes receive unwarranted surveillance. We studied the relationship between hospital characteristics and special care nursery use and total length of stay among GDM deliveries.

Methods: We identified GDM deliveries at 44 USA member hospitals of the National Perinatal Information Center from 2007 to 2011. To study low risk, relatively healthy newborns with presumed discretion in special care nursery use, we analyzed 43 444 singleton newborns with only minor or moderate complications and WHO were not preterm or low birthweight.

Results: Among eligible newborns, 6% received special care, but this ranged from 1% to 16% across 44 hospitals studied. Unadjusted associations suggested special care nursery use was highest in academic teaching hospitals, the Midwest, hospitals with ≥40% Medicaid births, and hospitals with a high supply of special care nursery beds. However, after controlling for clustering within hospitals, there were no significant associations between hospital characteristics and special care nursery use or length of stay.

Conclusions: Hospital-level variation in special care nursery use and length of stay of relatively healthy newborns of mothers with GDM is unexplained by hospital characteristics and suggests other operational or management factors impacting utilization of newborn care resources.

(25 references) (Author)

20180208-145*

Pregnancy planning in type 1 diabetic women improves glycemic control and pregnancy outcomes. Kekalainen P, Juuti M, Walle T, et al (2016), Journal of Maternal-Fetal and Neonatal Medicine vol 29, no 14, 2016, pp 2252-2258

Objective: Pregnancy in women with type 1 diabetes is associated with increased risks. The aim of this study was to evaluate the effect of pregnancy planning on outcomes of type 1 diabetic pregnancies.

Methods: We retrospectively assessed pregnancy outcomes of type 1 diabetic women who were patients of Diabetes Clinic of North Karelia hospital between 2000 and 2012. We evaluated the medical records of 73 women experiencing 145 pregnancies and data of their infants.

Results: Altogether 96 (66.2%) pregnancies were planned. HbA1c levels were significantly lower before and during the whole pregnancy when pregnancy was planned than if it was not planned (all $p < 0.001$). Planned pregnancies resulted in significantly fewer congenital anomalies ($p < 0.001$). Pregnancy planning reduced the age-adjusted risk of Cesarean sections (OR 0.25, $p = 0.021$). Pregnancy planning was associated with a reduced risk of adverse pregnancy outcomes (including miscarriages and congenital anomalies). This association was independent of age, HbA1c before pregnancy, smoking, hypertension, microvascular complications, and thyroid disease (OR 0.26; 95% CI 0.09, 0.76).

Conclusions: Pregnancy planning is beneficial for glycemic control and pregnancy outcomes of type 1 diabetic women. The benefit of pregnancy planning was independent of other risk factors for adverse pregnancy outcomes.

(29 references) (Author)

20180207-14*

Malformations among infants of mothers with insulin-dependent diabetes: Is there a recognizable pattern of

abnormalities?. Nasri H, Ng KH, Westgate M-N, et al (2018), Birth Defects Research vol 110, no 2, January 2018, pp 108-113

Background
Infants of diabetic mothers have been shown in several studies to have an increased frequency of malformations. In previous studies, an increased frequency of several specific malformations has been noted, including anencephaly, bilateral renal agenesis, and double outlet right ventricle. Surveillance, used to identify all malformed infants in a consecutive sample of births, can identify a distinctive pattern of malformations among the affected infants.
Methods
The infants of insulin-dependent, pregestational diabetic mothers were identified in the daily review of the medical records of each newborn infant with a malformation and her/his mother's medical record. Infants of mothers with gestational diabetes were excluded. The frequency of each malformation was compared to that among the malformed infants of nondiabetic mothers.
Results
One hundred and eighty-three malformed infants of diabetic mothers were identified among the 289,365 births. The most notable malformations were: neural tube defects (anencephaly, 9%), heart defects (transposition of great arteries, 4%), bilateral renal agenesis or dysgenesis (6%), and vertebral anomalies (hemivertebrae, 4%).
Conclusions
There was a recognizable pattern of malformations and characteristics of infants of diabetic mothers, although there was variation in the pattern among affected infants. Some of the malformations in the diabetic embryopathy can be identified in prenatal screening by ultrasound. More important, their occurrence can be reduced significantly by the mother achieving much better control of her diabetes mellitus prior to conception. (Author)

20180206-51*

Diabetic pregnancy, maternal and fetal docosahexaenoic acid: a review of existing evidence. Leveille P, Rouxel C, Plourde M (2018), Journal of Maternal-Fetal and Neonatal Medicine vol 31, no 10, January 2018, pp 1358-1363

Objective: Docosahexaenoic acid (DHA) is vital for fetal development especially during the third trimester of gestation when the speed of fetal brain growth is at its peak. Diabetes modifies the maternal fatty acid profile, which may in turn change the quantity and/or quality of lipids transferred to the fetus. Neonates born to diabetic mothers might be more vulnerable to DHA deficiency leading to lower cognitive scores together with lower overall intellectual quotients when compared to control. We reviewed the influence of type 1 or type 2 pre-gestational (PGD) and gestational diabetes mellitus (GDM) on maternal and fetal DHA levels.
Method: We searched MEDLINE articles about PGD and/or GDM and DHA published before October 2016.
Results: Maternal blood DHA level seems higher in those with diabetes than those without diabetes. However, DHA in cord plasma of neonates born to PGD and/or GDM mothers seem lower compared to neonates born to nondiabetic mothers.
Conclusions: Altogether, these results suggest that the transfer of DHA from the mother to the fetus may be deficient or dysregulated in diabetic pregnancies. What remains to be understood is how placental lipid transport is regulated and whether there is a link with clinical neurodevelopmental phenotypes in the newborns.
(41 references) (Author)

20180201-72*

Diabetes insipidus in pregnancy. Quigley J, Shelton C, Issa B, et al (2018), The Obstetrician and Gynaecologist vol 20, no1, January 2018, pp 41-48

Key content
There are various types of diabetes insipidus that occur due to different pathology that occurs outside of, during, and as a result of pregnancy.
All pregnant women presenting with polyuria and polydipsia should be investigated with blood tests including urea and electrolytes, calcium levels and thyroid function tests. Plasma and urine osmolality can also be helpful in making the diagnosis. Additional symptoms that are suggestive of diabetes insipidus secondary to other underlying pathology (e.g. a pituitary tumour) are likely to require radiological imaging.
Women diagnosed with diabetes insipidus should have regular consultant review in clinic with monitoring of serum electrolytes. They should also receive an antenatal anaesthetic review. A multidisciplinary approach should be adopted during labour and they should be managed on delivery suite with senior obstetric and anaesthetic input.
Pre-eclamptic toxaemia (PET) and haemolysis, elevated liver enzymes and low platelets (HELLP) can exacerbate diabetes insipidus as hepatic dysfunction leads to a reduction in vasopressinase metabolism. Furthermore, it has been suggested that pituitary hypoperfusion due to this syndrome could also be a cause of gestational diabetes insipidus.
These women present a therapeutic challenge as they are in a volume-depleted state as a consequence of DI,

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however they require judicious fluid management because of their PET.
Early detection and effective management will reduce morbidity and mortality in both the mother and fetus.
Untreated or undiagnosed, it has the potential to have serious consequences for the expectant mother and fetus.
Learning objectives
To understand the different subtypes of diabetes insipidus, their pathophysiologies and their effects during the ante-, peri- and postnatal periods.
To appreciate that diabetes insipidus can herald the onset of underlying hepatic dysfunction with associated serious maternal and fetal consequences arising from both the biochemical abnormalities associated with diabetes insipidus and the secondary problems of impaired liver function.
To appraise the current theories of the link between PET and diabetes insipidus.
(38 references) (Author)

20180201-57*

Trends in early prenatal care among women with pre-existing diabetes: have income disparities changed?. Breathett K, Filley J, Pandey M, et al (2018), Journal of Women's Health vol 27, no 1, January 2018, pp 93-98

Background: Women with pre-existing diabetes are at high maternal risk for comorbidities and death, particularly when early prenatal care is not received. Low income is a known barrier to early prenatal care. It is unknown whether recent policies to expand access to prenatal care have reduced income disparities. We hypothesized that income disparities would be minimized and that the odds of receipt of first trimester prenatal care among women with pre-existing diabetes would become similar across income strata over time.
Material and Methods: Using the Colorado birth certificate registry from 2007 to 2014, receipt of prenatal care was assessed retrospectively in 2,497 women with pre-existing diabetes. Logistic regression was used to examine the association between high (>$50,000), medium ($25,000-50,000), and low (<$25,000) income strata and receipt of first trimester prenatal care by birth year, adjusted for demographics.
Results: High, medium, and low income represented 29.5%, 19.0%, and 51.5% of the cohort, respectively. Women with high income were more likely to receive first trimester care than women with low income from 2007 [adjusted odds ratio, 95% confidence interval: 2.16 (1.18, 3.96)] through 2013 [1.66 (1.01, 2.73)], but significant differences were no longer observed in 2014 [1.59 (0.89, 2.84)]. The likelihood of receiving first trimester prenatal care was not significantly different between medium- and low-income strata from 2007 [1.07 (0.66, 1.74)] through 2014 [0.77 (0.48, 1.23)].
Conclusions: From 2007 to 2013, women in Colorado with diabetes were more likely to receive early prenatal care if they were in the highest income stratum than in the lowest stratum. In 2014, receipt of first trimester care became equitable across all income strata. Future work should examine national patterns of income with receipt of prenatal care and outcomes among women with pre-existing diabetes. (45 references) (Author)
Full URL: http://online.liebertpub.com/doi/full/10.1089/jwh.2016.6031

20180201-117*

4D assessment of fetal brain function in diabetic patients. Antsaklis P, Porovic S, Daskalakis G, et al (2017), Journal of Perinatal Medicine vol 45, no 6, August 2017, pp 711-716

Objective:
To assess whether there is a difference in the behavior of fetuses of pregnant women with diabetes under treatment with insulin, compared to fetuses of pregnant women without diabetes.
Materials and methods:
Kurjak's antenatal neurodevelopmental test (KANET) - a method that, by application of four-dimensional (4D) ultrasound, assesses fetal behavior in a similar way that neonatologists perform a neurological assessment in newborns - was applied from 28 to 38 weeks of gestation to 40 pregnancies with pre-existing diabetes mellitus or gestational diabetes mellitus (GDM) requiring insulin (diabetic group) and to 40 non-diabetic cases, with otherwise low-risk pregnancies (non-diabetic group).
Results:
There were no statistically significant differences regarding maternal age (30.5±5.1 years for diabetic group vs. 29.8±6.2 years for non-diabetic group) and gestational age (32±1.6 weeks for the diabetic group compared to 33±1.2 weeks for the non-diabetic group). After analysis of the results obtained from application of KANET to each group, results of KANET had higher scores in the non-diabetic group.
Conclusion:
It appears that there are differences in the fetal behavior between diabetic and non-diabetic fetuses, and also the specific parameters - movements that were different between the two groups were identified.
(21 references) (Author)

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20180125-120*

Targeting Adrenomedullin to Improve Lipid Homeostasis in Diabetic Pregnancies. Dong Y, Betancourt A, Belfort M, et al (2017), The Journal of Clinical Endocrinology and Metabolism vol 102, no 9, September 2017, pp 3425-3436

Context

Gestational diabetes mellitus (GDM) is associated with disturbances in maternal lipid metabolism. Hypertriacylglycerolemia in GDM is associated with an increased risk of large for gestational age neonates, but the pathogenesis of disrupted lipid homeostasis remains unclear.

Objectives

To determine the role of adrenomedullin (AM), a multifunctional peptide, in lipid metabolism in GDM.

Design

Omental adipose biopsies were collected in term pregnancy from women with normal glucose tolerance (NGT, n = 10) and GDM (n = 10).

Results

AM and its receptor components, calcitonin receptor-like receptor, receptor activity-modifying protein 2, and receptor activity-modifying protein 3, were higher in adipose tissues from GDM compared with NGT pregnancies, and these expressions in normal adipose tissues were enhanced by glucose and tumor necrosis factor-αin vitro. AM dose- and time-dependently stimulated lipolysis in human adipocytes, and this effect was reversed by AM antagonist AM22-52. Furthermore, AM inhibited phosphorylation of insulin receptor-β and insulin receptor substrate-1 and enhanced the protein expression of leptin and resistin in adipose tissue from NGT women. The increased messenger RNA expression of leptin and resistin in adipose tissue from GDM was reduced by AM22-52 treatment.

Conclusions

GDM pregnancies are associated with increased AM and its receptor expression in adipose tissues. AM stimulates lipolysis and leptin and resistin expression, and these effects can be reversed by AM antagonist. To our knowledge, manipulation of AM and its receptors in adipocytes might represent an approach in reducing the risk of GDM and fetal overgrowth. (Author)

20180125-119*

Does a First-Degree Family History of Diabetes Impact Placental Maternal and Fetal Vascular Circulation and Inflammatory Response?. Shargorodsky M, Kovo M, Schraiber L, et al (2017), The Journal of Clinical Endocrinology and Metabolism vol 102, no 9, September 2017, pp 3375-3380

Context

Heritability of diabetes is associated with hyperinsulinemia, impaired endothelial function, and inflammatory up-regulation. However, no studies have examined whether a family history of diabetes (FHD) effects placental vascular circulation.

Objective

The current study was designed to investigate the impact of a first-degree FHD on placental vascular circulation and inflammatory lesions.

Design

Observational cohort study.

Setting

Pregnant women who gave birth at Edith Wolfson Medical Center.

Patients

Three hundred thirty-nine pregnant women were divided into two groups according to presence of FHD: group 1 included 225 subjects without FHD, and group 2 included 114 subjects with FHD.

Intervention

Placental histopathological examination.

Main Outcome Measures

Placental vascular supply abnormalities of maternal and fetal origin.

Results

Maternal vascular supply (MVS) abnormalities of the placenta were significantly higher in subjects with FHD, compared with subjects without FHD ($P < 0.005$). Fetal vascular supply abnormalities, as well as maternal and fetal inflammatory response did not differ significantly between groups. In the general linear modeling analysis, FHD was an independent and significant predictor of MVS abnormalities and more than doubled the risk of this outcome. Gestational diabetes mellitus (GDM) incidence was significantly higher in subjects with FHD ($P < 0.0001$). Significant by-group differences in GDM persisted even after adjustment for age and body mass index. Although incidence of

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gestational hypertensive disorders was significantly higher in individuals with FHD, after adjustment FHD did not significantly predict this outcome.
Conclusions
A first-degree FHD is significantly and independently associated with an increased rate of maternal vascular perfusion abnormalities and risk of GDM. (Author)

20180124-83*

3. Management of Diabetes in Pregnancy: Standards of Medical Care in Diabetes-2018. American Diabetes Association (2018), Diabetes Care vol 41, suppl 1,January 2018, pp S137-S143

The American Diabetes Association (ADA) 'Standards of Medical Care in Diabetes' includes ADA's current clinical practice recommendations and is intended to provide the components of diabetes care, general treatment goals and guidelines, and tools to evaluate quality of care. Members of the ADA Professional Practice Committee, a multidisciplinary expert committee, are responsible for updating the Standards of Care annually, or more frequently as warranted. For a detailed description of ADA standards, statements, and reports, as well as the evidence-grading system for ADA's clinical practice recommendations, please refer to the Standards of Care Introduction. Readers who wish to comment on the Standards of Care are invited to do so at professional.diabetes.org/SOC. (65 references) (Author)

Full URL: http://care.diabetesjournals.org/content/41/Supplement_1/S137

20180124-81*

Subclinical First Trimester Renal Abnormalities Are Associated With Preeclampsia in Normoalbuminuric Women With Type 1 Diabetes. Kelly CB, Hookham MB, Yu JY, et al (2018), Diabetes Care vol 41, no 1,January 2018, pp 120-127

OBJECTIVE This study was conducted to determine the utility of tubular (urinary/plasma neutrophil gelatinase-associated lipocalin [NGAL] and urinary kidney injury molecule 1 [KIM-1]) and glomerular (estimated glomerular filtration rate [eGFR]) biomarkers in predicting preeclampsia (PE) in pregnant women with type 1 diabetes mellitus (T1DM) who were free of microalbuminuria and hypertension at the first trimester.
RESEARCH DESIGN AND METHODS This was a prospective study of T1DM pregnancy. Maternal urinary and plasma NGAL, urinary KIM-1 (ELISA of frozen samples), and eGFR (Chronic Kidney Disease Epidemiology Collaboration equation) were determined at three study visits (V1: 12.4 ± 1.8; V2: 21.7 ± 1.4; V3: 31.4 ± 1.5 weeks' gestation [mean ± SD]) in 23 women with T1DM with subsequent PE (DM+PE+), 24 who remained normotensive (DM+PE−), and, for reference, in 19 normotensive pregnant women without diabetes (DM−). The groups with diabetes were matched for age, diabetes duration, and parity. All subjects were normotensive and free of microalbuminuria or albuminuria at V1. All study visits preceded the onset of PE.
RESULTS Urinary creatinine-corrected NGAL (uNGALcc, ng/mg) was significantly elevated at V1 in DM+PE+ vs. DM+PE− women (P = 0.01); this remained significant after exclusion of leukocyte-positive samples (5 DM+PE+ and 2 DM+PE−) (P = 0.02). Accounting for BMI, HbA1c, and total daily insulin dose, a doubling of uNGALcc at V1 conferred a sevenfold increase in risk for PE (P = 0.026). In contrast, neither plasma NGAL nor urinary KIM-1 predicted PE. Also at V1, eGFR was elevated in DM+PE+ vs. DM+PE− (P = 0.04).
CONCLUSIONS Early tubular and glomerular dysfunction may predict PE in first trimester women with T1DM, even if free of microalbuminuria. These data suggest that subclinical renal tubular and glomerular injury, if present early in pregnancy, may predispose women with T1DM to PE. (Author)

20180117-51*

Intrapartum glycaemic control and neonatal hypoglycaemia in pregnancies complicated by diabetes: a systematic review. Yamamoto JM, Benham J, Mohammad K, et al (2018), Diabetic Medicine vol 35, no 2, February 2018, pp 173-183

Aims
To examine whether, in neonates of mothers with Type 1, Type 2 and gestational diabetes, in-target intrapartum glycaemic control was associated with a lower risk of neonatal hypoglycaemia compared with out-of-target glycaemic control.
Methods
We searched PubMed and EMBASE for all available publications, regardless of year, based on a published protocol (PROSPERO CRD42016052439). Studies were excluded if they did not report original data or were animal studies. Data were extracted from published reports in duplicate using a prespecified data extraction form. The main outcome of interest was the association between in-target intrapartum glycaemic control and neonatal hypoglycaemia.
Results

We screened 2846 records for potential study inclusion; 23 studies, including approximately 2835 women with diabetes, were included in the systematic review. Only two of those studies specifically examined in-target vs out-of-target intrapartum glycaemic control. Of the studies included, six showed a relationship between intrapartum glucose and neonatal hypoglycaemia, five others showed a relationship in at least one of the analyses performed and 12 did not find a significant relationship. Only one study was identified as having a low risk of bias.
Conclusions
There is a paucity of high-quality data supporting the association of glucose during labour and delivery with neonatal hypoglycaemia in pregnancies complicated by diabetes. Further studies are required to examine the impact of tight glycaemic targets in labour. (Author)

20180112-1*

Diabetes and pregnancy: national trends over a 15 year period. Mackin ST, Kerssens JJ, Wood R, et al (2018), Diabetologia 11 January 2018. First online

Aims/hypothesis
We aimed to examine time trends in national perinatal outcomes in pregnancies complicated by pre-existing type 1 or type 2 diabetes.
Methods
We analysed episode-level data on all obstetric inpatient delivery events (live or stillbirth) between 1 April 1998 and 31 March 2013 (n = 813,921) using the Scottish Morbidity Record (SMR02). Pregnancies to mothers with type 1 (n = 3229) and type 2 (n = 1452) diabetes were identified from the national diabetes database (Scottish Care Information-Diabetes), and perinatal outcomes were compared among women with type 1 diabetes, type 2 diabetes and those without diabetes.
Results
The number of pregnancies complicated by diabetes increased significantly, by 44% in type 1 diabetes and 90% in type 2 diabetes, across the 15 years examined, to rates of 1 in 210 and 1 in 504 deliveries, respectively. Compared with women without diabetes, delivery occurred 2.6 weeks earlier (type 1 diabetes 36.7 ± 2.3 weeks) and 2 weeks earlier (type 2 diabetes 37.3 ± 2.4 weeks), respectively, showing significant reductions for both type 1 (from 36.7 weeks to 36.4 weeks, $p = 0.03$) and type 2 (from 38.0 weeks to 37.2 weeks, $p < 0.001$) diabetes across the time period. The proportions of preterm delivery were markedly increased in women with diabetes (35.3% type 1 diabetes, 21.8% type 2 diabetes, 6.1% without diabetes; $p < 0.0001$), and these proportions increased with time for both groups ($p < 0.005$). Proportions of elective Caesarean sections (29.4% type 1 diabetes, 30.5% type 2 diabetes, 9.6% without diabetes) and emergency Caesarean sections (38.3% type 1 diabetes, 29.1% type 2 diabetes, 14.6% without diabetes) were greatly increased in women with diabetes and increased over time except for stable rates of emergency Caesarean section in type 1 diabetes. Gestational age-, sex- and parity-adjusted z score for birthweight (1.33 ± 1.34; $p < 0.001$) were higher in type 1 diabetes and increased over time from 1.22 to 1.47 ($p < 0.001$). Birthweight was also increased in type 2 diabetes (0.94 ± 1.34; $p < 0.001$) but did not alter with time. There were 65 perinatal deaths in offspring of mothers with type 1 diabetes and 39 to mothers with type 2 diabetes, representing perinatal mortality rates of 20.1 (95% CI 14.7, 24.3) and 26.9 (16.7, 32.9) per 1000 births, respectively, and rates 3.1 and 4.2 times, respectively, those observed in the non-diabetic population ($p < 0.001$). Stillbirth rates in type 1 and type 2 diabetes were 4.0-fold and 5.1-fold that in the non-diabetic population ($p < 0.001$). Perinatal mortality and stillbirth rates showed no significant fall over time despite small falls in the rates for the non-diabetic population.
Conclusions/interpretation
Women with diabetes are receiving increased intervention in pregnancy (earlier delivery, increased Caesarean section rates), but despite this, higher birthweights are being recorded. Improvements in rates of stillbirth seen in the general population are not being reflected in changes in stillbirth or perinatal mortality in our population with diabetes. (30 references) (Author)
Full URL: https://link.springer.com/article/10.1007/s00125-017-4529-3

20180111-29*

Maternal and perinatal outcomes in pregnant women with type 1 diabetes treated with continuous subcutaneous insulin infusion and real time continuous glucose monitoring in two specialized centers in Medellin, Colombia. Restrepo-Moreno M, Ramirez-Rincon A, Hincapie-Garcia J, et al (2018), Journal of Maternal-Fetal and Neonatal Medicine vol 31, no 6, 2018, pp 696-700

Objective: We assessed maternal and perinatal outcomes in pregnant women with type 1 diabetes, treated with continuous subcutaneous insulin infusion and real time continuous glucose monitoring.
Methods: This is a retrospective study, analyzing the basal characteristics, glycemic control, maternal and perinatal

outcomes of pregnant women with type 1 diabetes, who were on an insulin pump with continuous glucose monitoring between 2011 and 2015.
Results: Fourteen patients were included. The median age was 33 and disease duration 12 years. Indications for therapy were mainly poor glycemic control and severe hypoglycemia. The median A1c decrease was 1.02% between the first and third trimester. Pregnancies were associated with complications: 7.1% of the patients had diabetic ketoacidosis, 7.1% had an abortion, 28.5% gestational hypertension and 12.2% preeclampsia. The median gestational age at birth was 37 weeks and four days; the frequency of preterm birth was 7.1% and macrosomia 21.4%. There were no congenital malformations or perinatal death.
Conclusions: Baseline characteristics and results of patients in this study were similar to those reported in the previous literature. Continuous subcutaneous insulin infusion with continuous glucose monitoring is an alternative treatment option for pregnant women with type 1 diabetes before or during pregnancy. (30 references) (Author)

20180109-49*

Prenatal Care Adherence and Neonatal Intensive Care Unit Admission or Stillbirth among Women with Gestational and Preexisting Diabetes Mellitus. Sperling JD, Maggio L, Has P, et al (2018), American Journal of Perinatology vol 35, no 2, January 2018, pp 103-109

Objective To determine if there was an association between prenatal care adherence and neonatal intensive care unit (NICU) admission or stillbirth, and adverse perinatal outcomes in women with preexisting diabetes mellitus (DM) and gestational DM (GDM).
Materials and Methods This is a retrospective cohort study among women with DM and GDM at a Diabetes in Pregnancy Program at an academic institution between 2006 and 2014. Adherence with prenatal care was the percentage of prenatal appointments attended divided by those scheduled. Adherence was divided into quartiles, with the first quartile defined as lower adherence and compared with the other quartiles.
Results There were 443 women with DM and 499 with GDM. Neonates of women with DM and lower adherence had higher rates of NICU admission or stillbirth (55 vs. 39%; p = 0.003). A multivariable logistic regression showed that the lower adherence group had higher likelihood of NICU admission (adjusted odds ratio: 1.61 [1.03-2.5]; p = 0.035). Those with lower adherence had worse glycemic monitoring and more hospitalizations. Among those with GDM, most outcomes were similar between groups including NICU admission or stillbirth.
Conclusion Women with DM with lower adherence had higher rates of NICU admission and worse glycemic control. Most outcomes among women with GDM with lower adherence were similar. (21 references) (Author)

20180108-4*

Planned birth at or near term for improving health outcomes for pregnant women with gestational diabetes and their infants (Cochrane Review). (Assessed as up-to-date: 15 August 2017). Biesty LM, Egan AM, Dunne F, et al (2018), The Cochrane Database of Systematic Reviews Issue 2, 9 February 2018, Art No:. CD012948

Background

Pregnant women with pre-existing diabetes (Type 1 or Type 2) have increased rates of adverse maternal and neonatal outcomes. Current clinical guidelines support elective birth, at or near term, because of increased perinatal mortality during the third trimester of pregnancy.

This review replaces a review previously published in 2001 that included "diabetic pregnant women", which has now been split into two reviews. This current review focuses on pregnant women with pre-existing diabetes (Type 1 or Type 2) and a sister review focuses on women with gestational diabetes.

Objectives

To assess the effect of planned birth (either by induction of labour or caesarean birth) at or near term gestation (37 to 40 weeks' gestation) compared with an expectant approach, for improving health outcomes for pregnant women with pre-existing diabetes and their infants. The primary outcomes relate to maternal and perinatal mortality and morbidity.

Search methods

We searched Cochrane Pregnancy and Childbirth's Trials Register, ClinicalTrials.gov, the WHO International Clinical Trials Registry Platform (ICTRP) (15 August 2017), and reference lists of retrieved studies.

Selection criteria

We planned to include randomised trials (including those using a cluster-randomised design) and non-randomised

trials (e.g. quasi-randomised trials using alternate allocation) which compared planned birth, at or near term, with an expectant approach for pregnant women with pre-existing diabetes.

Data collection and analysis
Two of the review authors independently assessed study eligibility. In future updates of this review, at least two of the review authors will extract data and assess the risk of bias in included studies. We will also assess the quality of the evidence using the GRADE approach.

Main results
We identified no eligible published trials for inclusion in this review.

We did identify one randomised trial which examined whether expectant management reduced the incidence of caesarean birth in uncomplicated pregnancies of women with gestational diabetes (requiring insulin) and with pre-existing diabetes. However, published data from this trial does not differentiate between pre-existing and gestational diabetes, and therefore we excluded this trial.

Authors' conclusions
In the absence of evidence, we are unable to reach any conclusions about the health outcomes associated with planned birth, at or near term, compared with an expectant approach for pregnant women with pre-existing diabetes.

This review demonstrates the urgent need for high-quality trials evaluating the effectiveness of planned birth at or near term gestation for pregnant women with pre-existing (Type 1 or Type 2) diabetes compared with an expectant approach. (Author)
Full URL: https://doi.org/10.1002/14651858.CD012948

20180104-5*

Type-2 diabetes mellitus: does prenatal care affect outcomes?. Allen AJ, Snowden JM, Lau B, et al (2018), Journal of Maternal-Fetal and Neonatal Medicine vol 31, no 1, 2018, pp 93-97
Objective: To determine if prenatal care affects adverse perinatal outcomes in pregnant women with Type-2 diabetes mellitus (T2DM).
Study design: This was a retrospective cohort study of pregnant women with pregestational diabetes mellitus pregnancies in the state of California between 1997 and 2006, using vital statistics data linked to birth certificates. Women were stratified by time of presentation to care and we compared those who presented in the first trimester, third trimester, and those who had no prenatal care prior to delivery. Perinatal outcomes looked at included: preeclampsia, macrosomia, preterm delivery, cesarean delivery, and intrauterine fetal demise (IUFD). The two groups were compared with chi-squared testing to determine statistical significance.
Results: In women with pregestational diabetes those who presented at time of delivery had an 11.3% risk of IUFD compared to 0.9% in those who presented in the first trimester. There was also an increased rate of preterm birth in the late presentation cohort (29.4% at time of delivery versus 21.0% in the first trimester). After adjusting for possible confounding variables using logistic regression models, rates of IUFD and preterm delivery were still found to be statistically significant with adjusted odds ratios of 11.37 (95% CI: 6.10-21.16) and 1.55 (95% CI: 1.03-2.32), respectively. There were no differences in rates of macrosomia or preeclampsia between the three cohorts.
Conclusions: Treatment of T2DM throughout pregnancy leads to improved maternal and neonatal outcomes. (10 references) (Author)

20180103-76*

Implementation of guidelines for multidisciplinary team management of pregnancy in women with pre-existing diabetes or cardiac conditions: results from a UK national survey. Taylor C, McCance DR, Chappell L, et al (2017), BMC Pregnancy and Childbirth vol 17, no 434, 22 December 2017
Background
Despite numerous publications stating the importance of multidisciplinary care for women with pre-existing medical conditions, there is a lack of evidence regarding structure or processes of multidisciplinary working, nor impact on maternal or infant outcomes. This study aimed to evaluate the implementation of guidelines for multidisciplinary team (MDT) management in pregnant women with pre-existing diabetes or cardiac conditions. These conditions were selected as exemplars of increasingly common medical conditions in pregnancy for which MDT management is recommended to prevent or reduce adverse maternal and fetal outcomes.

Methods
National on-line survey sent to clinicians responsible for management or referral of women with pre-existing diabetes or cardiac conditions in UK National Health Service (NHS) maternity units. The survey comprised questions regarding the organisation of MDT management for women with pre-existing diabetes or cardiac conditions. Content was informed by national guidance.
Results
One hundred seventy-nine responses were received, covering all health regions in England (162 responses) and 17 responses from Scotland, Wales and Northern Ireland. 132 (74%) related to women with diabetes and 123 (69%) to women with cardiac conditions. MDT referral was reportedly standard practice in most hospitals, particularly for women with pre-existing diabetes (88% of responses vs. 63% for cardiac) but there was wide variation in relation to MDT membership, timing of referral and working practices. These inconsistencies were evident within and between maternity units across the UK. Reported membership was medically dominated and often in the absence of midwifery/nursing and other allied health professionals. Less than half of MDTs for women with diabetes met the recommendations for membership in national guidance, and although two thirds of MDTs for women with cardiac disease met the core recommendations for membership, most did not report having the extended members: midwives, neonatologists or intensivists.
Conclusions
The wide diversity of organisational management for women with pre-existing diabetes or cardiac conditions is of concern and merits more detailed inquiry. Evidence is also required to support and better define the recommendations for MDT care.
(20 references) (Author) [Please note: BMC initially publishes articles in a provisional format. If there is a note on the document to indicate that it is still provisional, it may undergo minor changes]
Full URL: https://bmcpregnancychildbirth.biomedcentral.com/articles/10.1186/s12884-017-1609-9

20171222-4*

Exercise for pregnant women with pre-existing diabetes for improving maternal and fetal outcomes (Cochrane Review). (Assessed as up-to-date: 27 June 2017). Brown J, Ceysens G, Boulvain M, et al (2017), The Cochrane Database of Systematic Reviews Issue 12, 2017
Background
Pregnancies with pre-existing diabetes are high risk, with increased risk of poorer fetal, neonatal, and maternal outcomes. Identifying interventions to improving health outcomes for women with diabetes and their infants is a priority, as rates of diabetes continue to increase.
Exercise has been shown to have benefits for non-pregnant individuals with pre-existing type 2 diabetes, such as improving glycaemic control, and reducing visceral adipose tissue and plasma triglycerides. For pregnant women with pre-existing diabetes, the effects of exercise interventions on the mother and her baby are unknown.
An earlier Cochrane review on 'Exercise for pregnant women with diabetes' considered both pre-existing diabetes and gestational diabetes. That Cochrane review has now been split into two new reviews (following new protocols) - one on gestational diabetes and one on pre-existing diabetes (this review).
Objectives
To evaluate the effects of exercise interventions for improving maternal and fetal outcomes in women with pre-existing diabetes.
Search methods
We searched Cochrane Pregnancy and Childbirth's Trials Register, ClinicalTrials.gov, and the WHO International Clinical Trials Registry Platform (ICTRP) on 27 June 2017, and reference lists of retrieved studies.
Selection criteria
We had planned to include published or unpublished randomised controlled trials (RCT) or cluster-randomised trials, in full text or abstract format that compared any type of exercise programme, added to standard care, targeted at women with known pre-gestational diabetes (type 1 or type 2 diabetes), at any stage of pregnancy, compared with 1) standard care alone or 2) standard care plus another exercise intervention. Quasi-randomised and cross-over trials were excluded. Conference abstracts were handled in the same way as full-text publications.
Women with gestational diabetes mellitus were excluded, as they were covered in a separate Cochrane review.
Data collection and analysis
We had planned that two review authors would independently assess all the potential studies we identified as a result of the search strategy. For eligible studies, two review authors would have independently extracted the data using an agreed form. We had planned to resolve discrepancies through discussion, or by consulting a third person. We also had planned to assess the evidence using the GRADE approach.

Main results
We did not identify any randomised controlled trials.
Authors' conclusions
There was no evidence from RCTs that evaluated the effects of exercise interventions for improving maternal and fetal outcomes in women with pre-existing diabetes.
Good quality, large randomised controlled trials are urgently needed to identify exercise interventions that are safe, and improve health outcomes for women with pre-existing diabetes and their babies. Future studies in this area could utilise the standardised outcomes in this review, in order to improve consistency between trials in this area, and aid future meta-analysis. (Author)

20171220-3*

Pregnancy outcomes in women on metformin for diabetes or other indications among those seeking teratology information services. Panchaud A, Rousson V, Vial T, et al (2017), British Journal of Clinical Pharmacology 7 December 2017. Accepted article

BACKGROUND:
Metformin is used to treat type 2 diabetes, polycystic ovary syndrome associated infertility, and gestational diabetes. Human studies evaluating the safety of metformin in early pregnancy are scarce.
METHOD:
We evaluated the risk of major birth defects and pregnancy losses in a cohort of pregnant women exposed to metformin during first trimester for different indications relative to a matched unexposed reference group.
RESULTS:
The risk of major birth defects was 5.1% (20/392) in pregnancies exposed to metformin during the first trimester and 2.1% (9/431) in the reference group (adjusted odds ratio (OR) 1.70; 95%CI 0.70-4.38). Among metformin users, this risk was 7.8% (17/219) in patients with pre-gestational diabetes and 1.7% (3/173) in those without this diagnosis. Compared to the unexposed reference, the OR for metformin user with diabetes was 3.95 (95% CI 1.77-9.41) and for metformin with other indications it was 0.83 (95% CI 0.18-2.81). The risk of pregnancylosses (spontaneous abortions and stillbirths) was 20.8% in women on metformin during the first trimester and 10.8% in the reference group (adjusted hazard ratio (HR) 1.57; 95%CI 0.90-2.74). The risks for women on metformin with and without pre-gestational diabetes were 24.0% and 16.8% respectively, with adjusted HR of 2.51 (95%CI 1.44-4.36) and 1.38 (95%CI 0.74-2.59) when compared to the reference.
CONCLUSION:
Pregnant women with pre-gestational diabetes on metformin are at a higher risk for adverse pregnancy outcomes than the general population. This appears to be due to the underlying diabetes since women on metformin for other indications do not present meaningfully increased risks.
This article is protected by copyright. All rights reserved. (Author)

20171213-85*

Experiences of closed-loop insulin delivery among pregnant women with Type 1 diabetes. Farrington C, Stewart ZA, Barnard K, et al (2017), Diabetic Medicine vol 34, no 10, October 2017, 1461-1469

Aims
To explore the experiences of pregnant women with Type 1 diabetes, and the relationships between perceptions of glucose control, attitudes to technology and glycaemic responses with regard to closed-loop insulin delivery.
Methods
We recruited 16 pregnant women with Type 1 diabetes [mean ± sd age 34.1 ± 4.6 years, duration of diabetes 23.6 ± 7.2 years, baseline HbA1c 51±5 mmol/mol (6.8 ± 0.6%)] to a randomized crossover trial of sensor-augmented pump therapy vs automated closed-loop therapy. Questionnaires (Diabetes Technology Questionnaire, Hypoglycaemia Fear Survey) were completed before and after each intervention, with qualitative interviews at baseline and follow-up.
Results
Women described the benefits and burdens of closed-loop systems during pregnancy. Feelings of improved glucose control, excitement and empowerment were counterbalanced by concerns about device visibility, obsessive data checking and diminished attentiveness to hyper- and hypoglycaemia symptoms. Responding to questionnaires, eight participants felt less worry about overnight hypoglycaemia and that diabetes 'did not run their lives'; however, five reported that closed-loop increased time thinking about diabetes, and three felt it made sleep and preventing hyperglycaemia more problematic. Women slightly overestimated their glycaemic response to closed-loop therapy. Most became more positive in their technology attitudes throughout pregnancy. Women with more positive technology attitudes had higher degrees of overestimation, and poorer levels of glycaemic control.

Conclusions

Women displayed complex psychosocial responses to closed-loop therapy in pregnancy. Perceptions of glycaemic response may diverge from biomedical data. (Author)

20171213-83*

Fetal overnutrition and offspring insulin resistance and β-cell function: the Exploring Perinatal Outcomes among Children (EPOCH) study. Sauder KA, Hockett CW, Ringham BM, et al (2017), Diabetic Medicine vol 34, no 10, October 2017, 1392-1399

Aims

To examine the associations of intrauterine exposure to maternal diabetes and obesity with offspring insulin resistance, β-cell function and oral disposition index in a longitudinal observational study of ethnically diverse offspring.

Methods

A total of 445 offspring who were exposed (n=81) or not exposed (n=364) to maternal diabetes in utero completed two fasting blood measurements at mean (sd) ages of 10.5 (1.5) and 16.5 (1.2) years, respectively, and an oral glucose tolerance test at the second visit. We used linear mixed models and general linear univariate models to evaluate the associations of maternal diabetes and pre-pregnancy BMI with offspring outcomes.

Results

Maternal diabetes in utero predicted increased insulin resistance [18% higher updated homeostatic model assessment of insulin resistance (HOMA2-IR), P=0.01; 19% lower Matsuda index, P=0.01 and 9% greater updated homeostatic model assessment of β-cell function (HOMA2-β), P=0.04]. Each 5-kg/m2 increase in pre-pregnancy BMI predicted increased insulin resistance (11% greater HOMA2-IR, P<0.001; 10% lower Matsuda index, P<0.001; 6% greater HOMA2-β, P<0.001). Similar results were obtained in a combined model with both exposures. After adjustment for offspring BMI, only maternal diabetes was associated with higher HOMA2-IR (β=1.12, P=0.03) and lower Matsuda index (β=0.83, P=0.01). Neither exposure was associated with early insulin response or oral disposition index.

Conclusions

Intrauterine exposure to diabetes or obesity is associated with greater offspring insulin resistance than non-exposure, supporting the hypothesis that fetal overnutrition results in metabolic abnormalities during childhood and adolescence. (Author)

20171213-82*

Management of sulfonylurea-treated monogenic diabetes in pregnancy: implications of placental glibenclamide transfer. Shepherd M, Brook AJ, Chakera AJ, et al (2017), Diabetic Medicine vol 34, no 10, October 2017, 1332-1339

The optimum treatment for HNF1A/HNF4A maturity-onset diabetes of the young and ATP-sensitive potassium (KATP) channel neonatal diabetes, outside pregnancy, is sulfonylureas, but there is little evidence regarding the most appropriate treatment during pregnancy. Glibenclamide has been widely used in the treatment of gestational diabetes, but recent data have established that glibenclamide crosses the placenta and increases risk of macrosomia and neonatal hypoglycaemia. This raises questions about its use in pregnancy. We review the available evidence and make recommendations for the management of monogenic diabetes in pregnancy. Due to the risk of stimulating increased insulin secretion in utero, we recommend that in women with HNF1A/ HNF4A maturity-onset diabetes of the young, those with good glycaemic control who are on a sulfonylurea per conception either transfer to insulin before conception (at the risk of a short-term deterioration of glycaemic control) or continue with sulfonylurea (glibenclamide) treatment in the first trimester and transfer to insulin in the second trimester. Early delivery is needed if the fetus inherits an HNF4A mutation from either parent because increased insulin secretion results in ~800-g weight gain in utero, and prolonged severe neonatal hypoglycaemia can occur post-delivery. If the fetus inherits a KATP neonatal diabetes mutation from their mother they have greatly reduced insulin secretion in utero that reduces fetal growth by ~900 g. Treating the mother with glibenclamide in the third trimester treats the affected fetus in utero, normalising fetal growth, but is not desirable, especially in the high doses used in this condition, if the fetus is unaffected. Prospective studies of pregnancy in monogenic diabetes are needed. (50 references) (Author)

20171212-32*

Neonatal delivery weight and risk of future maternal diabetes. Stuart AE, Amer-Wahlin I, Kallen KBM (2018), International Journal of Gynecology & Obstetrics vol 140, no 1, January 2018, pp 111-117

Objective

To investigate associations between neonatal delivery weight and future risk of maternal type 1 or type 2 diabetes.
Methods
Data included in the Swedish Medical Birth Registry and Swedish National Diabetes Registry were merged to include all women born during 1930-1989; patients with pre-existing diabetes or gestational diabetes were excluded. Cox regression analyses were performed to identify associations between the neonatal delivery weight from the most recent pregnancy and later occurrence of diabetes.
Results
There were 1 873 440 patients included in the analyses. An increased risk of type 1 (hazard ratio 3.60, 95% confidence interval [CI] 3.23-4.01) or type 2 diabetes (hazard ratio 2.77, 95% CI 2.68-2.87) was observed among patients who had a large for gestational age neonate compared with patients who had neonates within one standard definition of the mean weight for gestational age; the odds of developing type 1 (odds ratio 10.27, 95% CI 7.37-14.31) or type 2 diabetes (odds ratio 8.50, 95% CI 6.01-12.02) within 1 year of delivery was also increased compared with patients who had a neonate within one standard deviation of the mean weight for gestational age.
Conclusions
Delivering a large for gestational age neonate was a potent risk factor for the later development of maternal type 1 or type 2 diabetes.
(Author)

20171204-37*

Gestational diabetes: a red flag for future Type 2 diabetes in pregnancy? A retrospective analysis. Cheung MW, Lih A, Lau SM, et al (2015), Diabetic Medicine vol 32, no 9, September 2015, pp 1167-1171

Aims
This study sought to understand the relationship between Type 2 diabetes in pregnancy and previous gestational diabetes (GDM), and determine whether a previous pregnancy with GDM was associated with subsequent better pregnancy planning.
Methods
A retrospective review of medical records of women with Type 2 diabetes in pregnancy was conducted at three teaching hospitals to ascertain whether they had earlier GDM, and to determine whether this is associated with differences in measures of pregnancy planning and diabetes management.
Results
Of 172 index pregnancies affected by Type 2 diabetes, in 76 (44%) cases, the mother had a previous history of GDM. Within this cohort, a diagnosis of 'overt diabetes in pregnancy', made on the basis of a GTT result during pregnancy in the WHO diabetic range with persistent diabetes post partum, was more common among women who had previous GDM than women who had not had GDM (20% vs 7%, P = 0.02). Women who previously had GDM did not exhibit a higher incidence of preconception planning or folate supplementation.
Conclusions
It is common for women with Type 2 diabetes in pregnancy to have had GDM previously. The diagnosis of GDM is an opportunity to improve future pregnancy planning and outcomes for women with Type 2 diabetes in pregnancy. This goal is yet to be realized. (Author)

20171204-36*

Normal pregnancy outcome after first-trimester exposure to liraglutide in a woman with Type 2 diabetes. Greco D (2015), Diabetic Medicine vol 32, no 10, October 2015, pp e29-30

Background
Data from animal studies suggest that glucagon-like peptide-1 analogues should not be used in pregnancy, but there have been no reports to date of their effects in human pregnancy. The aim of the present report was to describe a case of exposure to liraglutide during the first trimester of pregnancy in a patient with Type 2 diabetes mellitus.
Case report
A 37-year-old woman with Type 2 diabetes mellitus who had been taking liraglutide for 2 years was admitted in the 13th week of gestation. Liraglutide was immediately discontinued and intensive insulin therapy instituted. The woman gave birth to a healthy child after completing an uneventful gestation period.
Conclusion
Although the present normal pregnancy outcome does not mean that glucagon-like peptide-1 analogues are safe to use in pregnancy, this report contributes to the limited knowledge regarding human exposure to these drugs during pregnancy in women with diabetes. (Author)

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20171204-33*

Mental health in early pregnancy is associated with pregnancy outcome in women with pregestational diabetes.
Callesen NF, Secher AL, Cramon P, et al (2015), Diabetic Medicine vol 32, no 11, November 2015, pp 1484-1491

Aim

To explore the role of early pregnancy health-related quality of life, anxiety, depression and locus of control for pregnancy outcome in women with pregestational diabetes.

Methods

This was a cohort study of 148 pregnant women with pregestational diabetes (118 with Type 1 diabetes and 30 with Type 2 diabetes), who completed three internationally validated questionnaires: the 36-item Short-Form Health Survey, the Hospital Anxiety and Depression Scale and the Multidimensional Health Locus of Control survey at 8 weeks. Selected pregnancy outcomes were preterm delivery (< 37 weeks) and large for gestational age infants (birth weight > 90th percentile). Differences between groups in the questionnaires were analysed using an unpaired t-test.

Results

Women with preterm deliveries (n = 28) had lower (i.e. worse) mean (sd) quality-of-life scores for the two 36-item Short-Form Health Survey scales, Role-Emotional [58.3 (38.1) vs. 82.9 (31.3); P = 0.0005] and Mental Health [67.7 (20.4) vs. 75.2 (15.8), P = 0.04], and a lower score for the 36-item Short-Form Health Survey scale Mental Component Summary (42.8 (13.1) vs. 48.8 (9.7), P = 0.03) in early pregnancy, compared with women with term deliveries. Depression symptoms (Hospital Anxiety and Depression Scale depression score ≥ 8) were more frequent in women with preterm vs. term deliveries (seven (25%) vs. six women (5%); P = 0.003), while levels of anxiety and locus of control were similar in these two groups. No difference in early pregnancy scores for health-related quality of life, anxiety, depression and locus of control were seen in women delivering large or appropriate for gestational age infants.

Conclusions

Poor mental quality of life and the presence of depressive symptoms in early pregnancy were associated with preterm delivery in women with pregestational diabetes. (Author)

20171204-18*

Risk and recurrence of serious adverse outcomes in the first and second pregnancies of women with preexisting diabetes. Tennant PWG, Bilous RW, Prathapan S, et al (2015), Diabetes Care vol 38, no 4, April 2015, pp 610-619

OBJECTIVE Women with preexisting (type 1 or type 2) diabetes experience an increased risk of serious adverse pregnancy outcomes. It is not known, however, how these risks change between the first and second pregnancy and whether there is an increased risk of recurrence. This study describes the absolute risks and recurrence of serious adverse pregnancy outcomes in 220 women with preexisting diabetes.

RESEARCH DESIGN AND METHODS A total of 440 pregnancies occurring in 220 women with preexisting diabetes who delivered successive singleton pregnancies in the North of England during 1996-2008 were identified from the Northern Diabetes in Pregnancy Survey (NorDIP). Predictors of serious adverse outcome were estimated by competing-risks regression.

RESULTS Sixty-seven first pregnancies (30.5%) ended in serious adverse outcome, including 14 (6.4%) with congenital anomalies and 53 (24.1%) additional fetal or infant deaths. Thirty-seven second pregnancies (16.8%) ended in serious adverse outcome-half the rate among first pregnancies (P = 0.0004)-including 21 (9.5%) with congenital anomalies and 16 (7.3%) additional fetal or infant deaths. Serious adverse outcomes in the second pregnancy occurred twice as frequently in women who experienced a previous adverse outcome than in those who did not (26.9% vs. 12.4%, P = 0.004), but previous adverse outcome was not associated with preparation for the following pregnancy.

CONCLUSIONS Serious adverse outcomes are less common in the second pregnancies of women with preexisting diabetes, although the risk is comparable in those whose first pregnancy ends in adverse outcome. Reducing the risk of recurrence may require more support in the immediate period after an adverse pregnancy outcome. (41 references) (Author)

Full URL: http://care.diabetesjournals.org/content/38/4/610

20171127-51*

Controversies in the peripartum management of diabetes. Modi a, Levy N, Hall GM (2016), Anaesthesia vol 71, no 7, July 2016, pp 750-755

An editorial discussing pre-existing and gestational diabetes and their management in pregnancy, particularly the methods used to prevent the higher risks associated with the condition. Suggests that the current literature on diabetes in pregnancy conflicts with the NICE guidance, with the latter adhering to historical strategies for perinatal

glycaemic control, and therefore should be renewed urgently. (KRB)

20171123-27*

Effect of pregnancy planning on maternal and neonatal outcomes in women with Type 1 diabetes. Wotherspoon AC, Young IS, Patterson CC, et al (2017), Diabetic Medicine vol 34, no 9, September 2017, pp 1303-1308

Aims

To assess the effect of pregnancy planning on maternal and neonatal outcomes in women with Type 1 diabetes.

Methods

Pregnancy planning was assessed retrospectively in a cohort of women who participated in the Diabetes and Pre-eclampsia Intervention Trial (DAPIT). Pregnancy planning was determined based on self-report as to whether pregnancy was planned or unplanned. The effect of pregnancy planning on maternal and neonatal outcomes was examined, controlling for confounding variables.

Results

A total of 747 women were included in the study, of whom 39% considered their pregnancy unplanned. Characteristics associated with unplanned pregnancy included being younger (P<0.001), being a current smoker (P<0.001), being from a lower social class (P<0.001) and having higher HbA1c values prior to and throughout pregnancy (P≤0.005). Significantly fewer women with unplanned vs planned pregnancies received pre-pregnancy counselling (24% vs 64%; P<0.001). Infants of women with unplanned pregnancies were more likely to be small for gestational age (<5th centile; P=0.004), to be admitted to the neonatal care unit (P=0.001) and to have a longer stay in hospital (P=0.01). Outcomes did not differ between the groups in relation to pre-eclampsia, congenital malformations or a composite adverse outcome.

Conclusions

Risks associated with diabetes in pregnancy need to be highlighted to all women, their partners and families, and healthcare professionals. Further research is required to determine if these groups are fully aware of the risks associated with diabetes in pregnancy. (26 references) (Author)

20171115-108*

Fetal overgrowth in women with type 1 and type 2 diabetes mellitus. Ladfors L, Shaat N, Wiberg N, et al (2017), PLoS ONE vol 12, no 11, 9 November 2017, e0187917

Objectives

Despite improved glycemic control, the rate of large-for-gestational-age (LGA) infants remains high in pregnancies complicated by diabetes mellitus type 1 (T1DM) and type 2 (T2DM). Poor glycemic control, obesity, and excessive gestational weight gain are the main risk factors. The aim of this study was to determine the relative contribution of these risk factors for LGA in women with T1DM and T2DM, after controlling for important confounders such as age, smoking, and parity.

Methods

In this retrospective chart review study, we analyzed the medical files of pregnant women with T1DM and T2DM who attended the antenatal care program at Skåne University Hospital during the years 2006 to 2016. HbA1c was used as a measure of glycemic control. Maternal weight in early pregnancy and at term was registered. LGA was defined as birth weight > 2 standard deviations of the mean. Univariable and multivariable logistic regression analysis was used to calculate odds ratios (OR's) and 95% confidence intervals (CIs) for LGA.

Results

Over the 11-year period, we identified 308 singleton pregnancies in 221 women with T1DM and in 87 women with T2DM. The rate of LGA was 50% in women with T1DM and 23% in women with T2DM. The multivariable regression model identified gestational weight gain and second-trimester HbA1c as risk factors for LGA in T1DM pregnancies (OR = 1.107, 95% CI: 1.044-1.17, and OR = 1.047, 95% CI: 1.015-1.080, respectively) and gestational weight gain as a risk factor in T2DM pregnancies (OR = 1.175, 95% CI: 1.048-1.318), independent of body mass index.

Conclusions

Gestational weight gain was associated with LGA in women with T1DM and T2DM, independent of maternal body mass index. The findings suggest that monitoring and regulation of gestational weight gain is important in the clinical care of these women, to minimize the risk of fetal overgrowth. (41 references) (Author)

Full URL: http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0187917

20171113-6*

Very tight vs. tight control: what should be the criteria for pharmacologic therapy dose adjustment in diabetes in

pregnancy? Evidence from randomized controlled trials. Caissutti C, Saccone G, Ciardulli A, et al (2018), Acta Obstetricia et Gynecologica Scandinavica vol 97, no 3, March 2018, pp 235-247

Introduction

There is inconclusive evidence from randomized controlled trials (RCTs) to support any specific criteria for pharmacologic therapy dose adjustment in diabetes in pregnancy. Our objective was to analyze the criteria for dose adjustment of pharmacologic treatment for diabetes mellitus (DM) in pregnancy.

Material and methods

Data sources: MEDLINE, OVID and Cochrane Library were searched from their inception to September 2017. Selection criteria included all trials of DM in pregnancy managed by oral hypoglycemic agents or insulin reporting criteria for pharmacologic therapy dose adjustment. RCTs in women with pregestational DM and gestational DM (GDM) were included. For each trial, data regarding glucose values used for pharmacologic therapy dose adjustment were extracted and carefully reviewed.

Results

Of 51 RCTs on therapy for GDM or pregestational DM, 17 (4230 women) were included as they reported criteria for pharmacologic therapy dose adjustment. Most of them (88%, 15/17) included women with GDM only. For RCTs including women with GDM, 12/16 (75%) used the two-step approach, three (19%) the one-step approach and one (6%) either the one- or two-step approach. Regarding the type of initial therapy, 13 (77%) RCTs used different types and doses of insulin; nine (53%) used metformin; five (30%) used glyburide; and one (6%) used placebo. In most RCTs, glucose monitoring was assessed four times daily, i.e. fasting (all RCTs) and two hours (15 RCTs, 88%) after each of the three main meals - breakfast, lunch, and dinner. For fasting glucose target, all used a value <105 mg/dL; nine (53%) used 95 mg/dL as target. Of the 15 RCTs using a two-hour postprandial value as target, 11 (73%) had 120 mg/dL as cutoff. Regarding the criteria for pharmacologic therapy dose adjustment, we found six different criteria. The majority of RCTs (9/17, 53%) used either one or two values per week higher than the target values, of which two-thirds used only one value (35% of total), and one-third (18% of total) two values. Five RCTs (29%) used >50%, one (6%) >30%, and one (6%) >20% of the values higher than the target value; one (6%) used the appearance of glycosuria.

Conclusions

When evaluating RCTs which included criteria for pharmacologic GDM therapy dose adjustment, the most common criterion for diagnosis was the two-step test, and the most common used therapies were insulin and metformin. Regarding glucose monitoring, the most common frequency was four times per day, fasting and two hours after each main meal, using as target glucose values 95 and 120 mg/dL, respectively. Importantly, we found six different criteria for pharmacologic GDM therapy dose adjustment, with the majority using very tight criteria of either one or two values per week higher than the target values, of which two-thirds used only one value, and one-third used two values. (Author)

20171109-48*

Diabetic pregnancy outcomes in mothers treated with basal insulin lispro protamine suspension or NPH insulin: a multicenter retrospective Italian study. Dalfra MG, Soldato A, Moghetti P, et al (2016), Journal of Maternal-Fetal and Neonatal Medicine vol 29, no 7, 2016, pp 1061-1065

Objective: The aim of this study was to study the efficacy and safety of long-acting insulin analog insulin lispro protamine suspension (ILPS) in diabetic pregnant women.

Methods: In a multicenter observational retrospective study, we evaluated pregnancy outcome in 119 women affected by type 1 diabetes and 814 with gestational diabetes (GDM) treated during pregnancy with ILPS, compared with a control group treated with neutral protamine hagedorn (NPH) insulin.

Results: Among type 1 diabetic patients, fasting blood glucose at the end of pregnancy was significantly lower in ILPS-treated than in NPH-treated patients. HbA1c levels across pregnancy did not differ between groups. Caesarean section and preterm delivery rates were significantly lower in the ILPS-women. Fetal outcomes were similar in the ILPS and NPH groups. Among GDM women, fasting blood glucose at the end of pregnancy was significantly lower in ILPS-treated than in NPH-treated patients. Duration of gestation was significantly longer, caesarian section and preterm delivery rates were lower in the ILPS-treated group. In addition, there were significantly fewer babies with an excessive ponderal index or neonatal hypoglycemic episodes in the ILPS group than in the NPH group.

Conclusions: Association of ILPS with rapid-acting analogs in pregnancy is safe in terms of maternal and fetal outcomes. (37 references) (Author)

20171030-22*

Use of the smartphone application 'Pregnant with Diabetes'. Nørgaard SK, Nichum VL, Barfred C, et al (2017), Danish Medical Journal vol 64, no 11, November 2017, A5417

MIDIRS is part of RCM Information Services Limited which is a company incorporated in England and Wales under company no.11914882 with registered office at 10-18 Union Street, London SE1 1SZ
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Introduction: The aim of this article was to evaluate the awareness and use of the smartphone application (app) 'Pregnant with Diabetes' locally, nationally and internationally.
Methods: In 2013, a patient initiated collaboration with the staff at Centre for Pregnant Women with Diabetes, Rigshospitalet, to develop the app 'Pregnant with Diabetes'. The app communicates clinically important antenatal health information to women with diabetes, based on recommendations from our centre. Women with pre-existing diabetes (Type 1 and Type 2 diabetes) completed an anonymous, structured questionnaire at their first antenatal visit in early pregnancy at our centre. National and international data on numbers of downloads were obtained from Google Play, from the App Store and from Google Analytics.
Results: Among 139 pregnant women with diabetes (96 with Type 1 diabetes and 43 with Type 2 diabetes), 99% had a smartphone and 75% had downloaded the app, whereof 48% had obtained information from the app before their pregnancy. In July 2017, the app had been downloaded 4,465 times in Denmark and 27,361 times in a total of 183 countries. The topics most frequently visited were 'diet and carbohydrates', 'blood glucose' and 'possible complications'.
Conclusions: Easily accessible patient information made available via app technology reaches the patients and may contribute to improved pregnancy planning and outcome in women with pre-existing diabetes - locally, nationally and internationally. Funding: The app was sponsored by Novo Nordisk, Bayer A/S, Diabetes Care, Abbott, MSD Denmark, A.D.I.P.S and Rigshospitalet. (14 references) (Author)

20171030-1*

The Association of Falling Insulin Requirements With Maternal Biomarkers and Placental Dysfunction: A Prospective Study of Women With Preexisting Diabetes in Pregnancy. Padmanabhan S, Lee VW, Mclean M, et al (2017), Diabetes Care vol 40, no 10, October 2017, pp 1323-1330

OBJECTIVE:
To investigate the association of falling insulin requirements (FIR) among women with preexisting diabetes with adverse obstetric outcomes and maternal biomarkers longitudinally in pregnancy.
RESEARCH DESIGN AND METHODS:
A multicenter prospective cohort study of 158 women (41 with type 1 diabetes and 117 with type 2 diabetes) was conducted. Women with FIR of ≥15% from the peak total daily dose after 20 weeks' gestation were considered case subjects (n = 32). The primary outcome was a composite of clinical markers of placental dysfunction (preeclampsia, small for gestational age [≤5th centile], stillbirth, premature delivery [<30 weeks], and placental abruption). Maternal circulating angiogenic markers (placental growth factor [PlGF] and soluble fms-like tyrosine kinase 1 [sFlt-1]), placental hormones (human placental lactogen, progesterone, and tumor necrosis factor-α), HbA1c, and creatinine were studied serially during pregnancy.
RESULTS:
FIR ≥15% were associated with an increased risk of the composite primary outcome (odds ratio [OR] 4.38 [95% CI 1.9-10.3]; P < 0.001), preeclampsia (OR 6.76 [95% CI 2.7-16.7]; P < 0.001), and was more common among women with type 1 diabetes (36.6 vs. 14.5%; P= 0.002). Creatinine was modestly elevated among women with FIR ≥15%; however, there was no difference in HbA1c. The ratio of sFlt-1 to PlGF was significantly higher among women with FIR at 25, 30, and 36 weeks, with differences maintained in the subgroup that developed preeclampsia. There was no difference in placental hormones between the groups.
CONCLUSIONS:
This is the first prospective study to associate FIR with altered expression of placental antiangiogenic factors and preeclampsia. FIR are an important clinical sign, among women with preexisting diabetes, that should alert the clinician to investigate underlying placental dysfunction.
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20171027-26*

The value of real-time continuous glucose monitoring in premature infants of diabetic mothers. Saw H-P, Yao N-W, Chiu C-D, et al (2017), PLoS ONE vol 12, no 10, 16 October 2017, e0186486

To determine the feasibility of using a real-time continuous glucose monitoring system (RTGMS) in intensive care units, our study focus on preterm infants with diabetic mothers owing to their high risk of blood sugar abnormalities. Thirty preterm babies (M = 15 and F = 15; ≤ 36 week gestation age) were studied from within 72 hours of delivery. These babies were admitted to the newborn intensive care and were further categorized into groups based on whether their mothers with or without diabetic mellitus. Blood sugar levels were monitored by both RTGMS and the traditional intermittent arterial line (A-Line) glucose method. Continuous glucose monitoring were well tolerated in 30 infants. There were good consistency between RTGMS and A-Line glucose concentration measurements. Of the

preterm infants, 33.33% experienced abnormal glucose levels (hypoglycemia or hyperglycemia) between the checkpoint intervals of the intermittent A-Line blood sugar measurements. RTGM showed advantages with regards to reduced pain, greater comfort, the provision of real-time information, high sensitivity (94.59%) and specificity (97.87%) in discovering abnormalities of blood sugar, which are especially valuable for premature infants of diabetic mothers. RTGMS is comparable to A-line measurement for identifying fluctuations in blood glucose in premature infants. RTGMS detects more episodes of abnormal glucose concentration than intermittent A-line blood glucose measurement. High risk infants, especially premature infants with diabetic mothers, should receive more intensive blood sugar level checks by using continuous RTGMS. (33 references) (Author)

Full URL: http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0186486#sec001

20171024-65*

Preeclampsia is associated with increased ambulatory arterial stiffness index in type 1 diabetes mellitus. Al-Far HFM, Tjessem IH, Fuglsang J, et al (2017), European Journal of Obstetrics & Gynecology and Reproductive Biology vol 216, September 2017, pp 153-158

Introduction

Treatment of mild to moderate hypertension might not benefit maternal or fetal outcome. This pessimistic point of view may have come about by using non-validated methods for measuring blood pressure in pregnancy combined with inadequate methodology for diagnosis, treatment, and monitoring effects.

Aim

To determine the association between AASI in women with type 1 diabetes mellitus (T1DM) and preeclampsia, and to assess the ability of AASI to diagnose preeclampsia.

Material and methods

Repeated 24-h ambulatory blood pressure recordings were performed three times during pregnancy and once three months postpartum in 151 women with T1DM and 50 control women without diabetes. Circadian rhythm was evaluated as the night day ratio, night blood pressure divided by day blood pressure.

Results

Of the T1DM women, 33 developed preeclampsia, which was associated with AASI in the 3rd trimester ($p < 0.05$). The best predictor of preeclampsia in T1DM was an AASI of 0.35. The diurnal blood pressure was significantly higher in all trimesters in women who later had preeclampsia. A flattened circadian rhythm was present in T1DM women with preeclampsia compared to women without preeclampsia (night-day ratio: systole 2nd trimester: 0.94 ± 0.07 vs. 0.91 ± 0.05, women with and without preeclampsia, respectively, $p = 0.015$; diastole 2nd trimester: 0.89 ± 0.07 vs. 0.85 ± 0.07, $p = 0.003$). AASI was higher during pregnancy compared to postpartum in women with T1DM (0.31 ± 0.16, 0.31 ± 0.16 and 0.33 ± 0.18 vs. 0.25 ± 0.17; 1st, 2nd and 3rd trimester vs. postpartum).

Conclusion

Women with T1DM and preeclampsia demonstrate increased arterial stiffness and had early manifestations in the non-dipping of blood pressure.

(23 references) (Author)

20171020-3*

Oral anti-diabetic agents for women with pre-existing diabetes mellitus/impaired glucose tolerance or previous gestational diabetes mellitus (Cochrane Review). (Assessed as up-to-date: 31 October 2016). Tieu J, Coat S, Hague W, et al (2017), The Cochrane Database of Systematic Reviews Issue 10, 2017

Background

While most guidance recommends the use of insulin in women whose pregnancies are affected by pre-existing diabetes, oral anti-diabetic agents may be more acceptable to women. The effects of these oral anti-diabetic agents on maternal and infant health outcomes need to be established in pregnant women with pre-existing diabetes or impaired glucose tolerance, as well as in women with previous gestational diabetes mellitus preconceptionally or during a subsequent pregnancy. This review is an update of a review that was first published in 2010.

Objectives

To investigate the effects of oral anti-diabetic agents in women with established diabetes, impaired glucose tolerance or previous gestational diabetes who are planning a pregnancy, or pregnant women with pre-existing diabetes, on maternal and infant health. The use of oral anti-diabetic agents for the management of gestational diabetes in a current pregnancy is evaluated in a separate Cochrane Review.

Search methods

We searched the Cochrane Pregnancy and Childbirth Group's Trials Register (31 October 2016) and reference lists of retrieved studies.

Selection criteria
Randomised controlled trials (RCTs) and quasi-RCTs assessing the effects of oral anti-diabetic agents in women with established diabetes, impaired glucose tolerance or previous gestational diabetes who were planning a pregnancy, or pregnant women with pre-existing diabetes. Cluster-RCTs were eligible for inclusion, but none were identified.
Data collection and analysis
Two review authors independently assessed study eligibility, extracted data and assessed the risk of bias of the included RCTs. Review authors checked the data for accuracy, and assessed the quality of the evidence using the GRADE approach.
Main results
We identified six RCTs (707 women), eligible for inclusion in this updated review, however, three RCTs had mixed populations (that is, they included pregnant women with gestational diabetes) and did not report data separately for the relevant subset of women for this review. Therefore we have only included outcome data from three RCTs; data were available for 241 women and their infants. The three RCTs all compared an oral anti-diabetic agent (metformin) with insulin. The women in the RCTs that contributed data had type 2 diabetes diagnosed before or during their pregnancy. Overall, the RCTs were judged to be at varying risk of bias. We assessed the quality of the evidence for selected important outcomes using GRADE; the evidence was low- or very low-quality, due to downgrading because of design limitations (risk of bias) and imprecise effect estimates (for many outcomes only one or two RCTs contributed data).
For our primary outcomes there was no clear difference between metformin and insulin groups for pre-eclampsia (risk ratio (RR) 0.63, 95% confidence interval (CI) 0.33 to 1.20; RCTs = 2; participants = 227; very low-quality evidence) although in one RCT women receiving metformin were less likely to have pregnancy-induced hypertension (RR 0.58, 95% CI 0.37 to 0.91; RCTs = 1; participants = 206; low-quality evidence). Women receiving metformin were less likely to have a caesarean section compared with those receiving insulin (RR 0.73, 95% CI 0.61 to 0.88; RCTs = 3; participants = 241; low-quality evidence). In one RCT there was no clear difference between groups for large-for-gestational-age infants (RR 1.12, 95% CI 0.73 to 1.72; RCTs = 1; participants = 206; very low-quality evidence). There were no perinatal deaths in two RCTs (very low-quality evidence). Neonatal mortality or morbidity composite outcome and childhood/adulthood neurosensory disability were not reported.
For other secondary outcomes we assessed using GRADE, there were no clear differences between metformin and insulin groups for induction of labour (RR 1.42, 95% CI 0.62 to 3.28; RCTs = 2; participants = 35; very low-quality evidence), though infant hypoglycaemia was reduced in the metformin group (RR 0.34, 95% CI 0.18 to 0.62; RCTs = 3; infants = 241; very low-quality evidence). Perineal trauma, maternal postnatal depression and postnatal weight retention, and childhood/adulthood adiposity and diabetes were not reported.
Authors' conclusions
There are insufficient RCT data to evaluate the use of oral anti-diabetic agents in women with established diabetes, impaired glucose tolerance or previous gestational diabetes who are planning a pregnancy, or in pregnant women with pre-existing diabetes. Low to very low-quality evidence suggests possible reductions in pregnancy-induced hypertension, caesarean section birth and neonatal hypoglycaemia with metformin compared with insulin for women with type 2 diabetes diagnosed before or during their pregnancy, and no clear differences in pre-eclampsia, induction of labour and babies that are large-for-gestational age. Further high-quality RCTs that compare any combination of oral anti-diabetic agent, insulin and dietary and lifestyle advice for these women are needed. Future RCTs could be powered to evaluate effects on short- and long-term clinical outcomes; such RCTs could attempt to collect and report on the standard outcomes suggested in this review. We have identified three ongoing studies and four are awaiting classification. We will consider these when this review is updated. (Author)

20171012-19

Disparities in Care for Publicly Insured Women With Pregestational Diabetes. Easter SR, Rosenthal EW, Morton-Eggleston E, et al (2017), Obstetrics & Gynecology vol 130, no 5, November 2017, pp 946-952

OBJECTIVE: To investigate the association among public health insurance, preconception care, and pregnancy outcomes in pregnant women with pregestational diabetes.
METHODS: This is a retrospective cohort of pregnant women with pregestational type 1 or type 2 diabetes from 2006 to 2011 in Massachusetts-a state with universal insurance coverage since 2006. Women delivering after 24 weeks of gestation and receiving endocrinology and obstetric care in a multidisciplinary clinic were included. Rates of preconception consultation, our primary outcome of interest, were then compared between publicly and privately insured women. We used univariate analysis followed by logistic regression to compare receipt of preconception consultation and other secondary diabetes care measures and pregnancy outcomes according to insurance status.
RESULTS: Fifty-four percent (n=106) of 197 women had public insurance. Publicly insured women were younger

(median age 30.4 compared with 35.3 years, P<.01) with lower rates of college education (12.3% compared with 45.1%, P<.01). Women with public insurance were less likely to receive a preconception consult (5.7% compared with 31.9%, P<.01), had lower rates of hemoglobin A1C less than 6% at the onset of pregnancy (37.2% compared with 58.4%, P=.01), and experienced higher rates of pregnancies affected by congenital anomalies (10.4% compared with 2.2%, P=.02) compared with those with private insurance. In adjusted analyses controlling for educational attainment, maternal age, and body mass index, women with public insurance were less likely to receive a preconception consult (adjusted odds ratio [OR] 0.21, 95% CI 0.08-0.58), although the odds of achieving the target hemoglobin A1C (adjusted OR 0.45, 95% CI 0.20-1.02) and congenital anomaly (adjusted OR 2.23, 95% CI 0.37-13.41) were similar after adjustment. CONCLUSION: Despite continuous access to health insurance, publicly insured women were less likely than privately insured women to receive a preconception consult-an evidence-based intervention known to improve pregnancy outcomes. Improving use of preconception care among publicly insured women with diabetes is critical to reducing disparities in outcomes. (Author)

20170921-1*

Continuous glucose monitoring in pregnant women with type 1 diabetes (CONCEPTT): a multicentre international randomised controlled trial. Feig DS, Donovan LE, Corcoy R, et al (2017), The Lancet vol 390, no 10110, 25 November 2017, pp 2347-2359

Background

Pregnant women with type 1 diabetes are a high-risk population who are recommended to strive for optimal glucose control, but neonatal outcomes attributed to maternal hyperglycaemia remain suboptimal. Our aim was to examine the effectiveness of continuous glucose monitoring (CGM) on maternal glucose control and obstetric and neonatal health outcomes.

Methods

In this multicentre, open-label, randomised controlled trial, we recruited women aged 18-40 years with type 1 diabetes for a minimum of 12 months who were receiving intensive insulin therapy. Participants were pregnant (≤13 weeks and 6 days' gestation) or planning pregnancy from 31 hospitals in Canada, England, Scotland, Spain, Italy, Ireland, and the USA. We ran two trials in parallel for pregnant participants and for participants planning pregnancy. In both trials, participants were randomly assigned to either CGM in addition to capillary glucose monitoring or capillary glucose monitoring alone. Randomisation was stratified by insulin delivery (pump or injections) and baseline glycated haemoglobin (HbA1c). The primary outcome was change in HbA1c from randomisation to 34 weeks' gestation in pregnant women and to 24 weeks or conception in women planning pregnancy, and was assessed in all randomised participants with baseline assessments. Secondary outcomes included obstetric and neonatal health outcomes, assessed with all available data without imputation. This trial is registered with ClinicalTrials.gov, number NCT01788527.

Findings

Between March 25, 2013, and March 22, 2016, we randomly assigned 325 women (215 pregnant, 110 planning pregnancy) to capillary glucose monitoring with CGM (108 pregnant and 53 planning pregnancy) or without (107 pregnant and 57 planning pregnancy). We found a small difference in HbA1c in pregnant women using CGM (mean difference −0·19%; 95% CI −0·34 to −0·03; p=0·0207). Pregnant CGM users spent more time in target (68% vs 61%; p=0·0034) and less time hyperglycaemic (27% vs 32%; p=0·0279) than did pregnant control participants, with comparable severe hypoglycaemia episodes (18 CGM and 21 control) and time spent hypoglycaemic (3% vs 4%; p=0·10). Neonatal health outcomes were significantly improved, with lower incidence of large for gestational age (odds ratio 0·51, 95% CI 0·28 to 0·90; p=0·0210), fewer neonatal intensive care admissions lasting more than 24 h (0·48; 0·26 to 0·86; p=0·0157), fewer incidences of neonatal hypoglycaemia (0·45; 0·22 to 0·89; p=0·0250), and 1-day shorter length of hospital stay (p=0·0091). We found no apparent benefit of CGM in women planning pregnancy. Adverse events occurred in 51 (48%) of CGM participants and 43 (40%) of control participants in the pregnancy trial, and in 12 (27%) of CGM participants and 21 (37%) of control participants in the planning pregnancy trial. Serious adverse events occurred in 13 (6%) participants in the pregnancy trial (eight [7%] CGM, five [5%] control) and in three (3%) participants in the planning pregnancy trial (two [4%] CGM and one [2%] control). The most common adverse events were skin reactions occurring in 49 (48%) of 103 CGM participants and eight (8%) of 104 control participants during pregnancy and in 23 (44%) of 52 CGM participants and five (9%) of 57 control participants in the planning pregnancy trial. The most common serious adverse events were gastrointestinal (nausea and vomiting in four participants during pregnancy and three participants planning pregnancy).

Interpretation

Use of CGM during pregnancy in patients with type 1 diabetes is associated with improved neonatal outcomes, which are likely to be attributed to reduced exposure to maternal hyperglycaemia. CGM should be offered to all pregnant

women with type 1 diabetes using intensive insulin therapy. This study is the first to indicate potential for improvements in non-glycaemic health outcomes from CGM use.

Funding

Juvenile Diabetes Research Foundation, Canadian Clinical Trials Network, and National Institute for Health Research. (Author)

20170919-81*

Increased Neonatal Respiratory Morbidity Associated with Gestational and Pregestational Diabetes: A Retrospective Study. Kawakita T, Bowers K, Hazrati S, et al (2017), American Journal of Perinatology vol 34, no 11, September 2017, pp 1160-1168

Objective To examine the risk of neonatal respiratory morbidity associated with gestational and pregestational diabetes, accounting for the prematurity-associated risk using a propensity score analysis.

Study design In a retrospective study including 222,978 singleton pregnancies, delivering at 240/7 to 416/7 weeks (2002-2008), we calculated a probability to deliver at term (≥37 weeks of gestation). Outcomes were stratified by the probability to deliver at term (>0.8 and ≤0.8). Adjusted odds ratios (aORs) with 95% confidence intervals (95% CIs) were calculated.

Results Gestational and pregestational diabetes complicated 5.1 and 1.5% of pregnancies, respectively, and were associated with increased risks of neonatal respiratory morbidity compared with women without diabetes regardless of probability to deliver at term. However, these risks tended to be higher with a higher probability to deliver at term: respiratory distress syndrome (aOR: 1.5; 95% CI: 1.3-1.7 and aOR: 3.1; 95% CI: 2.6-3.7); transient tachypnea of newborn (aOR: 1.5; 95% CI: 1.3-1.6 and aOR: 2.2; 95% CI: 1.9-2.6); and apnea (aOR: 1.5; 95% CI: 1.2-1.7 and aOR: 3.2; 95% CI: 2.6-3.9, for gestational and pregestational at term, respectively).

Conclusion Diabetes was associated with increased risk of neonatal respiratory morbidity beyond what can be attributed to prematurity. Neonatal respiratory morbidities were increased with pregestational diabetes compared with gestational diabetes. (Author)

20170907-82*

Management of diabetic ketoacidosis in pregnancy. Mohan M, Baagar KAM, Lindow S (2017), The Obstetrician and Gynaecologist vol 19, no 1, January 2017, pp 55-62

Key content:

Diabetic ketoacidosis in pregnancy (DKP) is a serious complication that poses several challenges with respect to diagnosis, management and prevention.

This article covers the precipitating factors for DKP in pregnancy as well as diagnosis, management and prevention of the complication.

Learning objectives:

To manage the acute crisis of DKP.

To increase awareness of DKP.

To reduce the perinatal morbidity and mortality associated with DKP.

Ethical issues:

Despite adequate knowledge and care of patients with diabetes, is DKA a major cause for concern?

To increase awareness, and reduce the perinatal morbidity and mortality associated with DKP.

(32 references) (Author)

20170906-78*

Fetal thymus size in pregnant women with diabetic diseases. Dornemann R, Koch R, Mollmann U, et al (2017), Journal of Perinatal Medicine vol 45, no 5, July 2017, p 595

Aim:

The aim of our study was to assess fetal thymus size in diabetic pregnancies compared with normal pregnancies.

Methods:

Sonographic fetal thymus size was retrospectively assessed in 161 pregnancies with maternal diabetes and in 161 uncomplicated pregnancies matched by gestational age. The anteroposterior thymic and the intrathoracic mediastinal diameter were measured and the quotient was calculated [thymic-thoracic ratio (TT-ratio)]. In addition, we defined the quotient of the anteroposterior thymic diameter and the head circumference as thymus-head ratio (TH-ratio). The maternal diabetes cases were subdivided into three groups: (1) diet-controlled gestational diabetes, (2) insulin-dependent gestational diabetes and (3) preexisting maternal diabetes.

Results:

TT-ratio and TH-ratio were smaller in pregnancies with maternal diabetes (P<0.001 and P<0.001, respectively). In all three maternal diabetes subgroups, the TT-ratio and the TH-ratio were lower compared with the control group (P<0.001 for each group).
Conclusions:
Reduced fetal thymus size seems to be associated with diabetic pregnancy. We introduce fetal thymus size as a new potential prognostic parameter for maternal diabetes. (24 references) (Author)

20170905-81*

Decidual arteriolopathy with or without associated hypertension modifies the underlying histomorphology in placentas from diabetic mothers. Stanek J (2017), Journal of Obstetrics and Gynaecology Research vol 43, no 5, May 2017, pp 839-847

Aim
The aim of this study was to retrospectively document the impact of hypertensive conditions in pregnancy and decidual arteriolopathy on the patterns of placental injury in maternal diabetes mellitus (MDM).
Methods
Among all 5248 > 20 weeks' placentas, the frequencies of 19 selected clinical and 24 placental phenotypes were compared between 287 MDM placentas and 4961 remaining placentas (control group [CG]) before and after further exclusion of 85 and 611 patients with hypertensive conditions (gestational hypertension, pre-eclampsia, chronic hypertension).
Results
Cesarean section rate, heavy placentas, decidual arteriolopathy, microscopic chorionic pseudocysts, and chorangiosis were more common in MDM than in the CG both before and after exclusion of hypertensive conditions. The frequencies of preuterine patterns of chronic hypoxic placental injury and plasma cell deciduitis became statistically significant only after exclusion of hypertensive conditions.
Conclusion
Hypertensive conditions of pregnancy may obscure the underlying preuterine placental hypoxic pattern in MDM placentas. Even in normotensive patients, decidual arteriolopathy, and shallow placental implantation significantly impact placental histomorphology in MDM. (Author)

20170901-4*

Mortality and morbidity in offspring of mothers with diabetes compared with a population group: a Danish cohort study with 8-35 years of follow-up. Nielsen GL, Welinder L, Berg Johansen M (2017), Diabetic Medicine vol 34, no 7, July 2017, pp 938-945

Aims
To assess mortality and morbidity in the offspring of mothers with diabetes compared with a control cohort of offspring of mothers without diabetes.
Methods
The mortality rate, percentage of days admitted to hospital, diagnostic categories and incidence of diabetes mellitus among 691 offspring of mothers with diabetes were compared with a control group of 168 831 offspring not exposed to maternal diabetes. Offspring of mothers with diabetes were identified from the North Jutland Pregnancy database (521 Type 1; 34 Type 2; 136 gestational diabetes) born between 1976 and 2003. Outcome data were retrieved from the National Registry of Patients with follow-up until 31 December 2011. In a subgroup with the longest hospital stay we reviewed hospital records for clinical details until 2016.
Results
Mortality was 1.45% in the diabetes group compared with 1.36% in the control group. In the first 2 years, offspring exposed to diabetes spent significantly more time in hospital than the control offspring, but this difference faded to an insignificant difference of 0.04% of time spent in hospital between age 2 and 8 years. The offspring of mothers with diabetes had a sixfold increased risk of developing diabetes mellitus.
Conclusions
The offspring of mothers with and without diabetes had almost identical mortality. The increased morbidity was restricted to the first 2 years of life, and was primarily attributable to a few individuals with very severe but probably non-diabetes-related disease burden. The large majority of offspring of mothers with diabetes experienced health conditions similar to those not exposed to diabetes. (Author)

20170830-93*

Immediate postpartum glycemic control and risk of surgical site infection. Johnston RC, Gabby L, Tith T, et al (2017), Journal of Maternal-Fetal and Neonatal Medicine vol 30, no 3, 2017, pp 267-271

Objective: Nearly one-third of all births in the United States in 2013 were by cesarean delivery, with 6% complicated by diabetes. The purpose of this study was to correlate immediate postoperative hyperglycemia with wound morbidity in diabetic women who underwent cesarean delivery.

Methods: This retrospective case-control study was performed at UC Irvine Health and Miller Women's & Children's Hospital Long Beach between 2009 and 2015. Subjects included women with at least Class B diabetes mellitus who underwent cesarean birth. Fasting and postprandial blood glucose levels (BGL) were recorded daily during postoperative days one through four. Outcomes included abscess formation, cellulitis, wound separation, fascial dehiscence, hospital readmission, secondary wound closure, antibiotic treatment, and a composite of the above.

Results: Outcomes were evaluated for 176 subjects. Twenty-nine experienced wound complications. Women readmitted for wound complications and those with composite morbidity experienced significantly higher mean fasting BGL, however, BGL during the immediate postoperative setting were not predictive of wound morbidity.

Conclusion: In our cohort of diabetic women who underwent cesarean delivery, immediate postoperative hyperglycemia was not associated with wound morbidity. (26 references) (Author)

20170830-7*

Prenatal care in a specialized diabetes in pregnancy program improves compliance with postpartum testing in GDM women. Huynh T, Ghaffari N, Bastek J, et al (2017), Journal of Maternal-Fetal and Neonatal Medicine vol 30, no 9, 2017, pp 1075-1079

Objective: To evaluate whether prenatal care in a specialized diabetes in pregnancy program (DMC) improves compliance with completion of the 2-h 75 g oral glucose tolerance test (2HrOGTT) in GDM women.

Methods: A retrospective cohort study of GDM women delivering in a university health system between January 2011 and March 2014 was performed. Women were divided into two groups: those receiving care in prenatal clinics over an 18-month period prior to the establishment of the diabetes in pregnancy clinic (pre-DMC) and those receiving prenatal care in a specialized diabetes in pregnancy clinic (post-DMC). The primary outcome was completion of the 2HrOGTT postpartum. Clinical characteristics associated with 2HrOGTT completion were evaluated. Time trend analysis was performed to evaluate month to month variation in 2HrOGTT compliance for secular trends.

Results: A total of 292 women were analyzed, 147 post-DMC and 118 pre-DMC. The 2HrOGTT was ordered more frequently in the post-DMC compared to pre-DMC (90.0 versus 53.0%, $p < 0.0001$). Rates of completion of the 2HrOGTT were 49.2% post-DMC and 25.0% pre-DMC, $p = 0.007$. After adjusting for potential confounders, women who received prenatal care post-DMC were 2.98 times more likely to complete the 2HrOGTT compared to those receiving care pre-DMC (OR 2.98 [1.34, 6.62], $p = 0.007$).

Conclusions: Providers were 5.9 times more likely to order the recommended testing for GDM women who attended the postpartum visit in the post-DMC period. GDM women who receive prenatal care in a specialized diabetes in pregnancy program are more likely to complete the 2HrOGTT in the postpartum period. (28 references) (Author)

20170830-26*

Glycemic control, compliance, and satisfaction for diabetic gravidas in centering group care. Parikh LI, Jelin AC, Iqbal SN, et al (2017), Journal of Maternal-Fetal and Neonatal Medicine vol 30, no 10, 2017, pp 1221-1226

Purpose: To determine if diabetic gravidas enrolled in Centering® group care have improved glycemic control compared to those attending standard prenatal care. To compare compliance and patient satisfaction between the groups.

Materials and methods: We conducted a prospective cohort study of diabetics enrolled in centering group care from October 2013 to December 2015. Glycemic control, compliance and patient satisfaction (five-point Likert scale) were evaluated. Student's t-test, Chi-Square and mixed effects model were used to compare outcomes.

Results: We compared 20 patients in centering to 28 standard prenatal care controls. Mean fasting blood sugar was lower with centering group care (91.0 versus 105.5 mg/dL, $p = 0.017$). There was no difference in change in fasting blood sugar over time between the two groups ($p = 0.458$). The percentage of time patients brought their blood glucose logs did not differ between the centering group and standard prenatal care (70.7 versus 73.9%, $p = 0.973$). Women in centering group care had better patient satisfaction scores for 'ability to be seen by a physician' (5 versus 4, $p = 0.041$) and 'time in waiting room' (5 versus 4, $p = 0.001$).

Conclusion: Fasting blood sugar was lower for patients in centering group care. Change in blood sugar over time did not differ between groups. Diabetic gravidas enrolled in centering group care report improved patient satisfaction. (23 references) (Author)

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20170824-18*

Maturity onset diabetes of the young in pregnancy: diagnosis, management and prognosis of MODY in pregnancy. Rees K, Reed A, Banerjee A, et al (2017), Obstetrics, Gynaecology and Reproductive Medicine vol 27, no 5, May 2017, pp 144-147

Current management guidelines of diabetes within pregnancy do not differentiate between the underlying physiological dysfunctions that lead to dysglycaemia and provide generic guidance. Specific forms of diabetes in pregnancy require targeted treatment. Maturity onset diabetes of the young (MODY), caused by single gene mutations, is the most common identifiable variant and presents a significant challenge if the mutation is possessed by mother and not inherited by the fetus. Greater awareness of MODY and its subtypes will allow earlier detection and a better prognosis. Although genetic testing is rare, analysis by clinical phenotyping can provide a sensitive and cost effective solution. (5 references) (Author)

20170823-73

Breastfeeding and diabetes: a challenging but rewarding partnership. Macdonald G (2017), Essence [Magazine of the Australian Breastfeeding Association] vol 53, no 2, June 2017, pp 10-13

An overview of diabetes and its different types, including gestational diabetes mellitus, which is commonly caused by hormones from the placenta blocking the mother's insulin. Discusses management of diabetes during pregnancy, labour, and when breastfeeding, which can be emotionally exhausting and stressful, potentially leading to complications. Comments on the benefits of breastfeeding for mothers with diabetes or who have had gestational diabetes, the breastfeeding problems that can occur, the diabetic risk of not breastfeeding, and how to help women with feeding. (23 references) (KRB)

20170815-140*

Experiences of Parish Nurses in Providing Diabetes Education and Preconception Counseling to Women With Diabetes. Devido JA, Doswell WM, Braxter BJ, et al (2017), JOGNN: Journal of Obstetric, Gynecologic and Neonatal Nursing vol 46, no 2, March-April 2017, pp 248-257

Objective

To explore the role and experiences of the parish nurse in providing diabetes education and preconception counseling to women with diabetes.

Design

Mixed-methods concurrent embedded design.

Setting

Focus groups of community-based parish nurses accessed from a regional database (Pennsylvania, Florida, Ohio, New York, Arizona, and Minnesota).

Participants

Forty-eight parish nurses recruited from the Parish Nurse and Health Ministry Program database in Western Pennsylvania.

Methods

The primary method was focus groups using face-to-face, teleconference, and videoconferencing formats. A secondary method used a quantitative descriptive design with three self-report measures (demographic, preconception counseling self-efficacy, and preconception counseling knowledge). Qualitative content analysis techniques were conducted and combined with descriptive analysis.

Results

Forty-eight parish nurses participated in 1 of 11 focus groups. Eight qualitative themes emerged: Awareness, Experience, Formal Training, Usefulness, Willingness, Confidence, 'Wise Women,'and Preconception Counseling Tool for Patients. Participants provided recommendations for training and resources to increase their knowledge and skills. Parish nurses' knowledge scores were low (mean = 66%, range = 40%-100%) with only moderate levels of self-efficacy (mean = 99, range = 27-164). Self-efficacy had a significantly positive association with knowledge ($r = .29$, $p = .05$).

Conclusion

Quantitative results were consistent with participants' qualitative statements. Parish nurses were unaware of preconception counseling and lacked knowledge and teaching self-efficacy as it related to preconception counseling and diabetes education. Understanding parish nurses' experiences with women with diabetes and identifying their needs to provide education and preconception counseling will help tailor training interventions that could affect maternal and fetal outcomes. (25 references) (Author)

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20170809-70*

The importance of declining insulin requirements during pregnancy in patients with pre-gestational gestational diabetes mellitus. Ram M, Feinmesser L, Shinar S, et al (2017), European Journal of Obstetrics & Gynecology and Reproductive Biology vol 215, August 2017, pp 148-152

Objective: In patients with pre-gestational and gestational diabetes mellitus (GDM), insulin requirements often increase during the third trimester of pregnancy in order to maintain proper glycemic control. However, a fraction of patients demonstrate a significant decrease in insulin requirements in late gestation. We aimed to evaluate the clinical significance of decreasing insulin requirements in patients with pre-gestational diabetes and GDM with respect to fetal wellbeing and pregnancy outcome.

Study design: We performed a retrospective cohort study in a single referral center for gestational diabetes between 1/2010 and 12/2014. Healthy pregnant women with pre-gestational diabetes and GDMA2 and a decrease of at least 30% in insulin requirements over a period of two weeks during the third trimester (group A) were compared to women with stable or increasing insulin requirements (group B). The primary outcome was a composite of situations associated with feto-placental dysfunction (fetal growth restriction, oligohydramnios and cesarean section due to category 2-3 monitor). Secondary outcomes were maternal oral glucose tolerance test (OGTT) results 6 weeks postpartum, neonatal intensive care unit (NICU) admission rates, Apgar scores ≤7 at 5min, arterial blood pH≤7.1, macrosomia, neonatal hypoglycemia and a composite adverse neonatal outcomes (defined as one or more of the following: respiratory morbidity, cerebral morbidity, phototherapy, need for blood transfusion, necrotizing enterocolitis or death).

Results: Group A consisted of 101 women and group B - of 203 women. There were no differences between the groups in demographic characteristics or diagnostic characteristics of diabetes. The frequency of conditions related to feto-placental dysfunction did not differ between the groups (7.9% vs. 8.4%, p=0.61). Secondary outcome measures also did not differ between the groups, regardless of insulin requirements.

Conclusion: Decreasing insulin requirements during the third trimester are not associated with adverse perinatal outcome related to placental dysfunction. (Author)

20170809-4*

Association Between Glycemic Variability, HbA1c, and Large-for-Gestational-Age Neonates in Women With Type 1 Diabetes. McGrath RT, Glastras SJ, Seeho SK, et al (2017), Diabetes Care vol 40, no 8, August 2017, e98-e100

Summary of a study looking in to the association between women with type 1 diabetes, and fetal exposure to hyperglycemia in infants born large for gestational age. (5 references) (AB)

20170802-9*

Care of women with diabetes before, during and after pregnancy: time for a new approach?. Egan AM, Carmody L, Kirwan B, et al (2017), Diabetic Medicine vol 34, no 6, June 2017, pp 846-850

Aims

This study assesses the impact of pregnancy and pre-pregnancy care on longer-term treatment goals in women with diabetes.

Methods

This retrospective study included women with Type 1 (n = 247) and Type 2 diabetes (n = 137) who were evaluated before, during and after pregnancy.

Results

Among women with Type 1 diabetes, average HbA1c at 12 months post-partum was similar to the preconception level [63 vs. 64 mmol/mol (7.9% vs. 8.0%), P = 0.60]. This was also the case for women with Type 2 diabetes [52 vs. 52 mmol/mol (6.9% vs. 6.9%), P = 0.79]. At 12 months post-partum, there was no improvement in other measures of diabetes control and one in five women are lost to follow-up from clinical care. In total, 44.9% of women with Type 1 diabetes and 27.7% of those with Type 2 diabetes attended pre-pregnancy care. Attendees maintained superior glycaemic control throughout the study and were more likely to be receiving specialist care post-partum.

Conclusions

These findings identify a need to change our approach to the reproductive care of women with diabetes. In particular, efforts should be made to ensure all women have access to and attend pre-pregnancy care, and barriers to engagement with post-partum care should be addressed. (Author)

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20170712-25*

The fetal cerebro-placental ratio in diabetic pregnancies is influenced more by the umbilical artery rather than middle cerebral artery pulsatility index. Gibbons A, Flatley C, Kumar S, et al (2017), European Journal of Obstetrics & Gynecology and Reproductive Biology vol 211, April 2017, pp 56-61

Objective

This study aimed to assess the relationship between the cerebro-placental ratio (CPR) and intrapartum and perinatal outcomes in pregnancies complicated by pre-existing insulin dependent diabetes (pT1DM) mellitus, pre-existing non-insulin dependent diabetes mellitus (pT2DM) and gestational diabetes mellitus (GDM).

Study design

This was a retrospective cohort study of 1281 women with diabetes mellitus birthing at the Mater Mothers' Hospital in Brisbane between 2007 and 2015. The CPR in non-anomalous singleton fetuses was measured between 34 + 0 and 36 + 6 weeks gestation and compared between types of DM treatment groups and correlated with intrapartum and perinatal outcomes.

Results

Of the study cohort, 9.7% (124/1281) had pT1DM, 5.3% (68/1281) had pT2DM and 85.0% (1089/1281) had GDM. Of women with pT2DM and GDM, 61.8% (42/68) and 28.9% (315/1089) respectively, required insulin during pregnancy. Women with pT1DM had an increased odds of having a CPR <5th centile (OR 3.73, 95%CI: 1.90-6.96, p = 0.0001) or a CPR <10th centile (OR 3.01, 95% CI: 1.80-4.91, p < 0.0001) respectively. The odds of a UA PI >90th centile (OR 2.69, 95% CI: 1.60-4.39, p = 0.0001) was higher in the pT1DM cohort. There was however no significant difference in the mean MCA PI between the three groups. Stratification by CPR centiles (<10th centile vs. ≥10th centile) demonstrated a lower birth weight in the CPR <10th centile cohort for all DM categories. The proportion of neonates with birth weights <10th centile were higher in the CPR <10th centile cohort with the GDM cohort having an odds ratio of 8.28 (95% CI 4.22-16.13, p < 0.0001) of this complication. The CPR <10th centile cohort also had a greater proportion of adverse composite neonatal outcome regardless of type of DM.

Conclusions

Regardless of the type of DM, a low CPR was associated with poorer neonatal outcomes. Women with pT1DM also had the highest mean UA PI and lowest mean CPR despite no difference in the mean MCA PI between the three groups. (24 references) (Author)

20170629-5*

Neonatal outcomes following planned preterm delivery in diabetic mothers. Cope EV, Sultana N, Masson EA, et al (2017), Journal of Neonatal-Perinatal Medicine vol 10, no 1, pp 25-31

OBJECTIVE: Women with diabetes may need elective preterm delivery due to pregnancy or diabetes related complications. The aim of this study was to describe the neonatal outcomes arising from elective preterm delivery in diabetic women. METHOD: Suitable patients were identified by the obstetric team at Hull Royal Infirmary Women and Children's Hospital and data was extracted from their case notes. 45 diabetic women with planned preterm delivery were identified within a set time frame, resulting in 48 babies. RESULTS: Of the 48 babies born, 47 survived. 36 out of 48 were delivered via caesarean section. Gestational ages ranged from 29+3 to 36+6 weeks, and 24 out of 48 (50%) had a birth weight greater than the 90th centile for gestational age. 34 out of the 48 babies experienced some form of neonatal complication and were admitted to the neonatal unit. The median duration of stay in the neonatal unit was 7 days. 14 of the surviving neonates suffered from respiratory distress, although only 4 required surfactant therapy to regain respiratory function. However, the incidence of serious neonatal complications in those born after 34 weeks was shown to be low. CONCLUSIONS: Elective preterm delivery after 34 weeks had little effect on overall neonatal outcome. Therefore it could be proposed that elective preterm delivery after 34 weeks gestation may be an acceptable option in diabetic women if there are maternal or obstetric complications. (Author)

20170629-29*

Maternal BMI and diabetes in pregnancy: Investigating variations between ethnic groups using routine maternity data from London, UK. Nishikawa E, Oakley L, Seed PT, et al (2017), PLoS ONE vol 12, no 6, 22 June 2017, e0179332

Objective

To investigate the ethnicity-specific association between body mass index (BMI) and diabetes in pregnancy, with a focus on the appropriateness of using BMI cut-offs to identify pregnant women at risk of diabetes.

Study design

Analysis of routinely-collected data from a maternity unit in London, UK. Data were available on 53 264 women delivering between 2004 and 2012. Logistic regression was used to explore the association between diabetes in

pregnancy and BMI among women of different ethnicities, and adjusted probability estimates were used to derive risk equivalent cut-offs. ROC curve analysis was used to assess the performance of BMI as a predictor of diabetes in pregnancy.
Results
The prevalence of diabetes in pregnancy was 2.3% overall; highest in South and East Asian women (4.6% and 3.7%). In adjusted analysis, BMI category was strongly associated with diabetes in all ethnic groups. Modelled as a continuous variable with a quadratic term, BMI was an acceptable predictor of diabetes according to ROC curve analysis. Applying a BMI cut-off of 30 kg/m2 would identify just over half of Black women with diabetes in pregnancy, a third of White (32%) and South Asian (35%) women, but only 13% of East Asian women. The 'risk equivalent' (comparable to 30 kg/m2 in White women) threshold for South Asian and East Asian women was approximately 21 kg/m2, and 27.5 kg/m2 for Black women.
Conclusions
This study suggests that current BMI thresholds are likely to be ineffective for diabetes screening in South and East Asian women, as many cases of diabetes will occur at low BMI levels. Our results suggest that East Asian women appear to face a similarly high risk of diabetes to South Asian women. Current UK guidelines recommend diabetes screening should be offered to all pregnant South Asian women; extending this recommendation to include women of East Asian ethnicity may be appropriate. (25 references) (Author)
Full URL: http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0179332

20170626-11*

Pregnancy outcome in women with cystic fibrosis-related diabetes. Reynaud Q, Poupon-Bourdy S, Rabilloud M, et al (2017), Acta Obstetricia et Gynecologica Scandinavica vol 96, no 10, October 2017, pp 1223-1227
Introduction
With increasing life expectancy, more women with cystic fibrosis and diabetes mellitus become pregnant. We investigated how pre-gestational diabetes (cystic fibrosis-related diabetes) influenced pregnancy outcome and the clinical status of these women.
Material and methods
We analyzed all pregnancies reported to the French cystic fibrosis registry between 2001 and 2012, and compared forced expiratory volume (FEV1) and body mass index before and after pregnancy in women with and without pre-gestational diabetes having a first delivery.
Results
A total 249 women delivered 314 infants. Among these, 189 women had a first delivery and 29 of these had pre-gestational diabetes. There was a trend towards a higher rate of assisted conception among diabetic women (53.8%) than non-diabetic women (34.5%, p = 0.06), and the rate of cesarean section was significantly higher in diabetic women (48% vs. 21.4%, p = 0.005). The rate of preterm birth and mean infant birthweight did not differ significantly between diabetic and non-diabetic women. Forced expiratory volume before pregnancy was significantly lower in the diabetic group. The decline in forced expiratory volume and body mass index following pregnancy did not differ between the women with and those without pre-gestational diabetes.
Conclusion
Pre-gestational diabetes in women with cystic fibrosis is associated with a higher rate of cesarean section but does not seem to have a clinically significant impact on fetal growth or preterm delivery. The changes in maternal pulmonary and nutritional status following pregnancy in women with cystic fibrosis were not influenced by pre-gestational diabetes. (Author)

20170623-19

Impact of type 2 diabetes, obesity and glycaemic control on pregnancy outcomes. Abell SK, Boyle JA, de Courten B, et al (2017), Australian and New Zealand Journal of Obstetrics and Gynaecology (ANZJOG) vol 57, no 3, June 2017, pp 308-314
Background
There are no contemporary cohorts examining pregnancy outcomes in women with type 2 diabetes (T2D) in Australia.
Aim
To compare pregnancy outcomes in women with and without T2D, and assess effects of body mass index (BMI) and glycaemic control on outcomes.
Materials and methods
An historical cohort study was conducted of all singleton births > 20 weeks gestation at a specialist maternity network in Australia from 2010 to 2013. Data were extracted from the Birthing Outcomes System database. Multivariable logistic regression analysis was used to examine associations between presence of T2D and pregnancy outcomes.

Results

Outcomes for 138 pregnancies with T2D and 27 075 pregnancies in women without diabetes were compared (type 1 diabetes and gestational diabetes excluded). Women with T2D were older and more overweight compared to women without diabetes (P < 0.01). Their babies were born earlier (P < 0.01) with increased risk of large for gestational age (adjusted odds ratio 2.13 (95% CI 1.37-3.32)), hypoglycaemia (4.90 (2.79-8.61)), jaundice (2.58 (1.61-4.13)) and shoulder dystocia (2.72 (1.09-6.78)), but not congenital malformations or perinatal death. Women with T2D had a higher risk of induction (4.03 (2.71-5.99)), caesarean section (2.10 (1.44-3.04)), preterm birth (2.74 (1.78-4.24)) and pre-eclampsia (2.75 (1.49-5.10)). An HbA1c ≥ 6.0% (42 mmol/mol) was associated with increased preterm birth, special care nursery admission, hypoglycaemia and jaundice.

Conclusions

Despite availability of preconception care, good glycaemic control and specialist management, T2D remains associated with increased adverse obstetric and neonatal outcomes. Further research to examine predictors of adverse outcomes may assist in targeted antenatal surveillance and management. (26 references) (Author)

20170612-9*

Vitamin D insufficiency, preterm delivery and preeclampsia in women with type 1 diabetes - an observational study.

Vestgaard M, Secher AL, Ringholm L, et al (2017), Acta Obstetricia et Gynecologica Scandinavica vol 96, no 10, October 2017, pp 1197-1204

Introduction

The aim of this study was to evaluate whether vitamin D insufficiency is associated with preterm delivery and preeclampsia in women with type 1 diabetes.

Material and methods

An observational study of 198 pregnant women with type 1 diabetes. 25-Hydroxy-Vitamin D and HbA1c were measured in blood samples in early (median 8 weeks, range 5-14) and late (34 weeks, range 32-36) pregnancy. Kidney involvement (microalbuminuria or nephropathy) at inclusion, smoking status at inclusion, preterm delivery (<37 weeks) and preeclampsia (blood pressure ≥140/90 mmHg and proteinuria) were registered. Vitamin D supplementation of 10 μg daily was routinely recommended.

Results

Thirty-nine (20%) of the 198 women delivered preterm and 16 (8%) developed preeclampsia. Vitamin D insufficiency (<50 nmol/L) was present in 68 women (34%) in early pregnancy and in 73 women (37%) in late pregnancy. Preterm delivery occurred more frequently in women with vitamin D insufficiency in late pregnancy (27% vs. 15%, crude odds ratio 2.1; 95% confidence interval 1.0-4.3, p = 0.04). After adjustment for preexisting kidney involvement, HbA1c in late pregnancy and smoking the association became nonsignificant (adjusted odds ratio 1.8; 95% confidence interval 0.8-3.7). Preeclampsia developed in 11% of women with vitamin D insufficiency vs. 6% of the remaining women (crude odds ratio 1.8; 95% confidence interval 0.9-4.1, p = 0.25).

Conclusion

In women with type 1 diabetes, preterm delivery was twice as frequent in women with vitamin D insufficiency in late pregnancy in crude analysis, but in this small study, low vitamin D was not independently associated with preterm birth or preeclampsia. (Author)

20170612-2*

Techniques of monitoring blood glucose during pregnancy for women with pre-existing diabetes (Cochrane Review). [Not current version]. Moy FM, Ray A, Buckley BS, et al (2017), The Cochrane Database of Systematic Reviews Issue 3, 2017

BACKGROUND:

Self-monitoring of blood glucose (SMBG) is recommended as a key component of the management plan for diabetes therapy during pregnancy. No existing systematic reviews consider the benefits/effectiveness of various techniques of blood glucose monitoring on maternal and infant outcomes among pregnant women with pre-existing diabetes. The effectiveness of the various monitoring techniques is unclear.

OBJECTIVES:

To compare techniques of blood glucose monitoring and their impact on maternal and infant outcomes among pregnant women with pre-existing diabetes.

SEARCH METHODS:

We searched the Cochrane Pregnancy and Childbirth Group's Trials Register (30 November 2016), searched reference lists of retrieved studies and contacted trial authors.

SELECTION CRITERIA:

Randomised controlled trials (RCTs) and quasi-RCTs comparing techniques of blood glucose monitoring including

SMBG, continuous glucose monitoring (CGM) or clinic monitoring among pregnant women with pre-existing diabetes mellitus (type 1 or type 2). Trials investigating timing and frequency of monitoring were also included. RCTs using a cluster-randomised design were eligible for inclusion but none were identified.
DATA COLLECTION AND ANALYSIS:
Two review authors independently assessed study eligibility, extracted data and assessed the risk of bias of included studies. Data were checked for accuracy. The quality of the evidence was assessed using the GRADE approach.
MAIN RESULTS:
This review update includes at total of 10 trials (538) women (468 women with type 1 diabetes and 70 women with type 2 diabetes). The trials took place in Europe and the USA. Five of the 10 included studies were at moderate risk of bias, four studies were at low to moderate risk of bias, and one study was at high risk of bias. The trials are too small to show differences in important outcomes such as macrosomia, preterm birth, miscarriage or death of baby. Almost all the reported GRADE outcomes were assessed as being very low-quality evidence. This was due to design limitations in the studies, wide confidence intervals, small sample sizes, and few events. In addition, there was high heterogeneity for some outcomes.Various methods of glucose monitoring were compared in the trials. Neither pooled analyses nor individual trial analyses showed any clear advantages of one monitoring technique over another for primary and secondary outcomes. Many important outcomes were not reported.1. Self-monitoring versus standard care (two studies, 43 women): there was no clear difference for caesarean section (risk ratio (RR) 0.78, 95% confidence interval (CI) 0.40 to 1.49; one study, 28 women) or glycaemic control (both very low-quality), and not enough evidence to assess perinatal mortality and neonatal mortality and morbidity composite. Hypertensive disorders of pregnancy, large-for-gestational age, neurosensory disability, and preterm birth were not reported in either study.2. Self-monitoring versus hospitalisation (one study, 100 women): there was no clear difference for hypertensive disorders of pregnancy (pre-eclampsia and hypertension) (RR 4.26, 95% CI 0.52 to 35.16; very low-quality: RR 0.43, 95% CI 0.08 to 2.22; very low-quality). There was no clear difference in caesarean section or preterm birth less than 37 weeks' gestation (both very low quality), and the sample size was too small to assess perinatal mortality (very low-quality). Large-for-gestational age, mortality or morbidity composite, neurosensory disability and preterm birth less than 34 weeks were not reported.3. Pre-prandial versus post-prandial glucose monitoring (one study, 61 women): there was no clear difference between groups for caesarean section (RR 1.45, 95% CI 0.92 to 2.28; very low-quality), large-for-gestational age (RR 1.16, 95% CI 0.73 to 1.85; very low-quality) or glycaemic control (very low-quality). The results for hypertensive disorders of pregnancy: pre-eclampsia and perinatal mortality are not meaningful because these outcomes were too rare to show differences in a small sample (all very low-quality). The study did not report the outcomes mortality or morbidity composite, neurosensory disability or preterm birth.4. Automated telemedicine monitoring versus conventional system (three studies, 84 women): there was no clear difference for caesarean section (RR 0.96, 95% CI 0.62 to 1.48; one study, 32 women; very low-quality), and mortality or morbidity composite in the one study that reported these outcomes. There were no clear differences for glycaemic control (very low-quality). No studies reported hypertensive disorders of pregnancy, large-for-gestational age, perinatal mortality (stillbirth and neonatal mortality), neurosensory disability or preterm birth.5.CGM versus intermittent monitoring (two studies, 225 women): there was no clear difference for pre-eclampsia (RR 1.37, 95% CI 0.52 to 3.59; low-quality), caesarean section (average RR 1.00, 95% CI 0.65 to 1.54; I^2 = 62%; very low-quality) and large-for-gestational age (average RR 0.89, 95% CI 0.41 to 1.92; I^2 = 82%; very low-quality). Glycaemic control indicated by mean maternal HbA1c was lower for women in the continuous monitoring group (mean difference (MD) -0.60 %, 95% CI -0.91 to -0.29; one study, 71 women; moderate-quality). There was not enough evidence to assess perinatal mortality and there were no clear differences for preterm birth less than 37 weeks' gestation (low-quality). Mortality or morbidity composite, neurosensory disability and preterm birth less than 34 weeks were not reported.6. Constant CGM versus intermittent CGM (one study, 25 women): there was no clear difference between groups for caesarean section (RR 0.77, 95% CI 0.33 to 1.79; very low-quality), glycaemic control (mean blood glucose in the 3rd trimester) (MD -0.14 mmol/L, 95% CI -2.00 to 1.72; very low-quality) or preterm birth less than 37 weeks' gestation (RR 1.08, 95% CI 0.08 to 15.46; very low-quality). Other primary (hypertensive disorders of pregnancy, large-for-gestational age, perinatal mortality (stillbirth and neonatal mortality), mortality or morbidity composite, and neurosensory disability) or GRADE outcomes (preterm birth less than 34 weeks' gestation) were not reported.
AUTHORS' CONCLUSIONS:
This review found no evidence that any glucose monitoring technique is superior to any other technique among pregnant women with pre-existing type 1 or type 2 diabetes. The evidence base for the effectiveness of monitoring techniques is weak and additional evidence from large well-designed randomised trials is required to inform choices of glucose monitoringtechniques. (Author) [Updated version available at Cochrane Database of Systematic Reviews, https://doi.org/10.1002/14651858.CD009613.pub4]

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20170609-1*

The duration of intrapartum maternal hyperglycaemia predicts neonatal hypoglycaemia in women with pre-existing diabetes. Joshi T, Oldmeadow C, Attia J, et al (2016), Diabetic Medicine vol 34, no 5, May 2017, pp 725-731

AIM:
There is a high incidence of neonatal hypoglycaemia in neonates born to mothers with pre-existing diabetes. This often necessitates admission to the neonatal intensive care. Guidelines suggest maintaining intrapartum blood glucose levels (BGLs) of 4-7 mmol/l in women with diabetes to reduce the risk of neonatal hypoglycaemia. This study assessed whether intrapartum BGLs in women with pre-gestational Type 1 and 2 diabetes were predictive of neonatal hypoglycaemia.
METHODS:
A retrospective analysis of 261 births delivered at a tertiary hospital in Australia from 2009 to 2014.
RESULTS:
There were 122 cases of neonatal hypoglycaemia (glucose ≤ 2.6 mmol/l) in 261 births (47%). The mothers in the neonatalhypoglycaemia group spent less time with BGL in the range 4-7 mmol/l [55 ± 37% vs. 65 ± 35%, P = 0.02; odds ratio (OR) 0.992, P = 0.03] and more time with BGL in the 7-10 mmol/l range (31 ± 34% vs. 18 ± 27%, P = 0.003; OR 1.013, P = 0.003) compared with those without neonatal hypoglycaemia. Although statistically significant, receiver operating characteristic (ROC) curve analysis showed that time spent with maternal BGLs in the range 4-7 mmol/l [area under the curve (AUC) = 0.58] or 7-10 mmol (AUC = 0.60) was not strong enough to be a useful clinical predictor of neonatal hypoglycaemia. HbA1c in the second trimester of pregnancy (P = 0.02, OR 1.42) and percentage time spent in BGL range of 7-10 mmol/l (P = 0.001, OR 1.02) were both associated with a risk of neonatalhypoglycaemia in a logistic regression model. HbA1c in the third trimester (P = 0.07, OR 1.28) approached, but did not reach, significance.
CONCLUSIONS:
These data support a BGL range of 4-7 mmol/l as an intrapartum target. Glycaemic control in the second trimester is associated with neonatal hypoglycaemia. Improvement in ante- and intrapartum glycaemic control may reduce neonatalhypoglycaemia in women with pre-existing diabetes.
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20170607-18*

Impact of aspirin on fetal growth in diabetic pregnancies according to White classification. Adkins K, Allshouse AA, Metz TD, et al (2017), American Journal of Obstetrics & Gynecology (AJOG) vol 217, no 4, October 2017, pp 465.e1-5

Objective
Current United States Preventative Services Task Force and other guidelines recommend low-dose aspirin for all pregnant women with pre-gestational diabetes mellitus to prevent preeclampsia and small for gestational age birth. The Maternal-Fetal Medicine Units High-Risk Aspirin trial did not show a reduction in either preeclampsia or small for gestational age birth in diabetic women. Our objective was to reassess the impact of aspirin on fetal growth in diabetic pregnancies overall and according to White classification. We hypothesized that aspirin improves fetal growth in pregnancies with vascular complications of diabetes at highest risk for poor fetal growth.
Study design
Secondary analysis of the cohort of diabetic women enrolled in the Maternal-Fetal Medicine Units High-Risk Aspirin trial. The impact of aspirin prophylaxis on birth weight was assessed in the overall cohort and in two groups categorized according to White classification as non-vascular (White class B, C, D) or vascular (White class R, F, RF). Birth weight was converted to Z-score normalized for gestational age at delivery and neonatal sex. Difference in birth weight Z-score between aspirin and placebo was tested with a 2-sample t-test. The effect of vascular group, aspirin versus placebo randomization and the interaction of the two on normalized birth weight percentile was estimated with linear regression with a multivariable model including covariates body mass index, tobacco use, race and parity. The percentage of small and large for gestational age newborns born to aspirin versus placebo-treated women was compared between groups using Pearson's exact chi-square analysis, and an adjusted model was estimated by logistic regression.
Results
All 444 women with pre-gestational diabetes and complete outcome data were included (53 vascular, 391 non-vascular). Aspirin was significantly associated with a higher birth weight Z-score (0.283, 95% CI 0.023, 0.544) in the overall cohort (p= 0.03). In the adjusted model, the association of aspirin with higher birth weight Z-score was confined to neonates of women with non-vascular diabetes (0.341, 95% CI 0.677- 0.006 p=0.044). An opposite but non-significant effect was observed among neonates from women with vascular diabetes (-0.416, 95% CI: -1.335, 0.503, p=0.6). This difference in the relationship of aspirin and birth weight Z-score by vascular group was significant, p=0.046. Aspirin-randomized women with non-vascular diabetes had more large for gestational age births than those treated

with placebo (40.2 vs. 26.6%, p=0.005). Small for gestational age births occurred at the same frequency with aspirin vs. placebo randomization in the overall cohort (8% in each group) and in each vascular group.
Conclusion
Inconsistent with our hypothesis, aspirin did not reduce small-for-gestational-age births in the overall cohort or either group. The increased incidence of large for gestational age infants in aspirin-treated diabetic gestations is of potential concern given the known increased maternal and neonatal morbidity associated with macrosomia. (Author)

20170606-26*

Global region of birth is an independent risk factor for type 2 diabetes in Stockholm, Sweden. Elinder LS, Hakimi S, Lager A, et al (2017), European Journal of Public Health vol 27, no 3, June 2017, pp 447-453

Background: In Stockholm, type 2 diabetes (T2D) is a public health concern and much more prevalent in areas with a high proportion of foreign-born individuals. One in five individuals in Stockholm County are born outside of Sweden, and we therefore investigated if global region of birth was associated with diabetes risk, adjusting for established risk factors. Methods: Cross-sectional data from the population-based Stockholm Public Health Survey 2010 (N = 69 115) was combined with registry-based information on country of birth grouped into eight global geographical regions. Cases of T2D were identified through self-reported physician-diagnosed diabetes and age at diagnosis. Region of birth was the independent risk factor and multivariable logistic regression analysis was performed adjusting for the risk factors age, sex, weight status, educational level, multiple dietary factors, tobacco, alcohol and physical activity. Results: T2D prevalence was 5.1% in the sample. Relative to Swedish-born participants, higher odds ratio (OR) were found in those born in Asia [OR 3.2, 95% confidence interval (CI) 2.2-4.7], Sub-Saharan Africa (OR 2.5, 95% CI 1.5-4.1) and North Africa/the Middle East (OR 2.1, 95% CI 1.6-2.8), after adjustment for established risk factors. Participants from Eastern Europe and Latin America had an elevated risk but this did not remain after adjustment for other risk factors. Conclusion: Region of birth was found to be an independent risk factor for T2D for participants born in Asia, Africa and the Middle East. This increased risk should be taken into consideration when allocating resources for prevention, detection and care. (Author)

20170530-23*

Glycemic Control and Pregnancy Outcomes in Women with Type 2 Diabetes Treated with Oral Hypoglycemic Agents. Feghali MN, Caritis SN, Catov JM, et al (2017), American Journal of Perinatology vol 34, no 7, June 2017, pp 697-704

Objective There is limited data regarding the use of oral hypoglycemic agents (OHAs) in pregnant women with type 2 diabetes mellitus (T2DM). Study Design This was a retrospective cohort study of women with T2DM who were treated with OHA or insulin from the first trimester onward. Bivariate and multivariate logistic regression analyses were used to compare pregnancy outcomes in women treated with OHA to those treated with insulin. Results One-third (67/198) of women were treated with OHA. Women treated with OHA had a shorter disease duration (4.4 vs. 6.8 years; p = 0.001), were more likely to have a normal prepregnancy body mass index, and had less gestational weight gain (GWG; 22.4 vs. 30.4 lbs; p = 0.005). A lower GWG was noted in obese women treated with OHA (19.9 ± 18.6 vs. 28.3 ± 17.7 pounds; p = 0.008). First-trimester hemoglobin A1c values were lower with OHAs, but second- and third-trimester values were similar. Among women who started pregnancy using OHA, 37/67 (55.2%) remained on OHA at delivery. Pregnancy outcomes did not differ between women who received OHA and those treated with insulin. Conclusion OHA treatment is more likely in women with T2DM who begin pregnancy with less severe disease, and use of OHA may be associated with decreased GWG. (Author)

20170524-41

Diabetes mellitus: an independent predictor of duration of prostaglandin labor induction. Hawkins JS, Stephenson M, Powers B, et al (2017), Journal of Perinatology vol 37, no 5, May 2017, pp 488-491

Objective:
The objective of this study is to analyze the association of diabetes mellitus with progress and outcomes of prostaglandin (PG) labor induction using a retrievable vaginal insert.
Study Design:
This is a secondary analysis of data collected during the Misoprostol Vaginal Insert Trial (Miso-Obs-004), a multicenter, double-blind, randomized controlled trial of women undergoing induction of labor with PGs. The duration, characteristics and outcomes of labor were compared in women with and without diabetes. Multivariable regression analysis was performed on all outcomes of interest, adjusting for differences in baseline characteristics.
Results:

There were 122 women with diabetes within the sample of 1275 women who delivered during their first admission. The time to reach active labor was significantly prolonged among women with diabetes compared with those without (22.0±13.0 vs 18.5±11.1, P=0.008) as was the time to delivery (30.2±15.0 vs 26.0±12.6, P=0.004). Fewer women with diabetes delivered within 36 h (adjusted odds ratio: 0.41, 95% confidence interval: 0.26 to 0.66, P=0.0003) and 48 h (adjusted odds ratio: 0.36, 95% confidence interval: 0.19 to 0.71, P=0.004). These relationships were significant after a multivariate regression analysis of baseline characteristics that adjusted for age, race, parity, body mass index, baseline modified Bishop Score, gestational age at induction and treatment group allocation.
Conclusion:
After PG labor induction, women with diabetes took longer to reach active labor and to deliver. We emphasize that this result comes from a secondary analysis and needs confirmation with additional studies. (29 references) (Author)

20170519-67*

A lot of hard work, but doable: Pregnancy experiences of women with type-1 diabetes. McGrath M, Chrisler JC (2017), Health Care for Women International vol 38, no 6, June 2017, pp 571-592

Despite many medical advances, pregnant women with type-1 diabetes are still considered to be at high risk. Previous research suggests that physicians' focus on strict glycemic control and negative outcomes can result in fear and uncertainty about undertaking pregnancy. The present study was designed to gain insight into the lived pregnancy experiences of women with type-1 diabetes and to solicit their thoughts on what health care providers could do to assist them to have a healthy pregnancy. Ten U.S. women with type-1 diabetes who were currently pregnant and/or had previously given birth participated in structured interviews. They described the hard work required to attain the strict glycemic control necessary during pregnancy to maintain their health and that of their fetus. However, they found diabetes and pregnancy to be a more positive and successful experience than they had anticipated. The results suggest that early diabetes education, pregnancy planning, and social support are important, yet often overlooked, factors that increase the likelihood of physically and emotionally successful pregnancy experiences for women with type-1 diabetes. (43 references) (Author)

20170517-18*

Pre-conception care for women with type 1 or type 2 diabetes: A mixed methods study exploring uptake of pre-conception care. Earle S, Tariq A, Komaromy C, et al (2017), Health Technology Assessment vol 21, no 14, April 2017

Background
Diabetes mellitus is a global health problem and one of the most common medical conditions in pregnancy. A wide range of modifiable risk factors are associated with diabetes mellitus in pregnancy, and it is widely acknowledged that preconception care (PCC) is beneficial for women with pre-existing diabetes mellitus. However, uptake of PCC services is low.
Objectives
To systematically review qualitative research on PCC for women with pre-existing diabetes mellitus of childbearing age, identify facilitators of and barriers to uptake of PCC and establish themes and gaps in knowledge. Through qualitative interviews explore views on the provision of, and facilitators of and barriers to the uptake of, PCC.
Design
Mixed methods encompassing a systematic review and qualitative interviews.
Setting
Two secondary care sites and 11 primary care sites.
Participants
Women of childbearing age with pre-existing type 1 diabetes mellitus (T1DM) and type 2 diabetes mellitus (T2DM) of white British or Pakistani origin.
Interventions
None.
Analysis
A narrative synthesis of the literature using thematic analysis and a thematic analysis of the qualitative interview data using the method of constant comparison.
Results
Eighteen qualitative studies were included in the systematic review and a quality appraisal was carried out using relevant criteria for qualitative research appraisal, including a narrative summary of study quality. Twelve interviews with women with pre-existing T1DM or T2DM were carried out. This fell short of the original aim of interviewing 48 women owing to challenges in recruitment, especially in primary care. A synthesis of these data shows that uptake of PCC is influenced by a range of factors, including the complexity of pregnancy planning, the skill and expertise of

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health professionals who provide care to women with diabetes mellitus, the role of health professionals in the delivery of PCC, and the quality of relationships between women and health professionals.
Limitations
Owing to significant challenges with recruitment of participants, particularly in primary care, 12 interviews with women with pre-existing T1DM or T2DM were carried out, which fell short of the a priori sample size.
Conclusions
Reconceptualising PCC to place greater emphasis on pregnancy planning, fertility and contraception would lower some of the existing barriers to uptake of care. It is important to clarify who is responsible for the delivery of PCC to women with pre-existing diabetes mellitus and to ensure that the correct expertise is available so that opportunities for advice giving are maximised. Relationships between women and health professionals should be based on a partnership approach that encourages mutual trust and respect, focusing on positive change rather than negative outcomes.
Future work
Further research is needed to investigate the views and experiences of stakeholders that commission, design and deliver PCC services for women with pre-existing diabetes mellitus; to explore experiences of women from minority or ethnically diverse backgrounds; to investigate the role of family support in contraception, pregnancy planning and PCC; and to investigate the management of diabetes mellitus in neonatal care and its role in breastfeeding. (49 references) (Author) [The full text of this article is available at https://www.journalslibrary.nihr.ac.uk/hta/hta21140/#/abstract]
Full URL: https://www.journalslibrary.nihr.ac.uk/hta/hta21140/#/abstract

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20170512-66

Practice matters: The role of the midwife in diabetes education and management. Boylan K (2017), Australian Midwifery News vol 17, no 1, Autumn 2017, pp 44-45

Kerry Boylan explains how she became a credential diabetes educator Registered Nurse Midwife, and details the requirements in order to train in this profession. (2 references) (AB)

20170512-36*

First-trimester exposure to metformin and risk of birth defects: a systematic review and meta-analysis. Cassina M, Dona M, Di Gianantonio E, et al (2017), Human Reproduction Update vol 20, no 5, 25 May 2014, pp 656-669

BACKGROUND
Metformin is generally considered a non-teratogenic drug; however, only a few studies specifically designed to assess the rate of congenital anomalies after metformin use have been published in the literature. The objects of the present study were to review all of the prospective and retrospective studies reporting on women treated with metformin at least during the first trimester of their pregnancy and to estimate the overall rate of major birth defects.
METHODS
Databases were searched for English language articles until December 2013. Inclusion criteria for the meta-analysis were: a case group of women with PCOS or pre-pregnancy type 2 diabetes and first-trimester exposure to metformin; a disease-matched control group which was not exposed to metformin or other oral anti-diabetic agents; and a list of the major anomalies in both the study and the control groups. A random effects model was used for the meta-analysis of data, using odds ratios. Studies not fulfilling the inclusion criteria for the meta-analysis but reporting relevant data on major malformations in women diagnosed with PCOS were then used to estimate the overall birth defects rate.
RESULTS
Meta-analysis of nine controlled studies with women affected by PCOS detected that the rate of major birth defects in the metformin-exposed group was not statistically increased compared with the disease-matched control group and that there was no significant heterogeneity among the studies. The metformin-exposed sample was composed of 351 pregnancies and the OR of major birth defects was 0.86 (95% confidence interval: 0.18-4.08; Pheterogeneity = 0.71). By evaluating all of the non-overlapping PCOS studies reported in the literature, even those without an appropriate control group, the overall rate of major anomalies was 0.6% in the sample of 517 women who discontinued the therapy upon conception or confirmation of pregnancy and 0.5% in the sample of 634 women who were treated with metformin throughout the first trimester of their pregnancy. Regarding type 2 diabetic women, we did not identify a sufficient number of studies with metformin exposure during the first trimester to proceed with the meta-analysis.
CONCLUSIONS
There is currently no evidence that metformin is associated with an increased risk of major birth defects in women affected by PCOS and treated during the first trimester. However larger ad hoc studies are warranted in order to definitely confirm the safety and efficacy of this drug in pregnancy. (Author)

20170509-26*

Correlation of placental pathology and perinatal outcomes with Hemoglobin A1c in early pregnancy in gravidas with pregestational diabetes mellitus. Starikov RS, Inman K, Has P, et al (2017), Placenta vol 52, April 2017, pp 94-99

INTRODUCTION:
Data on the correlation among Hemoglobin A1c (HbA1c), placental pathology, and perinatal outcome in the pregestational diabetic population is severely lacking. We believe that this knowledge will enhance the management of pregnancies complicated by pregestational diabetes. We hypothesize that placental pathology correlates with glycemic control at an early gestational age.
METHODS:
This is a retrospective cohort study conducted from 2003 to 2011 at a large tertiary care center. Women included had a singleton gestation, preexisting diabetes mellitus, and information about delivery and placental pathology available for review. Placental pathology and perinatal outcomes were compared across three groups of patients with differing HbA1c levels (<6.5%, 6.5-8.4%, and ≥8.5%).
RESULTS:
293 placentas were examined. HbA1c was measured at a mean of 9.5 week gestation. Median HbA1c was 7.5%, interquartile range 6.5%-8.9%. 23% of the cohort had HbA1c <6.5%, 41.9% between 6.5% and 8.4%, and 34.8% > 8.5%. BMI varied significantly by group (35.4 vs. 34.4 vs. 32.0 respectively, P = 0.04). Individual placental lesions did not vary with HbA1c levels. The incidence of acute chorioamnionitis differed significantly in the type 1 population and 'distal villous hypoplasia' varied in the type 2 population.
DISCUSSION:
The results show that HbA1c values in early pregnancy are poor predictors of future placental pathologies. As a result, HbA1c values obtained during early gestation (which reflect the level of glycemic control over an extended period of time) do not correlate with any particular placental pathology, despite reflecting the potential for placental insults secondary to pre-gestational diabetes.
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20170508-80

Maternal Type 1 diabetes activates stress response in early placenta. Gauster M, Majali-Martinez A, Maninger S, et al (2017), Placenta vol 50, February 2017, pp 110-116

INTRODUCTION:
Human pregnancy and in particular the first trimester, is a period highly susceptible towards adverse insults such as oxidative stress, which may lead to inadequate embryonic and feto-placental development. Diabetes mellitus is associated with increased oxidative stress caused by hyperglycemia, reactive oxygen species (ROS) production and inflammatory signals. In pregnancy, diabetes elevates the risk for early pregnancy loss, preeclampsia and fetal growth restriction, pathologies that origin from early placental maldevelopment. We hypothesized that maternal Type 1 diabetes mellitus (T1DM) induces oxidative stress in the first trimester human placenta.
METHODS:
We quantified stress induced, cytoprotective proteins, i.e. heat shock protein (HSP)70 and heme oxygenase (HO)-1 and determined protein modifications as markers for oxidation and glycation, i.e. levels of 4-hydroxynonenal (HNE) or Nε-(carboxymethyl)lysine (CML) modified proteins. Moreover, we measured expression levels of enzymes involved in antioxidant defense in the first trimester (week 7-9) placenta of normal and T1DM women by immunoblot and real-time qPCR. Primary human trophoblasts were isolated from first trimester placenta and the effects of oxygen, hyperglycemia and the pro-inflammatory cytokine tumor necrosis factor (TNF)-α on levels of HSP70 and HO-1 were analyzed.
RESULTS:
HSP70 (+19.9± 10.1%) and HO-1 (+63.5± 14.5%) were elevated ($p < 0.05$) in first trimester placenta of T1DM women when compared to normal women. However, levels of HNE or CML modified proteins were unchanged. Also, expression of most antioxidant enzymes was unchanged, with only superoxide dismutase 3 (SOD3) being upregulated by 3.0-fold ($p < 0.05$). In isolated primary trophoblasts, HSP70 and HO-1 were upregulated by increasing oxygen tension, but not by hyperglycemia or TNF-α.
CONCLUSION:
Although protein oxidation and glycation was not elevated, we infer that T1DM increases placental cellular stress in the first trimester. Elevated stress in early placenta of T1DM women may contribute to disturbances in placental development.

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20170425-55*

Risk Factors for Birth Defects. Harris BS, Bishop KC, Kemeny HR, et al (2017), Obstetrical and Gynecological Survey vol 72, no 2, February 2017, pp 123-135

Importance: Major congenital abnormalities, or birth defects, carry significant medical, surgical, cosmetic, or lifestyle consequences. Such abnormalities may be syndromic, involving multiple organ systems, or can be isolated. Overall, 2% to 4% of live births involve congenital abnormalities. Risk factors for birth defects are categorized as modifiable and nonmodifiable. Modifiable risk factors require thorough patient education/counseling. The strongest risk factors, such as age, family history, and a previously affected child, are usually nonmodifiable.

Objective: This review focuses on risk factors for birth defects including alcohol consumption, illicit drug use, smoking, obesity, pregestational diabetes, maternal phenylketonuria, multiple gestation, advanced maternal age, advanced paternal age, family history/consanguinity, folic acid deficiency, medication exposure, and radiation exposure.

Evidence Acquisition: Literature review via PubMed.

Results: There is a strong link between alcohol use, folic acid deficiency, obesity, uncontrolled maternal diabetes mellitus, uncontrolled maternal phenylketonuria, and monozygotic twins and an increased risk of congenital anomalies. Advanced maternal age confers an increased risk of aneuploidy, as well as nonchromosomal abnormalities. Some medications, including angiotensin converting enzyme inhibitors, retinoic acid, folic acid antagonists, and certain anticonvulsants, are associated with various birth defects. However, there are few proven links between illicit drug use, smoking, advanced paternal age, radiation exposure, and statins with specific birth defects.

Conclusions and Relevance: Birth defects are associated with multiple modifiable and nonmodifiable risk factors. Obstetrics providers should work with patients to minimize their risk of birth defects if modifiable risk factors are present and to appropriately counsel patients when nonmodifiable risk factors are present.

Target Audience: Obstetrician and gynecologists, family physicians, maternal-fetal medicine physicians, and genetic counselors.

Learning Objectives: The learner should be better able to (1) outline the most common modifiable maternal risk factors that are associated with birth defects; (2) locate high-quality health information resources for patients; and (3) promote patient autonomy, responsibility, and motivation to pursue healthy lifestyle choices during pregnancy. (Author)

20170421-20*

Analysis of cell-free fetal DNA for non-invasive prenatal diagnosis in a family with neonatal diabetes. De Franco E, Caswell R, Houghton J, et al (2017), Diabetic Medicine vol 34, no 4, April 2017, pp 582-585

AIMS:

An early genetic diagnosis of neonatal diabetes guides clinical management and results in improved treatment in ~ 40% of patients. In the offspring of individuals with neonatal diabetes, a prenatal diagnosis allows accurate estimation of the risk of developing diabetes and, eventually, the most appropriate treatment for the baby. In this study, we performed non-invasive prenatal genetic testing for a fetus at risk of inheriting a paternal KCNJ11 p.R201C mutation causing permanent neonatal diabetes.

METHODS:

A droplet digital polymerase chain reaction assay was used to detect the presence of the mutation in cell-free circulating DNA (cfDNA) extracted from maternal plasma at 12 and 16 weeks' gestation.

RESULTS:

The mutation was not detected in the cfDNA samples, suggesting that the fetus had not inherited the KCNJ11 mutation. The fetal DNA fraction was estimated at 6.2% and 10.7%, which is above the detection limit of the assay. The result was confirmed by Sanger sequencing after the baby's birth, confirming that the baby's risk of developing neonatal diabetes was reduced to that of the general population.

CONCLUSIONS:

We report the first case of non-invasive prenatal testing in a family with neonatal diabetes. A prenatal diagnosis in families at high risk of monogenic diabetes informs both prenatal and postnatal management. Although the clinical impact of this novel technology still needs to be assessed, its implementation in clinical practice (including cases at risk of inheriting mutations from the mother) will likely have a positive impact upon the clinical management of families affected by monogenic diabetes. (Author)

20170406-25*

Early pregnancy probiotic supplementation with Lactobacillus rhamnosus HN001 may reduce the prevalence of gestational diabetes mellitus: a randomised controlled trial. Wickens KL, Barthow CA, Murphy R, et al (2016), British Journal of Nutrition vol 115, no 1, 28 January 2016, pp 24-31

The study aims to assess whether supplementation with the probiotic Lactobacillus rhamnosus HN001 (HN001) can reduce the prevalence of gestational diabetes mellitus (GDM). A double-blind, randomised, placebo-controlled parallel trial was conducted in New Zealand (NZ) (Wellington and Auckland). Pregnant women with a personal or partner history of atopic disease were randomised at 14-16 weeks' gestation to receive HN001 (6×109 colony-forming units) (n212) or placebo (n 211) daily. GDM at 24-30 weeks was assessed using the definition of the International Association of Diabetes and Pregnancy Study Groups (IADPSG) (fasting plasma glucose ≥5·1 mmol/l, or 1 h post 75 g glucose level at ≥10 mmol/l or at 2 h ≥8·5 mmol/l) and NZ definition (fasting plasma glucose ≥5·5 mmol/l or 2 h post 75 g glucose at ≥9 mmol/l). All analyses were intention-to-treat. A total of 184 (87 %) women took HN001 and 189 (90 %) women took placebo. There was a trend towards lower relative rates (RR) of GDM (IADPSG definition) in the HN001 group, 0·59 (95 % CI 0·32, 1·08) (P=0·08). HN001 was associated with lower rates of GDM in women aged ≥35 years (RR 0·31; 95 % CI 0·12, 0·81, P=0·009) and women with a history of GDM (RR 0·00; 95 % CI 0·00, 0·66, P=0·004). These rates did not differ significantly from those of women without these characteristics. Using the NZ definition, GDM prevalence was significantly lower in the HN001 group, 2·1 % (95 % CI 0·6, 5·2), v. 6·5 % (95 % CI 3·5, 10·9) in the placebo group (P=0·03). HN001 supplementation from 14 to 16 weeks' gestation may reduce GDM prevalence, particularly among older women and those with previous GDM. (Author)

20170328-25*

Diabetes in pregnancy and lung health in offspring: developmental origins of respiratory disease. Azad MB, Moyce BL, Guillemette L, et al (2017), Paediatric Respiratory Reviews vol 21, January 2017, pp 19-26

Diabetes is an increasingly common complication of pregnancy. In parallel with this trend, a rise in chronic lung disease in children has been observed in recent decades. While several adverse health outcomes associated with exposure to diabetes in utero have been documented in epidemiological and experimental studies, few have examined the impact of diabetes in pregnancy on offspring lung health and respiratory disease. We provide a comprehensive overview of current literature on this topic, finding suggestive evidence that exposure to diabetes in utero may have adverse effects on lung development. Delayed lung maturation and increased risk of respiratory distress syndrome have been consistently observed among infants born to mothers with diabetes and these findings are also observed in some rodent models of diabetes in pregnancy. Further research is needed to confirm and characterize epidemiologic observations that diabetes in pregnancy may predispose offspring to childhood wheezing illness and asthma. Parallel translational studies in human pregnancy cohorts and experimental models are needed to explore the role of fetal programming and other potential biological mechanisms in this context. (69 references) (Author)

Full URL: http://www.prrjournal.com/article/S1526-0542(16)30081-1/fulltext

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20170324-15*

Reduced DHA transfer in diabetic pregnancies: mechanistic basis and long-term neurodevelopmental implications. Judge MP, Casavant SG, Dias JAM, et al (2016), Nutrition Reviews vol 74, no 6, June 2016, pp 411-420

Infants born to diabetic mothers have a higher frequency of impaired neurodevelopment. The omega-3 or n-3 fatty acid docosahexaenoic acid (DHA) is an important structural component of neural tissue and is critical for fetal brain development. Maternal DHA supplementation during pregnancy is linked to better infant neurodevelopment; however, maternal-fetal transfer of DHA is reduced in women with diabetes. Evidence of mechanisms explaining altered maternal-fetal DHA transfer in this population is limited. This review explores existing evidence underpinning reduced maternal-fetal DHA transfer in maternal fuel metabolism in this population. Further research is necessary to evaluate the role of peroxisome proliferator-activated receptors in modulating placental fatty acid binding and maternal-fetal DHA transfer. Considerations for clinical practice include a diet high in DHA and/or provision of supplemental DHA to obstetric diabetic patients within minimum guidelines. (Author)

20170323-49*

Three-Versus Two-Dimensional Sonographic Biometry for Predicting Birth Weight and Macrosomia in Diabetic Pregnancies. Tuuli MG, Kapalka K, Macones GA, et al (2016), Journal of Ultrasound in Medicine vol 35, no 9, 2016, pp 1925-1930

Objectives

The purpose of this study was to test the hypothesis that a formula incorporating 3-dimensional (3D) fractional thigh

volume would be superior to the conventional 2-dimensional (2D) formula of Hadlock et al (Am J Obstet Gynecol 1985; 151:333-337) for predicting birth weight and macrosomia.
Methods
We conducted a prospective cohort study of pregnancies complicated by pregestational or gestational diabetes and delivered after 38 weeks. Two-dimensional and 3D sonographic examinations were performed for fetal biometry and factional thigh volumes at 34 to 37 weeks. Fetal weight was estimated by Hadlock's 2D formula IV, which uses only 2D biometry, and formula 6 from Lee et al (Ultrasound Obstet Gynecol 2009; 34:556-565), which incorporates 3D fractional thigh volume and 2D biometry. The gestation-adjusted projection method was used to estimate predicted birth weights from 2D and 3D estimates. The primary outcome was fetal macrosomia, which was defined as birth weight of 4000 g or higher.
Results
A total of 115 women with diabetes met inclusion criteria, and 17 (14.8%) delivered macrosomic neonates. The mean percentage error was significantly lower for the 2D than the 3D projected estimate (1.0% versus 12.0%; P < .01). The standard deviation of the mean percentage error was also significantly lower for the 2D projected estimate (10.2% versus 17.2%; P< .01). Two-dimensional biometry was overall superior to 3D biometry for predicting macrosomia (area under the receiver operating characteristic curve, 0.88 versus 0.75; P = .03). Specificity was significantly higher for 2D biometry (85% versus 66%; P < .01), whereas the difference in sensitivity was not statistically significant (59% versus 71%; P = .22).
Conclusions
In this study, the Hadlock 2D formula was superior to the 3D method for predicting birth weight and macrosomia in diabetic women when used approximately 2 weeks before delivery, based on the gestation-adjusted projection method. (Author)

20170322-47*

Validation of a symphysis-fundal height chart developed for pregnancy complicated by diabetes and hyperglycemia: an observational study. de Sousa Basso NA, Morceli G, Costa R, et al (2016), Reproductive Health vol 13, no 89, August 2016

Background
The present study validates a symphysis-fundal height chart (SFH-chart) for pregnant women with type 2 diabetes mellitus (DM2), gestational diabetes mellitus (GDM) and mild gestational hyperglycemia (MGH) attending at the Diabetes and Pregnancy Reference Service of the Botucatu Medical School, UNESP, Brazil.
Methods
A cross-sectional study was carried out to evaluate the performance of the specific FHC in predicting small (SGA) and large (LGA) for gestational age newborns (NB). We evaluated 206 pregnant women with DM2, GDM or MGH and their NB. The last symphysis-fundal height measure, taken at birth, was used to determine the sensitivity index (Sens), specificity index (Spe), positive prediction value (PPV), negative prediction value (NPV) and accuracy in predicting SGA and LGA. The gold standard was the Lubchenco birth weight/gestational age ratio evaluated at birth.
Results
The mothers showed adequate glycemic control; 91.3 % of all pregnant women achieved HbA1c < 6,5 % in the third trimester. The SFH-chart tested achieved 100 % of Sens and NPV in predicting both SGA and LGA, with accuracy of 90.3 % (85.5; 93.6) and 91.8 % (87.2; 94.8), respectively, for predicting SGA and LGA newborns.
Conclusions
The Basso SFH-chart showed high performance in predicting both SGA and LGA newborns of DM-2, GDM and MGH mothers, with better performance than the national reference SFH-chart. These findings support the internal validation of the Basso SFH-chart, which may be implemented in the prenatal care of the Diabetes and Pregnancy Reference Service-Botucatu Medical School/UNESP. (24 references) (Author)
Full URL: https://reproductive-health-journal.biomedcentral.com/articles/10.1186/s12978-016-0202-4

20170317-26*

Prepregnancy Factors as Determinants of the Development of Diabetes Mellitus After First Pregnancy. Cho GJ, Park JH, Lee H, et al (2016), The Journal of Clinical Endocrinology and Metabolism vol 101, no 7, 2016, pp 2923-2930

Context:
The identification of modifiable factors at prepregnancy or early pregnancy as well as continued monitoring and management of these factors before and during pregnancy may reduce the incidence of diabetes mellitus (DM) among women, regardless of gestational diabetes mellitus (GDM) status.
Objective:
This study aimed to identify prepregnancy factors for the development of DM in women with or without GDM in their

first pregnancy.
Design and Participants:
This retrospective, observational, cohort study included data for 53 109 women who underwent a National Health Screening Examination through the National Health Insurance Corporation between 2002 and 2003 and had their first delivery in 2004 with follow-up until 2012.
Main Outcomes:
The main outcome of the study was the risk of developing DM after 8 years in women with and without GDM during their first pregnancy.
Results:
The cumulative risks of developing DM after 8 years were 8.4% and 3.3% in women with and without GDM during their first pregnancy, respectively. Old age, a family history of DM, obesity, a high fasting glucose level, and high total cholesterol level were associated with DM development in women without GDM. In women with GDM, a family history of DM, prepregnancy obesity, a high fasting glucose level, and a high total cholesterol level were associated with DM. When stratified by GDM status and the number of prepregnancy risk factors, the number of prepregnancy risk factors was associated with the risk of DM in women with or without GDM. Women with GDM had a higher risk of DM for the same number of prepregnancy risk factors than women without GDM.
Conclusion:
The results show that GDM may be a marker for development of DM in the future because it shares the same risk factors with DM development. Thus, eliminating other risk factors in women with GDM may lead to a reduction in the risk of DM.
GDM is a marker for future DM, as it shares risk factors with DM. Thus, eliminating other risk factors among women with GDM may reduce the risk of future DM. (Author)

20170310-93*

Outcome of Diabetic Pregnancies in a Tertiary Referral Centre, Varanasi. Pandey U, Agrawal NK, Agrawal S, et al (2016), Journal of Obstetrics and Gynecology of India vol 66, no 4, 2016, pp226-232

Aim
The study was done to determine the maternal and fetal outcome of pregnancies complicated by maternal diabetes either Gestational Diabetes Mellitus (GDM) or preexisting (type 1 or type 2) diabetes over a period from March 2011 to Feb 2013 in a tertiary care hospital, Varanasi.
Methods
This is a retrospective audit of the maternal and fetal outcome of women who presented to the Sir Sundar Lal Hospital, Department of Obstetrics and Gynaecology, Institute of Medical Sciences, Banaras Hindu University, Varanasi, India from March 2011 to Feb 2013, with GDM or pre-existing type 1 or type 2 Diabetes with pregnancy. The audit group comprised 65 pregnancies (67 babies), of whom 27 had preexisting diabetes and 38 cases developed gestational diabetes. Pregnant women who were found to be diabetic preconceptionally or in the first trimester were classified as 'pre-existing diabetes'.
Results
There were total of 65 diabetic women in this retrospective study, 39 women were GDM (60 %) while 26 women (40 %) were having pre-existing diabetes (24 type 1 diabetes and 2 women were in type 2 diabetes group). There were 35 multigravid women (53.85 %) and 30 primigravid women (46.15 %). There were 39 (60 %) women on Insulin. There were 42 Lower Segment Caesarean Section (64.62 %) and 23 Spontaneous Vaginal Delivery (35.38 %). In fetal and neonatal complications, there were three still births, one case of intrapartum death, and one case of shoulder dystocia. Fetal anomalies were less frequent, one case of Gastroschisis with Hydrocephalus associated with Menigomyelocoele, there was one case of isolated Hydrocephalus, and there was also one case of Truncus arteriosus.
Conclusions
The study analyses maternal and fetal complication in the GDM group and also preexisting diabetes group. In our centre, the 60 % women were GDM while 40 % were having pre-existing diabetes. Total rate of fetal/neonatal complication rate was 7.69 % and of congenital anomaly rate it was 9.23 %. Proportion of still birth, Intrauterine death, and congenital malformations was higher in the pre-existing diabetes group although the data are not large enough to draw a statistically significant conclusion. LSCS rate was little higher in the GDM group (69.23 %) in comparison to the preexisting diabetes group where it was 57.69 %. SVD (Spontaneous Vaginal Delivery) rate was 30.77 % in GDM and 42.31 % in the pre-existing diabetes group. HbA1c was within normal range 84.62 % of GDM group while in 15.38 % it was raised >6 %. In the pre-existing diabetes group, only 19.23 % of women had HbA1c within acceptable range and 80.77 % had it >6. The aim of St Vincent Declaration is to 'achieve pregnancy outcome in the diabetic woman that is similar to that of the non-diabetic woman.' But, so far we have not been able to achieve this. Our HbA1c level is

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remarkably high in the pre-existing diabetes group. Only 3 out of 65 patients' women took Folic Acid periconceptionally. We need to work to achieve it our best. It is well known that insulin treatment during pregnancy results in reduction in the rate of macrosomia, fetal/neonatal, and maternal complications. Therefore, we need to use insulin judiciously and advocate its usage in the situations where it is needed. (Author)

20170310-54*

A clinical study which relates to a theoretical simulation of the glucose transport in the human placenta under various diabetic conditions. Barta E, Drugan A (2016), Journal of Perinatal Medicine vol 44, no 4, May 2016, pp 405-410

Aims: To characterize placental glucose delivery under normoglycemic conditions, gestational and pre-gestational diabetes and to relate the clinical data to theoretical predictions.
Methods: Data from 125 pregnancies: 50 normal gestations and 75 ones with various types of diabetes were collected. In parallel, we formulated a theoretical model for the transport of glucose under various diabetic conditions. Measured glucose blood levels were fed into the theoretical model that predicts glucose supply to the fetus and the results were confronted with measured fetal weights.
Results: Measured fetal weight and computed glucose delivery in gestational diabetic parturients resemble the situation in normal pregnancies. However, pre-gestational diabetes has a major effect as it involves heavier fetuses and enhanced computed glucose fluxes via placental membranes.
Conclusions: Fetal weight (increased in pre-gestational and unaltered in gestational diabetes) correlates with the predicted rate of glucose delivery through the placenta. (Author)

20170308-81*

Depression and anxiety in pregnant women with diabetes or mild hyperglycemia. Marquesim NAQ, Cavassini ACM, Morceli G, et al (2016), Archives of Gynecology and Obstetrics vol 293, no 4, April 2016, pp 833-837

Introduction
A number of physical and psychological changes that occur during pregnancy can stimulate the development of psychological disorders such as anxiety and depression. The study evaluated psychological aspects related to maternal depression and anxiety in pregnant women with diabetes mellitus or hyperglycemia, contrasting the results with those of non-diabetic pregnant women.
Method
In a prospective and longitudinal approach, two questionnaires were applied and validated for use in Brazil, the Beck depression inventory and the State-Trait Anxiety Inventory. The questionnaires were applied to pregnant women at the first prenatal visit or at the time of disease diagnosis (T1) and reapplied at admission for delivery (T2). Regardless of the degree of hyperglycemia, both at first and in the second stage most women had severe anxiety trait. In early pregnancy (T1), however, severe state anxiety was more frequent in women with hyperglycemia than in those from the NG group.
Results
Most pregnant women showed moderate state anxiety over their pregnancy, regardless of glycemic status. In early pregnancy, however, severe state anxiety was more prevalent in hyperglycemic women than in those with normal glycemic status. Most women showed moderate trait anxiety and mild depression in both early and late pregnancy, irrespective of glycemic status.
Conclusion
The incidence of severe state anxiety in early pregnancy is more frequent in women with diabetes or hyperglycemia, but their levels of trait anxiety and depression are not affected by glycemic status. (30 references) (Author)

20170308-19

Prenatal visit utilization and outcomes in pregnant women with type II and gestational diabetes. Carter EB, Tuuli MG, Odibo AO, et al (2017), Journal of Perinatology vol 37, no 2, February 2017, pp 122-126

Objective:
To investigate the association between the number of prenatal visits (PNVs) and pregnancy outcomes in women with gestational diabetes (GDM) and Type 2 diabetes mellitus (DM).
Study Design:
A 4-year prospective cohort study of women with GDM and DM and was conducted. Patients 75th percentile for number of PNVs were compared with those 25th percentile. The primary outcomes were large for gestational age (LGA) with birth weight >90% and neonatal intensive care unit (NICU) admission for >24 h. Secondary neonatal outcomes included severe LGA (>95%), shoulder dystocia, hyperbilirubinemia requiring phototherapy, neonatal

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hypoglycemia, low 5 min APGAR score (<7) and preterm birth (prior to 37 weeks). Secondary maternal outcomes included mean third trimester fasting blood glucose, hemoglobin A1c (Hgb A1c) in labor, preeclampsia, gestational weight gain over Institute of Medicine recommendations, mode of delivery and maternal readmission within 30 days. Logistic regression was used to adjust for maternal race, nulliparity and body mass index.
Results:
Of the 305 women, 4 were excluded for unknown number of PNVs. Among the 301 included, the average number of visits was 12. Rates of LGA were similar between the high (28%) compared with low (18%) utilization groups (adjusted odds ratio (aOR) 1.69; 95%confidence interval (CI) 0.81-3.54). The high utilization group was 85% less likely to deliver an infant requiring NICU admission (aOR 0.15; 95% CI 0.04-0.53) and 59% less likely to have a preterm birth (aOR 0.41; 95% CI 0.21-0.80). A time-to-event analysis to account for the fact that patients who delivered earlier had fewer weeks to experience PNVs showed that the risk for NICU admission was still significantly lower in the high PNV utilization group (hazard ratio 0.15; 95% CI 0.04-0.51) after adjusting for confounders in a Cox proportional hazard model. The mean Hgb A1c at the time of delivery was significantly better in the high (6.4%) compared with low (6.9%) utilization groups (P=0.01). There were no differences in other maternal outcomes based on prenatal care utilization.
Conclusions:
Diabetic women with high PNV utilization have better glycemic control in the 3 months prior to delivery and are significantly less likely to deliver preterm infants or infants requiring NICU admission. There may be innovative ways to provide prenatal care for GDM and DM to optimize maternal and neonatal outcomes. (25 references) (Author)

20170224-47*

Expected probability of congenital heart disease and clinical utility of fetal echocardiography in pregnancies with pre-gestational diabetes. Nassr AA, El-Nashar SA, Shazly SA, et al (2016), European Journal of Obstetrics & Gynecology and Reproductive Biology vol 201, June 2016, pp 121-125

Objectives
To establish a prediction model for fetal congenital heart disease (CHD) that could facilitate selective fetal echocardiography screening for diabetic women, and to provide cost analysis of selective versus global screening of these women.
Study design
A historical cohort study included women with pre-gestational diabetes who received perinatal care at Mayo Clinic, Minnesota from 2007 through 2013. Anatomical scans and fetal echocardiograms were reviewed and charts for postnatal outcomes were abstracted. Logistic regression models were utilized to identify predictors of CHD. Cost of global versus selective screening was estimated using cost per case detected.
Results
A cohort of 152 women was included. Abnormal anatomy scan was reported in five (3.3%). Among 51 (33.6%) who had fetal echocardiography, eight (15.7%) had abnormal findings. Postnatal echocardiography was conducted in 36 neonates, 12 had abnormalities. Only first trimester HbA1c was independent predictor with observed incidence of CHD of 1.8, 14.3, and 40% and HbA1c of <8, 8-10, and >10% respectively. Global screening strategy missed 22% of fetal cardiac abnormalities, while selective screening missed 33%.
Conclusions
According to our probability model, selective screening based on HbA1c and/or anatomic surveys seems to be an accurate and cost effective strategy for prenatal diagnosis of CHD among diabetic pregnancies. (Author) (25 references)

20170210-37*

Screening for eye problems for pregnant women with diabetes. An easy guide to screening tests when you are pregnant. Public Health England (2017), London: PHE February 2017. 6 pages

One of eight easy read guides explaining the screening tests offered during and after pregnancy for people with learning disabilities. (Publisher, edited)

Full URL: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/590111/STFYAYB_easy_read_pregnancy_section_part_5_Feb_2017_final.pdf

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20170206-6*

Different insulin types and regimens for pregnant women with pre-existing diabetes (Cochrane Review). (Date of most recent substantive amendment: 17 Oct 2016). O'Neill SM, Kenny LC, Khashan AS, et al (2017), The Cochrane Database of Systematic Reviews issue 2, 2017

Background
Insulin requirements may change during pregnancy, and the optimal treatment for pre-existing diabetes is unclear. There are several insulin regimens (e.g. via syringe, pen) and types of insulin (e.g. fast-acting insulin, human insulin).
Objectives
To assess the effects of different insulin types and different insulin regimens in pregnant women with pre-existing type 1 or type 2 diabetes.
Search methods
We searched the Cochrane Pregnancy and Childbirth Group's Trials Register (30 October 2016), ClinicalTrials.gov (17 October 2016), the WHO International Clinical Trials Registry Platform (ICTRP; 17 October 2016), and the reference lists of retrieved studies.
Selection criteria
We included randomised controlled trials (RCTs) that compared different insulin types and regimens in pregnant women with pre-existing diabetes.
We had planned to include cluster-RCTs, but none were identified. We excluded quasi-randomised controlled trials and cross-over trials. We included studies published in abstract form and contacted the authors for further details when applicable. Conference abstracts were superseded by full publications.
Data collection and analysis
Two review authors independently assessed trials for inclusion, conducted data extraction, assessed risk of bias, and checked for accuracy. We assessed the quality of the evidence using the GRADE approach.
Main results
The findings in this review were based on very low-quality evidence, from single, small sample sized trial estimates, with wide confidence intervals (CI), some of which crossed the line of no effect; many of the prespecified outcomes were not reported. Therefore, they should be interpreted with caution. We included five trials that included 554 women and babies (four open-label, multi-centre, two-arm trials; one single centre, four-arm RCT). All five trials were at a high or unclear risk of bias due to lack of blinding, unclear methods of randomisation, and selective reporting of outcomes. Pooling of data from the trials was not possible, as each trial looked at a different comparison.
1. One trial (N = 33 women) compared Lispro insulin with regular insulin and provided very low-quality evidence for the outcomes. There were seven episodes of pre-eclampsia in the Lispro group and nine in the regular insulin group, with no clear difference between the two groups (risk ratio (RR) 0.68, 95% CI 0.35 to 1.30). There were five caesarean sections in the Lispro group and nine in the regular insulin group, with no clear difference between the two groups (RR 0.59, 95% CI 0.25 to 1.39). There were no cases of fetal anomaly in the Lispro group and one in the regular insulin group, with no clear difference between the groups (RR 0.35, 95% CI 0.02 to 8.08). Macrosomia, perinatal deaths, episodes of birth trauma including shoulder dystocia, nerve palsy, and fracture, and the composite outcome measure of neonatal morbidity were not reported.
2. One trial (N = 42 women) compared human insulin to animal insulin, and provided very low-quality evidence for the outcomes. There were no cases of macrosomia in the human insulin group and two in the animal insulin group, with no clear difference between the groups (RR 0.22, 95% CI 0.01 to 4.30). Perinatal death, pre-eclampsia, caesarean section, fetal anomaly, birth trauma including shoulder dystocia, nerve palsy and fracture and the composite outcome measure of neonatal morbidity were not reported.
3. One trial (N = 93 women) compared pre-mixed insulin (70 NPH/30 REG) to self-mixed, split-dose insulin and provided very low-quality evidence to support the outcomes. Two cases of macrosomia were reported in the pre-mixed insulin group and four in the self-mixed insulin group, with no clear difference between the two groups (RR 0.49, 95% CI 0.09 to 2.54). There were seven cases of caesarean section (for cephalo-pelvic disproportion) in the pre-mixed insulin group and 12 in the self-mixed insulin group, with no clear difference between groups (RR 0.57, 95% CI 0.25 to 1.32). Perinatal death, pre-eclampsia, fetal anomaly, birth trauma including shoulder dystocia, nerve palsy, or fracture and the composite outcome measure of neonatal morbidity were not reported.
4. In the same trial (N = 93 women), insulin injected with a Novolin pen was compared to insulin injected with a conventional needle (syringe), which provided very low-quality evidence to support the outcomes. There was one case of macrosomia in the pen group and five in the needle group, with no clear difference between the different insulin regimens (RR 0.21, 95% CI 0.03 to 1.76). There were five deliveries by caesarean section in the pen group compared with 14 in the needle group; women were less likely to deliver via caesarean section when insulin was injected with a pen compared to a conventional needle (RR 0.38, 95% CI 0.15 to 0.97). Perinatal death, pre-eclampsia, fetal anomaly, birth trauma including shoulder dystocia, nerve palsy, or fracture, and the composite outcome measure of neonatal morbidity were not reported.
5. One trial (N = 223 women) comparing insulin Aspart with human insulin reported none of the review's primary outcomes: macrosomia, perinatal death, pre-eclampsia, caesarean section, fetal anomaly, birth trauma including shoulder dystocia. nerve palsy, or fracture, or the composite outcome measure of neonatal morbidity.

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6. One trial (N = 162 women) compared insulin Detemir with NPH insulin, and supported the outcomes with very low-quality evidence. There were three cases of major fetal anomalies in the insulin Detemir group and one in the NPH insulin group, with no clear difference between the groups (RR 3.15, 95% CI 0.33 to 29.67). Macrosomia, perinatal death, pre-eclampsia, caesarean section, birth trauma including shoulder dystocia, nerve palsy, or fracture and the composite outcome of neonatal morbidity were not reported.
Authors' conclusions
With limited evidence and no meta-analyses, as each trial looked at a different comparison, no firm conclusions could be made about different insulin types and regimens in pregnant women with pre-existing type 1 or 2 diabetes. Further research is warranted to determine who has an increased risk of adverse pregnancy outcome. This would include larger trials, incorporating adequate randomisation and blinding, and key outcomes that include macrosomia, pregnancy loss, pre-eclampsia, caesarean section, fetal anomalies, and birth trauma. (Author)

20170118-19*

Comprehensive maturity onset diabetes of the young (MODY) gene screening in pregnant women with diabetes in India. Doddabelavangala Mruthyunjaya M, Chapla A, Hesarghatta Shyamasunder A, et al (2017), PLoS ONE vol 12, no 1, 17 January 2017, e0168656

Pregnant women with diabetes may have underlying beta cell dysfunction due to mutations/rare variants in genes associated with Maturity Onset Diabetes of the Young (MODY). MODY gene screening would reveal those women genetically predisposed and previously unrecognized with a monogenic form of diabetes for further clinical management, family screening and genetic counselling. However, there are minimal data available on MODY gene variants in pregnant women with diabetes from India. In this study, utilizing the Next generation sequencing (NGS) based protocol fifty subjects were screened for variants in a panel of thirteen MODY genes. Of these subjects 18% (9/50) were positive for definite or likely pathogenic or uncertain MODY variants. The majority of these variants was identified in subjects with autosomal dominant family history, of whom five were in women with pre-GDM and four with overt-GDM. The identified variants included one patient with HNF1A Ser3Cys, two PDX1 Glu224Lys, His94Gln, two NEUROD1 Glu59Gln, Phe318Ser, one INS Gly44Arg, one GCK, one ABCC8 Arg620Cys and one BLK Val418Met variants. In addition, three of the seven offspring screened were positive for the identified variant. These identified variants were further confirmed by Sanger sequencing. In conclusion, these findings in pregnant women with diabetes, imply that a proportion of GDM patients with autosomal dominant family history may have MODY. Further NGS based comprehensive studies with larger samples are required to confirm these findings. (45 references) (Author) [Full article available online at: http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0168656#sec014]
Full URL: http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0168656#sec014

20170117-121*

Diabetes in pregnancy and infant adiposity: systematic review and meta-analysis. Logan KM, Gale C, Hyde MJ, et al (2017), Archives of Disease in Childhood: Fetal and Neonatal Edition vol 102, no 1, January 2017, F65-F72

Objective Maternal glycaemia and anthropometry-derived newborn adiposity are strongly correlated. The children of mothers with diabetes are at greater risk of adverse metabolic health, and increased adiposity is a plausible mediator. We undertook a systematic review and meta-analysis to compare adiposity in infants of diabetic mothers (IDM) and infants of mothers without diabetes (NIDM).
Design We identified observational studies reporting adiposity in IDM and NIDM. We searched references, traced forward citations and contacted authors for additional data. We considered all body composition techniques and compared fat mass, fat-free mass, body fat % and skinfold thickness. We used random effects meta-analyses and performed subgroup analyses by maternal diabetes type (type 1, type 2 and gestational) and infant sex. We examined the influence of pre-pregnancy body mass index (BMI) and conducted sensitivity analyses.
Results We included data from 35 papers and over 24 000 infants. IDM have greater fat mass than NIDM (mean difference (95% CI)): 83 g (49 to 117). Fat mass is greater in infants of mothers with gestational diabetes: 62 g (29 to 94) and type 1 diabetes: 268 g (139 to 397). Insufficient studies reported data for type 2 diabetes separately. Compared with NIDM, fat mass was greater in IDM boys: 87 g (30 to 145), but not significantly different in IDM girls: 42 g (−33 to 116). There was no attenuation after adjustment for maternal BMI.
Conclusions IDM have significantly greater adiposity in comparison with NIDM. These findings are justification for studies to determine whether measures to reduce infant adiposity will improve later health. (64 references) (Author)
Full URL: http://fn.bmj.com/content/102/1/F65.full

20170113-10*

Perinatal nurse home visiting referral patterns among women with diabetes and hypertension in Philadelphia. Bloch JR, Zupan S, McKeever AE, et al (2017), JOGNN: Journal of Obstetric, Gynecologic and Neonatal Nursing vol 46, no 1, January-February 2017, pp 29-39

Objective

To examine access to perinatal nurse home visiting services for high-risk pregnant women who have diabetes or hypertension.

Design

Secondary data analysis.

Setting

Philadelphia, PA.

Participants

Pregnant women who had a live birth during 2012 and those referred to a community-based agency for perinatal nurse home visiting because of their diagnosis of diabetes or hypertension.

Methods

Access to services was measured by examining referral information (dosage, diagnosis, gestational age at time of referral, and insurance type) retrieved from administrative logs of the community-based organization that provides perinatal home visiting to high-risk pregnant women. The population-based prevalence rates of hypertension and diabetes were calculated from birth record data provided by the Philadelphia Department of Public Health.

Results

During 2012, 595 pregnant women were referred for perinatal nurse home visiting services. The mean gestational age when referred for services was 24.9 weeks (standard deviation = 8.5) with a mean number of 8.8 authorized visits (standard deviation = 8). Associated with more authorized visits was having Medicaid as the insurance type and medical diagnoses that included hypertension ($p < .01$). Philadelphia prevalence rates for diabetes and hypertension varied by race and ethnicity ($p < .001$); Asian mothers had the greatest rates for diabetes and Black mothers the greatest rates for hypertension.

Conclusion

Various models of home visiting programs exist to improve maternal and child health outcomes. Because maternal morbidity and mortality rates are rising in the United States, further research about perinatal nurse home visiting programs for pregnant women with diabetes and hypertension is warranted. (43 references) (Author)

20170112-6*

Self-reported diabetes during pregnancy in the South African National Health and Nutrition Examination Survey: extent and social determinants. Chola L, Mutyambizi C, Sewpaul R, et al (2017), BMC Pregnancy and Childbirth vol 17, no 20, 10 January 2017

Background

Diabetes is a serious and growing public health concern in South Africa, but its prevalence and distribution in pregnant women is not well known. Women diagnosed with diabetes during pregnancy have a substantially greater risk of adverse health outcomes for both mother and child. This study aims to determine the prevalence and social determinants of diabetes during pregnancy in South Africa.

Methods

Data used in this study were from the 2012 South African National Nutrition and Health Examination Survey; a nationally representative cross-sectional household survey. The analysis was restricted to girls and women between the ages of 15 to 49 years who self-reported ever being pregnant (n = 4261) Logistic regression models were constructed to analyse the relationship between diabetes during pregnancy and several indicators including race, family history of diabetes, household income, area of residence and obesity.

Results

The prevalence of diabetes during pregnancy in South Africa was 3% (144 women) of all women who reported ever being pregnant. The majority of the women who had ever had diabetes were African (70%), 51% were unemployed and 76% lived in rural areas. Factors strongly associated with diabetes during pregnancy were age (1.04 [Odds Ratio], 0.01 [Standard Error]), family history of diabetes (3.04; 0.8) and race (1.91; 0.53).

Conclusion

The analysis will contribute to an understanding of the prevalence of diabetes during pregnancy and its social determinants. This will help in the development of effective interventions targeted at improving maternal and child health for mothers at high risk. (Author) [Please note: BMC initially publish articles in a provisional format. If there is a note on the document to indicate that it is still provisional, it may undergo minor changes]

Full URL: https://bmcpregnancychildbirth.biomedcentral.com/articles/10.1186/s12884-016-1218-z

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20170112-13*

A prepregnancy care program for women with diabetes: effective and cost saving. Egan AM, Danyliv A, Carmody L, et al (2016), The Journal of Clinical Endocrinology and Metabolism vol 101, no 4, April 2016, pp 1807-1815

Context:

Only a minority of women with diabetes attend prepregnancy care service and the economic effects of providing this service are unclear.

Objective:

The objective of the study was to design, put into practice, and evaluate a regional prepregnancy care program for women with types 1 and 2 diabetes.

Design:

This was a prospective cohort and cost-analysis study.

Setting:

The study was conducted at antenatal centers along the Irish Atlantic Seaboard.

Participants:

Four hundred fourteen women with type 1 or 2 diabetes participated in the study.

Intervention:

The intervention for the study was a newly developed prepregnancy care program.

Main Outcome Measures:

The program was assessed for its effect on the risk of adverse pregnancy outcomes. The difference between program delivery cost and the excess cost of treating adverse outcomes in nonattendees was evaluated.

Results:

In total, 149 (36%) attended: this increased from 19% to 50% after increased recruitment measures in 2010. Attendees were more likely to take preconception folic acid (97.3% vs 57.7%, P < .001) and less likely to smoke (8.7% vs 16.6%, P = .03) or take potentially teratogenic medications at conception (0.7 vs 6.0, P = .008). Attendees had lower glycated hemoglobin levels throughout pregnancy (first trimester glycated hemoglobin 6.8% vs 7.7%, P < .001; third trimester glycated hemoglobin 6.1% vs 6.5%, P = .001), and their offspring had lower rates of serious adverse outcomes (2.4% vs 10.5%, P = .007). The adjusted difference in complication costs between those who received prepregnancy care vs usual antenatal care only is €2578.00. The average cost of prepregnancy care delivery is €449.00 per pregnancy.

Conclusions:

This regional prepregnancy care program is clinically effective. The cost of program delivery is less than the excess cost of managing adverse pregnancy outcomes. (32 references) (Author)

Full URL: https://academic.oup.com/jcem/article/101/4/1807/2804593/A-Prepregnancy-Care-Program-for-Women-With

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20170112-1*

Ten years of optimizing outcomes for women with type 1 and type 2 diabetes in pregnancy. Owens LA, Egan AM, Carmody L, et al (2016), The Journal of Clinical Endocrinology and Metabolism vol 101, no 4, April 2016, pp 1598-1605

Context:

Pregnancy for women with type 1 or type 2 diabetes is a time of increased risk for both mother and baby. The Atlantic Diabetes in Pregnancy program provides coordinated, evidence-based care for women with diabetes in Ireland. Founded in 2005, the program now shares outcomes over its first decade in caring for pregnant women with diabetes.

Objective:

The objective was to assess improvements in clinical outcomes after the introduction of interventions.

Design, Setting, Participants:

We retrospectively examined 445 pregnancies in women with type 1 and type 2 diabetes and compared them over two time points, 2005-2009 and 2010-2014.

Interventions:

Interventions introduced over that time include: provision of combined antenatal/diabetes clinics, prepregnancy care, electronic data management, local clinical care guidelines, professional and patient education materials, an app, and a web site.

Main Outcomes:

Pregnancy outcomes were measured.

Results:

The introduction of the Atlantic Diabetes in Pregnancy program has been associated with a reduction in adverse neonatal outcomes. There has been a reduction in congenital malformations (5 to 1.8%; P = .04), stillbirths (2.3 vs 0.4%; P = .09), despite an upward trend in maternal age (mean age, 31.7 vs 33 years), obesity (29 vs 43%; body mass index >30 kg/m2), and excessive gestational weight gain (24 vs 38%; P = .002). These improvements in outcomes occur

alongside an increase in attendance at pre pregnancy care (23 to 49%; P < .001), use of folic acid (45 vs 71%; P < .001), and sustained improvement in glycemic control.
Conclusions:
Changing the process of clinical care delivery and utilizing evidence-based interventions in a pragmatic clinical setting improves pregnancy outcomes for women with pre gestational diabetes. We now need to target optimization of maternal body mass index before pregnancy and put a greater focus on gestational weight gain through education and monitoring. (Author)
Full URL: https://academic.oup.com/jcem/article/101/4/1598/2804540/Ten-Years-of-Optimizing-Outcomes-for-Women-With

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20170106-61*

Diabetes mellitus in pregnancy. Sutton DM, Han CS, Werner EF (2017), NeoReviews vol 18, no 1, January 2017, pp e33-e43

Gestational and pregestational diabetes make up the most common maternal metabolic disorder of pregnancy. Suboptimal control of blood glucose has the potential for serious maternal and neonatal adverse effects. Neonates of diabetic mothers are at risk for congenital malformations, perinatal mortality, preeclampsia, preterm birth, increased birthweight, neonatal hypoglycemia and respiratory distress. The nature and severity of risks depend on the timing and duration of hyperglycemia. Through glycemic control and proper prenatal care, many of these risks can be mitigated. Pediatric providers must be sensitive to the association between a newborn's risk and the mother's level of glycemic control, often linked to her adherence to prenatal care. (Author)

20170106-24*

Obesity, diabetes, and birth outcomes among American Indians and Alaska natives. Anderson KG, Spicer P, Peercy MT (2016), Maternal and Child Health Journal vol 20, no 12, December 2016, pp 2548-2556

Objectives To examine the relationships between prepregnancy diabetes mellitus (DM), gestational diabetes mellitus (GDM), and prepregnancy body mass index, with several adverse birth outcomes: preterm delivery (PTB), low birthweight (LBW), and macrosomia, comparing American Indians and Alaska Natives (AI/AN) with other race/ethnic groups. Methods The sample includes 5,193,386 singleton US first births from 2009-2013. Logistic regression is used to calculate adjusted odds ratios controlling for calendar year, maternal age, education, marital status, Kotelchuck prenatal care index, and child's sex. Results AI/AN have higher rates of diabetes than all other groups, and higher rates of overweight and obesity than whites or Hispanics. Neither overweight nor obesity predict PTB for AI/AN, in contrast to other groups, while diabetes predicts increased odds of PTB for all groups. Being overweight predicts reduced odds of LBW for all groups, but obesity is not predictive of LBW for AI/AN. Diabetes status also does not predict LBW for AI/AN; for other groups, LBW is more likely for women with DM or GDM. Overweight, obesity, DM, and GDM all predict higher odds of macrosomia for all race/ethnic groups. Conclusions for Practice Controlling diabetes in pregnancy, as well as prepregnancy weight gain, may help decrease preterm birth and macrosomia among AI/AN. (Author)

20170105-32*

Pregnancy Outcomes in Women With Diabetes-Lessons Learned From Clinical Research : The 2015 Norbert Freinkel Award Lecture. Mathiesen ER (2016), Diabetes Care vol 39, no 12, December 2016, pp 2111-2117

Among women with diabetes, the worst pregnancy outcome is seen in the subgroup of women with diabetic nephropathy. Development of severe preeclampsia that leads to early preterm delivery is frequent. Predictors and pathophysiological mechanisms for the development of preeclampsia among women with diabetes and observational studies that support antihypertension treatment for pregnant women with microalbuminuria or diabetic nephropathy preventing preeclampsia and early preterm delivery are presented here. Obtaining and maintaining strict glycemic control before and during pregnancy is paramount to prevent preterm delivery. The cornerstones of diabetes management are appropriate diet and insulin, although the risk of severe hypoglycemia always needs to be taken into account when tailoring a diabetes treatment plan. Pathophysiological mechanisms of the increased risk of hypoglycemia during pregnancy are explored, and studies evaluating the use of insulin analogs, insulin pumps, and continuous glucose monitoring to improve pregnancy outcomes and to reduce the risk of severe hypoglycemia in pregnant women with type 1 diabetes are reported. In addition to strict glycemic control, other factors involved in fetal overgrowth are explored, and restricting maternal gestational weight gain is a promising treatment area. The optimal carbohydrate content of the diet is discussed. In summary, the lessons learned from this clinical research are that glycemic control, gestational weight gain, and antihypertension treatment all are of importance for improving pregnancy outcomes in pregnant women with preexisting diabetes. An example of how to use app technology to share the recent evidence-based clinical recommendations for women with diabetes who are pregnant

or planning pregnancy is given. (Author)

20161215-97*

Placental weight in pregnant women with Type 1 diabetes mellitus: the association with fetal growth. Mehta S, Khoury J, Miodovnik M, et al (2016), American Journal of Perinatology vol 33, no 13, November 2016, pp 1255-1261

Objective This study aims to determine the association between placental weight (PW) and large for gestational age (LGA) in women with type 1 diabetes mellitus (T1DM) and whether glycemic control modifies the association.

Study Design In a retrospective analysis of a cohort of women with T1DM, poor glycemic control was defined as glycohemoglobin A1(HbA1)≥ 8.5% (≥2 standard deviations [SD] above mean), and LGA as birth weight > 90th percentile, according to gestation, race, and sex. Multivariable logistic regression was used for analysis. Stratified analyses (HbA1 < 8.5% vs. HbA1 ≥ 8.5%) assessed the role of glycemic control on association between PW and LGA.

Results PW in 302 pregnancies was positively associated with LGA (first vs. fourth quartile of PW; odds ratio [OR] = 9.56; 95% confidence interval [CI]: 4.14-22.08). Association varied significantly by glycemic control in the first trimester, but not in the second and third trimesters. For women with first trimester HbA1 concentration < 8.5%, there was no statistically significant association; however, with HbA1 ≥ 8.5%, there was a strong association (OR = 13.40, 95% CI: 3.31, 54.27).

Conclusion There was a significant positive association between PW and LGA in infants of women with T1DM, particularly evident in pregnancies with poor glycemic control during the first trimester, highlighting the importance of achieving good glycemic control early in gestation. (Author)

20161215-16*

Association of maternal diabetes/glycosuria and pre-pregnancy body mass index with offspring indicators of non-alcoholic fatty liver disease. Patel S, Lawlor DA, Callaway M, et al (2016), BMC Pediatrics vol 16, no 47, March 2016

Background

Little is known about early life determinants of non-alcoholic fatty liver disease (NAFLD). We examined associations of maternal pregnancy diabetes/glycosuria and pre-pregnancy body mass index (BMI) with offspring markers of NAFLD and liver pathology and examined mediation by birthweight and concurrent offspring adiposity.

Methods

We used data from a UK prospective pregnancy cohort. Offspring underwent abdominal ultrasonography (USS) at mean age 17.8 years. Outcomes included USS-assessed fatty liver, estimated liver volume and shear velocity, a variant of elastography (a marker of liver fibrosis) (N = 1 215) and blood-based markers of liver pathology [alanine amino transferase, aspartate amino transferase, gamma- glutamyltransferase and haptoglobin] (N = 2 359).

Results

2.1 % (N = 25) of participants had USS-assessed fatty liver [maternal diabetes/glycosuria (N = 7) and no diabetes/glycosuria (N = 18)]. Maternal diabetes/glycosuria was associated with greater odds of offspring USS fatty liver in confounder adjusted models [adjusted odds ratio (aOR) 6.74 (95 % confidence interval (CI) 2.47, 18.40)] and higher shear velocity [adjusted ratio of geometric mean (aRGM):1.10 (95 % CI 1.05, 1.15)]. These associations were not mediated by offspring birthweight or concurrent adiposity. Maternal diabetes/glycosuria was not associated with liver volume or blood-based outcomes. Greater maternal pre-pregnancy BMI was associated with greater odds of offspring USS fatty liver [aOR 2.72 (95 % CI: 1.20, 6.15)], higher liver volume [aRGM 1.03 (95 % CI 1.00, 1.07)] and shear velocity [aRGM1.03 (95 % CI: 1.01, 1.06)] in confounder adjusted models. These associations were largely mediated by offspring adiposity. Maternal pre-pregnancy BMI was not consistently associated with blood-based outcomes.

Conclusions

Results suggest that maternal pregnancy diabetes/glycosuria is associated with offspring NAFLD through mechanisms other than offspring's own adiposity. (41 references) (Author) [Please note: BMC initially publish articles in a provisional format. If there is a note on the document to indicate that it is still provisional, it may undergo minor changes] [The full article can be viewed free of charge at: https://bmcpediatr.biomedcentral.com/articles/10.1186/s12887-016-0585-y]

Full URL: https://bmcpediatr.biomedcentral.com/articles/10.1186/s12887-016-0585-y

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20161215-112*

Prepregnancy weight in women with type 1 diabetes mellitus: effect on pregnancy outcomes. Kawakita T, Bowers K, Coviello E, et al (2016), American Journal of Perinatology vol 33, no 13, November 2016, pp 1300-1305

Objective This study aims to evaluate the association between prepregnancy body mass index (BMI) and adverse pregnancy outcomes in women with type 1 diabetes mellitus (DM).

Methods This is a secondary analysis of a cohort of 426 pregnancies in women with type 1 DM recruited before 20 weeks gestation. Women were categorized according to prepregnancy BMI: low BMI (< 20 kg/m2), normal BMI (20 to < 25 kg/m2), and high BMI (≥ 25 kg/m2). The outcomes of interest were: spontaneous abortion (delivery < 20 weeks gestation); preeclampsia; emergent delivery for maternal indications (hypertension or placental abruption); and preterm delivery (< 37 weeks gestation). Analyses included proportional hazards and multiple logistic regression models with covariates: age, age at diagnosis of type 1 DM, previous spontaneous abortion, microvascular disease (nephropathy or retinopathy), and glycohemoglobin A1 concentrations.
Results Low BMI was associated with preterm delivery. High BMI was associated with emergent delivery for maternal indications. Glycemic control as measured by glycohemoglobin A1 was associated with increased risk of spontaneous abortion, attenuating the association with low prepregnancy weight.
Conclusion Prepregnancy BMI is a risk factor to be considered when caring for women with type 1 DM, in particular for preterm delivery (low BMI) and emergent delivery for maternal indications (high BMI).(Author)

20161215-107*

Longitudinal patterns of glycemic control and blood pressure in pregnant women with type 1 diabetes mellitus: phenotypes from functional data analysis. Szczesniak RD, Li D, Duan LL, et al (2016), American Journal of Perinatology vol 33, no 13, November 2016, pp 1282-1290

Objective To identify phenotypes of type 1 diabetes control and associations with maternal/neonatal characteristics based on blood pressure (BP), glucose, and insulin curves during gestation, using a novel functional data analysis approach that accounts for sparse longitudinal patterns of medical monitoring during pregnancy.
Methods We performed a retrospective longitudinal cohort study of women with type 1 diabetes whose BP, glucose, and insulin requirements were monitored throughout gestation as part of a program-project grant. Scores from sparse functional principal component analysis (fPCA) were used to classify gestational profiles according to the degree of control for each monitored measure. Phenotypes created using fPCA were compared with respect to maternal and neonatal characteristics and outcome.
Results Most of the gestational profile variation in the monitored measures was explained by the first principal component (82-94%). Profiles clustered into three subgroups of high, moderate, or low heterogeneity, relative to the overall mean response. Phenotypes were associated with baseline characteristics, longitudinal changes in glycohemoglobin A1 and weight, and to pregnancy-related outcomes.
Conclusion Three distinct longitudinal patterns of glucose, insulin, and BP control were found. By identifying these phenotypes, interventions can be targeted for subgroups at highest risk for compromised outcome, to optimize diabetes management during pregnancy.(Author)

20161215-102*

Characterizing gestational weight gain according to institute of medicine guidelines in women with type 1 diabetes mellitus: association with maternal and perinatal outcome. Kawakita T, Bowers K, McWhorter K, et al (2016), American Journal of Perinatology vol 33, no 13, November 2016, pp 1266-1272

Objective This study aims to evaluate the association between gestational weight gain (GWG) defined by the current Institute of Medicine (IOM) guidelines and pregnancy outcomes in women with type 1 diabetes mellitus (DM).
Study design This is a secondary analysis of a cohort of 293 pregnancies of women with type 1 DM between 24 and 41 weeks' gestation. Women were categorized according to GWG per week over the second and third trimester: below, within, and above the IOM guidelines. Adjusted odds ratios (aORs) with 95% confidence intervals (CIs) were calculated for maternal and neonatal outcomes, controlling for covariates and confounders (referent: GWG within the IOM guidelines).
Results Of the 293 women, there were 49 women (16.7%) with the GWG below the IOM guidelines, 86 women (29.4%) with the GWG within the IOM guidelines, and 158 women (53.9%) with the GWG above the IOM guidelines. Women with the GWG above the IOM guidelines had a higher risk of macrosomia and neonatal hyperbilirubinemia (aOR: 2.78; 95% CI: 1.23-6.30 and 2.31; 1.22-4.35, respectively).
Conclusion GWG above the IOM guidelines is associated with an increased risk of macrosomia and neonatal hyperbilirubinemia. Maintaining GWG within the IOM guidelines may decrease the risk of excessive fetal growth and neonatal hyperbilirubinemia in infants of women with type 1 DM. (Author)

20161124-3*

Is skin autofluorescence a marker of metabolic memory in pregnant women with diabetes?. Maury E, Savel J, Grouthier V, et al (2015), Diabetic Medicine vol 32, no 12, December 2015, pp 1575-1579

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Aim

To determine whether skin autofluorescence can help to detect those who have previously had abnormal glucose levels among women referred for diabetes during pregnancy.

Methods

Using an advanced glycation end product reader (AGE Readertm; DiagnOptics BV, Groningen, the Netherlands), we measured forearm skin autofluorescence at 24-30 weeks of gestation in all women who were referred to our Nutrition Diabetology unit for diabetes during pregnancy.

Results

The study included 230 women (200 with gestational diabetes and 30 with pre-gestational diabetes, of whom 21 had Type 1 and nine had Type 2 diabetes) and a reference group of 22 normoglycaemic non-pregnant women. Skin autofluorescence was significantly higher in women with pre-gestational diabetes (1.97 ± 0.44 arbitary units) compared with gestational diabetes (1.77 ± 0.32 arbitary units; P = 0.003) and lower in the reference group (1.60 ± 0.32 arbitary units; P = 0.009 vs all pregnant women). Among women with gestational diabetes, 71 had a history of hyperglycaemia (i.e. gestational diabetes or macrosomia in a previous pregnancy or discovery of diabetes before 24th gestational week in the present pregnancy). These women had higher levels of skin autofluorescence (1.83 ± 0.35 arbitary units) than women with gestational diabetes without previous history of hyperglycaemia (1.73 ± 0.30 arbitary units; P = 0.04, non-significant, adjusted for age). Skin autofluorescence increased with the number of criteria present for previous hyperglycaemia (P for trend = 0.008) and was significantly associated with having two or three criteria for hyperglycaemia after adjusting for age (P = 0.02).

Conclusions

Skin autofluorescence could reflect previous long-term hyperglycaemia in pregnant women, and could therefore be a marker of metabolic memory.

(Author)

20161103-29*

Insulin pumps and pregnancy. White SL, Brackenridge A, Rajasingam D (2016), The Obstetrician and Gynaecologist vol 18, no 3, July 2016, pp 199-203

Key content:

The workings of the insulin pump.

The evidence behind the use of insulin pumps in pregnancy.

How insulin dosage changes during pregnancy and the use of insulin pumps during labour.

The future of pump technology.

Learning objectives:

To understand the basics of insulin pump therapy during pregnancy.

To understand how to achieve good multidisciplinary care for pregnant women with diabetes who use a pump during pregnancy.

Ethical issues:

Do insulin pumps improve outcomes for pregnant women with diabetes?

Should continuous glucose monitoring be available for all pregnant women with diabetes who use an insulin pump?

(20 references) (Author)

20161031-3*

Quality of life, anxiety and depression symptoms in early and late pregnancy in women with pregestational diabetes. Callesen Do N, Secher AL, Cramon P, et al (2017), Acta Obstetricia et Gynecologica Scandinavica vol 96, no 2, February 2017, pp 190-197

Introduction

To explore changes in health-related quality of life, anxiety and depression symptoms during pregnancy in women with pregestational diabetes.

Material and methods

An observational cohort study including 137 pregnant women with pregestational diabetes (110 with type 1 and 27 with type 2). To evaluate changes from early to late pregnancy, the internationally validated questionnaires 36-Item Short-Form Health Survey (SF-36) and Hospital Anxiety and Depression Scale (HADS), were completed at 8 and 33 gestational weeks.

Results

From early to late pregnancy, the SF-36 scales Physical Function, Role Physical, Bodily Pain and Physical Component Summary worsened ($p<0.0001$ for all scales). Physical Component Summary score deteriorated from mean 52.3 (SD

6.5) to 40.0 (9.7) (p<0.0001) and the deterioration was negatively associated with gestational weight gain in multiple linear regression (β=-0.34/kg, p=0.03). The SF-36 scale Mental Health improved (p=0.0009) and the Mental Component Summary score increased moderately from 47.6 (10.6) to 53.5 (8.6) (p<0.0001). Greater improvement in Mental Component Summary score was seen with lower HbA1c in late pregnancy. The HADS-anxiety score improved slightly from 5.0 (3.3) to 4.5 (3.4) (p=0.04) while HADS-depression score was unchanged. The prevalence of women with HADS anxiety or depression score ≥8 did not change.
Conclusions
Physical quality of life deteriorated while mental quality of life improved slightly during pregnancy in women with pregestational diabetes. Minor reduction in anxiety and stable depression symptoms were observed. The results on mental health are reassuring, considering the great demands pregnancy place on women with pregestational diabetes. (Author)

20160914-50*

The association between diabetes and postpartum depression. Miller ES, Peri MR, Gossett DR (2016), Archives of Women's Mental Health vol 19, no 1, February 2016, pp 183-186

This study aims to estimate if diabetic women were more likely to experience postpartum depression symptoms than women without diabetes. This was a prospective cohort of women who received prenatal care at a hospital-affiliated prenatal clinic serving low-income women in Chicago, Illinois. For the primary analysis, women were divided by diabetes status (i.e., no diabetes or either gestational diabetes or pre-pregnancy diabetes). Postpartum depression was defined as a positive screen on the Patient Health Questionnaire-9. Rates of postpartum depression were compared, stratified by diabetic status. A multivariable logistic regression was performed to control for potential confounders. A planned secondary analysis compared women with pre-pregnancy diabetes to those without pre-pre-pregnancy diabetes. Three hundred and five women consented to participate of whom 100 (30.5 %) had gestational diabetes mellitus (GDM) and 33 (10.8 %) had pre-pregnancy diabetes. Compared to women without any diabetes, women with diabetes (either GDM or pre-pregnancy diabetes) had similar rates of antenatal [(OR) 0.69, 95 % CI) 0.44-1.08] and postpartum depression (OR 0.74, 95 % CI 0.33-1.66). However, postpartum depression was more common among women with pre-pregnancy diabetes (34.8 %) compared to non-diabetic women (16.7 %) (OR 2.67, 95 % CI 1.05-6.78). This association persisted even after adjusting for potential confounders (aOR 2.67, 95 % CI 1.05-9.79). Gestational diabetes was not associated with increased rates of depression. However, women with pre-pregnancy diabetes are more likely to experience postpartum depression compared to women without pre-pregnancy diabetes, even after adjusting for related comorbidities. (Author)

20160912-26*

Missed opportunities for appropriate postpartum care in women with pregestational diabetes. Riskin-Mashiah S, Almog R (2016), Journal of Maternal-Fetal and Neonatal Medicine vol 29, no 11, 2016, pp 1715-1719

Objective: Our aim was to evaluate postpartum glycemic control in women with pregestational diabetes and to assess contributing factors.
Methods: Retrospective data collection from an electronic database on a cohort of Israeli women at Clalit Healthcare Services with pregestational diabetes who gave birth in 2008-2011, including data on HbA1C, prescription fillings, and socio-demographics. HbA1C level was assessed during a 2 year time-period, from periconception until one-year postpartum.
Results: There were 180 deliveries to 166 women. Compared with the periconception period, the HbA1Clevel improved significantly during the last 6 months of pregnancy (6.7% versus 6.0%, p < 0.05). However, there was rapid continuous deterioration in glycemic control in the postpartum period with median HbA1C = 6.9% in the first 6 months postpartum and 7.2% in the late postpartum period (p < 0.05). One-year postpartum 107 women (59.4%) had suboptimal care (defined as HbA1C > 7.0% or no test). In the multiple logistic regression analysis, the only significant predictor of 1-year postpartum suboptimal care was suboptimal periconception care, OR = 6.1 (95% CI 3.15-11.84, p = 0.001).
Conclusions: Postpartum glycemic control deteriorated rapidly despite excellent control in most women in the last 6 month of pregnancy. More intensive and targeted intervention is needed in order to optimize postpartum care of diabetic patients. (Author)

20160908-6*

Contemporary type 1 diabetes pregnancy outcomes: impact of obesity and glycaemic control. Abell SK, Boyle JA, de Courten B, et al (2016), Medical Journal of Australia vol 205, no 4, 2016, pp 162-167

OBJECTIVE:
To compare contemporary pregnancy outcomes in women with and without type 1 diabetes, and to examine the effects of obesity and glycaemic control on these outcomes.
DESIGN AND SETTING:
Historical cohort study in a specialist diabetes and maternity network in Victoria.
PARTICIPANTS:
All singleton births (at least 20 weeks' gestation), 2010-2013, were analysed: 107 pregnancies to women with type 1 diabetes and 27 075 pregnancies to women without diabetes. Women with type 2 diabetes or gestational diabetes were excluded.
METHODS:
Data were extracted from the Birthing Outcomes System database; associations between type 1 diabetes and pregnancy outcomes were analysed by multivariable regression.
MAIN OUTCOME MEASURES:
Mode of birth; maternal and neonatal outcomes.
RESULTS:
The mean body mass index was higher for women with type 1 diabetes than for women without diabetes (mean, 27.3 kg/m(2) [SD, 5.0] v 25.7 kg/m(2) [SD, 5.9]; P = 0.01); the median gestation period for their babies was shorter (median, 37.3 weeks [IQR, 34.6-38.1] v 39.4 weeks [IQR, 38.4-40.4]; P < 0.001) and they were more likely to be large for gestational age (LGA) (adjusted odds ratio [aOR], 7.9; 95% CI, 5.3-11.8). Women with type 1 diabetes were more likely to have had labour induced (aOR, 3.0; 95% CI, 2.0-4.5), a caesarean delivery (aOR, 4.6; 95% CI, 3.1-7.0), or a pre-term birth (aOR, 6.7; 95% CI, 4.5-10.0); their babies were more likely to have shoulder dystocia (aOR, 8.2; 95% CI, 3.6-18.7), hypoglycaemia (aOR, 10.3; 95% CI, 6.8-15.6), jaundice (aOR, 5.1; 95% CI, 3.3-7.7), respiratory distress (aOR, 2.5; 95% CI, 1.4-4.4) or to suffer perinatal death (aOR, 4.3; 95% CI, 1.9-9.9). In women with type 1 diabetes, greater obesity was associated with increased odds for an LGA baby or congenital malformation, and increased HbA1c levels were associated with pre-term birth and perinatal death.
CONCLUSION:
Women with type 1 diabetes, even when managed in a specialist setting, still experience adverse obstetric and neonatal outcomes. Poor glycaemic control is not wholly responsible for adverse outcomes, reinforcing the importance of other risk factors, such as obesity and weight gain. (Author)

20160824-25*

Effect of pregnancy on insulin requirements differs between type 1 and type 2 diabetes: A cohort study of 222 pregnancies. Padmanabhan S, Jiang S, Mclean M, et al (2016), Australian and New Zealand Journal of Obstetrics and Gynaecology (ANZJOG) vol 56, no 4, August 2016, pp 352-357

Background
Knowledge about expected insulin requirements during pregnancy, in women with pre-existing diabetes may assist clinicians to effectively respond to gestation-specific changes in glycemic pattern. Few studies have examined differences between type 1 (T1DM) and type 2 diabetes (T2DM).
Aims
To compare patterns of insulin requirements in pregnancy for women with pre-existing T1DM and T2DM.
Material and Methods
A retrospective cohort study of 222 pregnancies was conducted in women with pre-existing diabetes, (67 with T1DM, 155 with T2DM). Total daily insulin dose (TID) at the end of each trimester, recorded as units and units per kilogram (median, 25th-75th percentile) as well as percentage increase in insulin dose per trimester were compared.
Results
Women with T1DM had higher insulin requirements in the first two trimesters than those with T2DM (0.69 (0.58-0.85) vs 0.36 (0.0-0.7) units/kg in first trimester; 0.80 (0.62-0.95) vs 0.61 (0.27-0.95) units/kg, P < 0.005) in second trimester), but requirements in late pregnancy were similar (0.97 (0.69-1.29) vs 0.95 (0.53-1.32) units/kg, P = 0.54). Women with T2DM needed much greater increases in insulin per trimester compared to T1DM (P < 0.001). Women with T1DM had a net fall in insulin requirements (3.7% in the first trimester and 4.1% in the late third trimester) while those with T2DM did not.
Conclusions
This is the largest comparison study of insulin requirements in women with pre-existing diabetes, highlighting important trimester-specific differences between T1DM and T2DM to guide insulin titration during pregnancy. Our findings suggest a differential effect of pregnancy-mediated insulin resistance by type of diabetes. (24 references) (Author)

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20160823-35*

Closed-Loop Insulin Delivery during Pregnancy in Women with Type 1 Diabetes. Stewart ZA, Wilinska ME, Hartnell S, et al (2016), The New England Journal of Medicine vol 375, no 7, 18 August 2016, pp 644-654

BACKGROUND:
In patients with type 1 diabetes who are not pregnant, closed-loop (automated) insulin delivery can provide better glycemic control than sensor-augmented pump therapy, but data are lacking on the efficacy, safety, and feasibility of closed-loop therapy during pregnancy.
METHODS:
We performed an open-label, randomized, crossover study comparing overnight closed-loop therapy with sensor-augmented pump therapy, followed by a continuation phase in which the closed-loop system was used day and night. Sixteen pregnant women with type 1 diabetes completed 4 weeks of closed-loop pump therapy (intervention) and sensor-augmented pump therapy (control) in random order. During the continuation phase, 14 of the participants used the closed-loop system day and night until delivery. The primary outcome was the percentage of time that overnight glucose levels were within the target range (63 to 140 mg per deciliter [3.5 to 7.8 mmol per liter]).
RESULTS:
The percentage of time that overnight glucose levels were in the target range was higher during closed-loop therapy than during control therapy (74.7% vs. 59.5%; absolute difference, 15.2 percentage points; 95% confidence interval, 6.1 to 24.2; P=0.002). The overnight mean glucose level was lower during closed-loop therapy than during control therapy (119 vs. 133 mg per deciliter [6.6 vs. 7.4 mmol per liter], P=0.009). There were no significant differences between closed-loop and control therapy in the percentage of time in which glucose levels were below the target range (1.3% and 1.9%, respectively; P=0.28), in insulin doses, or in adverse-event rates. During the continuation phase (up to 14.6 additional weeks, including antenatal hospitalizations, labor, and delivery), glucose levels were in the target range 68.7% of the time; the mean glucose level was 126 mg per deciliter (7.0 mmol per liter). No episodes of severe hypoglycemia requiring third-party assistance occurred during either phase.
CONCLUSIONS:
Overnight closed-loop therapy resulted in better glucose control than sensor-augmented pump therapy in pregnant women with type 1 diabetes. Women receiving day-and-night closed-loop therapy maintained glycemic control during a high proportion of the time in a period that encompassed antenatal hospital admission, labor, and delivery. (Author)

20160727-3

The associations of maternal body mass index with birthweight and placental weight. Does maternal diabetes matter? A population study of 106,191 pregnancies. Strøm-Roum EM, Tanbo TG, Eskild A (2016), Acta Obstetricia et Gynecologica Scandinavica vol 95, no 10, October 2016, pp1162-1170

Introduction
To study whether the associations of maternal body mass index (BMI) with offspring birthweight and placental weight differ by maternal diabetes status.
Material and Methods
We performed a population study of 106,191 singleton pregnancies by using data from the years 2009-2012 in the Medical Birth Registry of Norway. We estimated changes in birthweight and in placental weight (in grams) by maternal BMI by linear regression analysis.
Results
In pregnancies without diabetes, birthweight increased by 14.7 grams (g) (95% confidence interval (CI) 14.1-15.2) per unit increase in maternal BMI, and the increase in placental weight was 4.2 g (95% CI; 4.0-4.4). In pregnancies with gestational diabetes, the corresponding figures were 11.8 g (95% CI; 8.3-15.4) and 2.9 g (95% CI; 1.7-4.0). In pregnancies with diabetes type-1, we found no significant changes in birthweight or in placental weight by maternal BMI. Overall, mean birthweight was 513.9 g (95% CI; 475.6-552.1) higher in pregnancies with diabetes type-1 than in pregnancies without diabetes. Mean placental weight was 102.1 g (95% CI; 89.3-114.9) higher. Also in pregnancies with gestational diabetes, birthweight and placental weight were higher than in women without diabetes (168.2 g and 46.5 g, respectively). Adjustments were made for maternal BMI and gestational age at birth.
Conclusions
Birthweight and placental weight increased with increasing maternal BMI in pregnancies without diabetes and in pregnancies with gestational diabetes, but not in pregnancies with diabetes type-1. Independent of BMI, mean birthweight and mean placental weight were highest in pregnancies with diabetes type-1.
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20160711-6*

Perinatal outcome and frequency of congenital malformations in pregnancy complicated with diabetes type 1 and type 2. Kotori VM, Ivanisevic M, Delmis J (2016), Open Journal of Obstetrics and Gynecology vol 6, no 2, February 2016, pp 122-128

Objectives: The objectives of this study were to evaluate and compare perinatal outcomes and frequency of congenital malformations in pregnancy that are complicated with type 1 and type 2 diabetes. Study Design: This prospective study included 557 pregnant women with type 1 diabetes and 149 pregnant women with type 2 diabetes that gave birth in the Clinic for Diabetes in Pregnancy in Zagreb, from January 2000 to December 2012. Results: Women with type 2 diabetes were significantly older than women with type 1 diabetes ($p < 0.003$; 32.8 ± 5.5 versus 29.3 ± 3.2) and they have significantly higher BMI compared to type 1 diabetes ($P < 0.001$; 29.2 ± 6.5 versus 23.5 ± 3.8). Comparing their delivery patterns, women with type 1 diabetes were significantly more likely to give birth by caesarean section than women with type 2 diabetes ($p < 0.001$; 466 versus 82). The offspring of women with type 1 diabetes were more likely to be delivered preterm in comparison with offspring of women with type 2 diabetes (109 versus 31). Macrosomia is recognized characteristic of pregnancies complicated by diabetes and its incidence was significantly higher in women with type 1 diabetes compared to women with type 2 diabetes ($p < 0.035$; 174 versus 38). Neonatal malformations were higher in women with type 1 vs. type 2 diabetes (12 versus 7), but not statistically significant. Glycosylated haemoglobin (HbA1c) levels were statistically significantly higher in the first trimester (8.02% v. 6.72%), second (7.55% versus 6.27%) and third trimester (7.40% versus 6.03%) in women with type 1 and type 2 diabetes that gave birth to neonates with congenital malformations. Perinatal mortality was higher in pregnant women with type 1 diabetes than in women with type 2 diabetes (4 versus 2) but not statistically significant. Conclusion: Comparing perinatal mortality and frequency of congenital malformations in women with type 1 and type 2 diabetes, we didn't find any important statistical differences. There is no significant difference in complication for babies of women with type 1 and type 2 diabetes, and it is likely that the most important causative factor is a high maternal blood glucose concentration. (17 references) (Author) [Full article available online at: http://file.scirp.org/pdf/OJOG_2016022414371733.pdf]

Full URL: http://file.scirp.org/pdf/OJOG_2016022414371733.pdf

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20160711-25*

The effect of intramuscular versus intra-amniotic dexamethasone administration on blood glucose level in diabetic pregnant women. Zhu Y, He X, Yan F, et al (2016), Open Journal of Obstetrics and Gynecology vol 6, no 7, June 2016, pp 433-437

Background: To investigate the blood glucose level response of diabetic pregnant women when administrating antenatal dexamethasone to accelerate fetal lung maturity in different routes.

Methods: This prospective cohort study included 60 pregnant women with diabetes who required promotion of fetal lung maturity in Peking University First Hospital from January 2013 to April 2015.

Dexamethasone was administered by IM (n = 29) or IAC (n = 31). Blood glucose level was monitored before injection, and 1 day, 2 days and 3 days after injection. Results: In the intramuscular injection group, the preprandial and postprandial blood glucose concentration was significantly elevated in the first two days ($P< 0 .001$), and the postprandial blood glucose level was still higher than basal level ($P = 0.034$) on the third day. In the intra-amniotic injection group, the preprandial and postprandial blood glucose concentration was also significantly elevated on the first day ($P < 0.001$), but soon returned to the basal level on the second day. No significant difference was found in the increase between the two groups. Conclusion: Blood glucose level is significantly influenced by intramuscular injection between the two groups. Conclusion: Blood glucose level is significantly influenced by intramuscular injection of antenatal dexamethasone rather than amniotic cavity injection. (8 references) (Author)

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Full URL: http://www.scirp.org/Journal/PaperInformation.aspx?PaperID=67521

20160621-16*

Autism-specific maternal anti-fetal brain autoantibodies are associated with metabolic conditions. Krakowiak P, Walker CK, Tancredi D, et al (2016), Autism Research 17 June 2016. Online version ahead of print

Approximately 23% of mothers of children with autism spectrum disorder (ASD) produce specific patterns of autoantibodies to fetal brain proteins that have been detected in only 1% of mothers of typically developing children. The biological mechanisms underlying the development of ASD-specific maternal autoantibodies are poorly understood. We sought to determine whether ASD-specific maternal autoantibodies identified postnatally were associated with metabolic conditions (MCs) during gestation. Participants were 227 mothers of 2-5 year old children

with confirmed ASD, enrolled in CHARGE (Childhood Autism Risk from Genetics and the Environment) between January 2003 and April 2008, and from whom blood samples were collected and analyzed for anti-fetal brain autoantibodies (Ab+). MCs included diabetes, hypertensive disorders, and prepregnancy obesity or overweight, ascertained from medical records or structured telephone interviews. Log-linear regression models were performed to estimate prevalence ratios and 95% confidence intervals (CI) based on robust standard errors. Fifty-six (25%) mothers were Ab+. Ab+ prevalence was higher among mothers with diabetes, hypertensive disorders, or overweight compared to healthy mothers, but differences were not statistically significant. In a subset of 145 mothers whose children exhibited severe ASD (31 Ab+), those diagnosed with type 2 or gestational diabetes were 2.7-fold more likely to be Ab+ (95% CI 1.1, 6.6), controlling for delivery payer and smoking. Gestational diabetes specifically was associated with a 3.2-fold increased Ab+ prevalence (95% CI 1.2, 8.6). In this exploratory study, mothers whose children had severe ASD and who experienced diabetes were more likely to have anti-fetal brain autoantibodies 2-5 years later. (Author)

20160610-11*

Continuous subcutaneous insulin infusion versus multiple daily injections of insulin for pregnant women with diabetes (Cochrane Review). (Assessed as up to date: 31 March 2016). Farrar D, Tuffnell DJ, West J (2016), The Cochrane Database of Systematic Reviews Issue 6, 2016

Background

Diabetes results in a rise in blood glucose above normal physiological levels; if untreated this may cause damage to many systems including the cardiovascular and renal systems. Pregnancy increases resistance to insulin action; for those women who have pre-gestational diabetes, this results in an increasing insulin requirement. There are several methods of administering insulin. Conventionally, insulin has been administered subcutaneously, formally referred to as intensive conventional treatment, but now more usually referred to as multiple daily injections (MDI). An alternative method of insulin administration is the continuous subcutaneous insulin infusion pump (CSII).

Objectives

To compare CSII with MDI of insulin for pregnant women with pre-existing and gestational diabetes.

Search methods

We searched the Cochrane Pregnancy and Childbirth Group's Trials Register (31 March 2016) and reference lists of retrieved studies.

Selection criteria

Randomised trials comparing CSII with MDI for pregnant women with diabetes.

Data collection and analysis

Three review authors independently assessed studies and two review authors extracted data. Disagreements were resolved through discussion with the third author. We assessed the quality of the evidence using the GRADE approach.

Main results

We included five single-centre trials (undertaken in Italy) with 153 women and 154 pregnancies in this review.

There were no clear differences in the primary outcomes reported between CSII and MDI in the included trials: caesarean section (risk ratio (RR) 1.09, 95% confidence interval (CI) 0.66 to 1.77; three trials, 71 women, evidence graded very low), large-for-gestational age (RR 4.15, 95% CI 0.49 to 34.95; three trials, 73 infants; evidence graded very low), and perinatal mortality (RR 2.33, 95% CI 0.38 to 14.32; four trials, 83 infants, evidence graded very low). Other primary outcomes were not reported in these trials (hypertensive disorders of pregnancy, development of type 2 diabetes, composite outcome of serious neonatal outcomes, and neurosensory disability).

There was no clear evidence of differences in the maternal secondary outcomes: maternal weight gain during pregnancy, 24 hour mean blood glucose in each trimester, mean maternal HbA1c in each trimester, maternal hypoglycaemia, and maternal hyperglycaemia. The included studies did not report several GRADE outcomes: perineal trauma, return to pre-pregnancy weight, postnatal depression, induction of labour. Many maternal secondary outcomes were also not reported.

In two trials, including a total of 61 infants, CSII was associated with an increase in mean birthweight compared with MDI (mean difference (MD) 220.56 g, 95% CI -2.09 g to 443.20 g; P = 0.05). However, the large CI including anything from a small reduction to an increase in mean birthweight and the lack of a difference in macrosomia rate (RR 3.20, CI 0.14 to 72.62; two trials, 61 infants) suggests uncertainty. Large-for-gestational age (see above), and small-for-gestational age also suggests uncertainty of effect. No significant differences were found in: gestation at delivery, preterm birth < 37 weeks' gestation, preterm birth < 32 weeks' gestation, neonatal hypoglycaemia (evidence graded very low), respiratory distress syndrome, neonatal hyperbilirubinaemia, and fetal anomaly. There were no data reported on many important infant outcomes, including the GRADE outcomes adiposity and diabetes. There was no follow-up

of infants in childhood or adulthood, so longer-term outcomes were not reported.
The only outcome reported for use of health service resources was maternal days hospitalised, which did not show a difference between groups in the small number of women included (MD 9.40, CI -6.04 to 24.84; one trial, 10 women). The methods used by the trials were poorly reported, for example although blinding of participants and clinicians regarding intervention allocation is impossible, it is possible to blind assessors and this along with other aspects of trial methods was not reported, which means that the trials are at an unclear or high risk of bias. We do not know if the women who participated were representative, and therefore if the results can be generalised. Most GRADE outcomes were not reported. For the GRADE outcomes that were reported, our assessment was that the evidence is very low quality (caesarean section, large-for-gestational age, perinatal mortality, and neonatal hypoglycaemia). This was due to design limitations in the included trials, small sample sizes in the trials contributing data, wide CIs crossing both the line of no effect and the line of appreciable benefit and/or harm, and often few events. We are therefore uncertain whether CSII or MDI improves outcomes for pregnant women with diabetes and their infants, and the results of further studies may differ substantially from those presented in this review.
Authors' conclusions
There is no evidence to support the use of one particular form of insulin administration over another for pregnant women with diabetes. There are only a small number of trials appropriate for meta-analysis, a small number of women included and questionable generalisability of the trial population.
Pump technology has progressed since these trials were undertaken. Well-designed randomised trials are required to evaluate comparisons such as patch pumps against MDI and more conventional CSII against MDI. These trials should be adequately powered to assess the effect of interventions, and report the core set of outcomes used in Cochrane reviews of diabetes in pregnancy. Trials to assess the effects of pumps on birthweight and macrosomia rates are needed. It would be beneficial for future trials to undertake longer-term follow-up of participants and their infants, assess women's preferences, and conduct an economic evaluation. (Author)

20160607-46

Pre-conception care for women with diabetes: a public health issue. Hughes C, Spence D, Alderice F (2016), British Journal of Midwifery vol 24, no 6, June 2016, pp 422-427

Pre-conception care is recognised to be an effective strategy for addressing many health behaviours, particularly for women with diabetes, who carry a higher risk of morbidity and mortality. However, there is a lack of evidence of the most effective approaches for promoting pre-conception health and encouraging women to access services. This article explores this challenging issue and suggests a number of strategies that health professionals may consider in relation to promoting health in this area. (45 references) (Author)

20160519-21*

Pregnancy outcomes in youth with type 2 diabetes: The TODAY Study Experience. Klingensmith GJ, Pyle L, Nadeau KJ, et al (2016), Diabetes Care vol 39, no 1, January 2016, pp 122-129

OBJECTIVE We evaluated pregnancy outcomes, maternal and fetal/neonatal, during the Treatment Options for type 2 Diabetes in Adolescents and Youth (TODAY) study.
RESEARCH DESIGN AND METHODS The TODAY study was a randomized controlled trial comparing three treatment options for youth with type 2 diabetes. Informed consent included the requirement for contraception, including abstinence; this was reinforced at each visit. Following informed consent, self-reported data related to the mother's prenatal care and delivery and the infant's health were retrospectively collected. When permitted, maternal medical records and infant birth records were reviewed.
RESULTS Of the 452 enrolled female participants, 46 (10.2%) had 63 pregnancies. Despite continued emphasis on adequate contraception, only 4.8% of the pregnant participants reported using contraception prior to pregnancy. The mean age at first pregnancy was 18.4 years; the mean diabetes duration was 3.17 years. Seven pregnancies were electively terminated; three pregnancies had no data reported. Of the remaining 53 pregnancies, 5 (9.4%) resulted in early pregnancy loss, and 7 (13%) resulted in loss with inadequate pregnancy duration data. Two pregnancies ended in stillbirth, at 27 and 37 weeks, and 39 ended with a live-born infant. Of the live-born infants, six (15.4%) were preterm and eight (20.5%) had a major congenital anomaly.
CONCLUSIONS Despite diabetes-specific information recommending birth control and the avoidance of pregnancy, 10% of the study participants became pregnant. Pregnancies in youth with type 2 diabetes may be especially prone to result in congenital anomalies. Reasons for the high rate of congenital anomalies are uncertain, but may include poor metabolic control and extreme obesity. (31 references) (Author) [The full version of this article is available free of charge at: http://care.diabetesjournals.org/content/39/1/122.long]
Full URL: http://care.diabetesjournals.org/content/39/1/122.long

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20160519-20*

Gestational diabetes mellitus in early pregnancy: evidence for poor pregnancy outcomes despite treatment. Sweeting AN, Ross GP, Hyett J, et al (2016), Diabetes Care vol 39, no 1, January 2016, pp 75-81

OBJECTIVE Recent guidelines recommend testing at <24 weeks of gestation for maternal dysglycemia in 'high-risk' women. Evidence to support the early identification and treatment of gestational diabetes mellitus (GDM) is, however, limited. We examined the prevalence, clinical characteristics, and pregnancy outcomes of high-risk women with GDM diagnosed at <24 weeks of gestation (early GDM) and those with pre-existing diabetes compared with GDM diagnosed at ≥24 weeks of gestation, in a large treated multiethnic cohort.

RESEARCH DESIGN AND METHODS Outcomes from 4,873 women attending a university hospital antenatal diabetes clinic between 1991 and 2011 were examined. All were treated to standardized glycemic targets. Women were stratified as pre-existing diabetes (n = 65) or GDM diagnosed at <12 weeks of gestation (n = 68), at 12-23 weeks of gestation (n = 1,247), or at ≥24 weeks of gestation (n = 3,493).

RESULTS Hypertensive disorders in pregnancy including pre-eclampsia, preterm delivery, cesarean section, and neonatal jaundice (all P < 0.001) were more prevalent in women with pre-existing diabetes and early GDM. Macrosomia (21.8% vs. 20.3%, P = 0.8), large for gestational age (39.6% vs. 32.8%, P = 0.4), and neonatal intensive care admission (38.5% vs. 39.7%, P = 0.9) in women in whom GDM was diagnosed at <12 weeks of gestation were comparable to rates seen in women with pre-existing diabetes.

CONCLUSIONS Despite early testing and current best practice treatment, early GDM in high-risk women remains associated with poorer pregnancy outcomes. Outcomes for those in whom GDM was diagnosed at <12 weeks of gestation approximated those seen in pre-existing diabetes. These findings indicate the need for further studies to establish the efficacy of alternative management approaches to improve outcomes in these high-risk pregnancies. (Author)

20160516-12*

Outcomes of extremely preterm infants born to insulin-dependent diabetic mothers. Boghossian NS, Hansen NI, Bell EF, et al (2016), Pediatrics vol 137, no 6, June 2016, p 28

BACKGROUND AND OBJECTIVE: Little is known about in-hospital morbidities and neurodevelopmental outcomes among extremely preterm infants born to women with insulin-dependent diabetes mellitus (IDDM). We examined risks of mortality, in-hospital morbidities, and neurodevelopmental outcomes at 18 to 22 months' corrected age between extremely preterm infants of women with insulin use before pregnancy (IBP), with insulin use started during pregnancy (IDP), and without IDDM.

METHODS: Infants 22 to 28 weeks' gestation born or cared for at a Eunice Kennedy Shriver National Institute of Child Health and Human Development Neonatal Research Network center (2006-2011) were studied. Regression models compared the association between maternal IDDM and timing of insulin use and the outcomes of the 3 groups.

RESULTS: Of 10 781 infants, 536 (5%) were born to women with IDDM; 58% had IBP, and 36% had IDP. Infants of mothers with IBP had higher risks of necrotizing enterocolitis (adjusted relative risk [RR] = 1.55 [95% confidence interval (CI) 1.17-2.05]) and late-onset sepsis (adjusted RR = 1.26 [95% CI 1.07-1.48]) than infants of mothers without IDDM. There was some indication of higher in-hospital mortality risk among infants of mothers with IBP compared with those with IDP (adjusted RR = 1.33 [95% CI 1.00-1.79]). Among survivors evaluated at 18 to 22 months' corrected age, average head circumference z score was lower for infants of mothers with IBP compared with those without IDDM, but there were no differences in risk of neurodevelopmental impairment.

CONCLUSIONS: In this cohort of extremely preterm infants, infants of mothers with IBP had higher risks of necrotizing enterocolitis, sepsis, and small head circumference. (Author) (Only the abstract/summary is published in the print journal, even where additional comments and clinical implications have been added)

20160330-3*

Safety of insulin analogs during pregnancy: a meta-analysis. Lv S, Wang J, Xu Y (2015), Archives of Gynecology and Obstetrics vol 292, no 4, October 2015, pp 749-756

OBJECTIVE:

The objective of this study was to assess the safety of four insulin analogs (aspart, lispro, glargine, and detemir) for the treatment of diabetes in pregnancy.

METHODS:

We searched Embase, Pubmed, and the Cochrane Central Register for Controlled Trials database through May 31, 2014. All articles were reviewed by two independent researchers, and if a discrepancy was noted, a third researcher was

consulted. Results data were summarized by RevMan 5.2 software.
RESULTS:
Our search resulted in the retrieval and screening of 3519 studies. Of those, 24 studies met the eligibility criteria; the studies reported on a total of 3734 women with pre-gestational or gestational diabetes during pregnancy. The use of lispro was associated with lower rates of neonatal jaundice (RR = 0.63) and severe maternal hypoglycemia (RR = 0.33) than regular insulin. Lispro use was also associated with higher birth weight (WMD = 116.44) and an increased incidence of large for gestational age (LGA) births (RR = 1.42) compared with regular insulin. Rates of cesarean section and macrosomia were similar in pregnant women treated with aspart and regular insulin. Birth weights and rates of severe maternal hypoglycemia, respiratory dysfunction syndrome, and neonatal intensive care unit admission were similar after pregnant women were treated with glargine and NPH insulin. Rates of LGA, macrosomia, and neonatal hypoglycemia were similar after pregnant women were treated with detemir and NPH insulin.
CONCLUSIONS:
Aspart, glargine, and detemir are safe treatment options for diabetes during pregnancy; these insulin analogs did not increase complications for the mothers or fetuses in our study. However, lispro was related to higher birth weight and increased rate of LGA in neonates. More high-quality randomized controlled trials are needed to clarify the best treatment options for diabetes during pregnancy. (Author)

20160304-41

The impact of inadequate gestational weight gain in obese diabetic women. Kurnit KC, Overcash RT, Ramos GA, et al (2016), Journal of Perinatology vol 36, no 2, February 2016, pp 86-89

OBJECTIVE:
To determine the effect of inadequate gestational weight gain (GWG) on neonatal birth weight in diabetic obese women.
STUDY DESIGN:
Retrospective cohort study of women with an initial body mass index (BMI) ?30 kg m(-2) and gestational or type 2 diabetes was conducted. GWG was stratified: inadequate (<11 lbs), adequate (11 to 20 lbs) or excessive (>20 lbs). The primary outcome was birth weight. Secondary outcomes included hypertensive disorders, gestational age at delivery, mode of delivery and Apgar scores.
RESULT:
A total of 211 obese diabetic women were identified. Of those, 37% had inadequate GWG, 25% had adequate GWG and 38% had excessive GWG. Women with inadequate GWG had lower mean birth weights (P=0.048), as well as lower rates of cesarean delivery (P=0.017) and lower rates of pregnancy-related hypertensive disorders (P=0.026) compared with those with adequate and excessive GWG.
CONCLUSION:
Inadequate GWG was associated lower mean birth weights, lower rates of cesarean delivery and lower rates of pregnancy-related hypertensive disorders. (25 references) (Author)

20160225-4

Pregestational diabetes is associated with adverse outcomes in twin pregnancies: a regional register-based study. Darke J, Glinianaia SV, Marsden P, et al (2016), Acta Obstetricia et Gynecologica Scandinavica vol 95, no 3, March 2016, pp 339-346

INTRODUCTION:
The incidence of pregnancies complicated by twinning and diabetes is increasing in the UK. This is a worrying trend as both diabetes and twin gestations are associated with a high risk of adverse pregnancy outcomes. The few studies that have specifically addressed how twinning and pregestational diabetes in the same pregnancy may affect outcome have reported conflicting results.
MATERIAL AND METHODS:
We analyzed data on 27 women with a twin pregnancy and pregestational diabetes (54 babies) and 6407 women with a twin pregnancy without diabetes (12 814 babies) from the Northern Survey of Twin and Multiple Pregnancy during 1998-2010. A composite adverse pregnancy outcome (comprising fetal loss before 24 weeks, termination of pregnancy, stillbirth, infant death or any major congenital anomaly), extended perinatal mortality (stillbirths and neonatal deaths) and major congenital anomaly were the main outcome measures. Adjusted rate ratios were estimated using generalized estimating equations for Poisson regression controlling for potential confounders.
RESULTS:
Mothers with twin pregnancies with diabetes were older (p = 0.001) and had higher body mass indices (p < 0.0001) than those without diabetes. Their twins were more likely to be delivered earlier (p = 0.026), be delivered by

cesarean section (80.4% vs. 49.7%; p < 0.0001), be large-for-gestational-age (p < 0.0001) and require admission to a special care baby unit (p < 0.0001). Pregestational diabetes was associated with significantly increased rates of the composite adverse outcome and major congenital anomalies in twins (adjusted rate ratios 2.66, 95% confidence interval 1.14-6.20 and adjusted rate ratios 3.51, 95% confidence interval 1.31-9.40, respectively).
CONCLUSION:
Maternal pregestational diabetes in twin pregnancies is associated with a significantly increased risk of an adverse pregnancy outcome.
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20160209-14

Factors promoting diabetes self-care among low-income, minority pregnant women. Yee LM, McGuire JM, Taylor SM, et al (2016), Journal of Perinatology vol 36, no 1, January 2016, pp 13-18

Objective: To prospectively identify factors promoting healthy self-management of gestational and type 2 diabetes mellitus among underserved pregnant women.
Study design: Twenty-nine in-depth, semi-structured interviews were performed over the course of pregnancy for 10 women with diabetes. Interviews on factors promoting diabetes self-management used cognitive load theory to frame questions. Qualitative analysis of longitudinal interview data applied grounded theory techniques to generate themes.
Result: Half this cohort of minority, low-income, public aid-supported women had type 2 diabetes. Four themes, comprised of both internal self-driven motivators and external sources of support, were identified. These themes were: (1) disease familiarity and diabetes self-efficacy; (2) external motivation (for health of fetus and responsibilities to older children); (3) supportive social and physical environment; and (4) self-regulatory behavior, including goal responsiveness and long-term goal-setting.
Conclusion: Low-income women used multiple internal and external resources to promote health during a pregnancy complicated by diabetes. Successful behavior modification and achievement of diabetes care goals require leveraging these resources. (26 references) (Author)

20160201-31*

The association of maternal obesity and diabetes with autism and other developmental disabilities. Li M, Fallin MD, Riley A, et al (2016), Pediatrics vol 137, no 2, February 2016, p e20152206

BACKGROUND: Obesity and diabetes are highly prevalent among pregnant women in the United States. No study has examined the independent and combined effects of maternal prepregnancy obesity and maternal diabetes on the risk of autism spectrum disorder (ASD) in parallel with other developmental disorders (DDs).
METHODS: This study is based on 2734 children (including 102 ASD cases), a subset of the Boston Birth Cohort who completed at least 1 postnatal study visit at Boston Medical Center between 1998 and 2014. Child ASD and other DDs were based on physician diagnoses as documented in electronic medical records. Risks of ASD and other DDs were compared among 6 groups defined by maternal prepregnancy obesity and diabetes status by using Cox proportional hazard regression controlling for potential confounders.
RESULTS: When examined individually, maternal prepregnancy obesity and pregestational diabetes (PGDM) were each associated with risk of ASD. When examined in combination, only mothers with obesity and PGDM (hazard ratio 3.91, 95% confidence interval 1.76-8.68) and those with obesity and gestational diabetes (hazard ratio 3.04, 95% confidence interval 1.21-7.63) had a significantly increased risk of offspring ASD. Intellectual disabilities (IDs), but not other DDs, showed a similar pattern of increased risk associated with combined obesity and PGDM. This pattern of risk was mostly accounted for by cases with co-occurring ASD and ID.
CONCLUSIONS: Maternal prepregnancy obesity and maternal diabetes in combination were associated with increased risk for ASD and ID. ASD with ID may be etiologically distinct from ASD without ID. (Author) (Only the abstract/summary is published in the print journal, even where additional comments and clinical implications have been added)

20160126-8*

A cohort study of trends in the prevalence of pregestational diabetes in pregnancy recorded in UK general practice between 1995 and 2012. Coton SJ, Nazareth I, Petersen I (2016), BMJ Open vol 6, no 1, 22 January 2016

Objective To describe the characteristics of pregnant women with and without pregestational diabetes and to estimate the prevalence of pregestational diabetes in pregnant women recorded in a UK primary care database.
Methods The data source for this study is The Health Improvement Network (THIN) primary care database. Pregnant

women with and without diabetes aged 16 years and over were identified using diagnostic Read codes and prescriptions for antidiabetics from medical records. Data were examined on: age, body mass index (BMI), social deprivation, smoking, ethnicity and glycaemic control. The prevalence of pregestational diabetes was calculated by diabetes type and calendar year between 1995 and 2012.
Results Data from 400 434 pregnancies suggests that women with pregestational diabetes were: older (median 29, 32 vs 29 years for type 1, type 2 and without diabetes, respectively), had higher BMI (median 25.0, 30.4 vs 23.9 k/m2 for type 1, type 2 and without diabetes, respectively) and were registered with a general practice for longer than pregnant women without diabetes. The prevalence of type 1 diabetes in pregnancy increased from 1.56 to 4.09 per 1000 pregnancies between 1995 and 2015. For type 2 diabetes the increase was from 2.34 to 5.09 per 1000 pregnancies between 1995 and 2008 followed by a more rapid increase to 10.62 per 1000 pregnancies by 2012.
Conclusions Pregnant women with pregestational diabetes were older, had higher BMI and were registered for longer than women without diabetes. The prevalence of type 1 and type 2 diabetes increased in pregnancy. The prevalence of type 2 diabetes rose more rapidly with a marked increase after 2008.(Author)
Full URL: http://bmjopen.bmj.com/content/6/1/e009494.full

20160120-1*

Diabetes in pregnancy. Quality standard [Last updated 10 January 2023]. National Institute for Health and Care Excellence (2016), London: NICE 19 January 2016
This quality standard covers managing diabetes and its complications in women who are planning a pregnancy or are already pregnant. It includes care for women with pre-existing diabetes before and during pregnancy, and diagnosis and management of gestational diabetes. It describes high-quality care in priority areas for improvement.

The quality standard uses the term 'women' throughout. This should be taken to include people who do not identify as women but are planning to become pregnant or are already pregnant.

In January 2023, this quality standard was updated and replaced the previous version published in 2016. The topic was identified for update following the annual review of quality standards. The review identified:

* changes in the priority areas for improvement
* updated guidance on diabetes in pregnancy.

For more information, see "update information". (Author, edited)
Full URL: http://www.nice.org.uk/guidance/qs109

20160106-3*

Comparison of neonatal outcomes in macrosomic infants of diabetic and non-diabetic mothers. Opati P, Zheng R, Wang J, et al (2015), Journal of Neonatal-Perinatal Medicine vol 8, no 1, 2015
OBJECTIVE:
To compare the neonatal outcomes in macrosomic term infants of diabetic mothers and non-diabetic mothers.
METHODS:
This is a retrospective survey of all live-born term singletons with a birth weight ≥4000 g, admitted at Tianjin Medical University General Hospital between 2010 and 2013. Data collected for the mothers included age, parity, gestational age, method of glycemic control and mode of delivery. Data for the infants included sex, birth weight, birth length, duration of hospital stay and laboratory tests. Outcomes were compared between infants of diabetic mothers (IDMs) and infants of non-diabetic mothers (Non-IDMs). All data were analyzed using Statistical Package for Social Sciences (SPSS) 17.0.
RESULTS:
One hundred and eleven infant-mother pairs met the inclusion criteria. Fifty-seven were IDMs while 54 were non-IDMs. Seven (12.28%) of the IDMs were delivered vaginally while 50 (87.72%) were delivered via Caesarian section (CS). Seventeen (31.48%) of the non-IDMs were delivered vaginally while 37 (68.51%) were delivered by CS. Respiratory distress was the most common morbidity affecting 52.6% of the IDMs and 40.7% of the non-IDMs. Hyperbilirubinemia was observed in 49.1% of the IDMs and 14.8% of the non-IDMs. Hypoglycemia affected 38.6% of the IDMs and 7.4% of the non-IDMs. Cardiac enzymes were higher in IDMs than in non-IDMs. On average, IDMs had a longer duration of hospital stay.
CONCLUSION:
Macrosomic IDMs in comparison to macrosomic non-IDMs are at an increased risk for adverse neonatal outcomes.

(Author)

20160106-20*

Neonatal outcomes of macrosomic infants of diabetic and non-diabetic mothers. Cordero L, Paetow P, Landon MB, et al (2015), Journal of Neonatal-Perinatal Medicine vol 8, no 2, 2015

OBJECTIVE:

To compare neonatal outcomes (including breastfeeding (BF) initiation) of 170 macrosomic IDM with that of 739 macrosomic nIDM.

DESIGN/METHODS:

Retrospective cohort investigation of all macrosomic infants born consecutively over a four-year period (2008-2011). Macrosomic (birth weight ≥4000 g) IDM included 100 infants whose mothers had gestational diabetes and 70 whose mothers had pregestational diabetes.

RESULTS:

IDM were more likely to be delivered by cesarean to obese women while nIDM were more likely to be delivered vaginally to younger women with a higher level of education. Ethnic distribution (60% white, 20% black, 10% Hispanic and 10% Asian or African) was similar in each group. Forty-nine percent of IDM and 7% of nIDM required NICU admission. Respiratory disorders (mainly TTNB) affected 21% of IDM and 3% of nIDM while hypoglycemia was observed in 36% of IDM and 15% of nIDM. Of the 35 IDM delivered vaginally, 10 were complicated by shoulder dystocia without injury. Conversely, 70 of the 458 nIDM delivered vaginally experienced shoulder dystocia that resulted in 6 limb fractures and 3 brachial plexus injuries. On arrival to labor and delivery, 75% of all women intended to BF; however, at the time of discharge, 65% of women with diabetes and 92% of those without diabetes who intended to BF had initiated BF.

CONCLUSIONS:

Both macrosomic IDM and macrosomic nIDM are at risk for significant morbidities. Macrosomic IDM carry a higher risk for NICU admissions, leading to maternal-infant separation, and lower BF initiation rates. (Author)

20151215-11

Reducing diabetes-related complications in pregnancy. Mills L, Palmer C, Arya R (2015), British Journal of Midwifery vol 23, no 12, December 2015, pp 848-853

Women with pre-existing type 1 and 2 diabetes have an increased risk of adverse pregnancy outcomes, including miscarriage, fetal congenital anomaly and perinatal death. There is a further group of women who develop diabetes during pregnancy, who are also at increased risk of adverse pregnancy outcomes. Since the original publication of the National Institute for Health and Care Excellence (NICE) guidance on diabetes in pregnancy in 2008, there have been several developments that prompted an update. Recently published guidance from NICE (2015) has reviewed studies on the diagnosis and treatment of gestational diabetes and those with pre-existing type 1 and 2 diabetes. This article outlines the background to diabetes, preconception care and the management and prevention of complications throughout pregnancy. (24 references) (Author)

20151118-25*

National pregnancy in diabetes audit report, 2014. England, Wales and the Isle of Man. The Health and Social Care Information Centre (2015), London: HSCIC 2015. 35 pages

Presents key findings from an audit to assess the quality of care and outcomes for pregnant women with pre-existing diabetes in England, Wales and the Isle of Man in 2014. (JSM)

20151117-38

Diabetes in pregnancy. Parry D (2015), Perspective no 27, June 2015, p 5

Dot Parry, midwife and antenatal teacher, provides an overview on what it means to have diabetes during pregnancy, and how NCT practitioners can support women. (5 references) (Author)

20151110-21

Monogenic diabetes and pregnancy. Murphy R (2015), Obstetric Medicine vol 8, no 3, September 2015, pp 114-120

Monogenic diabetes is frequently mistakenly diagnosed as either type 1 or type 2 diabetes, yet accounts for approximately 1-2% of diabetes. Identifying monogenic forms of diabetes has practical implications for specific therapy, screening of family members and genetic counselling. The most common forms of monogenic diabetes are

due to glucokinase (GCK), hepatocyte nuclear factor (HNF)-1A and HNF-4A, HNF-1B, m.3243A>G gene defects. Practical aspects of their recognition, diagnosis and management are outlined, particularly as they relate to pregnancy. This knowledge is important for all physicians managing diabetes in pregnancy, given this is a time when previously unrecognised monogenic diabetes may be uncovered with careful attention to atypical features of diabetes misclassified as type 1, type 2, or gestational diabetes. (54 references) (Author)

20151102-12*

Cardiac findings in infants of diabetic mothers. Yeh J, Berger S (2015), NeoReviews vol 16, no 11, November 2015, e624

Hypertrophic cardiomyopathy (HCM) associated with diabetes during pregnancy has been relatively recently described. The echocardiographic findings are similar to those found in the classic sarcomeric familial HCM. In addition, the hemodynamics and clinical presentation may be significant and can include impaired cardiac output and pulmonary hypertension as a result of diastolic dysfunction, left ventricular outflow tract obstruction, and systolic dysfunction. Unlike sarcomeric HCM, neonatal HCM associated with diabetes during pregnancy is self-limited and in fact tends to resolve in weeks to months. On the other hand, in the impaired neonate, a rational management plan needs to be instituted. This article describes the history, potential causes, and pathophysiology of HCM and details a rational management plan for the treatment of these patients. (Author)

20151027-39*

Managing diabetes in pregnancy using cell phone/internet technology. Bartholomew ML, Soules K, Church K, et al (2015), Clinical Diabetes vol 33, no 4, October 2015, pp 169-174

For pregnant women with diabetes, using cell phone/Internet technology to track and report self-monitoring of blood glucose results improves compliance and satisfaction compared to using the more traditional methods of log books, telephone calls, and voicemail messages. (Author)

20151020-19

Diabetes in pregnancy. McCance DR (2015), Best Practice & Research: Clinical Obstetrics and Gynaecology vol 29, no 5, July 2015, pp 685-699

Diabetes in pregnancy is still considered a high-risk condition for both mother and baby. Even in the best centres, malformation and mortality rates are reportedly twofold to fivefold higher than in the background population, and pregnancy planning rates remain obstinately poor. Increasing global rates of type 2 diabetes are now extending into pregnancy, with similarly poor outcomes to type 1 diabetes, and excess maternal weight is adding to the complexity of management. Over the last 5-10 years, several randomised trials have offered new insight into the role of oral hypoglycaemic drugs and insulin analogues in pregnancy, while continuous subcutaneous insulin infusion (CSII) pumps and continuous glucose monitors (CGMs) are under scrutiny. The relevance of minor degrees of hyperglycaemia to adverse pregnancy outcome was clearly demonstrated by the Hyperglycaemia and Adverse Pregnancy Outcome (HAPO) study, but translation of these data into clinical practice has proved challenging because of the continuum of risk. Long-term metabolic and cardiovascular implications of hyperglycaemia during pregnancy for mother and child are now generally recognised with major implications for public health. (48 references) (Author)

20150929-11*

Fetal sex and the natural history of maternal risk of diabetes during and after pregnancy. Retnakaran R, Shah BR (2015), The Journal of Clinical Endocrinology and Metabolism vol 100, no 7, July 2015, pp 2574-2580

CONTEXT:

It has recently emerged that carrying a male fetus is associated with poorer maternal β-cell function in pregnancy and an increased risk of gestational diabetes mellitus (GDM). β-cell dysfunction is the central pathophysiologic defect underlying both GDM and subsequent postpartum progression to type 2 diabetes mellitus (T2DM).

OBJECTIVE:

This was a retrospective cohort study that aimed to determine whether fetal sex influences the natural history of maternal risk ofdiabetes after delivery and in a subsequent pregnancy.

SETTING:

The study was conducted using population-based administrative databases in Ontario, Canada.

PATIENTS:

All women with a singleton live-birth first pregnancy between April 2000 and March 2010 (n = 642 987) were included.

EXPOSURE:

Fetal sex was the exposure of interest (313 280 delivered a girl; 329 707 delivered a boy).
MAIN OUTCOME MEASURE:
Development of T2DM or a second pregnancy were the main outcome measures. Glucose tolerance in each pregnancy was classified as either GDM or non-GDM.
RESULTS:
The population was followed for a median of 3.8 years. Carrying a boy yielded a higher risk of GDM in both the first pregnancy (odds ratio [OR] =1.03; 95% confidence interval [CI], 1.0002-1.054) and second pregnancy (OR =1.04, 95% CI, 1.01-1.08). For women with GDM in the first pregnancy, the likelihood of developing T2DM before a second pregnancy was higher if they delivered a girl (OR = 1.07; 95% CI, 1.01-1.12). Recurrence of GDM was not affected by fetal sex (P = .7). However, among women with a non-GDM first pregnancy while carrying a girl, having a boy in their second pregnancy predicted an increased risk of GDM (OR = 1.07, 95% CI, 1.01-1.14).
CONCLUSIONS:
Fetal sex is a previously unrecognized factor that is associated with maternal diabetic risk both after delivery and in a subsequent pregnancy. (24 references) (Author)

20150928-6*

Risk and recurrence of serious adverse outcomes in the first and second pregnancies of women with preexisting diabetes. Tennant PW, Bilous RW, Prathapan S, et al (2015), Diabetes Care vol 38, no 4, April 2015, pp 610-619

OBJECTIVE:
Women with preexisting (type 1 or type 2) diabetes experience an increased risk of serious adverse pregnancy outcomes. It is not known, however, how these risks change between the first and second pregnancy and whether there is an increased risk of recurrence. This study describes the absolute risks and recurrence of serious adverse pregnancy outcomes in 220 women with preexisting diabetes.
RESEARCH DESIGN AND METHODS:
A total of 440 pregnancies occurring in 220 women with preexisting diabetes who delivered successive singleton pregnancies in the North of England during 1996-2008 were identified from the Northern Diabetes in Pregnancy Survey (NorDIP). Predictors of serious adverse outcome were estimated by competing-risks regression.
RESULTS:
Sixty-seven first pregnancies (30.5%) ended in serious adverse outcome, including 14 (6.4%) with congenital anomalies and 53 (24.1%) additional fetal or infant deaths. Thirty-seven second pregnancies (16.8%) ended in serious adverse outcome--half the rate among first pregnancies(P = 0.0004)--including 21 (9.5%) with congenital anomalies and 16 (7.3%) additional fetal or infant deaths. Serious adverse outcomes in the second pregnancy occurred twice as frequently in women who experienced a previous adverse outcome than in those who did not (26.9% vs. 12.4%, P = 0.004), but previous adverse outcome was not associated with preparation for the following pregnancy.
CONCLUSIONS:
Serious adverse outcomes are less common in the second pregnancies of women with preexisting diabetes, although the risk is comparable in those whose first pregnancy ends in adverse outcome. Reducing the risk of recurrence may require more support in the immediate period after an adverse pregnancy outcome. (41 references) (Author) [The full text of this article is available free of charge at: http://care.diabetesjournals.org/content/38/4/610.long]
Full URL: http://care.diabetesjournals.org/content/38/4/610.long

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20150908-44*

Increasing prevalence of diabetes during pregnancy in South Carolina. Lynch CP, Baker N, Korte JE, et al (2015), Journal of Women's Health vol 24, no 4, April 2015, pp 316-323

BACKGROUND:
The objective of our study was to examine the prevalence of diabetes during pregnancy at the population level in SC from January 1996 through December 2008.
METHODS:
The study included 387,720 non-Hispanic white (NHW), 232,278 non-Hispanic black (NHB), and 43,454 Hispanic live singleton births. Maternal inpatient hospital discharge codes from delivery (91.59%) and prenatal information (i.e., Medicaid [42.91%] and SC State Health Plan [SHP] [5.98%]) were linked to birth certificate data. Diabetes during pregnancy included gestational and preexisting, defined by prenatal and maternal inpatient International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) diagnostic codes (i.e., 64801-64802, 64881-64882, or 25000-25092) or report on the birth certificate.
RESULTS:
Diabetes prevalence from any source increased from 5.02% (95% confidence interval [CI]: 4.82-5.22) in 1996 to 8.37%

(95% CI: 8.15-8.60) in 2008. Diabetes prevalence, standardized for maternal age and race/ethnicity from 1996 through 2008, increased from 3.38% (95% CI: 3.29-3.47) to 5.81% (95% CI: 5.71-5.91) using birth certificate data, from 3.99% (95% CI: 3.89-4.10) to 6.69% (95% CI: 6.58-6.80) using hospital discharge data, and from 4.74% (95% CI: 4.52-4.96) to 8.82% (95% CI: 8.61-9.03) using Medicaid data. Comparing birth certificate to hospital discharge, Medicaid, and SHP data, Cohen's kappa in 2008 was 0.73 (95% CI: 0.72-0.75), 0.64 (95% CI: 0.62-0.66), and 0.59 (95% CI: 0.54-0.65), respectively.
CONCLUSIONS:
An increasing prevalence of diabetes during pregnancy is reported, as well as substantial lack of agreement in reporting of diabetesprevalence across administrative databases. Prevalence of reported diabetes during pregnancy is impacted by screening, diagnostic, and reporting practices across different data sources, as well as by actual changes in prevalence over time. (Author)

20150902-42*

Incretin and glucagon levels in adult offspring exposed to maternal diabetes in pregnancy. Kelstrup L, Clausen TD, Mathiesen ER, et al (2015), The Journal of Clinical Endocrinology and Metabolism vol 100, no 5, 2015, pp 1967-1975

CONTEXT:
Fetal exposure to maternal diabetes is associated with increased risk of type 2 diabetes mellitus (T2DM) later in life. The pathogenesis of T2DM involves dysfunction of the incretin hormones, glucagon-like peptide-1 (GLP-1) and glucose-dependent insulinotropic polypeptide (GIP), as well as hyperglucagonemia.
OBJECTIVE:
Our aim was to investigate circulating plasma levels of GLP-1, GIP, and glucagon during the oral glucose tolerance test (OGTT) inadult offspring of women with diabetes in pregnancy.
DESIGN AND PARTICIPANTS:
We conducted a follow-up study of 567 offspring, aged 18-27 years. We included two groups exposed to maternaldiabetes in utero: offspring of women with diet-treated gestational diabetes mellitus (O-GDM; n = 163) or type 1 diabetes (O-T1DM; n = 146). Two reference groups were included: offspring of women with risk factors for GDM, but normoglycemia during pregnancy (O-NoGDM; n = 133) andoffspring from the background population (O-BP; n = 125). The subjects underwent a 75-g OGTT with venous samples at 0, 30, and 120 minutes.
RESULTS:
Fasting plasma levels of GLP-1 were lower in the two diabetes-exposed groups compared to O-BP (O-GDM, P = .040; O-T1DM, P = .008). Increasing maternal blood glucose during OGTT in pregnancy was associated with reduced postprandial suppression of glucagon in the offspring. Lower levels of GLP-1 and higher levels of glucagon during the OGTT were present in offspring characterized by overweight or prediabetes/T2DM at follow-up, irrespective of exposure status.
CONCLUSION:
Lower levels of fasting GLP-1 and impaired glucagon suppression in adult offspring exposed to maternal diabetes during pregnancy are diabetogenic traits that may contribute to glucose intolerance in these persons, but further investigations are needed. (40 references) (Author)

20150820-13*

'I don't want them to feel different': a mixed methods study of parents' beliefs and dietary management strategies for their young children with type 1 diabetes mellitus. Patton SR, Clements MA, George K, et al (2015), Journal of the Academy of Nutrition and Dietetics 7 August 2015. Online ahead of print

Background:
Many young children with type 1 diabetes mellitus (T1DM) do not consume a healthful diet; exactly why this occurs despite T1DM education remains poorly understood.
Objective
This study describes parents' perceptions of healthful eating for T1DM in young children and identifies factors related to parents' dietary management.
Design
A cross-sectional, mixed-methods study was performed. Parents completed a questionnaire, 3-day weighed diet record, and a semi-structured interview regarding their perceptions of healthful eating for T1DM and their dietary management practices.
Participants/setting
Twenty-three families, recruited from a pediatric diabetes clinic in the midwestern United States between February 2012 and April 2013, participated. Eligible families had a child with T1DM who was 1 to 6 years old, at least 6 months from diagnosis, and was following an intensive insulin regimen.

Statistical analyses performed
Mean scores and percentages were calculated from the diet diaries and parent questionnaires, and parents' interviews were coded to identify common themes.
Results
Results showed that while parents may believe they know what constitutes a healthful diet for T1DM, they do not always feed their child a healthful diet. Parent-identified barriers to healthful eating included limited time to prepare homemade meals, perceived higher costs of healthier foods, the influence of peers on children's food preferences, and picky eating. Parents also discussed a desire not to limit their child's diet or make their child 'feel different,' which many parents said often led them to give into their child's requests for less healthful food options.
Conclusions
Parents of young children with T1DM identified several barriers to healthful eating that are common for all parents, such as time constraints, expense, and child food preferences. However, unique themes emerged, including parents' desire not to limit their child's diet or make their child 'feel different.' Nutrition components of T1DM education should include psychological and behavioral strategies to help parents manage these unique concerns. (35 references) (Author)

20150819-5*

Maternal diabetes, large-for-gestational-age births, and first trimester pregnancy-associated plasma protein-A. Wells G, Bleicher K, Han X, et al (2015), The Journal of Clinical Endocrinology and Metabolism vol 100, no 6, March 2015, pp 2372-2379

CONTEXT: Maternal pregnancy-associated plasma protein-A (PAPP-A) is measured at nuchal translucency scanning to assess the risk of fetal chromosomal disorders.
OBJECTIVE: The aim of this study was to examine whether PAPP-A might also be a predictor of gestational diabetes (GDM), type 2 diabetes (T2D), or large-for-gestational-age (LGA) births.
DESIGN: PAPP-A levels were measured in serum from 1664 women at their 10-14-week nuchal translucency scan at a tertiary referral hospital.Maternal diabetes was categorized as T2D, 'early GDM' (GDM diagnosed < 22 wk), and 'late GDM' (GDM diagnosed ≥ 22 wk). The relationship between PAPP-A multiples of the median (MoM), maternal diabetes, and LGA was examined with multivariate regression models.
RESULTS: PAPP-A MoM was significantly lower in women with T2D and women who developed GDM than in nondiabetic women. PAPP-A MoM was 41.3% lower in T2D, 22.6% lower in early GDM, and 8.6% lower in late GDM. Women in the lowest quartile of PAPP-A MoM were 2.7 times more likely to have early GDM (odds ratio [OR], 2.74; 95% confidence interval [CI], 1.2-6.1) compared with the highest quartile. Birth weight had a positive linear association with PAPP-A MoM. Women in the highest PAPP-A MoM quartile were twice as likely to have an LGA baby (OR, 2.2; 95% CI, 1.39-3.46; P = .0007).
CONCLUSIONS: Routinely tested first-trimester PAPP-A is a novel biomarker for maternal diabetes and LGA. PAPP-A decreased with increasing severity of maternal diabetes. Although this cannot infer causality, low PAPP-A may help identify women at risk of GDM, and high PAPP-A may help identify pregnancies at risk of LGA. (29 references) (Author)

20150818-31*

Lower resting energy expenditure and fat oxidation in Native American and Hispanic infants born to mothers with diabetes. Short KR, Teague AM, Fields DA, et al (2015), Journal of Pediatrics vol 166, no 4, April 2015, pp 884-889

OBJECTIVE: To determine whether exposure to diabetes in utero affects resting energy expenditure (REE) and fuel oxidation in infants.
STUDY DESIGN: At 35 ± 5 days after birth, body composition and REE were measured in full-term offspring of Native American and Hispanic women with either well-controlled diabetes (13 girls, 11 boys) or normal healthy pregnancies (18 girls, 17 boys).
RESULTS: Control of dysglycemia during gestation in the women with diabetes mellitus met current clinical standards, shown by average glycated hemoglobin (5.9 ± 0.2%; 40.6 ± 2.3 mmol/mol). Infant body mass (offspring of women with diabetes: 4.78 ± 0.13, control offspring: 4.56 ± 0.08 kg) and body fatness (offspring of women with diabetes: 25.2 ± 0.6, control offspring: 24.2 ± 0.5 %) did not differ between groups. REE, adjusted for lean body mass, was 14% lower in offspring of women with diabetes (41.7 ± 2.3 kJ/h) than control offspring (48.6 ± 2.0, P = .025). Fat oxidation was 26%lower in offspring of women with diabetes (0.54 ± 0.05 g/h) than control offspring (0.76 ± 0.04, P < .01) but carbohydrate oxidation did not differ. Thus, fat oxidation accounted for a lower fraction of REE in the offspring of women with diabetes (49 ± 4%) than control offspring (60 ± 3%, P = .022). Mothers with diabetes were older and had higher prepregnancy body mass index than control mothers.
CONCLUSIONS: Well-controlled maternal diabetes did not significantly affect body mass or composition of offspring at 1-month old. However, infants with mothers with diabetes had reduced REE and fat oxidation, which could contribute

to adiposity and future disease risk. Further studies are needed to assess the impact differences in age and higher prepregnancy body mass index. (32 references) (Author)

20150812-34*

Multisystem morbidity and mortality in offspring of women with type 1 diabetes (the EPICOM Study): a register-based prospective cohort study. Knorr S, Stochholm K, Vlachová Z, et al (2015), Diabetes Care vol 38, no 5, May 2015, pp 821-826

OBJECTIVE: This study examined the long-term consequences for offspring born to mothers with pregestational type 1 diabetes regarding mortality, hospital admissions, and medication. We also examined the association between HbA1c levels during pregnancy and mortality and incidence of hospital admissions.

RESEARCH DESIGN AND METHODS:

We performed a prospective combined clinical and register-based cohort study comparing mortality, hospital admissions, and use of medication in offspring (n = 1,326) of women with pregestational type 1 diabetes (index children) with matched control subjects (n = 131,884). We also examined the association between HbA1c levels during pregnancy and mortality and the incidence of hospital admissions. Participants were monitored from birth to the age of 13-21 years.

RESULTS:

Overall mortality was significantly increased for index children (hazard ratio 2.10, 95% CI 1.33-3.30, P = 0.001). The incidence of hospital admissions for index children was significantly increased (incidence rate ratio [IRR] 1.45, 95% CI 1.38-1.53, P < 0.001), and this was the case for all age groups until the age of 15 years. The incidence of hospital admissions among index children was positively associated with maternal HbA1c before pregnancy and in the first trimester. In addition, the overall use of medication was increased in index children (IRR 1.13, 95% CI 1.07-1.19, P < 0.001).

CONCLUSIONS:

Type 1 diabetes during pregnancy has long-term implications on the health of offspring, with increased mortality, incidence of hospital admissions, and use of medication. Among mothers with type 1 diabetes, glycemic regulation is positively associated with incidence of hospital admissions in offspring. (Author)

20150804-43*

Analysis of continuous glucose monitoring in pregnant women with diabetes: distinct temporal patterns of glucose associated with large-for-gestational-age infants. Law GR, Ellison GTH, Secher AL, et al (2015), Diabetes Care vol 38, no 7, July 2015, pp 1319-1325

OBJECTIVE Continuous glucose monitoring (CGM) is increasingly used to assess glucose control in diabetes. The objective was to examine how analysis of glucose data might improve our understanding of the role temporal glucose variation has on large-for-gestational-age (LGA) infants born to women with diabetes.

RESEARCH DESIGN AND METHODS Functional data analysis (FDA) was applied to 1.68 million glucose measurements from 759 measurement episodes, obtained from two previously published randomized controlled trials of CGM in pregnant women with diabetes. A total of 117 women with type 1 diabetes (n = 89) and type 2 diabetes (n = 28) who used repeated CGM during pregnancy were recruited from secondary care multidisciplinary obstetric clinics for diabetes in the U.K. and Denmark. LGA was defined as birth weight ≥90th percentile adjusted for sex and gestational age.

RESULTS A total of 54 of 117 (46%) women developed LGA. LGA was associated with lower mean glucose (7.0 vs. 7.1 mmol/L; P < 0.01) in trimester 1, with higher mean glucose in trimester 2 (7.0 vs. 6.7 mmol/L; P < 0.001) and trimester 3 (6.5 vs. 6.4 mmol/L; P < 0.01). FDA showed that glucose was significantly lower midmorning (0900-1100 h) and early evening (1900-2130 h) in trimester 1, significantly higher early morning (0330-0630 h) and throughout the afternoon (1130-1700 h) in trimester 2, and significantly higher during the evening (2030-2330 h) in trimester 3 in women whose infants were LGA.

CONCLUSIONS FDA of CGM data identified specific times of day that maternal glucose excursions were associated with LGA. It highlights trimester-specific differences, allowing treatment to be targeted to gestational glucose patterns. (Author)

20150804-42*

Academic achievement in primary school in offspring born to mothers with type 1 diabetes (the EPICOM Study): a register-based prospective cohort study. Knorr S, Clausen TD, Vlachova Z, et al (2015), Diabetes Care vol 38, no 7, July 2015, pp 1238-1244

MIDIRS is part of RCM Information Services Limited which is a company incorporated in England and Wales under company no.11914882 with registered office at 10-18 Union Street, London SE1 1SZ
RCM Information Services Limited is a subsidiary of The Royal College of Midwives

OBJECTIVE This study examined the effect of maternal pregestational type 1 diabetes on offspring primary school performance.
RESEARCH DESIGN AND METHODS We performed a prospective combined clinical and register-based cohort study comparing primary school performance in offspring (n = 707) of women with pregestational type 1 diabetes with matched control offspring (n = 60,341). We also examined the association between HbA1c levels during pregnancy and later school performance among offspring born to women with pregestational type 1 diabetes.
RESULTS Offspring of mothers with pregestational type 1 diabetes obtained similar school grades as control offspring when finishing primary school (regression coefficient [β] = -0.13; 95% CI = -0.30 to 0.03; P = 0.12). Adjusting for parental education also resulted in an insignificant difference between the two groups (β = -0.07; 95% CI = -0.23 to 0.09; P = 0.37). Among offspring of women with type 1 diabetes, increasing maternal HbA1c pregestationally and throughout the pregnancy was associated with lower average school grades. Offspring born to mothers with good glycemic control in the third trimester obtained higher average school grades compared with control offspring. The opposite applied to offspring born to mothers with inadequate glycemic control, who obtained significantly lower average school grades compared with control offspring.
CONCLUSIONS Offspring of mothers with pregestational type 1 diabetes obtained similar average grades when finishing primary school compared with matched control offspring. Among offspring of women with type 1 diabetes, we found a consistent negative association between maternal HbA1c in pregnancy and primary school grades. However, whether this association reflects a direct causal influence of intrauterine hyperglycemia is uncertain. (Author)

20150803-28*

Comparison of maternal morbidity and medical costs during pregnancy and delivery between patients with gestational diabetes and patients with pre-existing diabetes. Son KH, Lim NK, Lee JW, et al (2015), Diabetic Medicine vol 32, no 4, 2015, pp 477-486

AIMS:
To evaluate the effects of gestational diabetes and pre-existing diabetes on maternal morbidity and medical costs, using data from the Korea National Health Insurance Claims Database of the Health Insurance Review and Assessment Service.
METHODS:
Delivery cases in 2010, 2011 and 2012 (459 842, 442 225 and 380 431 deliveries) were extracted from the Health Insurance Review and Assessment Service database. The complications and medical costs were compared among the following three pregnancy groups: normal,gestational diabetes and pre-existing diabetes.
RESULTS:
Although, the rates of pre-existing diabetes did not fluctuate (2.5, 2.4 and 2.7%) throughout the study, the rate of gestational diabetessteadily increased (4.6, 6.2 and 8.0%). Furthermore, the rates of pre-existing diabetes and gestational diabetes increased in conjunction withmaternal age, pre-existing hypertension and cases of multiple pregnancy. The risk of pregnancy-induced hypertension, urinary tract infections, premature delivery, liver disease and chronic renal disease were greater in the gestational diabetes and pre-existing diabetes groups than in the normal group. The risk of venous thromboembolism, antepartum haemorrhage, shoulder dystocia and placenta disorder were greater in the pre-existing diabetes group, but not the gestational diabetes group, compared with the normal group. The medical costs associated with delivery, thecosts during pregnancy and the number of in-hospital days for the subjects in the pre-existing diabetes group were the highest among the three groups.
CONCLUSIONS:
The study showed that the rates of pre-existing diabetes and gestational diabetes increased with maternal age at pregnancy and were associated with increases in medical costs and pregnancy-related complications. (Author)

20150731-39*

Evaluating gestational weight gain recommendations in pregestational diabetes. Siegel AM, Tita A, Biggio JR, et al (2015), American Journal of Obstetrics & Gynecology (AJOG) vol 213, no 4, October 2015, pp 563-565

Objectives
The Institute of Medicine (IOM) does not provide recommendations for gestational weight gain (GWG) specific to women with pregestational diabetes. We aimed to assess the impact of GWG outside the IOM recommendations on perinatal outcomes.
Study Design
We performed a retrospective cohort study of all singletons with pregestational diabetes from 2008-2013. Women

were classified as GWG within, less than, or greater than IOM recommendations for body mass index per week of pregnancy. Maternal outcomes examined were cesarean delivery (CD), preeclampsia, and percentage of visits with glycemic control (>50% blood sugars at goal). Neonatal outcomes were birth weight, small for gestational age (SGA, <10th percentile), large for gestational age (LGA, >90th percentile), macrosomia (>4000 g), preterm delivery (PTD, <37 weeks), and birth injury (shoulder dystocia, fracture, brachial plexus injury, cephalohematoma). Groups were compared using analysis of variance and chi-squared test, as appropriate. Backwards stepwise logistic regression was used to adjust for confounding factors.

Results

Of 340 subjects, 37 (10.9%) were within, 64 (18.8%) less than, and 239 (70.3%) greater than IOM recommendations. The incidence of CD, preeclampsia, glycemic control, PTD, and birth injury were not significantly different between GWG groups. The incidence of LGA and macrosomia increased as GWG category increased AOR 3.08, 95% CI 1.13-8.39 and AOR 4.02, 95% CI 1.16-13.9 respectively) without decreasing the incidence of SGA (AOR 0.34, 0.10-1.19 CI 95%). Increases in the risk in LGA and macrosomia were not explained by differences in glycemic control by GWG groups.

Conclusion

Women with pregestational DM should be counseled to gain within the IOM recommendations to avoid LGA and macrosomic newborns. (Author) (Only the abstract/summary is published in the print journal, even where additional comments and clinical implications have been added)

20150716-7

Type-1 diabetes and pregnancy. Jolley D (2015), International Journal of Childbirth Education vol 30, no 2, April 2015, pp 84-86

Type-1 diabetes is an autoimmune disease that is controlled with insulin therapy. However, during pregnancy it is more difficult to maintain constant blood sugars to prevent hyperglycemic and hypoglycemic events. Monitoring of blood glucose levels and other tests are essential. Levels of Hemoglobin A1c (HbA1c) should not exceed 6.5 for the safety of the diabetic woman and her baby. A team of professionals with expertise in type-1 diabetes can assist in supporting the patient to obtain tight glucose control. Self-management of patient includes constantly checking blood glucose levels, and the childbirth educator can encourage the mother to test her blood sugar regularly. (13 reference) (Author)

20150715-29

Fetal sonographic characteristics associated with shoulder dystocia in pregnancies of women with type 1 diabetes. Secher AL, Bytoft B, Tabor A, et al (2015), Acta Obstetricia et Gynecologica Scandinavica vol 94, no 10, October 2015, pp 1105-1111

Introduction

Shoulder dystocia is a rare but severe complication at vaginal delivery and diabetic women are at high risk. The aim of this study was to identify fetal sonographic and maternal glycemic characteristics associated with shoulder dystocia in pregnant women with type 1 diabetes.

Material and methods

Twelve cases (5%) of shoulder dystocia among 241 consecutive vaginal deliveries in women with type 1 diabetes followed at Rigshospitalet university hospital in 2009-2013 were retrospectively identified in a local database. Fetal sonographic and clinical data were compared with 69 women with type 1 diabetes and uncomplicated vaginal deliveries.

Results

Women experiencing shoulder dystocia had a higher glycated hemoglobin (HbA1c) in early pregnancy of median 7.0% (range 5.9-8.1) vs. 6.6% (range 5.4-10.0, p=0.04), whereas in late pregnancy HbA1c was comparable to women with uncomplicated deliveries at 6.1% (range 5.5-6.9) vs. 6.0% (range 4.7-8.4, p=0.30). Fetal biometry at 36 weeks showed higher estimated fetal weight of 3597g (range 3051-4069) vs. 2989g (range 2165-4025), p<0.001, corresponding to 20% (4-41%) vs. 5% (-20-44%) above the mean estimated fetal weight for gestational age (p=0.002) and greater abdominal circumference SD-score of 2.51 (range 1.56-4.20) vs. 1.33 (range -1.08-4.25), p=0.001), while the head circumference was comparable. Vacuum extraction was more frequent during deliveries with shoulder dystocia (58% vs. 17%, p=0.005). Seven (58%) newborns with shoulder dystocia had brachial plexus injuries, fractures, intra-abdominal bleeding or needed resuscitation.

Conclusions

Excessive estimated fetal weight and abdominal circumference at 36 weeks' sonographic examination may help identifying diabetic women at high risk of later shoulder dystocia. (29 references) (Author)

20150713-9*

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Fetal weight estimation in diabetic pregnancies using the gestation-adjusted projection method: comparison of two timing strategies for third-trimester sonography. Moore GS, Post AL, West NA, et al (2015), Journal of Ultrasound in Medicine vol 34, no 6, June 2015, pp 971-975

OBJECTIVES:

The gestation-adjusted projection method extrapolates birth weight using third-trimester sonography. This technique is shown to be more accurate for sonographic examinations from 34 weeks to 36 weeks 6 days than 37 weeks to 38 weeks 6 days. Our objective was to determine whether even earlier sonographic examinations (31 weeks-33 weeks 6 days) further improves birth weight prediction in patients with diabetes.

METHODS:

We conducted a retrospective cohort analysis of 388 pregnant women with pregestational or gestational diabetes who delivered at 37 weeks or later and had a sonographic examination performed between 31 weeks and 36 weeks 6 days. Sonographic examinations were categorized as 'early' if performed at 31 weeks to 33 weeks 6 days or 'late' if performed at 34 weeks to 36 weeks 6 days. We estimated birth weight using thegestation-adjusted projection method, compared errors in prediction of birth weight using the t test and Mann-Whitney U test, and performed a 2-sample test of proportions to compare prediction of macrosomia (birth weight >4000 g).

RESULTS:

The early and late groups had similar mean gestational ages at birth (38 weeks 4 days versus 38 weeks 5 days; P = .13) and rates of macrosomia (10.7% versus 12.4%; P = .63). The early group had a greater mean absolute error (336 versus 297 g; P = .03) and percent error (9.9% versus 7.9%; P = .01) in birth weight prediction but a lower mean birth weight (3303 versus 3426 g; P = .02). Sensitivity for prediction of macrosomia was 19% in the early group versus 45% in the late group (P = .07), whereas specificity was similar (98% versus 96%; P = .27).

CONCLUSIONS:

Using the gestation-adjusted projection method in our patients with diabetes, we found that sonographic examinations performed at 34 weeks to 36 weeks 6 days better predicted birth weight than those performed at 31 weeks to 33 weeks 6 days. (Author)

20150630-36

Management of diabetes in pregnancy: antenatal follow-up and decisions concerning timing and mode of delivery. Visser GHA, de Valk HW (2015), Best Practice & Research: Clinical Obstetrics and Gynaecology vol 29, no 2, February 2015, pp 237-243

Pregnancy in women with diabetes remains complicated despite improvements in glucose control. This seems mainly due to the fact that normoglycemia is still outside of reach. Congenital malformations are already significantly increased in the case of HbA1c values of 2-4SD above the mean, and fetal macrosomia is increasing in incidence. The latter may be due to an increase in maternal body mass index (BMI), absence of cardiovascular complications, better placentation, and increased weight gain during pregnancy. Severe maternal hypoglycemia is a frequent complication during the first trimester of pregnancy. The outcome is generally poorer in the case of type-2 diabetes as compared to type-1, which is likely to be due to a higher incidence of maternal metabolic syndrome. In this article, preconceptional and antenatal management and the mode and timing of delivery are discussed, both for women with preexisting diabetes and for those with gestational diabetes mellitus. (36 references) (Author)

20150629-22*

Academic Achievement in Primary School in Offspring Born to Mothers With Type 1 Diabetes (the EPICOM Study): A Register-Based Prospective Cohort Study. Knorr S, Clausen TD, Vlachová Z, et al (2015), Diabetes Care vol 38, no 7, 2015, pp 1238-1244

OBJECTIVE This study examined the effect of maternal pregestational type 1 diabetes on offspring primary school performance.

RESEARCH DESIGN AND METHODS We performed a prospective combined clinical and register-based cohort study comparing primary school performance in offspring (n = 707) of women with pregestational type 1 diabetes with matched control offspring (n = 60,341). We also examined the association between HbA1c levels during pregnancy and later school performance among offspring born to women with pregestational type 1 diabetes.

RESULTS Offspring of mothers with pregestational type 1 diabetes obtained similar school grades as control offspring when finishing primary school (regression coefficient [β] = -0.13; 95% CI = -0.30 to 0.03; P = 0.12). Adjusting for parental education also resulted in an insignificant difference between the two groups (β = -0.07; 95% CI = -0.23 to 0.09; P = 0.37). Among offspring of women with type 1 diabetes, increasing maternal HbA1c pregestationally and throughout the pregnancy was associated with lower average school grades. Offspring born to mothers with good glycemic control in the third trimester obtained higher average school grades compared with control offspring. The opposite applied to

offspring born to mothers with inadequate glycemic control, who obtained significantly lower average school grades compared with control offspring.
CONCLUSIONS Offspring of mothers with pregestational type 1 diabetes obtained similar average grades when finishing primary school compared with matched control offspring. Among offspring of women with type 1 diabetes, we found a consistent negative association between maternal HbA1c in pregnancy and primary school grades. However, whether this association reflects a direct causal influence of intrauterine hyperglycemia is uncertain. (Author)

20150624-7*

Cost-effectiveness of the New Zealand diabetes in pregnancy guideline screening recommendations. Coop C, Edlin R, Brown J, et al (2015), BMJ Open vol 5, no 6, 22 June 2015

Objective: To compare the cost-effectiveness of 2 possible screening strategies for gestational diabetes mellitus (GDM) from the perspective of the New Zealand health system, developed as part of a gestational diabetes guideline.
Design: A decision analytic model was built comparing 2-step screening (glycated haemoglobin (HbA1c) test at first booking and a 2 h 75 g oral glucose tolerance test (OGTT) as a single test at 24-28 weeks) with 3-step screening (HbA1c test at first booking and a 1 h glucose challenge test (GCT) followed by a 2 h 75 g OGTT when indicated from 24-28 weeks) using a 9-month time horizon.
Setting: A hypothetical cohort of 62 000 pregnant women in New Zealand.
Methods: Probabilities, costs and benefits were derived from the literature, and supplementary data was obtained from National Women's Annual Clinical Reports. Main outcome measures, screening and treatment costs (NZ$2013) and effect on health outcomes (incidence of complications).
Results: The total cost for both strategies under baseline assumptions shows that the 2-step screening strategy would cost NZ$1.38 m more than the 3-step screening strategy overall. The additional cost per case detected was NZ$12 460 per case. The model found that the 2-step screening strategy identifies 12 more women with diabetes and 111 more women with GDM when compared against the 3-step screening strategy. We assessed the effect of changing the sensitivity and specificity of the OGTT. The baseline model assumed that the 2 h 75 g OGTT has a sensitivity and specificity of 95%. The 2-step strategy becomes more cost-effective when the diagnostic accuracy measures are improved.
Conclusions: Adopting a 2-step strategy would moderately increase the number of GDM cases detected at the same time as moderately increasing the number of women with false negatives at a significant cost to the health system. Further evidence on the benefits of the 2 different approaches would be welcome. (Author)
Full URL: http://bmjopen.bmj.com/content/5/6/e006996.full

20150624-43*

Randomized controlled trial of insulin detemir versus NPH for the treatment of pregnant women with diabetes. Herrera KM, Rosenn BM, Foroutan J, et al (2015), American Journal of Obstetrics & Gynecology (AJOG) vol 213, no 3, September 2015, pp 426-428

Objective
To determine if insulin detemir (IDet) is non-inferior to insulin NPH for the treatment of gestational diabetes (GDM) and type 2 diabetes in pregnancy (T2DM).
Study Design
Randomized, controlled non-inferiority trial of women with GDM and T2DM who entered our Diabetes in Pregnancy Program (DIPP) from 3/2013-10/2014. Exclusion criteria were type 1 diabetes, age<18, and insulin allergy. Women who failed to achieve good glycemic control (GC) [mean blood glucose (BG) <100mg/dl] on diet and/or hypoglycemic agents were randomized to receive either IDet or NPH, with short acting insulin as part added as needed. Patients were instructed to test BG's 4 times a day [fasting (FBG) and 2-hour post-prandial (PPBG)]. Targets of GC were FBG <90 and PPBG <120mg/dL, and insulin was adjusted as needed to achieve the targets. The primary outcome was overall mean BG since during insulin treatment; secondary outcomes included overall mean PPBG and FBG, median number of weeks to achieve GC, percent of patients with overall GC, maternal weight gain, perinatal/neonatal outcomes, and number of hypoglycemic events. Power analysis (90% power) determined that 88 patients would need to be randomized, assuming a maximal acceptable difference in overall mean BG of 7mg/dL (SD of ±10mg/dL). A per-protocol analysis was performed.
Results
105 women were randomized. Eighteen women were excluded leaving 87 participants for analysis (45 NPH, 42 IDet). Maternal characteristics were similar in both groups. The difference in the mean BG of the groups was 2.1mg/dL with a 1-sided upper 95% confidence limit of 5.5mg/dL (less than the maximal acceptable difference of 7mg/dl; p=0.2937).

There was no significant difference in the primary outcome when an intent to treat analysis was performed or when the T2DM patients were excluded. The time to achieve GC was similar in both groups. There were no differences in perinatal outcomes and maternal weight gain among the groups. There were more hypoglycemic events per patient in the NPH group.
Conclusions
Insulin detemir is non-inferior to insulin NPH for the treatment of GDM and T2DM in pregnancy. (Author) (Only the abstract/summary is published in the print journal, even where additional comments and clinical implications have been added)

20150612-19*

1,5-Anhydroglucitol : a new predictor of neonatal birth weight in diabetic pregnancies. Delaney SS, Coley RY, Brown Z (2015), European Journal of Obstetrics & Gynecology and Reproductive Biology vol 189, pp 55-8

Objective: To determine whether 1,5-anhydroglucitol is predictive of neonatal birth weight. Study design: A retrospective cohort study including 85 pregnancies complicated by diabetes (Type 1=37, Type 2=24, gestational=24). Women had simultaneous hemoglobin A1c and 1,5-anhydroglucitol measurements every 4-8 weeks throughout pregnancy until delivery. Neonatal birth weight was evaluated by standardized z-scores. Linear regression analysis was performed to determine an association of 1,5-anhydroglucitol with neonatal birth weight z-score. Results: Type 1 diabetic patients had the lowest mean 1,5-anhydroglucitol of 3.5mcgmL (SD=1.6mcgmL) and highest mean hemoglobin A1c of 6.5% (SD=0.74%) compared to gestational diabetic patients who had the highest mean 1,5-anhydroglucitol of 6.7mcgmL (SD=3.8mcgmL) and lowest mean hemoglobin A1c of 6.0% (SD=0.94%). Mean 1,5-anhydroglucitol values were significantly different between diabetes types ($p<0.01$). Mean neonatal birth weight was above population averages for all diabetes classifications, although mean birth weight z-scores did not differ significantly between diabetic types ($p=0.38$). Multivariate linear regression showed a negative association between log-transformed 1,5-anhydroglucitol and birth weight (coefficient -0.82, 95% CI -1.19, -0.46). Conclusion: In pregnancies complicated by diabetes, low 1,5-anhydroglucitol was associated with increased neonatal birth weight. 1,5-Anhydroglucitol may be useful in the assessment of glycemic control in pregnancy in addition to A1c. (Author)

20150610-22

Adverse Pregnancy Outcomes Using The International Association of the Diabetes and Pregnancy Study Groups Criteria: Glycemic Thresholds and Associated Risks. Sacks DA, Black MH, Li X, et al (2015), Obstetrics & Gynecology vol 126, no 1, July 2015, pp 67-73

OBJECTIVE: To compare the risks of selected adverse pregnancy outcomes among untreated women who met The International Association of the Diabetes and Pregnancy Study Groups (IADPSG)-defined glucose criteria at two different thresholds.
METHODS: A retrospective cohort study of women tested for gestational diabetes mellitus (GDM) with the 75-g 2-hour glucose tolerance test (GTT) who delivered a live singleton neonate. Data of women who were treated because they met institutional criteria defining GDM (at least two GTT results greater than or equal to fasting 100 mg/dL, 1-hour 195 mg/dL, and 2-hour 160 mg/dL) were excluded. The data of the remaining women were analyzed in three groups. The prevalence of selected adverse pregnancy outcomes was compared for those with no GDM ('no GDM,' n=7,943); those at least one of whose results were fasting 92-94 mg/dL, 1-hour 180-190 mg/dL, or 2-hour 153-161 mg/dL ('GDM-1,' n=771); and those at least one of whose results were greater than or equal to fasting 95 mg/dL, 1-hour 191 mg/dL, or 2-hour 162 mg/dL ('GDM-2,' n=1,121).
RESULTS: Of the 9,835 women, 1,892 (19.2%) met criteria for GDM, of whom 771 (40.8%) were categorized as GDM-1 and 1,121 (59.2%) GDM-2. After adjustment for confounders, women with GDM-2 were at significantly greater risk for preeclampsia or eclampsia, preterm delivery, primary cesarean delivery, shoulder dystocia, higher birth weight, ponderal index, large for gestational age, transient tachypnea, and neonatal hypoglycemia than women without GDM. Only birth weight and large for gestational age were significantly greater in the GDM-1 compared with the no GDM group.
CONCLUSION: Fewer adverse outcomes are found at lower levels of the IADPSG-defined glucose intolerance spectrum. Determining whether these patients will benefit from treatment will require a randomized controlled trial. (Author)

20150603-6*

Insulin treatment of maternal diabetes mellitus and respiratory outcome in late-preterm and term singletons. Becquet O, El Khabbaz F, Alberti C, et al (2015), BMJ Open vol 5, no 6, 2 June 2015

Objectives While the incidence of diabetes mellitus (DM) during pregnancy has been steadily increasing in recent years, the link between gestational DM and respiratory outcome in neonates has not been definitely established. We asked the question whether DM status and its treatment during pregnancy could influence the risk of neonatal respiratory distress.
Design We studied in a large retrospective cohort the relationship between maternal DM status (non-DM, insulin-treated DM (IT-DM) and non-insulin-treated DM (NIT-DM)), and respiratory distress in term and near-term inborn singletons.
Results Among 18 095 singletons delivered at 34 weeks of gestation or later, 412 (2.3%) were admitted to the neonatal intensive care unit (NICU) for respiratory distress within the first hours of life. The incidence of NICU admission due to respiratory distress groups was 2.2%, 5.7% and 2.1% in the non-DM, IT-DM and NIT-DM groups, respectively. Insulin treatment of DM, together with several other perinatal factors, was associated with a significant increased risk for respiratory distress. Several markers of the severity of respiratory illness, including durations of mechanical ventilation and supplemental oxygen, and hypertrophic cardiomyopathy were also found increased following IT-DM as compared with NIT-DM. In a multivariate model, we found that IT-DM, but not NIT-DM, was significantly associated with respiratory distress independent of gestational age and caesarean section, with an incidence rate ratio of 1.44 (1.00-2.08).
Conclusions This study shows that the treatment of maternal DM with insulin during pregnancy is an independent risk factor for respiratory distress in term and near-term newborns. (Author)
Full URL: http://bmjopen.bmj.com/content/5/6/e008192.short?rss=1

20150602-16*

Socio-cultural influences on the behaviour of South Asian women with diabetes in pregnancy: qualitative study using a multi-level theoretical approach. Greenhalgh T, Clinch M, Afsar N, et al (2015), BMC Medicine vol 13, no 120, 21 May 2015

Background Diabetes in pregnancy is common in South Asians, especially those from low-income backgrounds, and leads to short-term morbidity and longer-term metabolic programming in mother and offspring. We sought to understand the multiple influences on behaviour (hence risks to metabolic health) of South Asian mothers and their unborn child, theorising how these influences interact and build over time, and inform the design of culturally congruent, multi-level interventions. Methods Our sample for this qualitative study was 45 women of Bangladeshi, Indian, Sri Lankan, or Pakistani origin aged 21-45 years with a history of diabetes in pregnancy, recruited from diabetes and antenatal services in two deprived London boroughs. Overall, 17 women shared their experiences of diabetes, pregnancy, and health services in group discussions and 28 women gave individual narrative interviews, facilitated by multilingual researchers, audiotaped, translated, and transcribed. Data were analysed using the constant comparative method, drawing on sociological and narrative theories. Results Key storylines (over-arching narratives) recurred across all ethnic groups studied. Short-term storylines depicted the experience of diabetic pregnancy as stressful, difficult to control, and associated with negative symptoms, especially tiredness. Taking exercise and restricting diet often worsened these symptoms and conflicted with advice from relatives and peers. Many women believed that exercise in pregnancy would damage the fetus and drain the mother's strength, and that eating would be strength-giving for mother and fetus. These short-term storylines were nested within medium-term storylines about family life, especially the cultural, practical, and material constraints of the traditional South Asian wife and mother role and past experiences of illness and healthcare, and within longer-term storylines about genetic, cultural, and material heritage - including migration, acculturation, and family memories of food insecurity. While peer advice was familiar, meaningful, and morally resonant, health education advice from clinicians was usually unfamiliar and devoid of cultural meaning. Conclusions 'Behaviour change' interventions aimed at preventing and managing diabetes in South Asian women before and during pregnancy are likely to be ineffective if delivered in a socio-cultural vacuum. Individual education should be supplemented with community-level interventions to address the socio-material constraints and cultural frames within which behavioural 'choices' are made. (Author) [Please note: BMC initially publish articles in a provisional format. If there is a note on the document to indicate that it is still provisional, it may undergo minor changes].
Full URL: http://www.biomedcentral.com/1741-7015/13/120/abstract

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20150521-14*

Association of maternal diabetes with autism in offspring. Xiang AH (2015), JAMA (Journal of the American Medical Association) vol 313, no 14, 14 April 2015, pp 1425-1434

Importance: Information about the association of maternal diabetes and autism spectrum disorders (ASDs) in offspring is limited, with no report on the importance of timing of exposure during gestation.
Objective: To assess ASD risk associated with intrauterine exposure to preexisting type 2 diabetes and gestational

diabetes mellitus (GDM) by gestational age at GDM diagnosis.
Design, Setting, and Patients: Retrospective longitudinal cohort study including 322 323 singleton children born in 1995-2009 at Kaiser Permanente Southern California (KPSC) hospitals. Children were tracked from birth until the first of the following: date of clinical diagnosis of ASD, last date of continuous KPSC health plan membership, death due to any cause, or December 31, 2012. Relative risks of ASD were estimated by hazard ratios (HRs) using Cox regression models adjusted for birth year.
Exposures: Maternal preexisting type 2 diabetes (n = 6496), GDM diagnosed at 26 weeks' gestation or earlier (n = 7456) or after 26 weeks' gestation (n = 17 579), or no diabetes (n = 290 792) during the index pregnancy.
Main Outcomes and Measures: Clinical diagnosis of ASD in offspring.
Results: During follow-up, 3388 children were diagnosed as having ASD (115 exposed to preexisting type 2 diabetes, 130 exposed to GDM at ≤26 weeks, 180 exposed to GDM at >26 weeks, and 2963 unexposed). Unadjusted annual ASD incidences were 3.26, 3.02, 1.77, and 1.77 per 1000 among children of mothers with preexisting type 2 diabetes, GDM diagnosed at 26 weeks or earlier, GDM diagnosed after 26 weeks, and no diabetes, respectively. The birth year-adjusted HRs were 1.59 (95% CI, 1.29-1.95) for preexisting type 2 diabetes, 1.63 (95% CI, 1.35-1.97) for GDM diagnosed at 26 weeks or earlier, and 0.98 (95% CI, 0.84-1.15) for GDM diagnosed after 26 weeks relative to no exposure. After adjustment for maternal age, parity, education, household income, race/ethnicity, history of comorbidity, and sex of the child, maternal preexisting type 2 diabetes was not significantly associated with risk of ASD in offspring (HR, 1.21; 95% CI, 0.97-1.52), but GDM diagnosed at 26 weeks or earlier remained so (HR, 1.42; 95% CI, 1.15-1.74). Antidiabetic medication exposure was not independently associated with ASD risk. Adjustment for a mother or older sibling with ASD in the full cohort and for maternal smoking, prepregnancy body mass index, and gestational weight gain in the subset with available data (n = 68 512) did not affect the results.
Conclusions and Relevance: In this large, multiethnic clinical cohort of singleton children born at 28 to 44 weeks' gestation, exposure to maternal GDM diagnosed by 26 weeks' gestation was associated with risk of ASD in offspring. (Author)

20150506-6*

The clinical management of hyperglycemia in pregnancy complicated by maturity onset diabetes of the young. Bacon S, Schmid J, McCarthy A, et al (2015), American Journal of Obstetrics & Gynecology (AJOG) vol 213, no 2, August 2015, pp 236-238
Objective
Women with Maturity Onset Diabetes of the Young (MODY) are often first identified and diagnosed with diabetes during pregnancy. Genetics and hyperglycemia play an important role in determining fetal size in MODY pregnancies. The principal objective of the current study is to determine the outcomes and clinical management of hyperglycemia in pregnancies complicated by glucokinase (GCK) and hepatocyte nuclear factor-1 alpha (HNF-1α) MODY mutations.
Study Design
A retrospective chart review of 37 women with a GCK/ HNF-1α mutation was conducted. Data on variables such as birth weight, mode of delivery and the treatment of hyperglycaemia was available on 89 pregnancies.
Results
The birth weight in non-affected GCK offspring was significantly higher than in the affected GCK offspring (4.8 kg (4.1-5.2) vs. 3.2 kg (3.1-3.7), p=0.01). Seven point home blood glucose monitoring (HBGM) over a seven day period in each trimester demonstrated higher fasting and post prandial glycemic excursions in the 1st trimester of GCK pregnancies when compared to HNF-1α pregnancies (Fasting; 104 mg/dL (90-115) vs. 84 mg/dL (77-88), p=0.01 and Post-prandial: 154 mg/dL (135 -196) vs. 111 mg/dL (100-131),p=0.04) despite insulin treatment. There was a higher percentage of miscarriages in the GCK group when compared to the HNF-1α MODY group (33.3% vs 14%, p=0.07) which was similar to the background population. Insulin initiated at an early gestation appeared to lower the incidence of macrosomia in GCK non-affected offspring.
Conclusions
Hyperglycemia in HNF-1α pregnancies is easily managed with current insulin protocols, in contrast glycemic excursions are difficult to manage in GCK pregnancies. There was an increased percentage of miscarriages in GCK pregnancies highlighting the importance of a diagnosis of GCK-MODY in women prior to conception and the necessity for pre-conception care. (Author) (Only the abstract/summary is published in the print journal, even where additional comments and clinical implications have been added.)

20150424-10*

Comparative effectiveness of continuous subcutaneous insulin infusion using insulin analogs and multiple daily injections in pregnant women with diabetes mellitus: a systematic review and meta-analysis.. Ranasinghe PD, Maruthur NM, Nicholson WK, et al (2015), Journal of Women's Health vol 24, no 3, March 2015, pp 237-49

We systematically reviewed the effectiveness and safety of continuous subcutaneous insulin infusion (CSII) with insulin analogs compared with multiple daily injections (MDI) in pregnant women with diabetes mellitus. We searched Medline®, Embase®, and the Cochrane Central Register of Controlled Trials through May 2013. Studies comparing CSII with MDI in pregnant women with diabetes mellitus were included. Studies using regular insulin CSII were excluded. We conducted meta-analyses where there were two or more comparable studies based on the type of insulin used in the MDI arm. Seven cohort studies of pregnant women with type 1 diabetes reported improvement in hemoglobin A1c (HbA1c) in both groups. Meta-analysis showed no difference in maternal and fetal outcomes for CSII versus MDI. Results were similar when CSII was compared with MDI with insulin analogs or regular insulin. Studies had moderate to high risk bias with incomplete descriptions of study methodology, populations, treatments, follow up, and outcomes. We conclude that observational studies reported similar improvements in HbA1c with CSII and MDI during pregnancy, but evidence was insufficient to rule out possible important differences between CSII and MDI for maternal and fetal outcomes. This highlights the need for future studies to examine the effectiveness and safety of CSII with insulin analogs and MDI in pregnant women with diabetes mellitus. (Author)

20150414-21

Assessing White's Classification of Pregestational Diabetes in a Contemporary Diabetic Population. Bennett SN, Tita A, Owen J, et al (2015), Obstetrics & Gynecology vol 125, no 5, May 2015, pp 1217-1223

OBJECTIVE: To assess the validity of White's classification, including the role of chronic hypertension, in a contemporary diabetic population.
METHODS: We performed a retrospective cohort study of all singleton pregnancies with pre-existing diabetes mellitus from 2008 to 2013. Adverse outcomes were compared across classes B, C, D, and vascular disease (R, F, H) and further stratified by the presence or absence of chronic hypertension. Outcomes examined were a composite perinatal outcome (stillbirth, neonatal death, shoulder dystocia, birth injury, seizures, requiring chest compressions or intubation at delivery, blood pressure support), small for gestational age (SGA), large for gestational age (LGA), macrosomia, shoulder dystocia, preterm delivery at less than 37 weeks of gestation, preeclampsia, and cesarean delivery.
RESULTS: Of the 475 patients, the 1980 White's classification was significantly associated with SGA, LGA, macrosomia, preterm delivery, preeclampsia, and cesarean delivery (P<=.01). Within each White's class based on age or time since diagnosis alone, hypertension was significantly associated with a higher incidence of preeclampsia in class B (16% without hypertension compared with 32% with hypertension, P<.01) and C (22% compared with 40%, P=.04), SGA in C (4.7% compared with 21%, P<.01), preterm delivery in B (25% compared with 46%, P<.01) and C (35% compared with 58%, P=.01), and the composite neonatal outcome in B (7.9% compared with 17%, P=.03). The incidence of adverse outcomes in classes B and C with hypertension resembles the incidence of adverse outcomes in those with diabetes one class higher.
CONCLUSION: The 1980 White's classification system, taking into consideration the presence of chronic hypertension, remains a useful system for counseling pregestational diabetic women regarding adverse pregnancy outcomes. (Author)

20150331-32*

Comparing type 1 and type 2 diabetes in pregnancy- similar conditions or is a separate approach required?. Owens LA, Sedar J, Carmody L, et al (2015), BMC Pregnancy and Childbirth vol 15, no 69, 27 March 2015

Background Pregnancy in women with type 1 (T1DM) or type 2 diabetes (T2DM) is associated with increased risk. These conditions are managed similarly during pregnancy, and compared directly in analyses, however they affect women of different age, body mass index and ethnicity. Methods We assess if differences exist in pregnancy outcomes between T1DM and T2DM by comparing them directly and with matched controls. We also analyze the effect of glycemic control on pregnancy outcomes and analyze predictive variables for poor outcome. Results We include 323 women with diabetes and 660 glucose-tolerant controls. T2DM women had higher BMI, age and parity with a shorter duration of diabetes and better glycemic control. Preeclampsia occurred more in women with T1DM only. Rates of elective cesarean section were similar between groups but greater than in controls, emergency cesarean section was increased in women with type 1 diabetes. Maternal morbidity in T1DM was double that of matched controls but T2DM was similar to controls. Babies of mothers with diabetes were more likely to be delivered prematurely. Neonatal hypoglycemia occurred more in T1DM than T2DM and contributed to a higher rate of admission to neonatal intensive care for both groups. Adverse neonatal outcomes including stillbirths and congenital abnormalities were seen in both groups but were more common in T1DM pregnancies. HbA1C values at which these poor outcomes occurred differed between T1 and T2DM. Conclusions Pregnancy outcomes in T1DM and T2DM are

different and occur at different levels of glycemia. This should be considered when planning and managing pregnancy and when counseling women. (Author) [Please note: BMC initially publish articles in a provisional format. If there is a note on the document to indicate that it is still provisional, it may undergo minor changes]

Full URL: http://www.biomedcentral.com/1471-2393/15/69/abstract

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20150327-6*

Application of customized birth weight curves in the assessment of perinatal outcomes in infants of diabetic mothers. González-González NL, González-Dávila E, Cabrera F, et al (2015), Fetal Diagnosis and Therapy vol 37, no 2, pp 117-22

OBJECTIVE:
To determine whether the use of customized curves (CC) allows better detection of large- (LGA) or small-for-gestational age (SGA) infants at risk of adverse perinatal morbidity than non-CC in women with diabetes mellitus (DM).
MATERIAL AND METHODS:
A model of CC was applied to all infants of diabetic mothers (IDM) who attended the Hospital Universitario Materno Infantil de Canarias between 2008 and 2011. We compared perinatal outcomes of IDM classified as LGA or SGA by non-CC versus CC.
RESULTS:
One of 4 LGA was appropriate for gestational age (AGA) by CC (false-positive rate: 25%) and 30% of SGA by CC were not identified by non-CC (false-negative rate). False-positive LGA and SGA showed similar perinatal outcomes to AGA infants. The rates of cesarean section, cephalopelvic disproportion, total fetal distress and shoulder dystocia were significantly higher in false-negative LGA than in AGA by CC ($p < 0.004$, $p < 0.02$, $p < 0.04$ and $p < 0.04$, respectively). Fetal distress was higher in false-negative SGA than in AGA by CC ($p < 0.03$).
DISCUSSION:
In pregnancies complicated by DM, the use of CC allowed more accurate identification of LGA and SGA infants at high risk of perinatal morbidity than non-CC.
(Author)

20150317-5*

Continuous subcutaneous insulin infusion (CSII) versus multiple daily injections (MDI) of rapid-acting insulin analogues and detemir in type 1 diabetic (T1D) pregnant women. Mello G, Biagioni S, Ottanelli S, et al (2015), Journal of Maternal-Fetal and Neonatal Medicine vol 28, no 3, February 2015, pp 276-280

Objective: To compare glycemic control, maternal-neonatal outcomes and fetal fat body mass growth of type 1 diabetic pregnant women treated with continuous subcutaneous insulin infusion (CSII) or multiple daily injections (MDI) with the long-acting insulin analogue detemir as basal insulin.
METHODS:
Retrospective study of 53 women, attending the Unit of Prenatal Medicine of Careggi University Hospital, Florence, from 2009 to 2012: 35 treated with CSII, 18 with MDI-detemir. Each woman performed daily blood glucose self-monitoring, had an individualized nutritional therapy, weekly prenatal visits and ultrasound scans (US) according to the Tuscan guidelines. US were also performed every two weeks from 28 to 38 weeks of gestation to assess fetal fat body mass growth. Student's t-test and Chi-square test were performed to compare the groups' results.
RESULTS:
No significant differences were observed in metabolic control, in any maternal and neonatal outcome nor fetal fat body mass growth for either group. The MDI group needed higher daily doses of insulin (MDI: 1.00 ± 0.32 UI/kg versus CSII: 0.75 ± 0.29 UI/kg, $p = 0.007$) to reach results comparable to the CSII group.
CONCLUSIONS:
MDI therapy with detemir is a safe and effective alternative, with a good benefit-cost ratio compared to insulin pumps.
(Author)

20150306-26*

Does exposure to hyperglycaemia in utero increase the risk of obesity and diabetes in the offspring? A critical reappraisal. Donovan LE, Cundy T (2015), Diabetic Medicine vol 32, no 3, 2015, pp 295-304

BACKGROUND:
The idea that exposure to hyperglycaemia in utero is an important factor in the development of obesity and diabetes in the offspring has become entrenched as popular belief.

AIM:
To appraise the literature supporting this hypothesis in the light of recent studies that have clarified the main drivers of obesity in children and adolescents.
METHODS:
A review of published evidence from animal studies, human observational studies, systematic reviews and experimental trials that address the impact of diabetes (Types 1 and 2, genetic or gestational) on the future risk of obesity and/or glucose intolerance in the offspring.
RESULTS:
Some animal studies support a relationship between exposure to hyperglycaemia in utero and future development of obesity and diabetes, but the results are inconsistent. Most of the human studies claiming to show a relationship have not taken into account important known confounders, such as maternal and paternal BMI. Evidence supporting a dose-response relationship between maternal hyperglycaemia exposure and obesity and diabetes in the offspring is weak, and there is no convincing evidence that treating gestational diabetes reduces the later risk of offspring obesity or glucose intolerance.
CONCLUSIONS:
Exposure to hyperglycaemia in utero has minimal direct effect on the later risk of obesity and Type 2 diabetes. The increased risk of obesity in the offspring of women with Type 2 or gestational diabetes can be explained by confounding factors, such as parental obesity. (Author)

20150305-25*

A pilot randomized, controlled trial of metformin versus insulin in women with type 2 diabetes mellitus during pregnancy. Refuerzo JS, Gowen R, Pedroza C (2015), American Journal of Perinatology vol 30, no 2, February 2015, pp 163-170

Objective Few studies support oral diabetic treatment in pregnant women with type 2 diabetes mellitus (T2DM). The objective of this study was to compare the effects of metformin versus insulin on achieving glycemic control and improving maternal and neonatal outcomes in pregnant women with T2DM. Study Design A pilot randomized, controlled trial was conducted of metformin versus insulin for the treatment of T2DM during pregnancy. The primary outcome was glycemic control measured with hemoglobin A1c < 7% at delivery. Maternal and neonatal outcomes were compared between groups. Results In this study, 8 women received metformin and 11 received insulin. All women in both groups achieved glycemic control by delivery (HgbA1c: metformin 5.96 ± 5.88 vs. insulin 6.34 ± 0.92%). There were similar rates of cesarean delivery, birth weights, neonatal intensive care unit admissions, respiratory distress syndrome, and neonatal dextrose treatment between groups. There was one case of fetal macrosomia in the insulin group, one case of shoulder dystocia in the metformin group and no cases of failed metformin therapy. Conclusion In this pilot study, glycemic control was achieved in women who received metformin and insulin. Larger studies are needed to determine whether metformin can be considered a reasonable alternative to insulin in pregnant women with T2DM. (Author)

20150226-4*

Diabetes in pregnancy: management of diabetes and its complications from preconception to the postnatal period [Last updated 16 December 2020]. National Institute for Health and Care Excellence (2015), London: NICE 25 February 2015. 65 pages

Gives updated guidance to health professionals and NHS bodies on the management of diabetes preconceptually, in pregnancy and in the postnatal period. (JR)

Full URL: https://www.nice.org.uk/guidance/ng3/resources/diabetes-in-pregnancy-management-of-diabetes-and-its-complications-from-preconception-to-the-postnatal-period-51038446021

20150223-92*

Association of pre-pregnancy BMI and postpartum weight retention with postpartum HbA1c among women with Type 1 diabetes. Huang T, Brown FM, Curran A, et al (2015), Diabetic Medicine vol 32, no 2, 2015, pp 181-188

AIM:
To examine the association of pre-pregnancy BMI and postpartum weight retention with postpartum HbA1c levels in women with Type 1 diabetes.
METHODS:
We longitudinally evaluated 136 women with Type 1 diabetes who received prenatal, pregnancy, and postpartum care through Joslin Diabetes Center's Diabetes and Pregnancy Program between 2004 and 2009. Weight, BMI and HbA1c

concentrations were assessed before the index pregnancy and repeatedly monitored after delivery until 12 months postpartum. We used linear mixed models to assess the association of postpartum HbA1c with pre-pregnancy BMI and postpartum weight retention.
RESULTS:
The mean HbA1c concentration increased from 49 mmol/mol (6.6%) at 6 weeks postpartum to 58 mmol/mol (7.5%) by 10 months postpartum, a level similar to the mean pre-pregnancy HbA1c concentration. Postpartum weight retention showed a linearly decreasing trend of 0.06 kg/week (P < 0.0001), with -0.1 kg average postpartum weight retention by 1 year postpartum. Compared with women with a pre-pregnancy BMI ≥ 25 kg/m(2) , women with a lower pre-pregnancy BMI maintained a 3.4 mmol/mol (0.31%) lower HbA1c concentration, after adjusting for several sociodemographic, reproductive and diabetes-related factors (P = 0.03). There was a suggestion of a time-varying positive association between HbA1c and postpartum weight retention, with the most significant difference of 3.7 mmol/mol (0.34%; P = 0.05) at 30 weeks postpartum among women with postpartum weight retention ≥ 5 kg vs those with postpartum weight retention < 5 kg.
CONCLUSIONS:
Pre-pregnancy BMI and postpartum weight retention were positively associated with HbA1c during the first postpartum year in women with Type 1 diabetes. Interventions to modify the behaviours associated with these body weight factors before pregnancy and after delivery may help women with Type 1 diabetes maintain good glycaemic control after pregnancy. (Author)

20150223-86*

Glycemic targets in the second and third trimester of pregnancy for women with type 1 diabetes. Maresh MJA, Holmes VA, Patterson CC, et al (2015), Diabetes Care vol 38, no 1, 2015, pp 34-42

OBJECTIVE:
To assess the relationship between second and third trimester glycemic control and adverse outcomes in pregnant women with type 1 diabetes, as uncertainty exists about optimum glycemic targets.
RESEARCH DESIGN AND METHODS:
Pregnancy outcomes were assessed prospectively in 725 women with type 1 diabetes from the Diabetes and Pre-eclampsia Intervention Trial. HbA1c (A1C) values at 26 and 34 weeks' gestation were categorized into five groups, the lowest, <6.0% (42 mmol/mol), being the reference. Average pre- and postprandial results from an eight-point capillary glucose profile the previous day were categorized into five groups, the lowest (preprandial <5.0 mmol/L and postprandial <6.0 mmol/L) being the reference.
RESULTS:
An A1C of 6.0-6.4% (42-47 mmol/mol) at 26 weeks' gestation was associated with a significantly increased risk of large for gestational age (LGA) (odds ratio 1.7 [95% CI 1.0-3.0]) and an A1C of 6.5-6.9% (48-52 mmol/mol) with a significantly increased risk of preterm delivery (odds ratio 2.5 [95% CI 1.3-4.8]), pre-eclampsia (4.3 [1.7-10.8]), need for a neonatal glucose infusion (2.9 [1.5-5.6]), and a composite adverse outcome (3.2 [1.3-8.0]). These risks increased progressively with increasing A1C. Results were similar at 34 weeks' gestation. Glucose data showed less consistent trends, although the risk of a composite adverse outcome increased with preprandial glucose levels between 6.0 and 6.9 mmol/L at 34 weeks (3.3 [1.3-8.0]).
CONCLUSIONS:
LGA increased significantly with an A1C ≥6.0 (42 mmol/mol) at 26 and 34 weeks' gestation and with other adverse outcomes with an A1C ≥6.5% (48 mmol/mol). The data suggest that there is clinical utility in regular measurement of A1C during pregnancy. (Author)

20150223-72*

Trends in pre-pregnancy diabetes among deliveries in 19 U.S. States, 2000-2010. Bardenheier BH, Imperatore G, Devlin HM, et al (2015), American Journal of Preventive Medicine vol 48, no 2, 2015, pp 154-161

BACKGROUND:
Trends in state-level prevalence of pre-pregnancy diabetes mellitus (PDM; i.e., type 1 or type 2 diabetes diagnosed before pregnancy) among delivery hospitalizations are needed to inform healthcare delivery planning and prevention programs.
PURPOSE:
To examine PDM trends overall, by age group, race/ethnicity, primary payer, and with comorbidities such as pre-eclampsia and pre-pregnancy hypertension, and to report changes in prevalence over 11 years.

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METHODS:
In 2014, State Inpatient Databases from the Agency for Healthcare Research and Quality were analyzed to identify deliveries with PDM and comorbidities using diagnosis-related group codes and ICD-9-CM codes. General linear regression with a log-link and binomial distribution was used to assess the annual change.
RESULTS:
Between 2000 and 2010, PDM deliveries increased significantly in all age groups, all race/ethnicity groups, and in all states examined (p<0.01). The age-standardized prevalence of PDM increased from 0.65 per 100 deliveries in 2000 to 0.89 per 100 deliveries in 2010, with a relative change of 37% (p<0.01). Although PDM rates were highest in the South, some of the largest relative increases occurred in five Western states (≥69%). Non-Hispanic blacks had the highest PDM rates and the highest absolute increase (0.26 per 100 deliveries). From 2000 to 2010, the proportion of PDM deliveries with pre-pregnancy hypertension increased significantly (p<0.01) from 7.4% to 14.1%.
CONCLUSIONS:
PDM deliveries are increasing overall and particularly among those with PDM who have hypertension. Effective diabetes prevention and control strategies for women of childbearing age may help protect their health and that of their newborns. (Author)

20150218-40

Preconception care has the potential for a high return on investment. Boggess KA, Berggren EK (2015), American Journal of Obstetrics & Gynecology (AJOG) vol 212, no 1, January 2015, pp 1-3

Comments on research published in this issue (1) that reports on the health and cost burdens relating to diabetes that could be prevented with universal preconception care. 1. Peterson C, Grosse SD, Sharma AJ et al. Preventable health and cost burden of adverse birth outcomes associated with pregestational diabetes in the United States. American Journal of Obstetrics and Gynecology, vol 212, no 1, January 2015, pp 74-76. (25 references) (SB)

20150217-59

The genetics of diabetic pregnancy. Bajaj K, Gross SJ (2015), Best Practice & Research: Clinical Obstetrics and Gynaecology vol 29, no 1, January 2015, pp 102-109

Advancements in molecular technology coupled with a greater awareness of the human genome and epigenome have broadened our understanding of the genetic contributions to the diabetic pregnancy. There are multiple genes and pathways that can result in a hyperglycemic environment for the fetus. Exposure to this environment in utero has an impact on the risk of adult-onset chronic diseases. How identification of an individual's genetic variants will impact clinical care and outcomes will continue to evolve as our understanding grows. (74 references) (Author)

20150204-63*

The impact of maternal obesity, age, pre-eclampsia and insulin dependent diabetes on severe maternal morbidity by mode of delivery-a register-based cohort study. Pallasmaa N, Ekblad U, Gissler M, et al (2015), Archives of Gynecology and Obstetrics vol 291, no 2, 2015, pp 311-318

PURPOSE:
To determine the rate of severe maternal morbidity related to delivery by delivery mode and to assess if the impact of studied risk factors varies by delivery mode.
METHODS:
A register-based study including all women having singleton delivery in Finland in 2007-2011, n = 292,253, data derived from the Finnish Medical Birth Registry and Hospital Discharge Registry. Diagnoses and interventions indicating a severe maternal complication were searched and the mode of delivery was assessed by data linkage. The impact of obesity, maternal age 35 years or more, pre-eclampsia and insulin dependent diabetes on severe maternal morbidity (all severe complications, severe infections and severe) was studied in each mode of delivery and calculated as Odds ratios.
RESULTS:
The overall incidence of severe complications was 12.8/1,000 deliveries. The total complication rate was lowest in vaginal deliveries (VD) in all risk groups. Obesity increased the risk for all severe complications and severe infections in the total population, but not significantly in specific delivery modes. Age increased the risk of hemorrhage in VD. Pre-eclampsia increased the risk for hemorrhage in all deliveries except elective CS. In women with pre-eclampsia, overall morbidity was similar in VD, attempted VD and elective CS. The presence of any studied risk factor increased the risk for complications within the risk groups by the high proportion of emergency CS performed.

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CONCLUSIONS:
An attempt of VD is the safest way to deliver even for high-risk women with the exception of women with pre-eclampsia, who had a similar risk in an attempt of VD and elective CS. (Author)

20150130-30

Advances in revealing the molecular targets downstream of oxidative stress-induced pro-apoptotic kinase signaling in diabetic embryopathy. Wang F, Reece EA, Yang P (2015), American Journal of Obstetrics & Gynecology (AJOG) vol 213, no 2, August 2015, pp 125-134

Pre-existing maternal diabetes is a high risk factor of diabetic embryopathy, such as neural tube defects (NTDs) and congenital heart defects (CHD). Maternal diabetes significantly increases the production of reactive oxygen species (ROS) resulting in oxidative stress and diabetic embryopathy. Multiple cellular and metabolic factors contribute to these processes. FoxO3a has been demonstrated as a key transcription factor in the signaling transduction pathways responsible for maternal diabetes-induced birth defects. ASK1 activated by oxidative stress stimulates nuclear translocation of FoxO3a, resulting in over-expression of TRADD, which, in turn, leads to caspase 8 activation and apoptosis. Maternal diabetes-activated JNK1/2, downstream effectors of ASK1, can be blocked by SOD1 overexpression, suggesting that oxidative stress is responsible for JNK1/2 signaling activation. Deletion of JNK1/2 significantly suppressed the activity of FoxO3a. These observations indicate that maternal diabetes-induced oxidative stress stimulates the activation of ASK1, JNK1/2, FoxO3a, TRADD, caspase 8 cleavage, finally, apoptosis and diabetic embryopathy. (124 references) (Author)

20150128-23*

Dietary advices on carbohydrate intake for pregnant women with type 1 diabetes. Roskjaer AB, Andersen JR, Ronneby H, et al (2015), Journal of Maternal-Fetal and Neonatal Medicine vol 28, no 2, 2015, pp 229-233

The impact of the quality and quantity of carbohydrate intake on glycaemic control and pregnancy outcome was evaluated with focus on pregnant women with type 1 diabetes. For women with type 1 diabetes, a gestational weight gain within the lower range of the guidelines of the Institute of Medicine (IOM) is generally recommended. A low-glycaemic index diet is considered safe, and has shown, positive effects on the glycaemic control and pregnancy outcomes for both healthy women, those with type 2 diabetic and gestational diabetes (GDM). In general, carbohydrate counting does improve glycaemic control in type 1 diabetes. A moderately low carbohydrate diet with a carbohydrate content of 40% of the calories results in better glycaemic control and comparable obstetric outcomes in type 2 diabetes and GDM when compared to a diet with a higher carbohydrate content, and is regarded safe in diabetic pregnancy. In type 1 diabetes pregnancy, a moderately low carbohydrate diet with 40% carbohydrates has been suggested; however, a minimum intake of 175 g carbohydrate daily is recommended. Despite limited evidence the combination of a low-glycaemic index diet with a moderately low carbohydrate intake, using carbohydrate counting can be recommended for pregnant women with type 1 diabetes. (Author)

20150108-3*

Birthweight, mediating biomarkers and the development of type 2 diabetes later in life: a prospective study of multi-ethnic women. Song Y, Huang Y-H, et al (2015), Diabetologia 5 January 2015 [Online version ahead of print]

Aims/hypothesis The aim of this work was to investigate the prospective relationship between low birthweight (LBW) and type 2 diabetes risk later in life and the mediation effects of type 2 diabetes biomarkers linking LBW to type 2 diabetes risk.

Methods We measured baseline plasma concentrations of various type 2 diabetes biomarkers in 1,259 incident type 2 diabetes cases and 1,790 controls in the Women's Health Initiative-Observational Study. Self-report birthweights of the participants were recorded. The total effect of LBW on type 2 diabetes risk was partitioned into effects that were mediated by a specific biomarker and effects that were not mediated by this biomarker, using counterfactual model-based mediation analysis.

Results LBW was significantly associated with increased risk

of type 2 diabetes. Compared with women with birthweight 3.63-4.54 kg, women with LBW (<2.72 kg) had a multivariable-adjusted OR of 2.15 (95% CI, 1.54, 3.00). Insulin resistance (indicated by HOMA-IR) mediated 47% of the total effect. Decreased sex hormone-binding globulin (SHBG) concentration accounted for 24%, elevated E-selectin concentration accounted for 25% and increased systolic blood pressure accounted for 8% of the total effect of LBW on type 2 diabetes risk. (Due to interactions among different mediators, the sum of each individual mediator's contribution could exceed 100%, without an upper limit.)
Conclusions/interpretation LBW is directly predictive of higher risk of type 2 diabetes later in life. The effect of LBW on type 2 diabetes risk seems mainly mediated by insulin resistance, which is further explained by circulating levels of SHBG and E-selectin and systolic blood pressure. The study provides potential risk stratification in a population at greater risk of developing type 2 diabetes. (Author)

20141112-38*

Preventable health and cost burden of adverse birth outcomes associated with pregestational diabetes in the United States. Peterson C, Grosse SD, Andrea RL, et al (2015), American Journal of Obstetrics & Gynecology (AJOG) vol 212, no 1, January 2015, pp 74-6

Objective:
Preconception care for women with diabetes can reduce the occurrence of adverse birth outcomes. We aimed to estimate the preconception care (PCC)-preventable health and cost burden of adverse birth outcomes associated with diagnosed and undiagnosed pregestational diabetes mellitus (PGDM) in the United States.
Study Design:
Among women of reproductive age (15-44 years), we estimated age- and race/ethnicity-specific prevalence of diagnosed and undiagnosed diabetes. We applied age and race/ethnicity-specific pregnancy rates, estimates of the risk reduction from PCC for 3 adverse birth outcomes (preterm birth, major birth defects, and perinatal mortality), and lifetime medical and lost productivity costs for children with those outcomes. Using a probabilistic model, we estimated the reduction in adverse birth outcomes and costs associated with universal PCC compared with no PCC among women with PGDM. We did not assess maternal outcomes and associated costs.
Results:
We estimated 2.2% of US births are to women with PGDM. Among women with diagnosed diabetes, universal PCC might avert 8397 (90% prediction interval [PI], 5252-11,449) preterm deliveries, 3725 (90% PI, 3259-4126) birth defects, and 1872 (90% PI, 1239-2415) perinatal deaths annually. Associated discounted lifetime costs averted for the affected cohort of children could be as high as $4.3 billion (90% PI, 3.4-5.1 billion) (2012 US dollars). PCC among women with undiagnosed diabetes could yield an additional $1.2 billion (90% PI, 951 million-1.4 billion) in averted cost.
Conclusion:
Results suggest a substantial health and cost burden associated with PGDM that could be prevented by universal PCC, which might offset the cost of providing such care. (Author)

20130107-32*

Prevalence of glucose intolerance, and associated antenatal and historical risk factors among Malaysian women with a history of gestational diabetes mellitus. Chew WF, Rokiah P, Chan SP, et al (2012), Singapore Medical Journal vol 53, no 12, December 2012, pp 814-820

Introduction: Women with previous gestational diabetes mellitus (PGDM) are at increased risk of future glucose intolerance. This study aimed to determine the prevalence of prediabetes and type 2 diabetes mellitus (T2DM), and the associated antenatal and historical risk factors among women with PGDM.
Methods: This was a cross-sectional study conducted at University Malaya Medical Centre, Kuala Lumpur, Malaysia. A 75-g 2-hour oral glucose tolerance test was performed in a cohort of multiethnic women with PGDM. Body mass index, waist and hip circumferences, fasting lipid profile and blood pressure were obtained. Data pertaining to the index gestational diabetes mellitus (GDM) were obtained from medical records and interviews.
Results: 448 women were enrolled in the study. The prevalence of prediabetes and T2DM was 26.2% and 35.5%,

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respectively. On multinomial logistic regression analysis, fasting plasma glucose at diagnosis of index GDM and duration lapse after index GDM were shown to be significantly higher in women with isolated impaired fasting glucose (IFG), combined IFG/impaired glucose tolerance and T2DM, as compared to women with normal glucose tolerance ($p < 0.05$). 2-hour plasma glucose at diagnosis of index GDM was significantly higher only in women who progressed to T2DM when compared to those that remained normal glucose tolerant ($p < 0.05$).
Conclusion: In this study, duration lapse after index GDM, fasting plasma glucose and 2-hour plasma glucose at diagnosis of index GDM were important risk factors for early identification of women at high risk for future glucose intolerance. These may be useful for developing potential preventive strategies. [The full text of this article can be accessed at http://sma.org.sg/Publications/articles.aspx?ID=37529645-93D5-49FD-846E-C090C2069095 (35 references) (Author)

Full URL: https://www.sma.org.sg/UploadedImg/files/SMJ/5312/5312a5.pdf

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