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EVIDENCE BASED MIDWIFERY

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From the Editor

Welcome to the June 2022 edition of *Evidence Based Midwifery*.

A period of transition: from a heartfelt farewell to Professor Marlene Sinclair, EBM Editor 2003-2021, to the dawn of a new EBM journal.

This is our first EBM journal without our longstanding Editor, Professor Marlene Sinclair, who held the reins and steered the journal from its conception back in 2003 to its respected place as an academic resource before her retirement in December 2021. Professor Sinclair has been an inspiration to midwives interested in furthering midwife-led research and a founder of the clinical academic career within the midwifery profession.

Her editorials, when read in order, provide a timeline of the development of clinical academic midwifery research and in celebration of both her and the authors who have contributed their work for publication in the EBM Journal we have produced a special edition of all of the past editorials 2003-2021. I urge you to download and read them. They are a succinct reflection of the way the midwifery profession has and continues to grow.

With the retirement of Professor Sinclair, comes a perfect opportunity to review the way forward. We are at a stage in the midwifery clinical academic career journey where we can pause, look to all the midwives who are keen to embark on this career pathway and move forward in a way to support them.

Consequently, in 2023, the *Evidence Based Midwifery* journal will be focusing on publishing research protocols and methodologies, audits and service evaluations. These are the foundations of research. The findings from studies are the outcome of interest but they are only possible, valid and usable if they are undertaken by a robust, well-structured 'mechanism'.

By publishing protocols, methodologies and service evaluations we will be able to support midwives with undertaking research by providing a knowledge base of how research is designed. It is also a way of ensuring that midwives get their work published.

The midwifery profession has come a long way since it was formalised by the Midwives' Act 1936. Together we will continue to enhance our fundamental role at the forefront of midwifery-led, woman-centred, evidence-based care. *Evidence Based Midwifery* will continue to help us do that.

Sara
Dr Sara Webb

Acting Editor
Evidence Based Midwifery (EBM)

Evidence Based Midwifery

The RETHINK Study Protocol: to determine if pregnant women who pain catastrophise are more likely to attend hospital during the latent phase of labour

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ABSTRACT

Background: Women experiencing an uncomplicated pregnancy are at increased risk of obstetric intervention if admitted to hospital during latent labour. Understanding which factors influence the time that women are admitted to hospital when in labour is crucial to reducing unnecessary obstetric intervention. There is evidence that some women seek early hospital admission for pain relief, and it is possible that women who pain catastrophise may be more likely to do this. Studies have yet to consider whether pain catastrophising impacts the timing of hospital admission. This study will consider the prevalence of pain catastrophising in the study group, and its sway on the timing of hospital admission, labour choices and birth outcomes.

Aim: This study aims to identify the prevalence of pain catastrophising during pregnancy and examine whether it has an impact on the timing of hospital admission when women are in labour.

Ethics: A favourable ethical opinion was received on 3 June 2020 by a National Health Service (NHS) local research ethics committee. Study approval was granted on 4 June 2020 by the Health Research Authority (HRA) and Health and Care Research Wales (HCRW).

Methods: This is a pragmatic, quasi-experimental study. Primigravid women, experiencing an uncomplicated pregnancy and planning to birth in an NHS hospital trust in England, will be recruited between 25 and 33 weeks and six days gestation. To estimate prevalence, with five per cent precision, requires a target sample size of 384. This was based on a study of women of reproductive age, calculated with the aid of a statistician and verified using the app WinPepi. Participants will complete two online questionnaires, one antenatal and one postpartum. The antenatal questionnaire includes the Pain Catastrophizing Scale (PCS), and the Wijma Delivery Expectancy Questionnaire (WDEQ-A). Analysis will divide the sample according to whether participants catastrophise pain or not. The primary outcome measure is admission to hospital in latent labour. Secondary outcome measures include pre-specified birth outcomes. Logistic regression will be used to assess if pain catastrophising is a predictor of hospital admission during latent labour. Other explanatory factors (for example, socio-economic) will be identified. The alpha level will be $p \leq 0.05$.

Discussion: It is hypothesised that the PCS can be used as a predictive tool to identify who will seek hospital admission during latent labour. Identifying whether pain catastrophising is a risk factor for early hospital admission will facilitate early intervention to support and empower women to manage their labour pain.

Keywords: latent labour, pain, catastrophise, pain catastrophizing scale, hospital admission, Evidence Based Midwifery

Introduction

Women experiencing an uncomplicated pregnancy are at increased risk of obstetric intervention if admitted to hospital during latent labour (Kobayashi et al 2017). However, definitions for latent labour vary considerably (Hanley et al 2016). The National Institute for Health and Care Excellence (NICE), for the United Kingdom, suggests a cervical dilatation of 4 cm signifies the end of latent labour (NICE 2017). The American College of Obstetricians and Gynecologists (ACOG) changed their definition of labour phases based on evidence which indicates that many women do not enter active labour until their cervix is 6 cm dilated (ACOG 2014). Both NICE (2017) and ACOG (2019) suggest that it is safe for pregnant women, at low obstetric risk, to stay at home until active labour begins. Nevertheless, many women seek professional care during latent labour because of the pain they experience, and their lack of confidence in their ability to cope (Barnett et al 2008, Kobayashi et al 2017).

More work is needed to understand how women can be effectively supported during latent labour (Hundley et al 2017, Kobayashi et al 2017). The latent phase is a complex, uncertain, and stressful time (Eri et al 2015) with women in labour bearing the responsibility for deciding the optimum time to go to hospital (Vik et al 2016). Turning women away from hospital before active labour begins can cause fear and anxiety (Barnett et al 2008). Higher levels of perceived pain and cognitive distress during latent labour have been associated with poorer labour efficiency and obstetric outcome (Wuitchik et al 1989), while fear of childbirth has been associated with a longer labour duration (Adams et al 2012).

Little is known about which characteristics of women's fear and anxiety contribute to their need for professional support and pain relief during the phases of labour. Greater understanding is needed, particularly when considering the prevalence of fear of childbirth among pregnant women. Comparing estimates of severe fear of childbirth is difficult, largely due to the variety of methods used in studies to measure it. However, a recent meta-analysis by O'Connell et al (2017) estimated the worldwide pooled prevalence of fear of childbirth to be 14 per cent. Women are being offered a variety of support and assessment methods during latent labour without comprehensive understanding of the holistic nature of pain-related fear, and how this affects labour choices (Eri et al 2015, Kobayashi et al 2017).

Pain catastrophising is a strong predictor of childbirth pain (Flink et al 2009). Pain catastrophising can be defined as an exaggerated negative mental set brought to bear during an actual or anticipated painful experience (Sullivan et al 2001). It is a subjective experience shaped by physiological, psychological, social and cultural influences mediated by previous pain experiences (Linton & Shaw 2011, Noel et al 2015). It is a multidimensional construct involving helplessness, rumination and magnification (Sullivan et al 1995) whereby people expect the worst in relation to a particular experience of pain (Sharpe & Johnson 2012). To a degree, fear of pain is natural and understandable. However, pain catastrophising may be considered a negative cognitive distortion.

Pain catastrophising is important in the anticipation of childbirth pain. It is also associated with fear of being overwhelmed by pain (Van den Bussche et al 2007), preferred mode of birth (Dehghani et al 2014), the experience of pain intensity during delivery, the need for epidural analgesia during labour (Veringa et al 2011), and poorer physical recovery following childbirth (Flink et al 2009). We have previously identified a high prevalence of pain catastrophising in women of reproductive age (Clark et al 2021). This paper reports a study to explore the impact of pain catastrophising in relation to latent phase labour.

Methods

This is a quasi-experimental study with nonprobability convenience sampling. The primary aim is to assess the prevalence of pain catastrophising among primigravid women with an uncomplicated pregnancy and determine how pain catastrophising affects the timing of women's admission to hospital in labour, and subsequently their birth outcomes. It is anticipated this will provide evidence for a future, targeted support intervention.

Objectives

The following objectives are those determined to achieve the study aim:

- to test the utility of the PCS as a predictive tool for the identification of pregnant women who may require additional labour support
- to determine the prevalence of pain catastrophising in the target sample using the predictive tool
- to examine the relationship between pain catastrophising in pregnant women and the timing of admission to hospital when in labour
- to examine the relationship between pain catastrophising and the specified birth outcomes
- to examine whether women who catastrophise pain also fear childbirth and, if so, to understand the relationship between these two variables and their effects on the timing of admission to hospital when in labour, and birth outcomes
- to determine what pregnant women find helpful and supportive, or unhelpful, with their pain management during labour

- to determine whether pain catastrophising acts as a predictor for mental health issues and/or pain as self-defined by the participant at approximately three weeks postpartum
- to analyse who and what are the influencing factors that impact on a woman's decision to seek hospital admission when in labour and the relationship between these factors and pain catastrophising
- to examine the relationship between the demographics specified in this study, pain catastrophising, timing of admission to hospital when in labour and birth outcomes.

Design

The quasi-experimental aspect will occur during analysis, meaning groups will be constructed according to those who catastrophise pain, those who have fear of childbirth (FOC), those who both catastrophise pain and have FOC, and those who do neither. The control group will be women who do not catastrophise pain and do not have FOC. Comparisons and associations will then be made between groups to estimate the possible impact that pain catastrophising, FOC, or both, have on birth outcomes and the timing of admission to hospital when in labour.

Setting

Maternity units in England will be invited to participate. The participating sites cover obstetric and midwife-led units, and rural and urban areas. This study will be undertaken concurrently at multiple sites with each site recruiting independently from each other.

Outcomes

The primary outcome measure is the prevalence of pain catastrophising and its association with admission to hospital in latent labour. Secondary outcomes are listed in Table 1.

Table 1. Secondary outcomes

Prevalence of FOC
Prevalence of FOC and PC
Latent phase hospital admission
Premature or postmature (i.e. greater than 14 days over expected date for birth) labour
Spontaneous, augmented (including artificial rupture of membranes or oxytocin use) or induction of labour
Analgesia use
Mode of birth (i.e. spontaneous vaginal birth, ventouse or forceps birth, elective or emergency caesarean section birth)
Duration of latent labour (cervical dilatation <4 cm)
Duration of active labour (cervical dilatation ≥4 cm)
Duration of second phase of labour
Duration of third phase of labour
Total duration of labour
Postpartum mental health issues
Postpartum pain

Measures

Demographics and additional relevant information

The demographic profile of participants provides important context to help understand the findings from this study (Table 2).

Table 2. Demographics and additional relevant information

Demographic information	Additional relevant information
Relationship/marital status	Previous miscarriage or termination of pregnancy before 24 weeks pregnant
Employment status	Gestation when answering the first online antenatal questionnaire
Highest level of education achieved	Whether they have/had ongoing pain that has lasted more than three months
Postcode	A brief pain experience history, which also includes current pain and its severity
Ethnicity	

Pain Catastrophizing Scale (PCS)

The PCS was first introduced by Sullivan et al (1995) and is one of the most widely used psychometric measures of catastrophic thinking linked to pain (Leung 2012). The PCS is a self-report measure developed for both clinical and non-clinical use. It is composed of 13 items based on catastrophising definitions described in the literature, and previous experimental and clinical research on catastrophic thinking in connection to pain experience (Sullivan et al 1995). PCS scores have been found to correlate with other health measures, including pain intensity, pain-related disability, and psychosocial distress (Severeijns et al 2004).

The 13 PCS items are divided into three dimensions (subscales): helplessness, magnification and rumination. The correlational relationship between these dimensions has been replicated in several investigations demonstrating internal consistency and validity of the three subscales with total PCS Cronbach's coefficient alphas = 0.87; rumination = 0.87; magnification = 0.66; helplessness = 0.78 (Sullivan et al 1995; Osman et al 1997) and it has high test-retest correlation of r = 0.75 across six weeks (Leung 2012).

Participants are required to reflect on past painful experiences and score their thoughts or feelings between not at all (score 0), and all the time (score 4), about the painful experience for each of the 13 items (possible total score of 52). The higher the score the greater the catastrophic thinking. Although pain catastrophising scores have been shown to be normally distributed (Sullivan et al 1995) the PCS developers (Sullivan et al 1995) have predominantly taken a score of 30 or more to determine pain catastrophising as clinically relevant, with other

studies finding lower cut-off scores as clinically relevant (Flink et al 2009).

The PCS was piloted with non-pregnant, nulliparous women, aged 18 to 45 years, studying at two university sites in the United Kingdom (Clark et al 2021). The study provided baseline data on the prevalence of pain catastrophising among women of reproductive age, identifying that over half of the sample catastrophised pain.

Wijma Delivery Expectancy Questionnaire Part A (WDEQ-A)

The Wijma Delivery Expectancy Questionnaire Part A (WDEQ-A) (Wijma et al 1998) is one of the most commonly used tools in assessing fear of childbirth (O'Connell et al 2017). It is a self-report measure with 33 items, each item rated on a six-point Likert scale ranging from 'not at all' (score 0) to 'extremely' (score 5). The higher the score the greater the fear. Questions refer to a cognitive and emotional belief about childbirth.

The WDEQ-A is a multidimensional psychometric measure to explore the fear of childbirth, therefore, the differential impact of the various aspects of WDEQ-A suggests a single score to diagnose FOC should not be used (Pallant et al 2016).

The WDEQ-A has been shown to correlate well with other fear of childbirth measures in identifying high childbirth fear in first-time mothers, previous emergency caesarean and women with self-reported anxiety and/or depression (Haines et al 2015). The correlation between the instruments was strong (Spearman's Rho = 0.66, $p < 0.001$) (Pallant et al 2016). The scale has been shown to have a high sensitivity (89%) and specificity (79%), with a positive predictive value of 85% and a negative predictive value of 79% (Pallant et al 2016).

Postpartum questionnaire

Women will complete a second online survey at approximately three weeks postpartum, or three weeks after their expected due date if they had their baby earlier.

The postpartum questionnaire will gather the following data:

- data about the latent phase (which is not routinely collected), including the signs that signalled to the woman it was time to go to hospital
- data about pain relief received during labour
- whether participants are receiving treatment for persistent pain and/or mental health conditions
- comments from respondents on what they found helpful and supportive during their labour and what was unhelpful and potentially had a negative effect
- participants' concerns about their physical or mental health and if they would like to be referred for professional NHS support.

Sampling method, sample size

Sampling will be nonprobability, convenience. This is an efficient and cost-effective way of achieving the required sample size.

Prevalence of pain catastrophising will be estimated using cut off points of 20 and 30, as indicated in the literature. A recent study by Clark et al (2021) found 21 per cent of their non-pregnant population had a pain catastrophising score over 30, and 48 per cent had a score above 20. Based on these findings, using a cut-off score of 30 and having five per cent precision in a pregnant population requires a sample size of 255 women. Using a cut-off score of 20 and having five per cent precision in a pregnant population requires a sample size of 384 women. Sample size calculations were conducted with the aid of a statistician and verified using the app WinPepi (Abramson 2011).

A sample size of 384 will have 90 per cent power to detect correlations between variables as small as -0.17 (coefficients (r) is = >0.17 at the 5% 2 sided significance level). To achieve this sample size, 768 women will be recruited to allow for 50 per cent of participants who are lost to drop-out or whose risk status changes from low to high during the antenatal period. For these participants their data will be included in relevant sensitivity analyses.

All women recruited to the study will be receiving normal pregnancy care with no intervention. Women who are 41 years or over at the time of childbirth are excluded. This is because of the range of risks for mother and baby with rising maternal age (Lean et al 2017). The inclusion and exclusion criteria are specified in Table 3.

Participant recruitment

Eligible women will be recruited from hospitals in England. Participating sites can employ different recruitment pathways in their recruitment strategy (Table 4).

However, there is an overarching journey that participants follow through the study. The overarching journey is that eligible women will be invited to participate in this study and, at the same time, be given a Participant Information Sheet (PIS) which contains all the necessary information about the study to facilitate an informed choice about participation. The PIS also contains the Uniform Resource Locator (URL) for women to access this online study.

Participation is entirely voluntary, and participants can withdraw from the study at any stage. If data has been anonymised and used within analysis, then

Table 3. Inclusion and exclusion criteria

Inclusion criteria	Exclusion criteria
Healthy primigravid women who are experiencing an uncomplicated singleton pregnancy, and who are planning a hospital birth	Women who are receiving **ongoing** care from an obstetrician during their pregnancy
Women aged 18 to ≤40 years at the time of study	Women who are 41 years or over at the time of childbirth
Able to understand and read English	Women with a current or pre-existing mental health condition requiring current medication and/or care by perinatal mental health team, e.g. specialist obstetrician, specialist midwife and/or local mental health services provision
Antenatal women who are between 25–33 weeks gestation	
Have internet access and an email address for study correspondence	Pregnant women already participating in a different study that is providing support with pain management or a labour support intervention of any kind. This includes the latent, active, second and third phases of labour

Table 4. The four recruitment pathways

Recruitment pathway	Recruitment process
1	Women are introduced to the study at one of their routine antenatal appointments
2	A member of the participating site's research team will screen and contact women to introduce them to the study
3	A member of the participating site's research team will screen and contact women to introduce them to the study At least 24 hours later the research team member will again contact the woman and support her to complete the online questionnaire. The research team member will be responsible for contacting the participant at the appropriate time to support the participant to complete the online postpartum questionnaire
4	Participants will be recruited directly from social media, and poster advertisements

withdrawal of participant's data from this part of the study will not be possible.

Eligibility will be checked online using a criteria checklist and women will be asked to consent. Those women who are not eligible to participate or who do not consent will be directed away from the questionnaire and will proceed no further.

Participants will be asked to provide their email address so that they can be contacted by the CI via secure email to request the personal identifiable information necessary to collect their labour and birth details. One reminder will be emailed if no reply is received to the first request.

Women who are approximately three weeks postpartum, or approximately three weeks after their expected due date if they had their baby beforehand, will be emailed the online link to the postpartum questionnaire. One reminder to complete the postpartum questionnaire will be sent.

Data collection and management

Data will be collected via two online questionnaires, one antenatal and one postpartum, and by retrieving participants' routinely collected labour and birth details from participating sites' digitally held records.

The online survey will be managed via a secure online survey provider. All site level data will be managed by a nationally used, secure and fully auditable software system.

Participants will be asked to consent to the collection and storage of their data.

A unique participant identifier (study ID) will be allocated to each participant once the completed antenatal questionnaire has been received. Participants' personal identifiable information will be held separately from their questionnaire responses and labour and birth details. Only the CI and the CI's research team will have access to the complete data set.

Data analysis

Data from the online questionnaires will be initially collated and organised in Microsoft Excel and then organised, summarised, and analysed using the statistical software package SPSS (v.26). Descriptive and inferential statistics will be used.

The association between the primary outcome measure (hospital admission in latent phase labour) and pain catastrophising will be examined using parametric statistics if the data are normally distributed, or non-parametric statistics if they are not. Logistic regression will be used to assess if pain catastrophising is a predictor of hospital admission during latent labour. Other explanatory factors (for example, socio-economic) will be identified. The alpha level will be $p \leq 0.05$.

Removal or inclusion of missing data, including data missing due to drop-out or withdrawal from the study, will be carefully considered to ensure inclusion or exclusion do not skew the data or create bias. Statistical analysis which has appropriate mechanisms and assumptions for the missing data will be conducted. Statistical analyses that tend to

work best with larger samples, such as multiple imputation or full maximum likelihood estimation, will be considered. All variables which present the potential mechanisms to explain the missing data will be included.

Inclusion or exclusion of data also has two other provisions. First, providing participants have not withdrawn their consent to participate and, second, providing the participants' data have not been anonymised. If a participant has dropped out, but not withdrawn from the study, their data will be analysed to see if they share significantly similar characteristics such as high or low pain catastrophising or fear of childbirth scores. This information will be conveyed in the final study report.

If on the postpartum questionnaire the participant indicates that they received ongoing care from a consultant obstetrician during their pregnancy and/or they did not experience latent labour at home, then their data will be included in relevant sensitivity analyses. The postpartum questionnaire will also collect data on what participants found helpful and supportive during their labour while at home, and then in hospital, and what was unhelpful and potentially had a negative effect. This data will be used to consider the potential mediating impact of things such as antenatal education, birth partner, a health professional such as a midwife, pharmacological interventions, and non-pharmacological interventions such as breathing exercises, music, hypnosis, baths, showers, birthing pool.

Written comments in response to relevant questions in the questionnaires will be coded and thematically analysed.

Study strengths

1. This is an original piece of work which brings together pain catastrophising and the latent phase. These two features together have not been studied before
2. It aims to fill the gap in knowledge about whether pain catastrophising is a risk factor for admission in the latent phase of labour
3. It will indicate the prevalence of pain catastrophising and fear of pain in the study group
4. It is anticipated that future research, based on this work, could lead to a reduction in hospital admissions in the latent phase of labour and associated labour interventions, thus improving birth outcomes
5. It creates the opportunity to work with women to develop support interventions.

Limitations

The study is limited by its use of convenience sampling, which opens it to sampling bias and the possibility that the sample is not representative of the whole population. The necessities of time, cost and accessibility to the required sample group mean nonprobability convenience sampling is the most appropriate to meet the aims and objectives of this study. The study sample will be compared with local population data to explore whether there are any differences and, where possible, to adjust for these in the analysis.

The measures

1 The PCS and the WDEQ-A may demonstrate predictive value for birth outcomes; however, causality cannot be determined.

2 Using the PCS as a predictive tool of poorer birth outcomes may prove ineffective.

3 Debate in the literature continues as to whether pain catastrophising is distinct from other constructs, such as negative affectivity. Therefore, women with a current or pre-existing mental health condition requiring care by a perinatal mental health team are excluded.

4 Lack of standardised routine data collection around the timing of admission to hospital when women are in labour means the women themselves will be asked to recall the details, which relies on correct recollection of events and that the appropriate information was passed to the woman at the time of her hospital admission.

5 Women may become more fearful the closer they progress towards childbirth; therefore, screening at 25 weeks pregnant may appear too early. However, this gestation has been chosen to facilitate a future support intervention before women reach full-term pregnancy.

Risks and safety

There are no foreseeable risks to the health of participants and their babies in participating in this study as participants should continue with their usual maternity care. If participants' responses raise safeguarding concerns for the woman or baby, then follow-up will be arranged by the Chief Investigator (who is also a registered midwife), and the information will be shared with their midwife.

Should an adverse event be identified it will be urgently reviewed by members of the research team and a decision made regarding the suspension or termination of this study. Adverse events are not anticipated for this study.

Discussion

A woman's previous pain experiences and her cognitions about pain may adversely affect how she interprets her labour pain. In addition, how she remembers and reflects upon it postpartum will affect

her behaviour and attitude towards pain experiences in the future, including future childbirth. Some women are predisposed to pain catastrophising, which can adversely affect their pain-coping behaviour.

This study comes at a point where there is little known about the best way to support women during latent labour. It is hypothesised that the PCS can be used as a predictive tool to identify pregnant women who will seek hospital admission during latent labour. Identifying whether pain catastrophising is a risk factor for early hospital admission will facilitate early intervention to support and empower women to manage their labour pain.

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Taylor Miller PG, Sinclair M, Gillen P, Miller PW, McCullough JEM, Farrell DP, Slater PF, Shapiro E, Klaus P (2022). Early psychological interventions for prevention and treatment of post-traumatic stress disorder (PTSD) and post-traumatic stress symptoms in postpartum women: a systematic review and meta-analysis protocol. *Evidence Based Midwifery* 20(2):12-18

Early psychological interventions for prevention and treatment of post-traumatic stress disorder (PTSD) and post-traumatic stress symptoms in postpartum women: a systematic review and meta-analysis protocol

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ABSTRACT

Background: One in 10 women experience post-traumatic stress disorder (PTSD) at four to six weeks following birth, with rates of 15.7 per cent in high-risk populations. PTSD is highly comorbid with other mental health conditions, and an expanding evidence base has identified that symptoms of PTSD and accompanying comorbidities have a detrimental effect on women, infants and the family system.

Objectives: This protocol will guide a systematic literature review and meta-analysis that aims to estimate the effect of early interventions on PTSD and post-traumatic stress symptoms in women following a traumatic birth. The protocol follows the PICOS framework.

Methods: There will be no limitation on the geographical location in which the studies are conducted. The population of interest are pregnant and postpartum women who have experienced a traumatic birth. Experimental interventions include any early psychological intervention delivered within three months of a traumatic birth experience as secondary prevention, or before birth as primary prevention. Usual care or any active intervention will be included as comparator interventions. The primary outcome is post-traumatic stress disorder or post-traumatic stress symptoms. Randomised controlled trials (RCTs) or pilot studies will be included in the review.

Results: Eleven electronic databases will be searched, data will be extracted, and meta-analysis will be conducted in Review Manager 5. Heterogeneity between studies will be measured by the I^2 test and Chi-squared test. Risk of bias assessments will be conducted in accordance with the criteria outlined in the Cochrane Handbook for Systematic Reviews of interventions. Strength of evidence will be evaluated by the Grading of Recommendations, Assessment, Development and Evaluations (GRADE) approach. Five reviewers will discuss study selection, data extraction and quality assessment. Results will be synthesised to formative narrative summary if there is insufficient data to conduct meta-analysis.

Conclusions: This protocol explains the methodology of a systematic literature review and meta-analysis of early psychological interventions in preventing PTSD and traumatic stress symptoms in women following a traumatic birth. Protocol development has been informed by the Preferred Reporting Items for Systematic Review and Meta-Analysis Protocols guidance (PRISMA-P).

Keywords: perinatal trauma, early intervention, psychological intervention, post-traumatic stress disorder, PTSD, birth, trauma, midwifery, review, protocol, Evidence Based Midwifery

Introduction

Post-traumatic stress disorder (PTSD) and symptoms of PTSD are experienced by 3.1 to 15.7 per cent of women following birth (Grekin & O'Hara 2014). PTSD and associated comorbid mental health disorders, including depression, are associated with a multitude of negative effects on mother–infant attachment as well as quality of life, physical health and family system (Fenech & Thomson 2014).

Early interventions are delivered in the early time period following a traumatic event. Previous systematic reviews have assessed the effectiveness of midwifery debriefing, suggesting that this form of early intervention is unhelpful in the days and weeks following birth (Bastos et al 2015, National Institute for Health and Care Excellence (NICE) 2014, 2016). NICE (2014, 2016) recommends Trauma Focused Cognitive Behavioural Therapy (TF-CBT), Narrative Exposure Therapy (NET) and Prolonged Exposure Therapy (PET) in the first four weeks following a traumatic birth, and Eye Movement Desensitisation and Reprocessing (EMDR) after four weeks; including a more definitive recommendation against treatment that involves reliving the experience as this could be harmful.

The International Society for Traumatic Stress Studies (ISTSS 2018) recommends early clinical treatment of PTSD symptoms in adults with multiple session TF-CBT and EMDR. Other Cochrane reviews have concluded that early universal psychological interventions, offered to all those who have witnessed or experienced a traumatic event, cannot be recommended to clinical practice (Roberts et al 2019a). Early psychological interventions including early EMDR intervention, trauma-focused cognitive-behavioural therapy (CBT-T) and cognitive therapy without exposure are effective in reducing PTSD symptoms in populations who have clinical presentation of PTSD (Roberts et al 2019b).

Ayers et al (2007) additionally found CBT to be an effective treatment for postpartum PTSD. Paradoxically, Gough & Giannouli (2020) reported therapists' sense of limitation by the emphasis placed on CBT while working with birth trauma, highlighting each case as unique. Early EMDR interventions have been specifically designed for treating populations in the days and weeks following exposure to a traumatic event or cumulative series of events (Shapiro & Laub 2008, Jarero et al 2016, Shapiro & Maxfield 2019) and may be particularly suitable for early prevention of PTSD and treatment of traumatic stress symptoms in women following a traumatic birth experience, with no exposure, or reliving of the event.

Rationale

The nature of PTSD and associated symptomology of shame, fear and avoidance, deter women from seeking treatment (Ford 2019). Given the multifinality of trauma, negative effects of PTSD, symptoms thereof, and accompanying comorbidities in women following traumatic birthing experiences (Ayers et al 2006, Fenech & Thomson 2014); it is important that a systematic review of the evidence is conducted on the effectiveness of early psychological interventions in reducing PTSD and PTSD symptoms in this population.

Objectives

This protocol has been developed in accordance with the Preferred Reporting Items for Systematic Review and Meta-Analysis Protocols (PRISMA-P) guidelines (Moher et al 2015). The research question was guided by the PICOS framework (Richardson et al 1995) and was implemented to ensure a 'well-built clinical question' for evidence-based medicine. The PICOS framework focuses on, patient, intervention, outcome, and study design of specific interest as follows:

- Population — pregnant and postpartum women who have experienced a traumatic birth
- Intervention — any early psychological intervention delivered within three months of a traumatic birth experience as secondary prevention, or before birth as primary prevention
- Comparator — usual care or any active intervention
- Outcome — post-traumatic stress disorder or post-traumatic stress symptoms
- Study design — randomised control trial or pilot study.

The objectives of this review are to:

- Estimate the effect of early interventions on PTSD and post-traumatic stress symptoms in women following a traumatic birth.
- Estimate the effect of intervention type.

Methods

Eligibility criteria

Types of study to be included

Any randomised or cluster randomised or pilot study that includes an early intervention targeting traumatic stress symptoms and prevention of PTSD in women during the perinatal period. Sample size, language, or publication status will not be used as an inclusion criterion and there will be no date limitations.

Participant characteristics

Studies that include adult women over the age of 18 years will be eligible for inclusion. Women who had a full term or pre-term traumatic birth experience, even if the birth was obstetrically straightforward; as assessed by reporting the birth as psychologically

traumatic, or experiencing an emergency caesarean, instrumental birth (vacuum or forceps), severe perineal tear, or postpartum haemorrhage. Pregnant women will be included for primary prevention or postpartum for secondary prevention (that is, up to three months).

Diagnosis

There will be no restriction on diagnosis or comorbidity at the time period when the early intervention was administered. This includes sub-clinical symptom scores of PTSD assessed by validated clinician or self-report psychometric tests such as, but not limited to, the PCL-5, IES-R. Assessment by Diagnostic and Statistical Manual of Mental Disorders; DSM-III, DSM-III-R, DSM-IV, DSM-V (American Psychiatric Association), International Classification of Diseases; ICD-9, ICD-10 or ICD-11 (World Health Organization) diagnostic criteria for PTSD and Criterion A qualifying as experience of a psychologically traumatic birth will be included.

We will focus on studies that report participants as experiencing a physically or psychologically traumatic birth during screening and symptoms of PTSD on outcome according to both self-report and clinician-administered measures of PTSD and chronic stress as stipulated by the Diagnostic and Statistical Manual of Mental Disorders; DSM-III, DSM-III-R, DSM-IV, or DSM-V (American Psychiatric Association) and the International Classification of Diseases; ICD-9, ICD-10 or ICD-11 (World Health Organization).

Exclusion criteria

The following studies will be excluded from this review: systematic reviews, meta-analysis, case-series and case reports, qualitative outcome measure only, studies focusing on effectiveness of religious or spiritual interventions and interventions that focused on parenting skills as the primary outcome. Interventions designed for abuse-related post-traumatic stress symptoms. Solely dismantling studies will not be included. There will be no restriction on the setting in which the intervention took place.

Condition being studied

Post-traumatic stress disorder experienced by women following a traumatic birth experience.

Types of intervention

Experimental interventions

Any experimental non-pharmaceutical intervention designed to prevent, reduce or treat symptoms of PTSD delivered by one or more health care professionals or layperson, during the perinatal period as a primary or secondary early intervention beginning no later than three months after the traumatic event will be eligible for inclusion.

Intervention categories could include but are not limited to any of the following:

- Any psychological intervention including trauma-focused cognitive behavioural therapy (TF-CBT) and EMDR, TF-CBT predominantly utilised trauma-focused cognitive, behavioural, or cognitive-behavioural techniques. Individual exposure therapy and prolonged exposure as well as early group-based interventions.
- Non-trauma-focused early interventions, including CBT and internet-based cognitive behavioural therapy (iCBT), addressing symptoms of PTSD not including treatment of PTSD symptoms through a trauma-focused or exposure-based therapy.
- Any online interventions and those that targeted expanding knowledge through psychoeducation, resilience, communication and on improving regulation, coping and stabilisation skills. This category includes midwifery-led debriefing, birth after thoughts, and counselling facilitated during the perinatal period.

Comparator interventions

Control interventions that include care-as-usual, waiting-list control, minimal or placebo condition are eligible for inclusion. Any alternative trauma-focused, or non-trauma-focused early psychological or biopsychological intervention will also be included in the search criteria.

Primary outcomes

1. Severity of post-traumatic stress symptoms using a validated psychometric measure of PTSD (continuous)
2. Diagnosis of PTSD as measured by clinician-administered diagnostic interview such as the CAPS-5 (Dichotomous).

Search strategy

The keywords in the search strategy will be used to carry out systematic searches in the following databases: AMED (Allied and Complementary Medicine Database) Embase, PsycInfo, MEDLINE, CINAHL, ProQuest PILOTS, ProQuest Dissertations, Cochrane Central Register of Controlled Trials (CENTRAL), The World Health Organization International Clinical Trials Registry Platform, ClinicalTrials.gov and the ISRCTN registry.

Keywords

Population

1. (perinatal OR postnatal OR antenatal OR prenatal OR pre-natal OR ante-natal OR peri-natal OR birth OR childbirth OR parturition OR postpartum OR caesarean OR caesarean OR haemorrhage OR assisted

delivery OR vacuum delivery OR perineal tear OR stillbirth OR stillborn OR forceps OR instrumental delivery).af.

Intervention & comparison

2. (EMDR OR (eye movement desensiti#ation and reprocessing) OR CBT OR cognitive behavio?ral therapy OR iCBT OR online intervention OR telehealth OR exposure OR counselling OR counseling OR therapy OR psychoeducation OR early intervention OR group intervention OR Psychological OR Psychotherapy OR debriefing OR birth afterthoughts OR midwifery led intervention OR rewind OR TF?CBT OR CPT OR cognitive processing therapy OR stabili#ation OR treatment as usual OR care as usual OR cau).af.

Outcome

3. (Post?Traumatic Stress Disorder OR PTSD).af.

Study design

4. (RCT or randomi#ed control* trial or protocol or pilot or clinical trial).af.

Searching other resources

Reference lists of identified studies, along with related review articles, policy documents, clinical guidelines, articles published by relevant charities and management guidelines will be hand-searched.

Internet searches of known websites, conference proceedings and discussion will be conducted as follows:

European Society for Traumatic Stress Studies (https://www.estss.org)

International Society for Traumatic Stress Studies (http://www.istss.org)

United Kingdom Psychological Trauma Society (http://www.ukpts.co.uk)

Birth Trauma Association UK (https://www.birthtraumaassociation.org.uk/)

Prevention and Treatment of Traumatic Childbirth (PATTCh) http://pattch.org/)

National Institute for Health and Care Excellence (www.NICE.org.uk)

Maternal Mental Health Alliance (www.maternalmentalhealthalliance.org)

Royal College of Obstetricians and Gynaecologists (https://www.rcog.org.uk/)

Royal College of Psychiatrists (https://www.rcpsych.ac.uk/)

Royal College of Midwives (https://www.rcm.org.uk/).

Selection of studies

Titles and abstracts of all studies will be screened. Study protocols will be retained and saved in a separate protocol folder for cross-referencing during the final review analysis. If an abstract describes an RCT or pilot study, the review author will independently read the full paper to assess whether the study meets the inclusion and exclusion criteria. After independently reading the screened full text articles, the multidisciplinary team of review authors will then discuss screening outcomes and ensure agreement on inclusion and exclusion of papers. Authors of eligible papers will be contacted for English translation if necessary.

Data extraction and management

Following screening of inclusion and exclusion criteria, data from each trial will be entered into a table format and data extracted into Review Manager 5 (Cochrane Collaboration 2014). Extracted information will include: detail of the trauma categorical specificity of traumatic event, primary or secondary prevention, timing of the intervention, the randomisation process, the interventions used, drop-out rates, reasons for drop out, fidelity to intervention, description and theoretical basis of intervention, dosage, timing, detail on facilitator, ethical approval and PTSD outcome data, including dichotomous incidence rates of PTSD, and continuous means and standard deviations in comparator and control groups as assessed at reported time points. Intention to treat, per protocol t-tests and results of analysis of variance (ANOVA) will be recorded in data extraction tables.

Assessment of risk of bias in included studies

Risk of Bias will be assessed in accordance with the criteria outlined in the Cochrane Handbook for Systematic Reviews of interventions (Higgins et al 2011).

Criteria for risk of bias assessment will be as follows:

1. Random sequence generation
2. Allocation concealment
3. Blinding of outcome assessment
4. Incomplete outcome data
5. Selective outcome reporting
6. Other bias (including imbalances in baseline statistics, early termination, researcher conflict of interests and allegiance).

Bias will be assessed as high, uncertain, or low risk. The risk of bias judgements will be taken into account in the final consideration of treatment effect. Studies with high risk of bias will be marked down by 1.

Data synthesis and measures of treatment effect

Meta-analysis on continuous and dichotomous outcomes will be performed dependent on assessment of risk of bias and sufficient data by intervention category and follow up.

Continuous outcomes will be analysed using mean difference (MD) in scales assessing for PTSD. The standardised mean difference (SMD) will be used as the summary statistic in meta-analysis as it is expected that studies will measure PTSD using differing psychometric scales. A fixed effects model will be used if different studies are estimating the same treatment effect (Higgins et al 2011). Tests for subgroup differences will be based on random-effects models in order to guard against high risk of false-positive results when comparing subgroups in a fixed-effect model.

Dichotomous data will be managed with the risk ratio (RR) as the main categorical outcome measure. All outcomes will be presented using 95% confidence intervals (CI). Rules for interpreting SMDs (or 'Cohen's effect sizes') will be guided by Cohen (1988) as <0.40=small, 0.40 to 0.70=moderate, >0.70=large.

If data is unavailable for calculation of meta-analysis, results will be synthesised to formative narrative summary. Funnel plots testing for publication bias across studies will be performed if more than 10 studies are identified as eligible for inclusion and sufficient data are available.

Dealing with missing data

Intention to treat data will be reported in the results. When mean (M) and standard deviations (SD) are missing, these will be calculated with other quantitative data available within the paper, including CIs, t statistics and p values. When imputation is not possible, the paper will not be included in analysis and will be reported on as a single study.

Assessment of heterogeneity

The presence and extent of between study variation will be assessed before making a decision to conduct a meta-analysis. Studies will be assessed qualitatively for clinical and methodological heterogeneity in terms of the variability in participant populations, interventions, study design outcomes and methodological rigour. An explorative study of forest plots will be assessed for possible statistical variability between intervention effects. Heterogeneity between studies will be measured by the I^2 test and Chi-squared test ($P < 0.10$). An I^2 of less than 30% will be considered to indicate that statistical heterogeneity might not be important; an I^2 of 30% to 60% to indicate moderate heterogeneity; an I^2 of 50% to 90% to indicate substantial heterogeneity and an I^2 greater than 75% to indicate considerable heterogeneity.

The strength of the body of evidence and outcomes will be evaluated by the GRADE approach (Guyatt et al 2011, Guyatt et al 2013, Langendam et al 2013). The GRADE guidelines framework will assess the quality of evidence in terms of study limitations, inconsistency/unexplained heterogeneity, indirectness of the available evidence, imprecision of effect estimates. Assessments will be made by researchers, independently followed by discussion and agreement as a team. High, moderate and low specifiers will be applied to each comparison as an indication of the confidence that the effect estimate will remain unchanged as a result of further research.

Discussion

This systematic review protocol has been developed to include all psychological interventions delivered to women in the early period following a traumatic childbirth experience. It is recognised that some unpublished studies may be extracted, and, in this case, study authors will be contacted for further information. If study authors are unresponsive or cannot be contacted, the study will be excluded from the review.

The inclusion of studies in English may lead to an overestimation of effects, as it has been reported that studies that have been published in English are more likely to have reported significant results in favour of the intervention (Egger et al 1997). Including only studies in the English language may be considered to introduce cultural bias. This is accounted for in the eligibility criteria for selected studies, where language is not used as a criterion for inclusion.

The review aims to include validation from a subject matter librarian on database searches. Where feasible, raw scores will be translated to standardised means for continuous and risk ratio for dichotomous variables to allow comparability across studies. If meta-analysis is not appropriate, results will be reported qualitatively, along with the overall GRADE quality of evidence for PTSD as the main outcome of interest.

No ethical approval was required for this review protocol, considering the investigation of secondary data and previous studies conducted on this topic. Our ethical consideration has been predominantly focused on the mother–infant dyad. Mild sub-clinical post-traumatic stress symptoms, including avoidance and numbness, are an expected stress response to a traumatic incident. It remains apparent that in some cases, this stress response may negatively impact upon the mother–infant dyad, maternal bonding, quality of life and wellbeing of the mother and family unit (Fenech & Thomson 2014). A peritraumatic response to a traumatic event may act as protective mechanism for women in the short term but, if symptoms as a result of such experiences remain unresolved, delayed onset of the disorder may occur (Utzon-Frank

et al 2014). It is for this reason that investigation of effective intervention for prevention is the focus of this review in this context.

Conclusion

The proposed systematic literature review will be the first to assess early interventions in the prevention and treatment of PTSD and PTSD symptoms in postpartum women who have had a traumatic birth experience. Results may provide insight into the clinical effectiveness of psychological interventions administered during the antenatal period as primary prevention, or within twelve weeks of a traumatic birth experience as secondary prevention. Early intervention is particularly important in this stage in a woman's life cycle as women may be more vulnerable to the effects of experiencing trauma, including mental health symptoms of post-traumatic stress, anxiety, depression, and physical symptoms of pain and fibromyalgia. Equally important is the dyadic bond between mother and infant that can be negatively impacted by mental health symptoms, and familial stressors (Grekin & O'Hara 2014).

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Patient consent for publication

Not required.

Provenance and peer review

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Fathers providing kangaroo care in neonatal intensive care units: a scoping review

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ABSTRACT

Background: Kangaroo care (KC) has been used widely in neonatal care to promote bonding/attachment and neurodevelopment for preterm and term infants. However, current literature suggests that research mainly focuses on infants' and mothers' experiences. The role of fathers in caring for their infant/child is changing and evolving in many countries around the globe yet little is known about fathers' experiences of KC in neonatal units. This review, therefore, aims to scope the current evidence of father–infant KC (FKC) in neonatal intensive care units (NICUs).

Research question: What impact does KC have on fathers when their baby is cared for in an NICU?

Search method: A scoping review was conducted, guided by the Arksey & O'Malley (2005) framework. The data sources consisted of MEDLINE, Embase, the American Psychological Association (APA) PsycInfo, Emcare, Cochrane Database of Systematic Reviews (CDSR), Web of Science, Google Scholar and ProQuest.

The study inclusion criteria were: 1. studies involving fathers who had experience of KC with their baby while in NICUs and other neonatal care settings (such as Special Care Baby Nursery (SCBU), delivery/labour room and postnatal ward); 2. literature published from 2000 to 2020; 3. primary studies including qualitative, quantitative, and mixed-methods studies; 4. studies published in English.

Results: The total number of studies identified was 13. Seven studies were qualitative and six were quantitative. None were mixed-methods studies. Studies reported several positive KC benefits for fathers such as reduced stress, promotion of paternal role and enhanced father–infant bond. It was highlighted that KC could be time-consuming for fathers and challenging to practise when balancing work and family life commitments.

Conclusion: This review provides evidence that KC practice has health and wellbeing benefits for fathers and infants in NICUs and other relevant neonatal care settings. The findings of this review support the justification to promote FKC in NICU environments, and guide policies to include father involvement. Implementing FKC in NICU settings will assist fathers to care and connect with their baby. Further research is needed to explore how to facilitate and evaluate KC education for fathers from diverse backgrounds and cultures.

Keywords: kangaroo care, skin-to-skin, fathers, neonatal, NICU, Evidence Based Midwifery

Introduction

Kangaroo care (KC) is often referred to as skin-to-skin or kangaroo mother care (KMC). KC refers to a method of holding an infant, naked (except for a diaper/nappy), in an upright and prone position, skin-to-skin, on a caregiver's bared chest (Conde-Agudelo & Díaz-Rossello 2016, Chen et al 2017).

KC was originally introduced at the Instituto Materno Infantil in Santa Fede Bogotá, Colombia in 1978. The initial reason KC was introduced in this maternity unit was due to a shortage of incubators; the lack of incubators led to a study being undertaken at the hospital. Lower neonatal mortality rates and increased weight gain for low birth weight (LBW) babies (that is, babies weighing less than 2500gms, regardless of gestational age) were reported compared to newborns receiving conventional care in an incubator (Whitelaw & Liestøl 1994).

The World Health Organization (WHO) reported that KC was a cost-effective method of achieving optimised health outcomes for premature and full-term babies (WHO 2003). It was acknowledged that

KC is a fundamental method of achieving thermal control for preterm and LBW infants (WHO 2015). Additionally, KC has been shown to reduce neonate infection rates and hospitalisation length and enhance maternal–infant bonding (Conde-Agudelo & Díaz-Rossello 2016).

Babies in NICUs experience stress from numerous interventions and separation from their mothers (Stevens et al 2011). KC has been reported as a primary method for mothers and babies to complete an integral physiological process following childbirth, while providing nurturing care (Jesus et al 2015). Mothers have been recognised as the main KC provider by health professionals in the NICU environment (Jesus et al 2015). In contrast, fathers are often referred to as 'bystanders' in the engagement of maternal and neonatal care (Steen et al 2012). However, due to some societal, economic, and cultural changes, there has been a steady increase in the father's role in providing care to their infant/child (Yogman et al 2016).

Research has provided evidence that fathers have an innate biological connection to their infants similar to mothers (Yogman et al 2016). This intrinsic connection enables father–infant KC: (FKC) to be implemented and is beneficial during the separation of mothers and infants (Shorey et al 2016), thus promoting and increasing KC practice in fathers (Jesus et al 2015). Additionally, FKC has been found to be associated with increased paternal involvement (Jesus et al 2015) and an enhanced paternal role (Varela et al 2018). Moreover, FKC has been shown to have the same effect as KMC on preterm and term infants' physiological stability (Shorey et al 2016).

Current literature on KC mainly investigates or explores mother and infant practices and experiences. There seems to be a lack of research exploring FKC (Martel et al 2016) and therefore a clear justification to undertake a scoping review of the literature.

A scoping review examines a broad topic to identify its volume, nature, and characteristics by mapping the related evidence with the relevant time, location, and origin, and detecting possible research-based gaps (Peters et al 2015). This type of review is suited to explore a unique and complex question when research appears limited for a specific topic. Therefore, this review used a scoping review framework to guide the review approach, to identify relevant studies to answer the research question and to collect evidence in accordance with inclusion criteria that incorporated core elements of Population, Concept, Context (PCC) in a wide range of databases (Peters et al 2020).

This framework recommends that findings are mapped, synthesised, presented narratively and summarised in tables. The clinical implications associated with FKC will be reported. It is envisaged that this review will provide evidence to support the practice of FKC in NICUs.

The aim of this review is to examine the literature relating to research exploring the views and experiences of fathers providing KC to their babies while they are being cared for in NICUs.

Methods

Protocol and registration

A protocol was developed to guide the undertaking of this scoping review (Dong et al 2021); the scoping review framework described by Arksey & O'Malley (2005) was used. According to the international prospective register of systematic reviews administered by the University of York's Centre for Reviews and Dissemination (PROSPERO), scoping reviews do not meet the eligibility to be registered in the database (University of York Centre for Reviews and Dissemination n.d.). Therefore, no registration was required for this review.

Research question

What impact does KC have on fathers when their baby is cared for in an NICU?

Eligibility criteria

In this review, the search strategy approach to finding studies was sought by utilising the core components: Population, Concept, Context (PCC). The inclusion criteria were aligned with the PCC components to guide the undertaking of this review (Peters et al 2020).

Population

Fathers, including all age groups >18 years old, from all geographical locations and all cultural backgrounds were included. Infants included in this review were referred to as neonates (that is, infants under 28 days of age) from different geographical areas with diverse cultural backgrounds. Babies who were beyond the neonatal period were excluded.

Concept

The core concept examined by this review is the experience of KC.

Context

The context of this review was mainly referred to as NICUs. However, other relevant settings where FKC might be practised were included, such as a Special Care Baby Nursery (SCBU), delivery/labour room or postnatal ward.

The types of evidence searched

Given that little is known, or published, about FKC the search timeframe was set from 2000 to 2020 (Peters et al 2020). The core content and type of

papers meeting the inclusion criteria associated with the components of PCC were searched. Primary studies using qualitative, quantitative, and mixed methods were included. Only articles in English were selected.

Information sources and search strategies

A wide range of literature searches was performed in databases, registers, and some additional sources, in October 2020. Databases involved MEDLINE, Embase, the American Psychological Association (APA), PsycInfo, Emcare. Registers include Cochrane Central Register of Controlled Trials (CENTRAL) and Clinical Trials.

The keywords and the Medical Subject Headings (MeSH) terms used in MEDLINE are listed in Table 1. The search strategy in MEDLINE is provided as an example for replicability and auditability (Peters et al 2020).

Table 1. MEDLINE search strategy (literature search)

1. Fathers/
2. Father-Child Relations/
3. (father* or dad* or paternal* or parent*).ti,ab,kw.
4. 1 or 2 or 3
5. Infant, Newborn/
6. ((preterm or premature* or term or full term or low birth weight or LBW or postnatal) adj4 (baby or babies or neonatal* or infant$1)).ti,ab,kw.
7. 5 or 6
8. Kangaroo. Mother Care Method/
9. ((Kangaroo or Skin to Skin) adj5 (care or contact or method)).ti,ab,kw.
10. 8 or 9
11. Intensive Care Units, Neonatal/
12. Postnatal Care/
13. Operating Rooms/
14. Nurseries, Hospital/
15. Delivery Rooms/
16. (NICU* or neonatal intensive care or neonatal care or intensive care units or newborn icus or neonatal or special baby care unit or SCBU or postnatal ward or delivery room or labo?r ward or theatre or operating room or recovery room or parenting room or birthing center).ti,ab,kw.
17. 1 or 12 or 13 or 14 or 15 or 16
18. 4 and 7 and 10 and 17
19. Limit 18 to yr="2000-2020"

An additional search of grey literature was conducted. The first 200 articles (Bramer et al 2017) were selected from Google Scholar under 'Father kangaroo care'. Theses and dissertations were searched in the ProQuest platform. Other searches included Web of Science, clinical guidelines, conference abstracts, hand-searching through reference lists, communication with peers or experts via media.

Study screen and selection

All the identified literature (n=1298) was exported into the bibliographic software EndNote X9.0 and duplicates were removed using the same software. The duplicating process was double-checked by an experienced librarian.

The initial selection was undertaken by screening titles and abstracts with a second reviewer. The further screening (n=38) was carried out by reading the full text to obtain the articles which met the inclusion criteria. Clarifications were sought with a third reviewer to achieve consensus to finalise the selected articles for the scoping review (n=13). The search strategy is demonstrated using a PRISMA 2020 flow chart for transparency and reflexivity (Figure 1).

Data charting

Microsoft Excel software was used to record data extracted from the 13 articles reporting a study aligned with the research question. Data extraction fields include author/s, year of publication, title of publication, country of origin, type of study, aim/objectives, methods, population and sample size, setting, factors associated with FKC, impact of FKC, limitations and strengths, clinical implications. Three reviewers defined the extracted data, which are shown in the **Summary of included studies** table (see Supplementary information).

Results

A total of 13 studies met the inclusion criteria. Of these, seven studies were reported to undertake qualitative research (Fegran et al 2008, Blomqvist et al 2012, Helth & Jarden 2013, Magee & Nurse 2014, Jesus et al 2015, Olsson et al 2017, Günay & Coşkun Şimşek 2021).

Five of the qualitative studies used a phenomenological research approach (Fegran et al 2008, Blomqvist et al 2012, Helth & Jarden 2013, Jesus et al 2015; Günay & Coşkun Şimşek 2021). One qualitative study reported using a descriptive approach (Olsson et al 2017) and the remaining study was a case study (Magee & Nurse 2014).

Six studies were reported to conduct quantitative research (Varela et al 2014, Mörelius et al 2015, Cong et al 2015, Chen et al 2017, Varela et al 2018, Dongre et al 2020). Quantitative studies included five experimental designs, two randomised controlled trials (RCTs) (Mörelius et al 2015, Chen et al 2017), one crossover study (Cong et al 2015), one quasi-experimental study (Varela et al 2014), and one pre- and post-observational study (Varela et al 2018). No mixed methods studies were identified.

Figure 2 demonstrates an upward trend in the number of studies undertaken on FKC between 2000 and 2020. Only one included study (Fegran et al

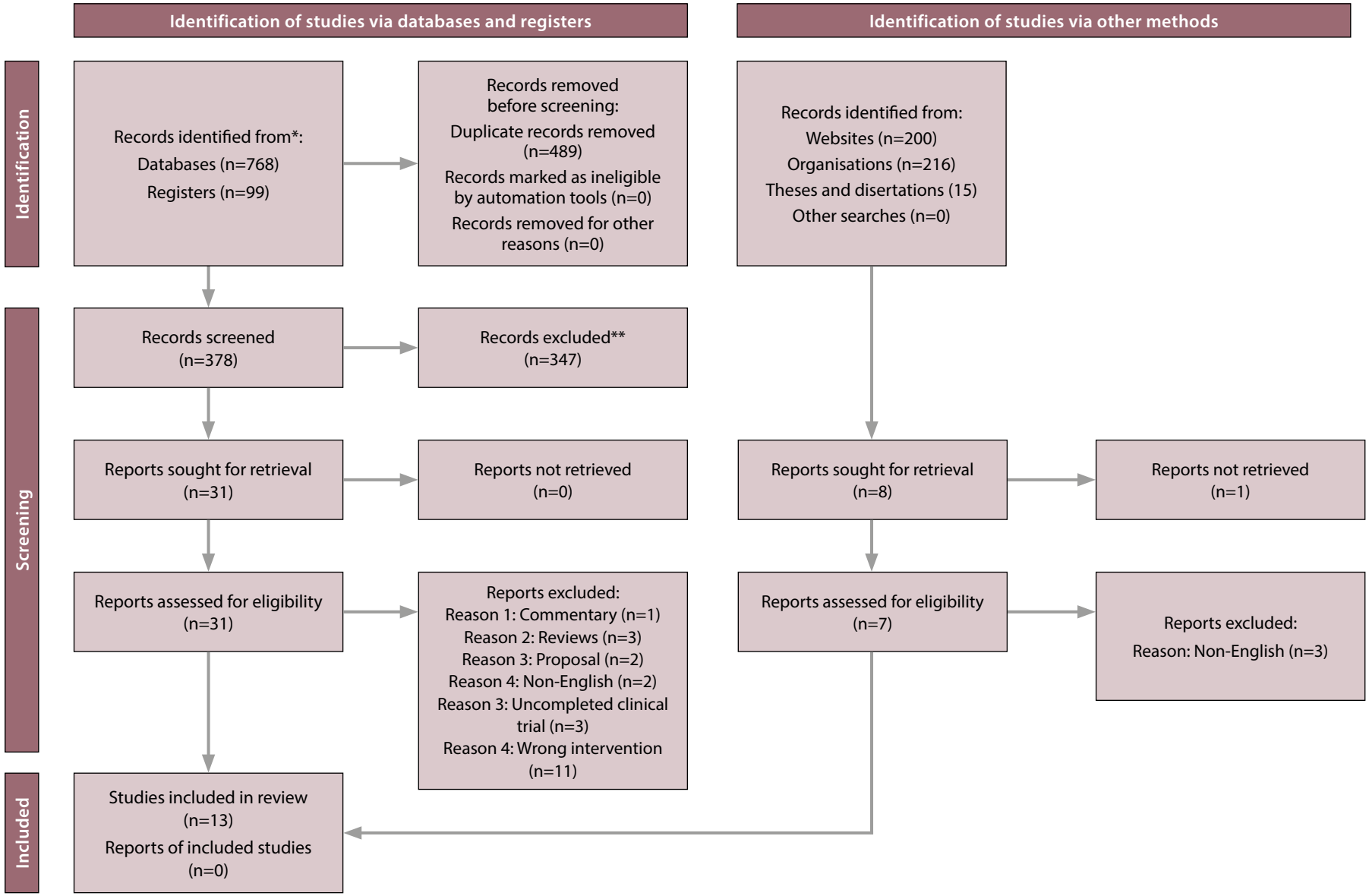

Figure 1. PRISMA flow chart of the selected articles for scoping review

Source: Adapted from Page et al (2021)

2008) was conducted between 2000 and 2009. Four studies were published during the 2011–2014 period (Blomqvist et al 2012, Helth & Jarden 2013, Magee & Nurse 2014, Varela et al 2014). Eight studies were published in the five years from 2015–2020 (Cong et al 2015, Jesus et al 2015, Mörelius et al 2015, Chen et al 2017, Olsson et al 2017, Varela et al 2018, Dongre et al 2020, Günay & Coşkun Şimşek 2021).

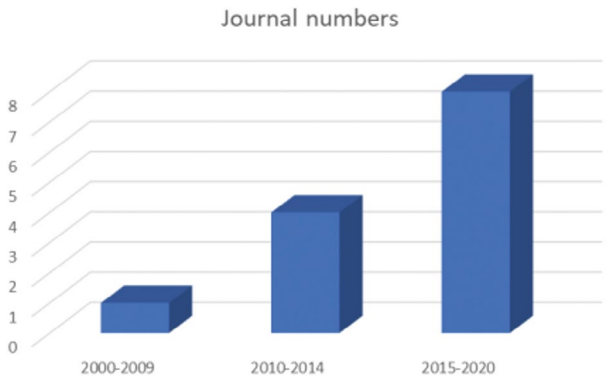

Figure 2. Publication year of the journals containing selected studies

Figure 3 highlights the geographical distribution of studies and demonstrates that northern European countries conducted more studies for FKC.

Three studies were undertaken in Sweden, one in the UK, one in Norway, and one in Denmark. Fewer studies were conducted in the Mediterranean and South East Asian regions: two in India, one in Turkey. One study was conducted in a Far East Asian country: Taiwan. Only one study was completed in Canada and one in the United States of America (USA). None have been undertaken in Australia.

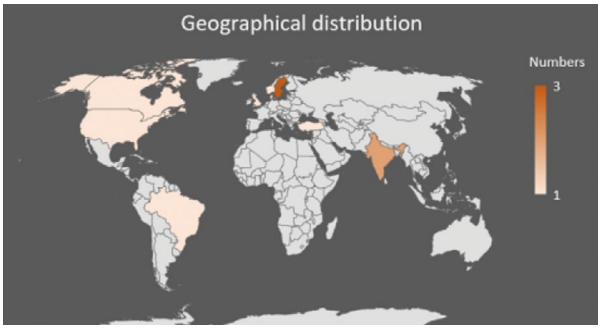

Figure 3. Geographical distribution of the selected studies

The data relevant to factors associated with FKC are detailed in the **Factors associated with father KC** table (see Supplementary information) which shows the length of KC, the facilities/aids for KC, and the cultural and policy background.

In Sweden, single-family rooms with beds were available in NICU settings. Parental leave and allowance enabled fathers to spend more time implementing KC. Blomqvist et al (2012) showed that fathers had KC with their babies for up to 24 hours a day, and 7–19.6 hours a day was reported in the study by Mörelius et al (2015).

In regions where fathers had to manage most of the family's financial responsibilities, KC duration was between 15–90 minutes (Varela et al 2014, Cong et al 2015, Chen et al 2017, Varela et al 2018, Dongre et al 2020, Günay & Coşkun Şimşek 2021). The cot-side chair provided for KC was reported in four studies (Cong et al 2015, Chen et al 2017, Varela et al 2018, Günay & Coşkun Şimşek 2021). However, three studies did not report on the provision of this aid (Helth & Jarden 2013, Magee & Nurse 2014, Jesus et al 2015).

The data related to clinical implications in the **Factors associated with father KC** table (see Supplementary information) demonstrate that five studies reported that staff educated fathers about KC (Blomqvist et al 2012, Magee & Nurse 2014, Jesus et al 2015, Chen et al 2017, Günay & Coşkun Şimşek 2021). One study (Blomqvist et al 2012) described a care plan to promote and support fathers to provide KC. One study (Fegran et al 2008) recommended mother's encouragement, and another study (Günay & Coşkun Şimşek 2021) established policies to support FKC practice. Interestingly, Varela et al (2014) reported less KC practice in a single room than in the open intensive care room.

Table 2 highlights which studies reported which impacts of FKC, including enhancement of paternal role and initiating and strengthening the father-infant bond.

An important finding was that increasing fathers' competence and affection was associated with a reduction of paternal stress and anxiety. Additionally, two studies (Jesus et al 2015, Olsson et al 2017) reported that the father's role was promoted as a primary carer in certain circumstances, when the mother was not available. Other findings included promoting the relationship between fathers and mothers; Dongre et al (2020) also showed KC to be an excellent opportunity to establish better communication between fathers and NICU staff.

Collectively, these findings indicate clear benefits associated with FKC. However, Olsson et al (2017) reported that KC was an energy-draining practice, and sometimes led to guilty feelings because of spending less time with other siblings. Helth & Jarden (2013) highlighted fathers' conflict between working and spending time with the infant. However, Jesus et al (2015) found that KC was a valuable learning experience for fathers, and this was confirmed by Olsson et al (2017).

Table 2. Categories of impact of father KC on fathers by study

The impact of father KC on fathers	Study
Initiating and strengthening father–infant bond	S1, S2, S3, S6, S7, S9, S11, S12
Enhancement of paternal role	S1, S6, S7, S8, S9, S10, S11, S12, S13
Feeling in control	S9, S10, S11
Improvement of competence as a father	S1, S6, S7, S8, S9, S12, S13
Reduction of paternal stress or anxiety	S1, S5, S6, S7, S11, S13
Affection	S1, S2, S7, S8, S11
Better communication between fathers and NICU staff	S5
Promotion of family relationships	S2, S4, S5, S10
KC information availability	S2, S11
Acting as a primary carer (motherly role)	S1, S9
Energy-draining, feeling guilty about other siblings at home	S1, S11
Conflict between working and spending time with their infant	S8

Discussion

As far as the authors are aware, this is the first scoping review undertaken to search current literature relating to fathers' experiences of providing KC to their baby in an NICU.

The 13 included studies for this review were undertaken in various geographical regions. The researchers acknowledge that clinical and cultural neonatal variations in NICUs and other neonatal care settings need to be considered. Fathers being involved in their infant's care will vary throughout the world and, generally speaking, most societies continue to recognise mothers as the primary caregiver. However, over the last few decades, there has been increasing involvement and caregiving by fathers (Steen et al 2012).

A specifically designed website (www.familyincluded.com) provides information on studies undertaken around the globe where fathers and families are being researched, and there appear to be several benefits when they are engaged in infant care. There is also a useful website for fathers to access (www.birthingdads.com.au).

Reflecting on this review, it highlights that there has been a growing interest in fathers' experiences of KC, mostly from northern European countries, but some research has also been undertaken in North America, Canada and in the Mediterranean, South East and Far East Asian regions. Nevertheless, it has been recommended that further research and studies that involve more diverse backgrounds are required (Magee & Nurse 2014).

The collective evidence from this review confirms that there are health and wellbeing benefits when FKC is undertaken, and this confirms earlier findings reported in an integrative review by Shorey et al (2016). These researchers concluded that FKC had positive effects on understanding the father's role, promoting improved paternal interaction with infants and reducing paternal stress.

Over the last few decades, fathers' involvement in childcare has been increasing and is associated with the dual-income family structure that has evolved from a transformation of the socio-economic environment (Faris 2016). The responsibilities pertaining to the father's role include involvement in childcare and influencing the child's physical and mental development (Varela et al 2014, Yogman et al 2016).

FKC can provide fathers with an opportunity to gain caregiving skills and connect with their baby, which is supported by Varela et al's (2014) study conducted in India. These researchers reported that fathers with KC experiences showed a more empathetic and emotional connection to their child. Fathers with a baby in an NICU are at increased risk of developing anxiety and depression (Givrad et al 2021): the practice of KC may assist fathers to manage anxiety and stress when caring for their newborn in an NICU (Magee & Nurse 2014, Mörelius et al 2015, Olsson et al 2017). Feeling competent as a father will also contribute to fathers' health and wellbeing (Fegran et al 2008, Blomqvist et al 2012, Helth & Jarden 2013, Magee & Nurse 2014, Varela et al 2014, Varela et al 2018, Günay & Coşkun Şimşek 2021).

Adamsons & Johnson (2013) reported that positive father involvement in a child's upbringing may enhance academic achievement, emotional wellbeing, and social behaviours. Garnica-Torres et al (2021) suggested that the attainment of fatherhood is driven by men's emotions and mental wellbeing. FKC appears to assist fathers to review their views about fatherhood and acts as a lived workshop about becoming a father, as described by Olsson et al (2017). This review found evidence to suggest that FKC supported fathers in connecting and bonding with their infants, which positively impacted fathers' confidence and self-esteem when engaging in their baby's care in an NICU environment.

These key findings confirm research by Logan & Dormire (2018) who conducted semi-structured interviews with seven fathers about the experience of caring for their premature babies in the first weeks in an NICU and reported that KC played a critical role in connecting to their infant.

According to John Bowlby's evolutionary concept of attachment theory, infants seek proximity figures that respond to their stress behaviours, such as crying, to help them survive (McLeod 2017). By acting as a caregiver, fathers could instinctively enable the father–infant attachment to be established, and

then a reciprocal interaction between them might be created. This physiological relationship between fathers and infants was also illustrated by Bloch-Salisbury et al (2014). They reported that premature infants' respiratory stability corresponded to the KC providers' cardiac rhythm during KC sessions and babies were calmer.

Interestingly, bonding between fathers and babies often occurs during pregnancy. Genesoni (2009) found that fathers psychologically bonded to their babies in the first trimester of their partner's pregnancy. However, during the childbirth continuum, fathers are often seen as a 'bystander' and receive education and information 'second-hand' (Steen et al 2012). Nevertheless, the NICU environment may provide opportunities to promote the father–infant bond and connection by supporting the practice of FKC.

Theoretically, close touch between fathers and infants through KC activates the hypothalamic-pituitary-adrenal axis stress system to produce oxytocin, which leads to decreased levels of cortisone, also referred to as a stress predictor (Cong et al 2015). This reduction in stress was clearly shown by Varela et al (2018). These researchers collected saliva samples from fathers and reported a significant reduction in cortisone level one-hour post-KC compared to before and during KC. Interestingly, Cong et al (2015) found similar results in their crossover study: fathers' oxytocin level was raised after KC and maintained at the same high level for 30 minutes after KC. Hence, the stress-free advantage produced by KC might act as a catalyst to enhance the paternal role, as highlighted by Blomqvist et al (2012). Evidence to support the promotion of FKC in NICU settings appears to be emerging over the last decade.

In some circumstances if a mother is unavailable as the result of a critical medical condition, such as following an emergency caesarean section, the father is available and can provide FKC. The benefits of FKC were also clearly shown in the case study reported by Magee & Nurse (2014). These researchers discussed how a bereaved father cared for his premature daughter in the NICU when her mother died nine days after giving birth. Therefore, health professionals may advocate KC to fathers to maximise the facilitation of KC.

Nevertheless, this review detected some negative impacts associated with FKC. Some fathers reported that providing KC to their newborn baby was time-consuming and it was perceived by some as an energy-draining task (Blomqvist et al 2012, Helth & Jarden 2013, Olsson et al 2017). The negativity reported might be related to prolonged KC events and finding time for KC from the father's multiple responsibilities: being a father and a supporter for mother or an economic provider. One issue that surfaced was that fathers' involvement in providing KC led to an imbalance between working and family life (Helth & Jarden 2013, Garnica-Torres et al 2021). Another was that fathers felt guilty about spending less time with other siblings at home when providing KC for their newborn baby in the NICU (Blomqvist et al 2012, Olsson et al 2017).

These negative impacts might be associated with socio-cultural factors and variations in health policies in different geographic areas. In some European countries, where NICU facilities/aids included single rooms with a bed and leisure equipment, parents are well-supported to offer their infants KC for up to 24 hours a day (Blomqvist et al 2012). Paternal leave enables fathers to be available for KC provision (Blomqvist et al 2012, Mörelius et al 2015). In contrast, parental leave is not provided in some countries, which impacted the availability of fathers. This finding is consistent with the studies reported by Garnica-Torres et al (2021) and Günay & Coşkun Şimşek (2021).

Mixed reports of facilities/aids and support for fathers to provide KC appears to be the current situation. Comfortable chairs and single rooms might help. Paid paternal leave could be advocated by the local government to reduce the financial burden and create more opportunities for fathers to be available. Negative outcomes might be circumvented by designing a FKC care plan to support fathers who wish to conduct KC with their infant (Blomqvist et al 2012) and introducing a flexible approach to the length of time for which KC is provided. Care plans for FKC may promote more positive experiences for fathers while their infant is in a NICU setting and address the negative aspects raised by some fathers.

As for clinical implementation, the findings of this review have demonstrated that FKC enhances couple and family relationships (Cong et al 2015, Jesus et al 2015, Mörelius et al 2015, Dongre et al 2020) and is therefore worthy of support for the practice. This positive outcome on relationships may be explained by a pattern of an interlinked influence circle of mother to child, child to father and father to mother, where the father–child bond that emerges from the involvement in FKC plays a pivotal role in linking the relationship between family members (Lindsey & Caldera 2006). The improved interaction reported between fathers and nursing staff associated with FKC (Dongre et al 2020) provides an opportunity for nurses and midwives to understand the fathers' perspective to help them communicate more effectively. Improved communication with a father will promote better engagement in their infant's care while in the NICU (Cong et al 2015).

Some studies mentioned education for FKC, and this seems to have had a positive outcome on supporting fathers to undertake the practice (Helth & Jarden 2013, Mörelius et al 2015, Chen et al 2017, Olsson et al 2017, Günay & Coşkun Şimşek 2021). Therefore,

it appears that providing FKC education to fathers before, or shortly after, admission of their infant to an NICU would be advantageous. However, further studies on educating and mentoring fathers to provide KC in NICUs are required.

Strengths and limitations

A strength of this review is that a protocol was developed, and rigorous steps were undertaken to identify relevant quantitative and qualitative studies. A scoping of the literature was undertaken and FKC in NICU settings is a topic currently emerging as an area of interest. However, the included studies were limited to some countries and therefore, may not be generalisable to a global population. A limitation is that the reviewed articles were only written in English, and therefore studies written in other languages may have been missed.

Some quantitative studies' sample sizes were small and underpowered and further larger studies are required. No longitudinal studies were reported, and this is a limitation. Most qualitative studies used a phenomenological approach and further studies may benefit from using an ethnographic design where the NICU environment, staff and fathers may all be considered and participate in the research. Mixed-method studies may also contribute to providing further evidence for FKC in NICU settings.

Conclusion

Research evidence to support FKC in NICU settings is emerging and this review has provided and consolidated current literature evidence by answering the research question: what impact does KC have upon fathers when their baby is cared for in an NICU?

This review has shown that there are health and wellbeing benefits for fathers and their babies when FKC is undertaken in NICUs and other clinical settings. The findings from this review provide some evidence to support the implementation of FKC in NICUs and other clinical settings and will inform policies and clinical practices in countries where paternal involvement is evolving. Paid paternal leave may reduce financial burdens and create more opportunities for fathers to be available to provide FKC.

Adopting a flexible approach strategy for the length of time to provide FKC that meets individual father's and their baby's needs may enhance the experience. Care plans for FKC may promote more positive experiences for fathers while their infant is in an NICU setting and address the negative aspects raised by some fathers.

Further research is needed about how, and what, to provide to fathers in terms of KC education and the evaluation of FKC care plans. Fathers from a wide range of diverse backgrounds need to be included in further research studies to enable an international perspective to be investigated and explored in more depth.

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Conflict of interest

The authors declare that they have no conflict of interest.

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Supplementary information

Summary of included studies

	Author(s)/year/country	Type of study	Aim/objectives	Methods	Population and sample size	Settings	Fathers' demographic profile
S1	Blomqvist et al 2012, Sweden	Qualitative descriptive study - Phenomenology	To describe fathers' experiences of providing KC to their preterm infant	Data collection: questionnaires completed by fathers while their babies were in hospital; individual semi-structured interviews at four months ± two weeks post-discharge; data analysis: using qualitative content analysis described by Grameheim & Lundman (2004)	Inclusion criteria: fathers whose babies were born at the gestational age of 28 to 33 + 6 weeks and medically stable. Sample size: x 7	Level 3 NICUs at two Swedish hospitals	Age range: 34 to 42 years old, 56.6% first-time fathers
S2	Jesus et al 2015, Brazil	Qualitative descriptive study - Phenomenology	To identify father's perceptions about KC; to explore how nurses could foster the father-child relationship	Data collection: semi-structured interviews through open and closed questions; data analysis: using content analysis	Inclusion criteria: fathers who were 1) biological parents of premature infants and/or low birth weight; 2) Fathers over 18 years of age; 3) Experiencing Kangaroo Care; 4) Interest participate Sample size: x 6	Maternal hospitals x 2, Brazil, no wards specified	Not reported
S3	Chen et al 2017, Taiwan	Quantitative study - RCT	To observe the effects of KC on father-child attachment	Pilot study performed: intervention group (n = 3) control group (n = 3); Data collection: computer program generated a random stratified allocation. Intervention group: KC provided for at least 15 minutes/for the first three days of life; control group: received standard care, KC provided at fathers' request; Both groups received KC information on admission. Data collection: instruments used: Demographic Information Survey; Early Childcare for Fathers, Nursing Pamphlet; Father-Child Attachment Scale (FCAS) developed by Yang & Chen (2001): self-reported by fathers; Data analysis: SPSS and Windows 20.0	Inclusion criteria: 1) new fathers; 2) older than 20 years old; 3) at the hospital daily until discharge; 4) non-smokers; 5) not have an alcohol addiction or be diagnosed with a psychological disorder; 6) signed an informed consent agreement; 7) babies of gestational age ≥ 37 weeks, stable vital signs and no congenital abnormalities or diseases. Sample size: total n=83 participants: intervention group (n=41) and control group (n=42)	Postnatal ward in a teaching hospital, maternal clinic in Taiwan	Age range: 34 to 42 years old, 56.6% first-time fathers, 50.6% college education, 85.5% antenatal class attendance

S4	Cong et al 2015, USA	Quantitative study - Crossover study	To examine oxytocin mechanism in modulating parental stress and anxiety during M-KC and paternal KC (P-KC) with their preterm infants	Data collection: the mother-father-infant triad was assigned randomly by a computer-program to study sequences: M-KC on day 1 and P-KC on day 2 or vice versa. Process: parents' saliva collected using a standard unstimulated passive drool method and a validated visual-analog scale (VAS) measuring anxiety and self-reported at the end of the period of pre-KC (10mins), during-KC (30 mins) and post-KC (30 mins) phases. Data collection: measurements: salivary oxytocin assay, salivary cortisol, parental anxiety; Data analysis: Using IBM SPSS 20.0 (Armonk, NY)	Used a convenience sampling approach. Power analysis to determine the sample size. Inclusion criteria: parents were > 18 years old, with no depression history, whose babies were the gestational age of 30-34+6 weeks @ the age of 3-10 days, cared for in an incubator, NPO or on bolus feeds. Sample size: 26 triads. Sequence 1 (M-KC on day -1 and P - KC on day - 2), n=14; Sequence 2 (P-KC on day -1 and M - KC on day - 2), n=12; mothers: n=26; fathers: n=19	A level IV NICU in Connecticut, USA	68% of fathers were white, 79% with higher education, 53% had KC experience before study participation
S5	Dongre et al 2020, India	Quantitative study - Prospective observational study	To study stress in fathers after initiation of KC	Data collection: total study period: 6 months. Demographic details collected. Likert type scale was rated by participants before KC, Parental Stressor Scale: neonatal intensive unit (PSS NICU) were used to assess fathers' stress level in 5 aspects after KC X 3 on the consecutive days; Data analysis: SPSS software version 16, Wilcoxon signed rank-sum test	Inclusion criteria: fathers with no major medical and surgical illnesses, whose babies were at the gestational age of 28-35 weeks, birth weight < 1500 grams, not ventilated, no congenital abnormalities. Sample size: n =30	A tertiary level neonatal unit, India	Mean age: 28.5 years old; 63.2% of fathers were lower-middle socio-economic class
S6	Fegran et al 2008, Norway	Qualitative - descriptive Phenomenology - hermeneutic approach	To obtain in-depth knowledge of, and to compare parents' individual experiences of the attachment process immediately after a premature birth	Data collection: interviews with mothers and fathers individually. Interview length: 40 minutes. Interview audiotaped. Demographic data collected. Data analysis: NUD*IST computer software ORS used	A convenience sample of parents. Inclusion criteria: Parents of infants at the gestational age of 27 to 32 weeks, staying at the same hospital with their infants from birth until discharge. Sample size: 6 parents	A 13-bed NICU in a regional Norwegian hospital	Age range: 27 - 59 years old
S7	Günay & Coşkun Şimşek 2021, Turkey	Qualitative descriptive study - Phenomenology	To investigate the emotions and experiences of fathers in Eastern Anatolia region of Turkey who experienced KC in the NICU	Data collection: face-to-face, audio-taped, individual interviews were conducted for 45-50 minutes at two weeks after experiencing KC from January to May 2019. Questions X 2, open-ended. Data analysis: inductive qualitative content analysis by Graneheim & Lundman (2004)	Inclusion criteria: Fathers whose babies were at the gestational age of 27 to 36 weeks, birth weight ≥1000 grams, who visited their babies regularly and experienced KC. Sample size: fathers x 12	NICU in a training and research hospital in the Eastern Anatolia region of Turkey	Mean age: 29.7 years old; First-time fathers x 6; education: primary to university; fathers x 5 from village

S8	Helth & Jarden 2013, Denmark	Qualitative - Phenomenology - hermeneutic approach	To explore how fathers of premature infant's experience and potentially benefit from experiencing KC during their infants' stay in NICU	Data collection: Semi-structured interviews for 30-45 mins. Data analysis: Theoretical framework by Kvale and Brinkman (2009)	Inclusion criteria: 1) Danish-speaking fathers, 2) Infants at the gestational age < 35 weeks, @ stable condition, 3) Admission to the NICU > 1 week; Sample size: Purposeful sampling, fathers x 5	Copenhagen University Hospital, Hvidovre Hospital, Denmark	Age: range: 28-37 years old, university degree x 3, employed x 4, student x1, all first-time fathers, twins X1
S9	Magee & Nurse 2014, UK	Case study - Reflective study - Qualitative study	To explore the nurse's role acting as an effective advocate for the baby and the role of the father in the neonatal unit	Data collection: reflective study for a case of a bereaved father who cared for his premature daughter in the NICU; Data analysis: Framework Guiding Reflective Activities by Borton's model (1970)	Father x 1, a bereavement father	NICU x 1 in UK	A father whose wife passed away nine days after birth of breast cancer, carried family commitments
S10	Mörelius et al 2015, Sweden	RCT - Quantitative study	To compare the effects of almost continuous KC (CKC) on salivary cortisol, parental stress, parental depression, and breastfeeding with standard KC (SKC)	Data collection: Apr 2008-Apr 2012, An RCT between two groups of parents; one group experiencing KC and the other experiencing SKC. Continuous KC: almost 24 hours a day, baby stayed with parents since birth. Standard KC: separate from parents after the birth of a baby. Measurements were collected at discharge during home-visit at CA of 1 and 4 months. Medical data was collected from the parents' journal. Measurements included: salivary cortisol, Swedish Parenthood Stress Questionnaire (SPSQ) Edinburgh Postnatal Depression Scale (EPDS), Questions about health and breastfeeding, Ainsworth's Sensitivity scale; Data analysis: statistical software SPSS 20.0	Inclusion criteria: mothers - healthy, proficient in Swedish, give birth to a single child who is at the gestation age of 32 to 35 weeks; Sample size: families x 42, CKC: 23, SKC: 19	Level 3 NICU x 1 and Level 2 NICU x1, in Sweden	Not reported
S11	Olsson et al 2017, Sweden	Qualitative descriptive study	To describe fathers' experiences of KC with their premature infant	Data collection: between January 2014 and June 2015, eligible fathers were interviewed using a semi-structured interview guide. Data analysis: direct qualitative content analysis by Hsieh & Shannon (2005)	Inclusion criteria: fathers of preterm infants, had provided KC for their infants on at least one occasion. Sample size: a purposeful sample. Fathers x 20	Neonatal units x 2 (one in a county hospital, the other in a university hospital) in central Sweden	Mean age: 32 years old. 6/20 fathers had more than two children

S12	Varela et al 2014, India	Quantitative study - quasi-experimental design - a pilot study	To evaluate the impact of KC on the sensitive care that fathers provided to their premature babies in 5 Kangaroo Mother Care programs in India	Data collection: socio-demographic survey completed. The Kangaroo position adherence survey was conducted to assign participants into two groups: intervention group (KC) and control group (non-KC). Paternal sensitive behaviour and perception of paternal role assessed by two people, using a Q-Sort methodology during a 60-minute period of KC. Data analysis: SPSS 17.0 for Windows, a non-parametric statistical test: the Mann-Whitney U, T-tests, and a Cohen's d	Inclusion criteria: fathers of preterm infants. Intervention group: n=14; Control group: n=23	Hospitals x 5 in India; No details of clinical setting/wards	Age range: 25-48 years old. Education level: up to high school. Spouse: the majority were classified as a housewife and related to both families. Not all fathers were proficient in English; for fathers who did not speak English, a local translator served as an interpreter
S13	Varela et al 2018, Canada	Quantitative study - Pre- and Post-investigation	To explore the physiological stress responses of fathers during their first KC with their new baby	Data collection: salivary cortisol measured from 6 saliva samples and simultaneous blood pressure and heart rate measured on arrival in the room, immediately before starting KC, at 30 minutes and 60 minutes into KC, and 15 and 30 minutes after the end of KC. Data analysis: SPSS statistics version 21.0	Inclusion criteria: fathers who were in a relationship with the infant's mother, no anxiety or depression, whose babies' GA was up to 33+3 weeks, medically stable. Sample size: fathers x 49	The NICU of the University Laval Hospital Centre's pediatric department in Quebec City, Canada	Mean age: 31 years old; Mean education level: 14.1 years of education; Mean working hours/ week: 43.3

Factors associated with father KC

	Factors associated with father KC				Findings of impact of father KC on fathers					Strengths and limitations	Clinical implications
	KC frequency & duration	KC facilities/aids	Culture and policies	KC education	Forming and strengthening father–infant bond	Enhancing paternal role	Decreasing paternal emotional and physiological stress	Promoting relationship between fathers and family members	Negative impacts		
S1	Up to 24 hours/ day	Cot-side beds or recliners plus privacy screen; Co-care rooms containing beds	Parents post-partum allowance - Parental leave up to 480 days/ child + NICU temporary parental leave	Nil	✓	✓	✓	Not reported	✓	Adequate sample size used, rigour and trustworthiness achieved, theoretical saturation achieved	Early KC education needed. Father KC could be initiated as early as after birth. Care plan would help in increasing the frequency of Father KC

S2	Not reported	Not reported	Not reported	Nil	✓	✓	✓	Not reported	Not reported	No demographic details of participant. Transparent data collection and analysis	Nurses can promote Father KC by explaining the purpose of KC and the benefits of KC to baby, father, and mother
S3	Once a day. At least 15-min session	An armchair with a footrest, a pillow and a blanket, private screen provided	Traditional women's confinement after birth; workforce limitations; KC session provided after 2 hours of feeding and a bath	KC information (pamphlets) provided on admission	✓	Not reported	Not reported	Not reported	Not reported	Workforce limitations stopped the provision of personalised instruction to the participants.	Father KC is recommended when mother is not available. KC education should be started as early as during childbirth education and antenatal period
S4	30-min session	A La Fuma recliner chair, a footrest, a privacy screen, a hospital gown, a blanket	Study was undertaken at 1-3 pm, between feeds, after parent's lunch, and with consideration of the timing of mother's milk expression	Not reported	Not reported	Not reported	✓	✓	Not reported	Small sample size	Paternal touch will contribute to parenting development
S5	90-min KC episode for 3 consecutive days	Not reported	Not reported	The benefits and method of KC were taught by a senior registrar	Not reported	Not reported	✓	✓	✓	Limited KC application length; No consideration about other relevant paternal stress stimuli, e.g., financial, physical, and social factors; singleton context, small sample size	Not reported
S6	Not reported	Not reported	Not reported	Not reported	✓	✓	✓	Not reported	Not reported	The method of collecting demographics was not mentioned. A small sample. Triangulation of data collection	Father KC was promoted by mothers' encouragement

S7	KC x 2/day for 15 days, each KC lasted for 15 - 30 min	A comfortable chair provided next to an incubator	Turkish culture requires men to return to work early due to the traditional role of the male in this society, i.e. financial support and limited role in caring for children	PowerPoint presentation + A handbook about KC process	✓	✓	✓	Not reported	Not reported	Transparent data collection and analysis process	Health professionals should encourage father–infant KC. The hospital facilities/aids and policies need to be established to facilitate father KC
S8	Not reported	Not reported	Not reported	KC method introduced	Not reported	✓	Not reported	Not reported	✓	Small sample size. Credibility was increased by using direct quotations. Future studies on the importance of the father's presence in the early infant's life	Parents, nurses, midwives, and hospital services need to recognise that fathers can participate equally in parenthood
S9	KC practised every second day; KC duration not mentioned.	Not reported	Not reported	Not reported	✓	✓	Not reported	Not reported	Not reported	The ethical approval was unclear	No visiting restriction for NICUs. NICU nurses/midwives should give fathers education in advance about the NICU father's experience
S10	SSC: 19.6 hours/day; SC: 7.0 hours/day	Single rooms equipped with beds for parents, medical equipment. KC accessories provided such as tube tops, scarves, and blouses	KC is standard care for both parents in these NICUs; the Swedish health care system allows parents to stay in the NICU as long as they can	KC method was introduced before the study. A lesson was given about noticing and responding to their preterm baby's signals	Not reported	✓	Not reported	✓	Not reported	No comparison with a baby who has no KC from parents as KC is routine care in their NICU	If both parents engage after the birth of preterm infants, this can strengthen the relationship between the parents

S11	Median times: 18 (4-80) min	Cot-side in the intensive care room with a private screen; a bed in the family rooms; television	The Swedish parental allowance system allows fathers and mothers to stay with the infant in the NICU and provide KC to him/her while receiving financial compensation	Information about the benefits of KC was given by the NICU staff	✓	✓	✓	Not reported	✓	Trustworthiness (confirmability, credibility, transferability) was achieved. Triangulation of data collection methods (interviewers X 2)	NICU staff need to identify the father's individual KC preference to advocate equal parenthood. Less KC practised in single rooms than in the open intensive care room
S12	1 hour/day for at least 1 week.	Not reported	The father is not the primary carer in India. Fathers do not live with mothers during the first months after giving birth, mothers live with their mothers. Many Indian families have a preference for boys over girls. Well-structured KC programs + a pediatric follow-up. KC was provided by fathers once premature infants had adapted to extra-uterine life and were able to breastfeed	Not reported	✓	✓	Not reported	Not reported	Not reported	Small sample. Language interpretation bias existed during data collection due to using a language translator. Triangulation data collection	Father KC provides opportunities for fathers to increase their paternal role in a culture where this is not recognised. Fathers did not display any gender preference
S13	1 hour	The room contained less than six incubators equipped with comfortable chairs	Fathers were asked not to consume nicotine, caffeine, food, or drugs for at least one hour before their arrival to the NICU	Not reported	Not reported	Not reported	✓	Not reported	Not reported	No control group were involved in this study due to the lack of consensus from the clinical team	Not reported

Do team building activities facilitate development of NHS values in undergraduate midwifery students?

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ABSTRACT

Background: On the BSc Midwifery course we have facilitated one-day events each year where the students participate in team building activities with the aim of helping them to develop the skills required to foster National Health Service (NHS) values in their future practice. We wanted to establish, from a student perspective, whether these events fulfil this aim.

Aim: To assess the impact of team building activities on the development of NHS values in year one undergraduate midwifery students.

Ethical approval: Ethical approval was granted by the ethics committee online from the higher education institution.

Methods: An electronic questionnaire was sent to all year one students following the team building event. The design was exploratory, using a convenience sample of 64 first-year undergraduate midwifery students who attended the team building event. Summary information about the study was shared with the students in a Word document using Microsoft Teams before the event.

Data analysis involved the collation of the descriptive statistics and thematic analysis of the narrative responses provided by each student. Four members of the research team conducted the thematic analysis individually and then met to triangulate the themes and ensure consistent interpretation.

Results: The questions asked were focused on NHS values and how students felt the team building event contributed to the development of each NHS value: working together; compassion; respect and dignity; improving lives; commitment to quality care and everyone counts.

Forty-five questionnaires were returned completed in full and all questions were answered, this is a 70 per cent (n=45) response rate, and all students offered some qualitative narrative information. When asked specifically about the development of each NHS value the one which received the highest rate of 'very useful' in helping them develop the skill was 'respect and dignity'. The NHS value which received the most mixed response was 'improving lives' as this had most of the students responding with 'somewhat useful' in helping them to develop the skill.

Conclusion: In this small study the majority of first-year student midwives stated that team building activities were of great benefit in the facilitation of their development of the NHS values. They also reported the activities enhanced any existing skills and helped them to consider these in relation to their new role as a student midwife. Overwhelmingly the students enjoyed the day and the event enabled them to get to know each other and make friends in a fun and relaxed environment.

Introduction

The NHS is world-renowned for its health care services (Department of Health and Social Care (DHSC) 2012). The NHS developed the *NHS constitution*, which is a document establishing the principles and values of the NHS in England (DHSC 2012). These values underpin the care offered by health care professionals within the NHS, establishing the rights to which service users, public and staff working within the NHS are entitled (DHSC 2012). The *NHS constitution* also identifies the responsibilities of staff and a shared ethos to care and service provision.

The values of working together for patients, respect and dignity, commitment to quality of care, compassion, improving lives and everyone counts are intrinsically linked to the core values of the *Code* (Nursing and Midwifery Council (NMC) 2018), and are also reflected in the International Confederation of Midwives' (ICM) *Essential competencies* (ICM 2019). All educational institutions throughout England offering midwifery education should embed and foster the development of the NHS values, equipping student midwives from the onset of their midwifery education as outlined in the *Standards of proficiency for midwives* (NMC 2019a). Students entering a programme working within the NHS should be able to demonstrate understanding of NHS values and be able to confidently display them in all aspects of their clinical work up to and post-qualification.

Given the importance of embedding NHS values in the midwifery curriculum, the midwifery education team considered ways for students to develop these from the outset of the programme, in a meaningful way, to apply the values to their clinical and academic setting. It is acknowledged that not all skills are developed in the classroom setting, and that students working in health care settings should have the opportunity to engage with wider skills and differing environments to enable them to develop professional skills and values (Billet 2015).

Institutions offering health care accredited courses, have the responsibility to not only ensure that students meet the proficiencies ready for qualification, but also enable them to demonstrate transferable skills in line with NHS values and the profession.

Multidisciplinary teamworking is key to ensure the provision of high-quality, kind and continually improving care to women, birthing people and their babies (National Maternity Review 2016). The lecturing team recognised the value that outdoor activities could have for future midwives entering the midwifery profession, with Largo-Wight et al (2017) highlighting how outdoor activities have proved to be beneficial for employees across differing professions. Outdoor learning enables students to gain skills and knowledge and encourages students to learn about other members of their group and themselves (Cooley et al 2013), while providing an opportunity to develop trust, collaboration and respect, key to multi-professional working (National Maternity Review 2016). In addition, Lovell (2019) discusses how the use of a natural environment can provide opportunities to develop independence and leadership skills.

Methods

A one-day event was arranged through the Higher Education Institutions Outdoor Team and the lecturing team. The planned activities for the day were coordinated in line with set learning outcomes and objectives set by the lecturing team, with the aim of enabling students to build relationships, confidence and skills which would prepare them for the academic and clinical components of the course. The venue was a university-owned site away from the main campus which provided one large room for the group to network and learn about each other, but also had lots of available outdoor space, enabling a variety of activities.

Students were randomly allocated into small groups of between six–eight students, with different instructors for each workstation. Students were provided with guidance regarding a specific problem-solving task, requiring the group to work together to find solutions. For example, one activity involved a large web made from ropes with different-sized spaces, the group had to transfer all individuals through the web without using the same space twice or touching the ropes. This task required leadership, communication, collaboration, and cooperation. Individuals needed to trust others as some members had to be lifted off the ground to get through their allocated space.

A convenience sample was used, with all 64 students in year one of the midwifery undergraduate degree programme invited to take part in the research. The students were attending the team building as part of their scheduled activities, with no obligation to participate in the study. Written and verbal information was provided about the research at the start of the team building day. A questionnaire was developed using Qualtrics, an online survey software package which was available through the university, and a link was sent to the students after the event. The survey was closed five weeks later. Ethical approval was granted prior to the event by the university's ethics committee.

The activities for the team building day centred around the core themes of communication and team working, with the aim of providing an opportunity for students to build relationships with each other, as well as developing their existing skills in communication and team working. These themes

were noted to correlate well with the NHS values 'working together', 'respect and dignity' and 'everyone counts', and links were made to the others during the post-task discussions. The NHS values feature heavily throughout the undergraduate BSc Midwifery programme, therefore it was appropriate to evaluate students' experiences of the team building day and their ability to link the activities to the NHS values.

A questionnaire was used, as questionnaires are a common method of evaluation within the university setting and are used frequently in module evaluations and other evaluation forms. The questionnaire required a minimal amount of time to complete which the researchers felt would add to the appeal for the student and encourage completion. Questionnaires are a useful tool to study individual beliefs and are a reliable method of data collection which suits the needs of this form of research (Moule et al 2017). All responses were anonymous, and students were aware that their identity was protected (Rees 2003).

Consent was gained through the completion of the electronic questionnaire, with the first question asking the student for consent to participate in the questionnaire and for the information gathered to be used in published articles, presentations and conferences.

Students were asked to complete the Likert scale survey questions (see Figure 1) and an additional three questions requiring written qualitative responses.

Figure 1. Likert scale survey questions and responses.

Question	Response
Q1 - Do you consent to participating in this project and understand that the answers given may be used in published articles, presentations and conferences?	45 – yes
Q2 - Considering the NHS values (https://www.hee.nhs.uk/about/our-values), do you feel that the team building event allowed you to develop skills in line with the NHS values?	45 – yes
Q3 - If you answered yes to the above, please choose one of the following statements to reflect how useful you feel the team building event was in developing the following NHS value: Working Together	38 – Very useful in developing this skill 7 – Useful in developing this skill 0 – Somewhat useful in developing this skill
Q4 - If you answered yes to Q2, please choose one of the following statements to reflect how useful you feel the team building event was in developing the following NHS value: Compassion	16 – Very useful in developing this skill 23 – Useful in developing this skill 6 – Somewhat useful in developing this skill
Q5 - If you answered yes to Q2, please choose one of the following statements to reflect how useful you feel the team building event was in developing the following NHS value: Respect and dignity	29 – Very useful in developing this skill 11 – Useful in developing this skill 5 – Somewhat useful in developing this skill
Q6 - If you answered yes to Q2, please choose one of the following statements to reflect how useful you feel the team building event was in developing the following NHS value: Improving lives	12 – Very useful in developing this skill 14 – Useful in developing this skill 19 – Somewhat useful in developing this skill
Q7 - If you answered yes to Q2, please choose one of the following statements to reflect how useful you feel the team building event was in developing the following NHS value: Commitment to quality of care	13 – Very useful in developing this skill 20 – Useful in developing this skill 12 – Somewhat useful in developing this skill
Q8 - If you answered yes to Q2, please choose one of the following statements to reflect how useful you feel the team building event was in developing the following NHS value: Everyone counts	40 – Very useful in developing this skill 5 – Useful in developing this skill 0 – Somewhat useful in developing this skill

Data analysis

Thematic analysis was performed independently by four of the authors (LK, SB, RM and RHT) on the responses to each qualitative question. This method of data analysis involves closely reviewing all the responses to identify common themes, ideas or points which are seen repeatedly, researchers then group these points together to identify key themes (Xu & Zammit 2020).

Five themes emerged from this approach: The NHS 6C's, communication, building relationships and teamwork skills, respect and diversity and self-development. The findings were then shared between the four authors, with outliers to the themes identified

discussed. This method of data analysis was employed to ensure the reliability of the process followed by each author, and to ensure that the data themes that emerged from the responses were valid. Following the analysis of the data, the themes were shared with the full team.

Results

A total of 64 students were invited to take part in the research. Forty-five students proceeded to complete the questionnaire, resulting in a 70 per cent response rate. Although it is recognised that there is no set level for an acceptable response rate (Bowling 2009) the authors were pleased with this level of completion.

NHS 6Cs

All the participants reported that the team building experience had provided them with the opportunity to develop skills embedded within the NHS 6Cs. Students were able to apply the learning and experience of team building to the care they will provide while on placement caring for pregnant people and families. All participants agreed that the team building session would support them to demonstrate a commitment to the quality of care they provided; this was evident during the activities as they were required to demonstrate compassion and care.

'Listening is key to both my theory and clinical time and trying out different ways of doing the same task will help me adapt my care for the individual. One size does not fit all' Participant 5.

'Throughout group work on the course and as part of a team on placement the skills for effective communication, commitment and valuing others are vital' Participant 16.

Communication

Team building replicated the nuances of teamwork in the clinical area in a safe space where students could challenge personal boundaries of confidence and communication. The opportunity to work with others outside their cohort was viewed positively by participants.

'The team building event was very useful to reiterate the importance of communication, especially within a group where you can have some strong characters, lots of varying ideas and no clear focus' Participant 10.

'It enforced the need to communicate and work together to achieve a goal, yet in some areas I felt I had to really challenge myself and push past nerves and anxiety to complete the task and stay as a team player' Participant 12.

'It really helped learn more about others in the group and helped with the challenge of the big cohort ... It forced me out of my comfort zone and respond to different tasks quickly. It helped me remember who people were and identify those similar and different to me …' Participant 33.

Building relationships and teamwork skills

An ethos of camaraderie was noted in the qualitative responses. Students reported feeling equipped to support one another and, similarly, seek support from peers when necessary. Eighty-four per cent of students reported believing the team building experience to be 'very useful' in developing skills relating to teamwork. Sixteen per cent stated that this was 'useful'.

'I feel more confident now moving forward as the day was such a fantastic opportunity to meet members of my cohort … I feel that we can all support each other throughout our journeys in our theory and clinical practice' Participant 8.

'To learn to reflect on how things can be approved and keep trying, don't give up … no matter how hard the task gets and ask other and rely on others when I need help' Participant 4.

Respect and diversity

All participants believed that team building enabled them to demonstrate and develop compassion: with 87 per cent of participants reporting the team building to be either 'useful' or 'very useful' in enhancing this skill. All participants reported their experience would support them to demonstrate greater respect and promote dignity for others, with 89 per cent reporting the experience was 'very useful' in developing a philosophy of 'everybody counts'. The group activities highlighted diversity in opinion reflective of the nature of teamwork in the clinical area.

'There were other people's circumstances that you had to consider while doing the activities and their abilities to complete them. It makes you more patient and more understanding of their backgrounds' Participant 39.

'It will make me more understanding of how people may be feeling and how you can help them' Participant 39.

'… All members showed compassion for others while respecting and valuing one another' Participant 38.

'We had to communicate well, listen to each other and respect different ideas and opinions' Participant 14.

Self-development

There was a general recognition that students attended the team building session already equipped with basic communication, leadership and teamwork skills. The activities supported students to identify areas of strength and development in preparation for clinical practice.

'The team building event allowed us to explore our

strengths and work as a team … we all have qualities which are valuable and can work as part of a team to gain more knowledge and advice' Participant 38.

'I felt that I improved my active listening skills and this coincides with all of the NHS Constitutional values' Participant 5.

Discussion

Continuous professional and personal development is fundamental to the midwifery profession: a concept rooted within *The code* (NMC 2018) and *Revalidation* (NMC 2019b). Student midwives find themselves at the beginning of a career in which they will continuously adapt and transform to meet the population's myriad needs. It is therefore the responsibility of midwifery education to facilitate student progression through developmental opportunities which nurture these skills and link theory to practice (Yardley et al 2012, Billet 2015).

It is important to consider the adult learning theory, or andragogy, proposed by Knowles (1984) who made several assumptions about the characteristics of all adult learners and aligned these to four main principles of adult learning. These are the need to be involved in the development and evaluation of their learning; the importance of experience, both good and bad, as it provides a base for learning activities; adults are also more interested in learning if it has an immediate impact upon them and they are less likely to focus on the content due to their inherent need to problem-solve (Yardley et al 2012).

Three main factors have been found to influence adult learning: motivation, meaningfulness, and pacing (Merriam & Bierema 2014). An adult learner is less likely to perform well if the learning is not meaningful to them (Merriam & Bierema 2014), they need to understand the relevance to their practice and future role, which will be achieved using social and interactive learning fostered during the team building sessions.

Within the overarching theme of self-development, students cited resilience, reflection and problem solving as key qualities which evolved due to the team building exercise. These qualities are viewed as essential assets among health care professionals (HCPs), as highlighted by Lake (2016), particularly during the current COVID-19 pandemic (Ratner et al 2020).

Although NHS resilience may be framed with negative connotations, and its efficacy questioned (Lake 2016, Eaves & Payne 2019) the NMC *Standards of proficiency* (2019a) highlights the significance of resilience in the development of midwives who are colleagues, scholars and leaders. Current research regarding student opinion concerning the embedding of resilience awareness within midwifery education is limited, but data suggest students recognise the importance of developing this attribute when preparing for a career in the NHS and value opportunities which enable them to safely develop this skill (McGowen & Murrey 2016, Callwood et al 2018).

A key theme identified was respect and diversity: both fundamental values of the role of the student midwife and central to the NMC *Code* (NMC 2018). Within the NMC *Standards of proficiency* (2019a), it is stated that midwives have a responsibility to provide and promote non-discriminatory, respectful, compassionate and kind care.

This theme links with 'salutogenesis', the philosophy which underpins the BSc Midwifery programme. Salutogenesis focuses on embracing being with birthing people, viewing childbearing as a healthy psychosocial and physical phenomenon (Ridley & Byrom 2018), while removing the pathological paradigms of normal, abnormal and risk-associated childbearing (Antonovsky 1979). Intertwined into the student journey from the point of application, with the use of values-based recruitment and an undergraduate curriculum underpinned with respect, diversity, and culturally sensitive care, are paramount in the development of skills, knowledge, and awareness of the student midwife (ICM 2019). Educators have a role to facilitate the development of these skills throughout the degree programme (ICM 2019), with a prime opportunity to commence this at an early team building event, held within the first week of the course.

National Maternity Review (2016) highlighted how maternity care must be respectful and sensitive, with a need for health care professionals to, first, understand and respect their own personal and cultural circumstances. Learning about the diverse backgrounds, cultures and individual journeys which have led to students commencing a midwifery programme is a key component of the event.

Effland & Hays (2018) discuss how a learning environment which is equity-focused helps to prepare students to provide culturally sensitive care to women and families. A key skill which students must develop during their training is respect for opinions, other than their own. This can sometimes present challenges for more junior student midwives, requiring them to think differently and challenge some of their own assumptions, biases and beliefs. Clarke (2011) acknowledges how, as a first-year student, opinions can change daily. To help facilitate the development of these skills students must themselves be treated with respect (National Maternity Review 2016).

Teamwork and respect between professions is key to the safe care of women and families, however, it was highlighted by National Maternity Review (2016) that there was an identified lack of respect across disciplines and a culture of silo working. One way to

change the work culture and improve teamworking is to facilitate shared learning and training events which include all members of the team (Logan & Kelly 2021). This emphasises the need to foster this within midwifery education: team building events help to build on key skills which students can then continue to develop throughout their training and after qualification. The *NHS Long term plan* (NHS 2019) states that the culture and safety of the workforce will improve through an NHS leadership code, where leadership behaviours and the cultural values of the NHS will be used to underpin clinical practice.

The art of effective communication is a fundamental cornerstone of all health care provision: this is especially true within maternity services. This is highlighted in standard seven of the *Code* (NMC 2018), which specifically refers to the need for all nurses and midwives to ensure they communicate well and at a level people will be able to understand. It also highlights the importance of both verbal and non-verbal communication skills and the ability to demonstrate these across a range of settings. The participants overwhelmingly found that the activities and tasks undertaken during the team building session helped them to develop their existing skills, while also enabling them to acquire the new skills associated with team working.

During the tasks, the students also considered the challenges of ensuring effective communication, especially when faced with distractions or feeling pressured, as identified in an integrative review of interprofessional communication in health care by Foronda et al (2016). Poor communication has also been cited as a contributory factor in several maternity service investigations (Kirkup 2015, Ockenden 2020, Knight 2022) highlighting the importance of nurturing effective communication skills with all students. Ensuring the effectiveness of communication training in all maternity staff is a challenge and requires organisations to ensure they prepare, practise and review this with all staff regularly (Chang 2018).

Reflection is a key component of the development and sustainment of resilience and professional growth (Hunter & Warren 2014); accorded such importance by the midwifery community, it forms the foundation of clinical assessment (NMC 2019c). Similarly, efficient problem solving as an essential attribute has become increasingly ingrained within maternity services (Cinar et al 2010, Yurtsal & Özdemir 2015). One cannot become resilient without reflecting and one cannot reflect without finding solutions, therefore the synergic nature of these elements needs to be facilitated dynamically within midwifery education to support the professional, and self, development of the future midwifery workforce.

Conclusion

Overall, team building activities have been of great value for undergraduate student midwives in facilitating their development of the NHS values. The themes identified are all essential skills in the development of the future midwife, linked to the NMC *Code* and women, birthing people, and family-centred care.

It is recognised that further research in future years of undergraduate study would be of benefit to explore this topic further and apply this to clinical practice.

Limitations

It is acknowledged that this research took place with one intake of students, so it is suggested that this is repeated in the following years to observe any potential trends and patterns. It is also recognised that this research did not include the collection of participant demographics, however this was due to the authors wanting to ensure participant anonymity.

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