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The Doctoral Midwifery Research Society: a concrete structure for supporting doctoral midwifery research

Key words: Doctoral midwifery research society, DMRS, definition of midwifery research, information age

When I launched the Doctoral Midwifery Research Society (DMRS), it was 'blue sky thinking' materialising into a concrete structure… a midwifery dream come true. I believe this is a major development for serious midwife researchers to use as a landscape for designing, drawing, imprinting and showcasing high-quality midwifery research. However, I do hope the DMRS will be able to grow fast enough to keep up with the modern needs of midwives living in the 'instantaneous age' where demands for faster, shorter and more transient communication pressurise us every day. Life for many of us is like that described by Wittel (2001: 51) where 'network sociality consists of fleeting and transient, yet iterative social relations; of ephemeral but intense encounters'. The era of electronic connectivity is at our finger-tips and modern media technology can be used to bring the gold nuggets of research interviews, news from the latest research reports, lectures from visiting professors and communications from discussion forums to the membership rapidly and in some cases instantaneously. We are living in the 'information age' and media technology is one key that may actually facilitate our survival in this 'network-supported society'. Living in 'liquid modernity' (Bauman, 2000) is already a reality for many of us and one in which the DMRS will have to become a strong and increasingly more visible resource. It is our intention, in time, with adequate funding, to be in a stronger position to harness many of the benefits of modern technology to communicate with each other, albeit through 'articulate' technology, 'telemidwifery', 'podcasts', 'skype' or email.

The origination of this new society arose from several factors – the major one being a growing number of midwives with PhDs in the UK, the Republic of Ireland and the rest of the world with no distinctly visible or tangible forum for discussion, debate and community development. In addition, as midwifery researchers mature and leave the seed bed with bursting shoots of new knowledge, they need nourishment that comes from cross-fertilisation of ideas and the sharing of fruits from labour-intensive searches for meaning and understanding. This appetite for communion can only be satisfied through sharing of our time and experience with each other. Therefore, the overall aim of the DMRS is to advance midwifery practice through the promotion, development and dissemination of midwifery research. I define midwifery research as 'a rigorous process of inquiry that aims to provide knowledge of and insights into the efficacy and effectiveness of midwifery practice; its effects on women, babies, parents, family and society. It includes research on the education and training of midwives, the use of information and communication technologies, the organisation and delivery of maternity services, and employment conditions and terms affecting midwives' working lives'.

A fundamental objective of the DMRS is to 'provide quality support and guidance to doctoral and post-doctoral midwife researchers regionally, nationally and internationally'. A major commitment of the society is to provide – whenever possible – 'a platform for midwife researchers to engage with academics, peers, colleagues, service users, commissioners and policy-makers in a strategic endeavour to ensure best evidence is indeed underpinning everyday practice'. This is in keeping with the strategic plan for research and development in Northern Ireland (Health and Personal Social Services in Northern Ireland, 2007) and the DMRS aims to play its part in:

- Developing an enabling infrastructure to support research that will impact on maternity care, management and service delivery
- Building the research confidence and skills of midwives working in health and personal social services (HPSS)
- Working in partnership with the HPSS research and development (R&D), related institutions and organisations to strengthen the quality and impact of midwifery research
- Supporting midwives to develop models of dissemination to effectively transfer and diffuse key outcomes for public health arising from midwifery and midwifery-related research
- Ensuring patient and public involvement in HPSS R&D
- Placing a strong emphasis on 'doing' and 'using' research for the good of society and for the advancement of midwifery practice.

The DMRS is sponsored by the Northern Ireland R&D Office and can be accessed from the website: doctoralmidwiferysociety.org. The first meeting used podcasts to capture Professor Billie Hunter's inspirational lecture on qualitative research (Hunter, 2007). The original lecture can be heard via the DMRS website or read in *Evidence Based Midwifery (EBM)*. The second meeting used video to capture an invigorating lecture on metasynthesis by Professor Soo Downe (Downe, 2008). This video can again be viewed on the website or the paper read in this edition of *EBM*.

In conclusion, the DMRS has been developed to meet a need in midwives for a research menu that offers a wide and varied assortment of delights. It is important to remember the key ingredients for its emergence came from midwifery pioneers, who fought to change our stable diet and introduce research and all of its nomenclature into our undergraduate and postgraduate curriculae. These changes in curriculae, professional practice standards, evidence-informed practice and government-led policies have all been influential in building strong edifices for the future development of midwifery research. The DMRS is a concrete foundation ready for pillars of knowledge to be placed and a building of great architectural beauty to arise.

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Metasynthesis: a guide to knitting smoke

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Abstract

Since the seminal production of Noblit and Hares' book *Meta-ethnography* published in 1988, the quest for an optimal route to synthesising qualitative evidence has gained momentum. Theoretical arguments in this area range diametrically from the impossibility of progressing knowledge based on qualitative evidence in the absence of such synthesis, to the impossibility of synthesising knowledge that is particular, context-specific, and dependent on the primary investigator as research instrument. Even if the need for such synthesis is accepted, there is debate at every stage of the process, from the acceptable range of inclusion of studies for reviews to the place of formal search strategies, inclusion criteria, quality assessment, and the optimum method of synthesis.

This paper explores all of these dimensions and dilemmas, with reference to the theoretical and methodological literature in this area. It also discusses solutions that have been employed by the author and her colleagues in undertaking a series of metasynthesis-based reviews in the area of maternity care.

Key words: Metasynthesis, qualitative research, theory generation, midwifery research, research dilemmas

Background

Very few researchers and practitioners would now dispute the value of combining the findings of randomised clinical trials to establish best evidence for guidelines and practice. While there is still some debate around the details of the methods that should be used, and considerable disagreement about how much weight meta-analysis should have in dictating best practice, this is in the context of the widespread authority of the techniques for systematic review and meta-analysis set out in the Cochrane handbook (Higgins et al, 2006). Criteria for assessing the quality of studies to be included are also standardised, both at the level of individual randomisation (Moher et al, 2001) and for cluster randomised trials (Campbell et al, 2004).

However, there is much less agreement around how to combine qualitative studies. Indeed, there have been fundamental arguments about whether this is a good thing to do at all. This is a live argument that has generated an increasing number of methodological and philosophical papers over the last ten years (Sandelowski et al, 1997; Silverman, 1997; Barroso and Powell, 2000; Beck, 2002; Sandelowski and Barrow, 2003; Finfgeld, 1999, 2003; Walsh and Downe, 2005, 2006; Downe et al, 2007; Finlayson and Dixon, 2008; Simkhada et al, 2008).

As Walsh and Downe note (2005), Stern and Harris (1985) first used the 'qualitative metasynthesis' in relation to combining the findings of a range of studies. However, it is the methods described in the seminal publication of Noblit and Hare (1988) that are cited most frequently in syntheses of qualitative studies currently. Although their technique was specifically focused on what they termed 'meta-ethnography', it has been extended to combinations of studies with a wide range of theoretical perspectives. This multiplicity is magnified by the addition of a range of analytic strategies, that have been typified as theory building (divided into grounded formal theory and metastudy), theory explication, and descriptive metasynthesis (Finfgeld, 2003). Against this multiplicity of approaches, there appears to be general agreement that, as Deborah Finfgeld notes: 'The goal of metasynthesis is to produce a new and integrative interpretation of findings that is more substantive than those resulting for individual investigations' (Finfgeld, 2003: 894).

Though the technique has a recent history, it has been applied in a range of areas, including transformational leadership (Pielstick, 1998), experience of chronic illness (Thorne et al, 2002), diabetes (Paterson, 2001; Campbell et al, 2003), concepts of caring (Sherwood, 1997) postnatal depression (Beck, 2002), adolescent motherhood (Clemmens, 2003), midwifery care (Kennedy et al, 2003), and midwifery expertise (Downe et al, 2007).

At least three active debates can be identified in the current metasynthesis literature. These cover the philosophical position taken by authors, the importance or otherwise of methodological rigour or quality in the studies to be included and the analytic approach employed. To some extent, these areas are interrelated. The next section explores the debates, and describes some of the specific approaches taken by the author and her colleagues in metasynthesis studies they have recently undertaken.

Discussion of the three debates

Philosophical positions: finding the truth or reducing uncertainty

Most qualitative research is seen as a specific construct of the world that is negotiated between the study participants, their social context, the researchers, and the reader of the research. Qualitative study tends to be based on relativist theoretical perspectives, such as interpretivism ('the world exists, but what we perceive as 'reality' is only a social interpretation') or constructivism ('the world only exists as an artefact of human interpretation and perception') (Crotty, 1998). In theory at least, research carried out under both conditions tends to limit any claim that the findings represent 'the (absolute) truth' about the way the world is. Sandelowski and her colleagues (1997) express this elegantly as they argue against 'summing up' the knowledge generated by this kind of research: 'To summarise qualitative findings is to destroy the integrity of the individual projects on which such summaries are based, to thin out the desired thickness of particulars… and ultimately to lose the vitality, visceral-ity and vicarism of the human experiences represented in the original studies' (Sandelowski, 1997: 366).

Apparently in direct contrast, in the same year that Sandelowski published her critique, Silverman argued that qualitative researchers risk increasing marginalisation from policy and practice if their work remains isolationist and esoteric, and if they are unwilling to engage in synthesis that might provide middle range theories to advance knowledge and practice (Silverman, 1997). Earlier, Statham had referred to this tendency to curtail the transferability of findings by refusing to move beyond single studies as 'analytic interruptus'. In a somewhat controversial statement that extends this critique, Jensen and Allen (1996) wrote about the need to search for 'truth value'.

Over the ten years or so since these views were expressed, acceptance of the need for increased transferability of study findings has become dominant, and metasynthesis studies are now appearing with increasing regularity, as noted above. Contemporary discussions seem to be more about method than about the fundamental philosophical principles of qualitative data synthesis. The ongoing debate has generated middle ground positions that are now gaining prominence. This is the stance taken by Kearney, for example: 'We seek to develop methods in which alternative experiences and interpretations are revealed rather than neutralised… (in which) differences must be sought and honoured' (Kearney, 1998: 499).

Recent observations by Noblit in a paper that presents the opinions of five of the leading proponents of a range of metasynthesis approaches suggest this was the original theoretical position that underpinned the meta-ethnography he undertook with Hare in 1988 (Thorne et al, 2004). He goes on to comment that the 1988 book was based on what he called 'three moves': that summaries of qualitative research offer interpretation, not new data; that what is generated are metaphors, not answers; and the notion that the socially-driven explanation that arises from such a synthesis is, in itself, a translation of findings from one context to another. Noblit saw the result of such an enterprise as contingent. It may or may not resonate with the context in which readers find themselves, so the usefulness of findings from metasynthesis studies will vary by how far they offer effective sets of metaphors for understanding in other contexts. When the derived metaphors, or 'line of synthesis' can be effectively translated, this results in what Louise Jenson has summarised as the reduction, but not the elimination of uncertainty (Thorne et al, 2004: 1342).

Debates around rigour

Louise Jensen probably takes the most robust and definitive approach to methodological quality in metasynthesis, warning, in another evocative turn of phrase, of the danger of creating 'metasoup' if the need for rigour is not appreciated (Thorne et al, 2004: 1347). As she acknowledges, her background in meta-analysis has strongly influenced this stance. In contrast, Sandelowski remains somewhat equivocal. She critiques the 'presumptive assumptive baggage that comes with the analogy to meta-analysis' (Thorne et al, 2004: 1361), but she has moved to a position of relative acceptance of the need for agreed standards at some level: 'We envision metasynthesis evolving into a complex set of strategies with which scholars in the health research field render the warranties for their qualitatively derived assertions in a manner that is increasingly accessible, auditable, and transparent' (Thorne et al, 2004: 1361). This is the stance taken by the author of this paper and her colleagues (Walsh and Downe, 2005, 2006).

Scope of the review phase

The differences of opinion about what metasynthesis is or should be have also led to disagreement about the scope of metasynthesis reviews. At one extreme, Paterson and colleagues (2001) attempted to synthesise 292 qualitative studies of chronic illness, in a technique they termed 'metastudy'. Not surprisingly perhaps, Thorne, who was a member of the team commented that 'truth claims of all sorts slipped into and out of focus' (Thorne et al, 2004: 1356). At another extreme, metasynthesis has been undertaken with only three studies (Russell et al, 1997). Noblit and Hare took the line that 'few studies are sufficient' (Noblit and Hare, 1988), but did not define 'few'. There is as yet, no agreement on whether search strategies for studies to include should be narrow or widely focused, or how strictly they should be applied. The approach of the author and her colleagues to this has been to be explicit about what question they started off with, and where they ended up, and to take an iterative approach to which studies to include. For example in our metasynthesis of expertise (Downe et al, 2007), we started with the question: 'What is the nature of midwifery expertise in the context of physiological birth?'

After a series of iterations around testing the topic against the current literature and extensive debate, we ended up with a much more nuanced question: 'What accounts of intrapartum midwifery skills, practices, beliefs and philosophies are given by practitioners working in the field of midwifery who are practising 'beyond the ordinary' in the intrapartum setting?'

As Downe et al (2007) explain, this change came about as a result of significant reflection on, and reflexivity about our personal political and ideological positions, the professional project of licensed midwifery, and midwifery mythologies that may or may not be justified. Most fundamentally and controversially, we began to question our own definitions of 'midwife', and of expertise. This led to the change in scope for the review.

Having defined the area of investigation, Downe et al (2007) use formal search strategy methods, augmented with techniques termed 'berry-picking' (Bates, 1989), where initial searching against the broad topic leads to new, unpredictable ideas and directions, and even a new formulation of the original query. The search also lead to 'backchaining', which involves close searching through reference lists of included studies to identify any further papers that may fall within the scope of a review. We have also adopted the techniques of theoretical saturation and of searching for disconfirming data, borrowed from grounded theory. In the case of a metasynthesis, the unit of analysis for these techniques is a study. As we analysed each additional study, we consciously checked if the findings extended or refuted the emerging line of argument synthesis (Downe et al, 2007). If additional studies continue to reinforce the line of argument, it is likely that continuing to search for new studies will reap increasingly diminutive returns, and so the search can be truncated at that point. These approaches align somewhat with Noblit and Hare's concepts of reciprocal and refutational synthesis, which are discussed further below (Noblit and Hare, 1988).

A range of other approaches to selection is evident in the literature. For example, in their study of the experience of living with diabetes, Campbell et al (2003) selected a purposive sample of ten studies, having decided *a priori* that ten would be sufficient for the aim of their study. Any approach can be valid, as long as the teams using them understand and pay attention to the underlying theoretical perspective adopted, and are explicit about the strengths and weaknesses involved, and the limits these impose on what they claim their findings say about the particular area of study they have approached.

Quality of included studies

One of the most active debates in the area of qualitative synthesis, and indeed, qualitative research in general is the application of quality criteria. Adherents of a strongly constructivist persuasion are most resistant to this approach, believing that any externally imposed rules of acceptability for context-specific in-depth studies risks violating epistemological principles of knowledge as particular, specific, and resistant to exact replication. At the other extreme, a wide range of checklists have been proposed, with varying degrees of rigidity. In a search for a quality tool, Walsh and Downe (2005) located eight existing checklists and summary frameworks, covering a wide range of elements. Their review included the summary framework of Spencer and colleagues (Spencer et al, 2003), which was in itself based on 29 different checklists. Recently, a team undertaking a review of access to antenatal care needed to develop another tool to assess the quality of qualitative studies in their sample (Simkhada, 2008), which suggests that this issue is still live in the qualitative research community.

If the point of undertaking qualitative research is to change policy and practice, the pragmatic approach to assessment of quality is probably somewhere in the middle of the extreme stances described above, as Murphy and colleagues have observed: 'Some argue that… the very idea of criteria is incompatible with… the… anti-realist assumptions… (of qualitative research)…. We suggest that this position is unnecessarily constraining… if the findings of research cannot be taken to represent even an approximation of the truth… why should commissioners… fund… such research' (Murphy et al, 1998: 10).

In the same vein, Barbour (2001: 1115) argues for checklists to be viewed as 'reflective rather than constitutive of good research'. Sandelowski and Barroso (2002) proposed a lengthy list of quality markers, but go on to urge that this should be used flexibly. From their position, all studies may contribute to an emerging understanding of a field, no matter how many ticks they generate on a list.

In contrast to the relativist position of Sandelowski and Barroso, Walsh and Downe (2005) have argued that 'metasynthesis of methodologically flawed studies may result in flawed metasynthesis'. This statement is based on the belief that a study, which does not meet at least a minimum level of credibility, transferability, dependability, and confirmability (Lincoln and Gupta, 1985) is unlikely to contribute to a significant reduction in uncertainty in the area under scrutiny. Walsh and Downe's quality assessment tool was published in 2005, and since then, a grading system for the studies included was adopted, adapted from an initial idea of one of our Masters' students (with thanks to Eileen Whitehead) (Downe et al, 2007) (see Box 1). The authors do not include studies that score less than C+ on the tool.

The tension between those who believe that any qualitative study is of value as it captures (at least partially), the essence of specific human experiences, and those who want to take a strictly quality-mediated approach is still not resolved. Again, anyone working in this area will need to decide at the outset where they are on this continuum, justify their position, and carry out their research accordingly.

Box 1. Quality summary score for qualitative studies

Key to quality rating

A – No or few flaws: The study credibility, transferability, dependability, and confirmability is high
B – Some flaws, unlikely to affect the credibility, transferability, dependability, and/or confirmability of the study
C – Some flaws, which may affect the credibility, transferability, dependability, and/or confirmability of the study
D – Significant flaws, which are very likely to affect the credibility, transferability, dependability, and/or confirmability of the study.
(Downe et al, 2007: adapted from Jackson, unpublished)

Box 2. Analytic strategy from meta-ethnography: Noblit and Hare (1988)

- Reading the studies
- Determining how the studies are related
- Translating the studies into one another
  - Reciprocal translation
  - Refutational translation
- Synthesising translations: 'line of argument'
- Expressing the synthesis.

Analytic strategy

In general, the aim of metasynthesis is to look for patterns in the included data that have high explanatory power for the phenomenon under investigation. Before this can be determined, decisions need to be made about which data are to be included, and about how patterns are to be identified.

Which data to include?

Once agreement is reached on which studies are included in a review, there is a question to be resolved about which data to include in the analysis. It might be argued that original transcripts are closest to the phenomenon under scrutiny. However, even these are only interpretations of those phenomena by the original researchers. The approach taken by Britten and colleagues (2002), where some of the included original papers had at least one member of the review team as a researcher, is one way of dealing with this factor of constructed or interpreted data. However, in general this is not a practical approach to take. The next level of interpretation is the original report of the data, or the thesis if it is a PhD, and this might be the ideal source for review groups that were not a part of the original data collection team. Often however, it is the drastically pared down account of a study that is presented in a journal, which is the primary source for metasynthesis studies. The limitations this imposes need to be acknowledged by all those working in this field.

Analysis

While a range of approaches to analysis has been taken, the techniques described by Noblit and Hare in 1988 are probably the most widely used, in whole or in part (see Box 2).

At the analysis phase, they proposed three distinct stages (or 'moves') of analysis. The first is termed 'reciprocal', and entails a search for phrases, metaphors and themes that occur repeatedly across the included data. The second is termed 'refutational', and involves a conscious search for phrases, metaphors and themes that refute any emerging patterns. The third phase is termed the 'line of argument synthesis', and results in the summary statement that most completely expresses the emerging patterns across the included studies. Despite the frequency with which Noblit and Hare's 1988 work is cited, Noblit observed in 2004 that, while most published metasynthesis accounts describe reciprocal findings, few report on the refutational phase of the work, and even fewer reach a distinct 'line of argument' synthesis (Thorne et al, 2004: 1349). Indeed, in critiquing the proliferation of under-theorised metasynthesis studies, Margarete Sandelowski has commented that 'we are in an era of metamadness… or even 'metajeopardy' (Sandelowski, 2006: 11). Like Noblit, she notes a difference between what she calls qualitative metasummary, which is a rather quantitatively orientated aggregation of qualitative findings, and qualitative metasynthesis, which is seen as an interpretive integration of qualitative findings that are themselves interpretive syntheses of data. In the latter case, Sandelowski argues that what is intended is something that is more than the sum of its parts. Her key argument, stated forcefully, is the need for those doing metasynthesis to 'come to a point'.

As an example of how 'coming to a point' may look, Downe et al's (2007) study of maternity care practitioners who were practising beyond the ordinary reached the following line of synthesis: 'As the practitioners in the studies in our review become more expert, they appeared to (re)value and to express qualities such as trust, belief and courage, to be more willing to act on intuitive gestalt insights, and to prioritise connected relationships over displays of technical brilliance… in some of the accounts, the enactment of vocation led these experts to move outside of and beyond normative childbirth practices, and so to become more exposed to critique' (Downe et al, 2007: 136).

Emerging fields of enquiry in reviews of non-controlled studies

As this paper has indicted, there is an emerging consensus for some aspects of metasynthesis. However, a wide range of debates persist, as Thorne and colleagues have noted: 'Qualitative metasynthesis seems to be unfolding before our eyes as we dive deeper and deeper into its implications and applications… the methodological conventions remain in flux…' (Thorne et al, 2004: 1345).

Beyond these debates, there is increasing interest in what has been termed 'realist policy review' (Pawson and Tilley, 1997; Pawson et al, 2005). This approach tends to include studies that utilise a range of methods, and even the opinion literature. It seeks to identify 'what works, for who, in what context'. Qualitative research is fundamental to this endeavour, and the potential for combining insights from a range of methodological approaches offers the potential for a much richer, more flexible, and dynamic approach to evidence generation, and to guideline and practice development, built firmly on the premise of limiting uncertainty, as opposed to seeking absolute truths. Downe et al (2007) have explored the potential for this way of seeing in terms of normal birth and more recently, Murray Enkin has charted his personal move away from absolutist faith in trials' evidence towards a more relativist, contingent position: 'This paper… was conceived during an era of medical authoritarianism, born in a time of nascent… family-centred maternity care, matured in a period of enthusiastic (but not unquestioning) homage to evidence-based obstetrics, and culminated in a reluctant but comforting acceptance of uncertainty… It is, to use an ancient word I only recently learned, a clinamen, a swerve, a point of intellectual revision…' (Enkin et al, 2006: 265).

Conclusion

The process of undertaking metasynthesis is iterative, contingent, and never definitively complete. There is debate about most steps in the process. However, there does appear to be an emerging consensus that it is worth doing, and that the findings can add to the general sum of knowledge in specific areas, primarily by reducing uncertainty to a greater or lesser extent. While there is no definitive 'how to' guide in this area, this does not mean that 'anything goes'. Each decision made in the process of undertaking such a review requires attention to one's theoretical perspective, epistemological stance, and methodological integrity. In doing this, those aiming to make some sense of the process would do very well to heed the following words of Margarete Sandelowski: 'Ask not what qualitative research can do for you, ask what qualitative research can do 'with'… you and what you can do better with qualitative research. Answer not that qualitative health research is only about asking the right questions, counter that… (it)... is about answering them too' (Sandelowski, 2004: 1383).

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Pain, disability and symphysis pubis dysfunction: women talking

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Abstract

Background. Pregnancy is not usually associated with disability or difficulty with activities of daily living, however when a woman develops symphysis pubis dysfunction (SPD), she may become disabled. During a research project – the Gap study – into women's experiences of SPD, issues of SPD-related disability became evident.

Aim. To explore the disabling effects of SPD on the lives of pregnant and newly-delivered women and their families.

Method. A qualitative phenomenological approach using semi-structured interviews was conducted in a large maternity hospital in the north-west of England. A total of 28 women were interviewed during pregnancy, and at six weeks' post-delivery.

Results. Results revealed that SPD had a profound effect on the women's lives, leaving them feeling disabled and compromised in their personal, maternal, sexual and housekeeping roles. This affected their ability to function in what they considered to be the normal roles of family life and caused feelings of frustration, loss of control and helplessness.

Conclusions. Healthcare professionals need to listen to women and give them the psychological support they require. This will have implications for practice in terms of education, training and postgraduate studies. Women need to feel more valued, when they complain about this type of pain.

Key words: Pain, phenomenology, pelvic girdle pain, low back pain, loss of control, symphysis pubis dysfunction, disability

Introduction

The word 'disability' is not usually associated with aspects of normal pregnancy. The Disability Discrimination Act (1995) defines a disabled person as one having a mental or physical impairment, which has an adverse effect on the ability of a person to carry out normal day-to-day activities. As healthcare practitioners, we appear to be unaware of how seriously disabling and painful symphysis pubis dysfunction (SPD) during pregnancy and labour can be. SPD may be defined as an abnormal stretching of the pubic joint during pregnancy (Wellock, 2002). This study was undertaken between 2003 and 2005. Since that time, the terminology has changed and is now known as pelvic girdle pain (PGP) related to pregnancy (Association of Chartered Physiotherapists in Women's Health, 2007). Throughout this paper, the term SPD will be used, but the authors acknowledge the new terminology.

Generally pain is the most frequently described symptom of SPD expressed by women to healthcare professionals. Depending on location, duration and intensity, this pain can have disabling effects on people's lives and their ability to perform the activities of daily living (Hansen et al, 1999; Katz, 2002; Leadbetter et al, 2004).

There have been many studies that have researched the effects of pain on activities of living. For example, Katz (2002) and Breivik (2005) have determined that it is the quality of life measurements that are most useful in assessing the ability of a person in pain to perform basic human activities.

Defining pain has proved difficult for researchers, especially the debates of what constitutes acute versus chronic pain. Traditionally, pain was only considered chronic if it persisted for six months or more (Wenof and Paul Perry, 1999). Singh et al (2004) recommended that pain should be classified as chronic if it persists for more than three months and the European Federation of the International Association for the Study of Pain (IASP) endorses this view and regards pain lasting between three and six months as chronic (Niv, 2007).

Pain has been defined as 'an unpleasant sensory or

emotional experience associated with actual or potential tissue damage or described in terms of such damage' (International Association for the Study of Pain, 1994: 209). Inadequately treated pain can have profound effects on patients, leading to increased morbidity and reduced mobility (Niv, 2007), reduced physical activity (van den Berg-Emons et al, 2007) or substantial reduction in activities of living (Smith et al, 2007a).

This scenario defies the image of pregnancy and motherhood as a positive, happy, joyous and natural experience for many women (Lewis, 1997; Fullerton, 1997; Choi and Henshaw, 2005) and one that becomes the ultimate fulfilment of a woman's role (Gregg, 1995; Green et al, 1998; Wilkins, 2006). Childbearing women who suffer from pain that persists for 12 weeks or more can become distressed and disabled, and this can have profound effects on family life.

Literature review

A literature search explored the electronic databases such as MIDIRS, CINAHL, MEDLINE and the *Cochrane Library* using terms such as 'activities of daily living', 'pelvic pain', 'low back pain', and 'pelvic pain/pregnancy'. The goal was to identify literature about pain-causing disability in pregnancy. 'Activities of living' and 'pelvic pain' combined revealed no matches. 'Activities' and 'pelvic pain' revealed only one article and 'activities' linked with 'low back pain' resulted in 19. Although these articles did not relate to pregnancy, they highlighted how the activities of living are affected by pain, causing disability and fear-avoidance behaviour (Buer and Linton, 2002; Goubert et al, 2004; Roelofs et al, 2004). In the main, the studies related to mixed genders and older age groups – they demonstrated that activities of living took much longer than they had previously, or were abandoned because of pain. Activities of living were rarely mentioned. Instead, aspects of fear of movement were highlighted as problems (Verbunt et al, 2005), lifting and cycling tasks (Roelofs et al, 2004), sleep disturbance, difficulty in conducting household tasks and recreational activities (Roberto and Reynolds, 2002). Studies used a variety of different measuring techniques and the approach was mainly quantitative.

When topics such as 'back pain in pregnancy', 'pelvic pain in pregnancy', pelvic girdle pain', 'chronic pelvic pain' and 'symphysis pubis dysfunction' were combined, a great deal of information was found that related to pregnancy, but was not combined with disability.

A literature review on low back pain and back pain in pregnancy revealed a systematic review undertaken by Pennick and Young (2007). This review highlighted that symptoms of low back and pelvic pain are common in pregnancy and can have a detrimental effect on aspects of daily living. Low back pain clearly has an impact upon the person's ability to carry objects, clean, sit comfortably, walk and it profoundly affects sleep. Eight studies, none of which came from the UK, included 1305 women. Pennick and Young (2007) state that many of the studies are poorly written, that researcher bias was evident and that the results should be viewed with caution. It was clear that more rigorous research was required into the stress these conditions cause to pregnant women.

Terminology such as 'pelvic girdle pain' or 'pregnancy related to pelvic girdle pain' (PPGP) are used and as the symphysis pubis is part of the pelvic girdle, one may presume that distressing symptoms may be linked.

An historical review by Bastiaanssen et al (2005) into pregnancy-related back pain and pelvic girdle pain revealed that there is increased interest in the topic because of the large number of women diagnosed with pelvic pathologies.

Interest in pelvic pain in pregnancy has increased significantly in Scandinavia and much of the current research emanates from there. The economic costs in terms of time lost at work in Scandinavia and the effects on society were profound (Bjorkland, 2000; Juhl et al, 2005; Prkachin et al, 2007).

Researchers had previously commented that terminology was confusing (Wellock, 2002; Leadbetter et al, 2004). Bastiaanssen (2005: 10) felt it would be prudent to have an 'all-embracing definition of this new syndrome'. The work done by Albert et al (2001, 2002) attempted to clarify terminology and divided pelvic pain into four syndromes, explaining what was meant in each group. The four groups are:

- Pelvic girdle syndrome, pain in all three joints
- Symphysiolysis, pain in symphysis pubis
- One-sided sacroiliac syndrome
- Double-sided sacroiliac syndrome.

However, the new guidelines from the Association of Chartered Physiotherapists in Women's Health (ACPWH) (2007) have suggested that the term 'pelvic girdle pain' be used, in order to lessen the confusion.

A quantitative study by Wang et al (2004) reported that 69% of pregnant women experienced low back pain that affected their daily household, sleep and leisure activities. In a qualitative study, Smith et al (2007b) stated that pain was a public health issue and a cause of increased morbidity indicating poorer health and greater disability. They reported back pain affected self-image and the resultant disability was compounded by feeling vulnerable about how others viewed them in relation to their incapacity.

Many of the studies on low back pain in pregnancy and non-pregnancy conclude that pain causes distress and disability (Leadbetter et al, 2006; Smith et al, 2007b) but few explore what that disability is or its effects on a pregnant woman and her family. In a review of the treatment for SPD, Jain et al (2006) refer to it as causing significant difficulty with women caring for their families. It can also lead to 'social isolation'. The list of symptoms given by Jain et al (2006) are similar to those listed by Leadbetter et al (2004) with a gap in the literature regarding the effects of those symptoms

on women and their families.

Robinson et al (2006) conducted a quantitative postal study in Norway on pelvic pain in pregnancy. The purpose of the study was to ascertain the effects that the condition had on daily functioning. Symphysis pubis pain was mentioned and placed clearly within the realms of pelvic girdle pain in pregnancy. This study described pain leading to women suffering sleep disturbance, severe functional disability and incontinence. The study concluded that more knowledge of the consequences of disability was required.

A review conducted in the UK by Leadbetter et al (2004) states that the effects of the condition are related to activities of daily living. A familiar pattern of symptoms was reported: night pain, broken sleep and pain on movement. Although the paper views many aspects of the condition and cites many articles to support the facts, the detailed consequences are limited. A scoring system has been devised in order to monitor women's progress and assess any interventions (Leadbetter et al, 2006). In general, there is a dearth of literature regarding the effects of pain from SPD on women's ability to fulfil family roles. Consequently, the aim of this paper is to explore how the pain and disabling effects of SPD affect the relationships of individual women and their families during pregnancy and childbirth.

Method

A qualitative approach was employed utilising the phenomenological method. This particular philosophical tradition was chosen, in order to capture the 'lived in' or 'essence' of the experience for each woman (Heidegger, 1974). Heidegger (1962) was considered appropriate, because of the doubts about the ability to 'bracket'. Bracketing – meaning to hold all presuppositions of the concept under review in abeyance in order to reach the true essence of the phenomena – is a Husserlian concept (Beech, 1999). The researchers felt that because they were midwives, it would be impossible to bracket knowledge from previous experiences of normal midwifery as this knowledge would bring additionality to the data. Rather than creating bias, it could be argued that the absence of bracketing would enhance the researchers' data. This in turn would help other professionals to understand what it feels like 'to be in the world' of a woman suffering SPD. This concept concurs with other healthcare-related research such as that of Taylor (1995), who found that preconceptions about nursing practice would add to, not detract, from the body of knowledge.

The directly transcribed papers were read and confirmed by the women in the study as the transcripts were returned to them for proofing pre- and post-analysis. The model chosen for analysis was Colaizzi (1978) as this had clear steps for the researchers to follow. The researchers have tried to remain faithful to the concepts of phenomenology. The work was a direct transcribed version of what the women actually said rather than an interpretation of what they said or may have meant. An in-depth explanation of methodology has been described in a previous paper on this study (the Gap study) (Wellock and Crichton, 2007a).

Ethical considerations

Ethical approval was obtained from the local research ethics committee, the hospital and university ethics committees prior to conducting this study.

Data collection

Data were collected using audio-taped in-depth interviews and field notes. As there had not been any qualitative research that assessed how women felt having SPD, the following opening comment was used as a means to explore the woman's experience: 'Tell me about your experiences of living with SPD and how it affects your life.'

The interviews were proposed to take place at three designated points: initial diagnosis, 36 weeks' gestation and six weeks' post-delivery. The interviews were carried out between March 2003 and February 2005. The time of diagnosis was variable, ranging from 18 to 38 weeks' gestation. A total of 28 women with SPD were recruited to the study with no refusals or withdrawals. Not all the interviews took place at the proposed intervals as some were only diagnosed late in pregnancy, some were admitted to hospital with other problems and some had moved out of the area.

Sample

The sample was purposive. Women with any signs of SPD were referred by midwives or doctors in antenatal clinics to the physiotherapy department. In each case, a physiotherapist confirmed the diagnosis using the signs and symptoms of SPD, which vary with the severity of the condition. Many of the women complained of a burning or stabbing sensation over the symphysis pubis, which radiated down into the inner thigh. Pubic pain increased on normal activity such as walking, parting or lifting the legs. This caused difficulty in turning over in bed, which resulted in sleep deprivation. Problems were also incurred getting into and out of a bath or having a shower. Other symptoms can be found in Wellock (2002).

The women were asked to participate in the research and those who agreed were given an information sheet, which outlined the study. This was followed up by a telephone call two days later from one of the researchers in order to answer any outstanding questions or queries. Informed written and verbal consent was obtained prior to the interview. Women were interviewed in a place of their choosing, usually their home, as this was more convenient for them in view of the mobility issues. Three women were interviewed on three occasions; a total of 17 were interviewed twice, and eight, once. Eight women were only seen once, because they were diagnosed late in pregnancy, moved away from

the area, or the study time had expired. Only three of the women were available for all three interviews as many were in hospital when the 36th week interview was due. The length of the interviews ranged between 30 and 90 minutes, with an average time of 60 minutes per woman. Numerical codes were assigned to each participant in order to maintain anonymity. Each woman was assured confidentiality. The study sample consisted of pregnant women aged from 18 to 42 years, both primigravida and multigravida. The cultural mix of the women was varied as was the socio-economic status, which was in keeping with the geographical area.

Data analysis

All interview tapes were transcribed verbatim. Analysis was informed by the phenomenological tradition, using Colaizzi's (1978) 'seven steps' approach. Emergent themes and sub-themes were identified by the researchers, explored and fully discussed in order to make it informative and iterative. Data were stored on cassettes then transcribed and saved, in keeping with the new regulations on research governance that data must be kept for ten to 15 years.

Findings

The main theme in this paper was to explore the disabling effects of SPD and to assess the effect this had on the women's roles. The results produced a significant amount of descriptive information relating to how difficult it was for women to perform daily tasks of living. This impacted on their lives and affected them as women, mothers, lovers and in the housekeeping role. In the mundane or important aspects of life, women saw themselves as disabled:

'At the Palace (Queen's birthday)... I thought... I can't say I'm disabled and so couldn't answer for disabling seating... although I've got a disability... that's another thing... telling them about badges and to get the doctor on your side to get a disabled badge...' (VM13).

'And the only way I can do the Trafford Centre is if we park in the disabled... er... they've got Shop Mobility there...' (VM10).

Several women chose to use metaphors in an attempt to describe their own movements. This concept was also highlighted in another study in Finland (Bondas and Eriksson, 2001) in which women were found to use animal metaphors to describe how they felt about their bodies. In the Gap study, the women described 'crab-like' movements, the sideways action they used to help them climb the stairs. Some of their partners spoke of their waddling gait, like that of a duck:

'If I tried to walk upstairs normally, straight up or something, I just couldn't do it because the pain would stop me doing it... I go up the stairs sideways... sort of go up crab-like...' (VM38).

'I couldn't go up facing the stairs. It was a crab motion or on my bottom... "you are waddling ...you're like a duck", my husband said... he calls it my duck walk... and the waddling ruins your shoes...' (VM13).

Some of the women smiled at their recollections, particularly if their husband or partner had described the movement with humour. This use of humour may have been in an effort to explain or mask the embarrassment they might have felt at being compared to a duck. Ragan (1990) and Bondas and Eriksson (2001) found that humour was often used to alleviate anxiety and/or embarrassment by both patients and staff.

Effects on personal role

The effect that SPD had on the personal lives of women in the study was grounded in cleanliness and personal hygiene, getting in and out of bed, sleeping and giving up work due to pain on mobility. Without exception, the women in the study felt that they lost their identity as a mother, daughter, wife or partner and this affected their personal image.

Several of the women (n=7) were unable to get to the toilet in time, many referred to 'little accidents' in the home and in bed during the night. Some were embarrassed, giving the information in hushed tones, some cried, while others laughed about it. The women were ingenious at finding alternative ways to get to the bathroom and several women used strategically placed utensils, such as buckets as commodes:

'I was cooking you know and when I feel I want to go to the toilet I feel it suddenly.... I couldn't reach upstairs and I was very much in pain...'(sobs) (VM3).

'Sometimes in the bedroom, I have to roll on to the floor... and you get up to go to the bathroom and it's very difficult... one time I had to crawl to the bathroom...' (VM18). (This woman reported that she wet herself before she reached the bathroom and became very upset).

Bathing also caused problems as it necessitated the women lifting their legs to get in and out of the bath. For some women, this was virtually impossible since moving their legs affected the pelvis and caused a great deal of pain:

'Oh yes, I got in the bath last week and I couldn't get out of it and I was on my own... I was crying.... God, it took me ages...' (VM18).

As a consequence women opted to use showers whenever possible and despite all the hardships they experienced, some were still able to view their situation with humour:

'When I'm like, getting washed in the shower, 'cos you've got to stand up and you're like bending down, that's just a killer, so in the end I just have to sit on the floor in the shower... just don't drop the soap... (laughs)' (VM34).

When pain does not seem to improve over time and starts to feel continuous, it affects the way women feel about themselves. Studies into the effects of chronic pelvic pain have reported that pain causes anxiety, depression and a sense of loss of control (Nicholson, 1999; Livneh et al, 2004). In relation to childbirth pain, being

in control is very important and a cause for concern to many pregnant women as they proceed to the delivery date (Lavender et al, 1999). Consequently the concept of pain and control is compounded for women with SPD. It becomes very worrying for them and often causes frustration. Women may have concerns about labour pain, but when they already have a degree of pain which does not abate, women with SPD are often concerned about how they would cope with both kinds of pain simultaneously:

'I worried about the labour... the pain of labour was easy, during the contractions I could easily cope, but the pain from SPD was terrible... nothing seemed to stop that pain' (VM41).

Control over their own lives was also an issue. The concept of being independent was considered important:

'I seem to have lost control over my life...' VM3.

'You can't take steps to make it better... I just feel like shoving the crutches up people's backsides... it's all right saying "do this and do that", but you just can't...' (VM44).

'*I've only got under-bumper knickers and the physio's suggested big knickers... so... I thought I am buying my own knickers, I am not having my husband go in and buy them. I walked to the aisle and people were jostling, knocking me... I realised... I could not make it... so my husband gave me a pound so I could go have a cup of tea while he went shopping... erm... I realised I couldn't carry a tray and my crutches... no-one helped me... I burst into tears and didn't stop all weekend. I just felt completely helpless'* (VM38).

The act of going to bed was difficult in many ways. There was difficulty walking upstairs, it was then hard to find a comfortable position in bed and to try and get some sleep. Nearly all the women commented that they found difficulty turning over in bed, which not only caused sleep deprivation but also terrible pain:

'As soon as I go to bed it kicks in... you lie down and try to turn over... you feel like you're a hundred, it's ridiculous... it's just a big effort to turn over...' (VM29).

Some women found that getting up in the night to go to the toilet was problematic. This led to some feeling disabled and powerless:

'Just feel like an old woman... all the way through it... not being able to walk and struggling to get out of bed... literally feeling crippled when I was going to the toilet in the night' (VM50).

Such effects appeared to make the women feel 'stranded'. They worried about what might happen to them if they found themselves in a difficult position and unable to obtain support because they were on their own:

'*I've been locked a few times (pelvis)... I wake up in the morning and I can't get up... I just lie there (pause)... I've had to ring my mum twice to come and get me up and my little boy had been crying for me in his bedroom... (becomes very upset)... and I've had a few accidents waiting for her to come round. If it wasn't for my mum, I could be left there for a long time. That worries me... I need to take the phone to bed with me'* (VM17).

The women who continued to work found that they needed to make adjustments. In the main, the women found their employers and fellow workers to be supportive, assisting them by finding them different chairs, desks and changing workloads. Unfortunately nothing seemed to help very much:

'I can't bend down, I can't sort of kneel and do things at work. I had to change my work chair because it was making me worse... I kneel a lot... I went to a conference in Cardiff, got delayed for three hours and had to stay in a hotel.... em... about 5 or 6pm... I couldn't get out of bed... I had to call my husband to collect me...' (VM9).

There were also financial implications for those women who had to give up work because they could not cope physically with the disability and pain caused by SPD. Hayghe (1993) reported that in society today, a wife's earnings make up a sizeable portion of the family income. Loss of income caused some of the women in the Gap study to become very emotional and tearful. Some felt that their ability to help support the family had been compromised by the condition of SPD and this affected how they felt about themselves:

'I need to go on benefit because I can't work any more... I need to pay... for my mortgage... I'd paid for my exam and if I don't attend the exam I will lose it... it is not a small amount... (very upset)... you know... I was enjoying my job, I wanted to gain more experience before I take my exams...' (VM3).

Effects on maternal role

The changes that occurred in this role produced tears, painful recollections and sadness in the women. It caused some to have doubts about their ability to be a good mother with this affecting them considerably. The maternal role in the home included taking care of children, which involved taking them to nursery, school, on outings and playing with them in and outside the home:

'Unless you've got the support of others... it means there's you all day with a baby that you feel you can't look after adequately...' (VM13).

Many women reported that they felt that they had lost this role in many ways. Taking the children to school, for example in the mornings was an ordeal because walking and/or driving was difficult and in some cases impossible:

'Picking up the children... couldn't go to school to pick up the children, so I had to get taxis and everything... so it means I won't be able to do anything... with the children...' (VM16).

Those women who were at home with young children all day expressed anxiety about their inability to entertain them. As a result, many of the interviews were

accompanied by the sound of children's videos and television programmes playing in the background. Some women were anxious about their ability to join in with family activities as they were no longer able to walk with the children, play with them or even take the dog for a walk. SPD therefore impacted on the whole family, including the dog:

'I can no longer even walk the dogs round the fields... I get my kids to go up and down the stairs a lot more for me, I've not gone swimming since I started with this and that's something else we try to do regularly as a family...' (VM14).

Some of the most emotional interviews involved the hygiene training of children and how powerless the women felt when they were unable to meet the needs of their children and had no one at home to help:

'When she goes to the toilet (upstairs), she accepts that... she would like a wash and she can't because she needs me to help her (woman sobs at this)... she was so good with toilet training and now it's all gone... (sobs again)... because I can only go up in an emergency because it is so painful, I go up and down on my bottom...' (VM3).

One woman admitted that she spent a week in the same clothes because she could not use the stairs and had no help that week. In this instance, mother and child slept on the settee. Another woman explained that she could only go up and down the stairs shuffling on her bottom.

The degree of emotion expressed by the women during the interviews was quite alarming, with many expressing their feelings to the researchers with clarity and ease. Some even expressed concern about how they would feel towards the baby:

'I thought I don't want this baby... and I was frightened of looking at him and saying and thinking... I don't love you, you have caused me all this pain... it's not him... but it was horrible... no more children' (VM12).

All the women complained that they could not lift their babies for several weeks after delivery. The movement of bending, lifting and carrying was too painful:

'It's just like... getting on the floor to bath her, I couldn't change her bottom on the floor... I have to do her on my knee and sat on a chair and that...' (VM40).

Women with other children had a great deal of difficulty coming to terms with their loss of ability to fulfil the maternal role. They felt that this caused confusion for the children and a break in the bonding they had nurtured as a mother:

'With him being little, he wants me to do things, well... I can't sit down because it's uncomfortable... and he wonders why mum is not doing it and dad is...' (VM30).

Effects on sexual relationship role

As pregnancy advances, sexual activity may well reduce for a number of reasons (Walton, 1994). The couple may be fearful of harming the fetus, women may have morning sickness or other minor disorders of pregnancy. Sexual desire varies considerably, however there is no blueprint for couples, as everyone is different (Walton, 1994). A study undertaken by von Sydow (1999) reviewed existing studies on sexuality during childbirth and concluded that two areas of research should be integrated, the medical-obstetrical and psychological branches. She found that the issue of sexuality is often explored superficially. In pregnant women who have SPD, the pain compounds the situation and means that the effects on husbands or partners could be enormous. In the Gap study, women reported that sexual activities did tend to be curtailed, often because of the movement that is required and the pain this caused:

'And it affects your relationships with your partner... I'm lucky I've got such a wonderful husband... it's all very well saying don't abduct your legs, but when you make love you can't help it... you find there are very few positions where he can get anywhere near you... (laughs)... and also now because I'm in so much pain... even after we make love, the next day I'm really in a lot of pain...' (VM19).

The following woman reported that both herself and her partner suffered from sleep deprivation, because she required help to turn over in bed and needed to wake him. The disruption caused was found to be very upsetting:

'Finally sorted out a bed in the spare room so I don't have to sleep with my husband... I need all the room... because every time I turn over, it's a big ordeal... I wake him up and then if I did get comfortable and then he moved and made me move... we would have a big row and it was hard to get to sleep' (VM11).

Following birth, many women express fear of another pregnancy when they resume sexual activity post-delivery. The time this recommences is variable. It is estimated on average to be at six to eight weeks in Europe and the US (von Sydow, 1999; Ahlborg et al, 2005). However, many women in the Gap study expressed a great fear of resuming sexual activity. As a result of the pain suffered with SPD, they felt that they needed an extended rest and were adamant that for them another pregnancy would not occur:

'I won't be doing this again... that's for sure... I couldn't go through it again... I really couldn't... I'll be adopting in future...' (VM27).

Effects on housekeeping role

Of major concern to the women was their inability to keep their homes clean and to cook for their families. In spite of being pregnant, they felt they should still be able to undertake these household tasks. The division of labour within the home has been well debated throughout the years, yet the women consistently accepted that household chores were their domain (Orbuch and Zimmer, 2001; Zipp et al, 2004). The latter study found that we learn expectations of behaviour as order to maintain the home and family life.

we grow and mature. We then 'perform' in accordance with our gender. Women perform in a domestic role, particularly when they have traditional beliefs.

US studies have demonstrated that as much as 70% of household work was undertaken by women (Walker, 1999; Milkie et al, 2002; Kroska, 2004). Households do vary however and the division of labour may well depend on which type of belief pattern prevails. In the Gap study, the women reported that they were responsible for undertaking the majority of household tasks, but because of the pain this was often impossible:
'It stopped me shopping, lifting, just everything really that I took for granted, that I could do beforehand' (VM6).

Activities of living – tasks such as cleaning, cooking and ironing – involved some kind of movement, which brought about pain. Resting did not help, as when they did have to move, mobilising became even more difficult and more painful. The physical act of movement therefore curtailed the activity and every task took much longer. The women also suffered afterwards from undertaking the tasks. This was also demonstrated in a study by Dudgeon et al (2005), who found that mobility exacerbates the pain, which in turn has an effect on personal and everyday activities of living.

An often-mentioned activity, which caused a change in behaviour was vacuuming. Nearly all the women in the Gap study mentioned that pushing and pulling the vacuum cleaner was very difficult and painful. As a consequence, the task of vacuuming was neglected, or it had to wait until someone else could do it for her:
'Kneeling down... em... like hoovering as well. I didn't realise that you're actually pushing from your pelvis and I didn't realise it until I started with the pain... it's something you don't think of' (VM20).
'I can't bend down, I can't do the vacuuming... which is cool... because my husband gets to do it... anything heavy duty, I don't dare attempt' (VM45).

Driving was a problem, since getting in and out of the car required several movements, i.e. bending to get into the car, swinging the legs and using the pedals. Also mothers had difficulties in getting children into car seats and dealing with prams and pushchairs.

Many of the women reported that they could no longer walk to the shops. Shopping itself caused a great deal of pain and discomfort for most of the women as the act of pushing a trolley was much like using a vacuum cleaner. In the big supermarkets, these women faced the added difficulty of walking long distances, further compounding their distress:
'Couldn't walk a mile in a supermarket... I have to stop halfway down the aisle... read the labels on dog and cat food... you name it... bleach... I can tell you what's what... surprised that we have ammonia in water but there you go... I just bend over the trolley... it kind of relieves the area somehow' (VM18).

Some of the women in the Gap study became very angry and upset over their inability to maintain their role. The change SPD brought about on their lives made some feel useless:
'I am not able to do something as simple as a little shopping... it's not fair... if I can't look after myself, how will I be able to look after my son and a new baby... I am a burden to my husband and family... my life gives me nothing except pain... I feel useless... what is the point?' (VM38).

This participant did become very anxious about her incapacity during pregnancy. In the postnatal interview, she admitted to having suicidal thoughts. She also took large amounts of strong analgesia to relieve the pain and this caused her to worry about the effect this would have on the baby.

Discussion

This study, like many others (Katz, 2002; Leadbetter, 2004) has found that pain in itself is debilitating. SPD causes disability, creates anxiety and often leaves women feeling stranded, helpless, useless, powerless and out of control. Many of the women suffered almost total incapacity in their activities of daily living and felt aggrieved at having to rely on others to help them cope with household chores and their families.

During the interviews, the women were eager to discuss their feelings, sometimes becoming very emotional, because they felt that no one else was listening to them when trying to explain their pain, a point highlighted in a recent article (Wellock and Crichton, 2007b). As a recent publication (*Take a Break*, 2007) demonstrates, women with the condition want their carers to listen to their pain and support them physically and emotionally.

However every woman in the study reported that they had received support from husbands, partners, family and friends throughout their ordeal. The strength of relationships witnessed by the researchers was quite remarkable. With increasing debilitating pain and an inability to function normally, many of the women displayed anxiety, fear and disappointment.

From the evidence presented, there can be little doubt that SPD impacts heavily on the role of pregnant and newly-delivered women, in their personal, maternal, sexual and household roles. This study has been able to identify directly from the women's point of view, how it makes them feel about themselves, their partners, family and friends.

The women told their stories unaided, without prompts and with great emotion. Many said they wanted to tell the researchers everything and the researchers felt that the women displayed great strength and determination throughout their experiences. They persevered, many from early pregnancy, to cope with increasing disability and pain. Many of the women showed tremendous innovation and forward planning in order to continue daily activities while minimising their pain, which concurs with the work of Buer and Linton (2002) and others, although the participants in those studies were not pregnant. They found ways of coping with the pain, in

order to maintain the home and family life.

The findings of this study suggest that it is difficult for women to have the 'normal, fulfilling, happy and joyous feelings' (Lewis, 1997; Fullerton, 1997; Choi and Henshaw, 2005) one might expect from a normal pregnancy and birth, when simple tasks such as shopping, child care and cleaning could not be achieved.

One of the most difficult tasks for women was their inability adequately to toilet themselves and their children. Women suffered accidents with their own toileting, causing them personal embarrassment and they became distressed when they were unable to attend to the needs of their children, whose progress in toilet and hygiene training was lost.

Conclusion

This study has highlighted that there is a need for further research into SPD, especially within the areas of causation and management.

Most importantly, healthcare professionals need to understand the psychological implications for women with this traumatising and disabling condition. This will have great implications for practice in terms of staff training, producing guidelines, devising scoring scales such as that of Leadbetter (2006) and producing advice sheets for pregnant women such as the *Pregnancy-related pelvic girdle pain: guidance for mothers-to-be and new mothers* (Association of Chartered Physiotherapists in Women's Health, 2007).

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The effect of the labour electronic fetal monitoring admission test on operative delivery in low-risk women: a randomised controlled trial

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Abstract

Background. The labour electronic fetal monitoring (EFM) admission test has been used to 'screen' low-risk pregnant women on admission to hospital in labour to confirm their low-risk status. As a form of continuous fetal monitoring, it has been proposed that this may result in increased obstetric intervention.
Aim. To test the relationship between the labour EFM admission test and obstetric intervention.
Method. A randomised controlled trial was conducted in a maternity unit in the south-east of England. A total of 582 women were randomly assigned, either to a control group, who underwent intermittent monitoring of the fetal heart, or to an experimental group, who underwent a labour EFM admission test. The primary outcome measure was rate of operative delivery.
Results. Operative delivery, occurred in 84(28%) of the 298 women undergoing a labour admission test, and 71 (25%) of the 284 women undergoing intermittent auscultation only (relative risk (RR) 1.18; 95% confidence interval (CI) 0.82-1.70) (chi-square statistic 0.76, df=1, p=0.38(ns)). A 3% reduction in operative delivery rate was reported among those having a labour admission test lasting up to one hour when compared to those having intermittent auscultation only. A large increase (23%) was reported in those who had a labour admission test lasting over one hour 38(47%), when compared with those who had intermittent auscultation only 73(24%) (RR 2.74; 95% CI 1.64-4.56)(chi-square statistic 15.60, df=1, p<0.0005). These sub-groups were not randomly selected, but result from the screening effect of the labour admission test.
Conclusions. For low-risk women, routine use of the labour admission test was not found to be associated with a statistically significant increase in operative delivery rate in this sample size. The duration of the labour admission test was identified as being of potential importance in this study. Labour admission tests over one hour were associated with a large increase in operative delivery rates. Contrary to theoretical expectations, labour admission tests under one hour resulted in a small reduction in operative delivery rates.

Key words: Midwifery, labour, electronic fetal monitoring, labour admission test, admission cardiotocography, cardiotocography, labour electronic fetal monitoring admission test, operative delivery, obstetric intervention, intermittent auscultation, randomised controlled trial

Background

Since the early 19th century, monitoring of the fetal heart rate has been recognised as a method of assessing fetal wellbeing. Initially, auscultation of the fetal heart was carried out for short periods during labour using a fetal stethoscope known as a pinard stethoscope. Through the 20th century, the methods available to assess the fetal heart rate became more technological. In the late 1960s, electronic fetal heart rate monitoring (EFM) was developed, and subsequently, widely introduced into intrapartum care. This technology enabled the fetal heart rate and the mother's uterine contractions to be recorded on a paper trace known as cardiotocograph (CTG) (Gibb and Arulkumaran, 1997; Alfirec et al, 2006). The methods of fetal monitoring in usage that are referred to in this paper are defined below.

Intermittent auscultation
A short period of fetal monitoring (at least one minute) with a pinard stethoscope or hand-held doppler at regular intervals through labour (Alfirec et al, 2006; National Institute for Health and Clinical Excellence, 2007).

Continuous electronic fetal monitoring (cEFM)
The use of electronic fetal heart rate monitoring technology to record a CTG of the fetal heart rate and uterine

contractions continuously throughout labour (Alfirec et al, 2006; National Institute for Health and Clinical Excellence, 2007).

Labour admission test

The use of continuous electronic fetal heart rate monitoring technology to record a period of CTG (15 to 30 minutes) upon admission of a woman in established labour (Gibb and Arulkumaran, 1997; Blix et al, 2005).

Continuous electronic fetal monitoring (cEFM) was integrated into practice based upon the assumption that the additional information obtained regarding the fetal heart rate from CTGs would lead to improved neonatal outcomes. Since its introduction, meta-analyses of the results of randomised controlled trials (RCTs) evaluating the use of cEFM in labour, involving up to 60,000 women have found no associated improvement in long-term outcome for the neonate, and a significant increase in the rate of operative deliveries among those undergoing cEFM (Thacker and Stroup, 1999; Alfirevic et al, 2006). The associated increase in operative deliveries is attributed to difficulties with interpreting complex fetal heart rate tracings. Abnormal tracings are not reliable predictors of asphyxia, and intervention based upon these tracings can lead to unnecessary operative delivery (Goer, 1995; Alfirec et al, 2006; Blix et al, 2005).

cEFM has also been associated with other increases in obstetric intervention. A significant increase in the rate of augmentation of labour with oxytocin was detected in one of the more recent studies of cEFM (Vintzileos et al, 1993), although other studies including MacDonald et al (1985) found no statistically significant effect. Additionally, increases in the need for pain relief have been proposed, with the most recent Cochrane meta-analyses finding a small increase in the overall use of analgesia with cEFM, but no difference in epidural analgesia rates (Alfirec et al, 2006).

Both midwifery and obstetric professionals agree that, in the light of the available evidence, routine cEFM for low-risk women in labour should not be performed (National Institute for Health and Clinical Excellence, 2007). However, there has been a reluctance to discontinue the use of cEFM in all its forms, because theoretical analysis appears to demonstrate that it should be effective, although research has not reflected this. The potential to use this technology to save babies' lives appears to exist, at least retrospectively, and especially in certain circumstances, but understanding which specific circumstances is a problem not yet solved.

Until the publication of the National Institute for Health and Clinical Excellence (NICE) and the RCOG guidelines in 2001, the majority of maternity units continued to use a 15 to 30 minute period of cEFM upon admission of low-risk women in labour known as a labour admission test (Maternal and Child Health Research Consortium, 2001). However, in the absence of good quality research regarding the labour admission test, NICE and the RCOG (2001) recommended that maternity units discontinue its use, recommending further research in this area to evaluate its performance.

The labour admission test has been used as an extension of the risk assessment of the woman, a suspicious or pathological EFM trace indicating high risk, a normal EFM trace indicating low risk. Problems occur when this screening method is scrutinised. If a normal labour admission test is completed on a woman, a normal labour admission test has not been identified as a predictor of future condition, therefore a suspicious tracing could occur immediately after this initial test has been completed.

The labour admission test presents further issues related to the difficulties of CTG interpretation, for example loss of contact or fetal sleep patterns on tracings (Alfirec et al, 2006). Once a labour admission test has commenced, it may not be possible to interpret normality within 15 to 30 minutes. It is proposed that, frequently the labour admission test may evolve into cEFM through difficulties in CTG interpretation. Normality in terms of a tracing may take up to an hour or the whole labour to determine. Where any doubt occurs, the tracing is kept going and intermittent monitoring abandoned. This process is in part, fuelled by concerns regarding litigation – tracings indicating deviation from complete 'normality' have been used in legal cases if problems are encountered with the baby during or following birth (Goer, 1995; Blix et al, 2005). In this way, the labour admission test can be seen to become cEFM with the same lack of long-term advantage and the similar disadvantages.

Literature review

Following the recommendation for further research into labour admission tests, three RCTs have since been published relating to this issue (Mires et al, 2001; Impey et al, 2003; Cheyne et al, 2003). All three trials evaluate the labour admission test in relation to intermittent auscultation in low-risk women. None of the trials find a change in neonatal outcome measures between the two groups, however in relation to operative delivery rates their results are conflicting. Significantly, the two larger trials have shortcomings that threaten their generalisability (Mires et al, 2001; Impey et al, 2003), and the third has an insufficient sample size to obtain significant results in isolation. The Mires et al (2001) trial experienced issues relating to difficulties in recruitment resulting in retrospective changes in power calculations, which has cast doubt upon its reliability. This trial found a statistically significant difference in the rate of operative delivery between the two groups.

The largest trial took place in Dublin (Impey et al, 2003) in a unit where active management of the birthing process was pursued, with all women in labour having an amniotomy performed upon admission to assess their liquor. This practice is not widely adopted across UK maternity units, and is advised against as routine care in the recent intrapartum NICE guidance (National Institute for Health and Clinical Excellence, 2007). Due to this

early amniotomy, several thousand women who otherwise would have been considered low risk were excluded from the trial. This atypical definition of low risk casts doubt on the external validity of the study. The study found no significant difference in the rate of operative delivery between the two groups as with the Cheyne et al (2003) study.

Blix et al (2005) conducted a systematic review of the available evidence regarding labour admission tests. This included the three RCTs and 11 observational studies. The lack of generalisability of the RCTs and the poor quality of the data from the observational studies made its conclusion that labour admission tests increased 'minor' measures of intervention (fetal blood sampling (FBS), cEFM and epidural rates), but not operative delivery, when compared to intermittent auscultation, lack any robustness.

Neonatal outcome measures have proven challenging for researchers to study in relation to the labour admission test. Indicators of poor outcome are numerous: Apgar score at birth; fetal acidosis; the need for neonatal resuscitation; the need for neonatal ventilation; the length of the neonatal hospital stay; the neonatal death rate; the stillbirth rate and the rate of neonatal seizures have all been used as possible indicators. Despite the number of indicators, none are particularly satisfactory (Blix et al, 2005). All are either only short-term indicators, suffer from poor rates of inter-observer and intra-observer reliability, or are sufficiently rare as to require extremely large samples to provide significant results. Although Impey et al's (2003) study had a sample size of over 8500, it was designed with a 90% power to detect a 50% reduction in its primary outcome measure – neonatal mortality.

As a form of cEFM, there is little theoretical argument for any long-term benefit to the neonate from the labour admission test. When planning the author's study, involving a large sample in investigating a small and improbable benefit was considered ethically unsound. It was felt important that any potential disadvantages were identified before any further research was carried out into the circumstances in which theoretical improvements in neonatal outcome could be achieved. The study was therefore, not designed to evaluate indicators of neonatal wellbeing, although indicators were recorded. It aimed to assess the existence and scale of any potential negative effect of the labour admission test, in terms of intervention, which could be achieved with a much smaller sample.

All three labour admission test RCTs evaluated augmentation with oxytocin and epidural analgesia rates as secondary outcome measures with conflicting results. Impey et al (2003) and Cheyne et al (2003) found no significant difference in the rate of augmentation, but Mires et al (2001) found an increase of 4% in this respect in the experimental group, those having a labour admission test compared to those having intermittent auscultation only. Mires et al (2001) found a statistically significant (5%) increase in the rate of epidural analgesia in labour in the experimental group, whereas Cheyne et al (2003) found no significant increase. Impey et al (2003) did not study this variable.

Intervention in the natural process of labour takes many forms, for this reason, as well as the rate of augmentation of labour with oxytocin, the author's study examined a secondary variable 'intravenous infusion'. This variable was chosen to provide a combined measure of intervention. Intravenous infusion was therefore, considered indicative of an overall increase in intervention, that is more general and therefore, easier to detect than singular measures, such as an increase in the need for pain relief.

None of the existing labour admission test studies evaluated the role of the duration of the labour admission test in any form (Blix et al, 2005). Despite it not having been studied previously, it was considered important to evaluate this, owing to the close relationship between the labour admission test, cEFM, and time. Duration and timing being the only distinguishing feature between the two monitoring methods. This aspect was explored further in the author's study.

Aim

The aim of the study was to test the null hypothesis: The labour admission test has no effect on obstetric intervention in low-risk women and the alternative hypothesis: The labour admission test increases obstetric intervention in low-risk women.

The primary outcome of the study was operative delivery and the secondary outcome was increased obstetric intervention.

The primary objective of the study was to determine whether the independent variable – the labour admission test – had a statistically significant effect upon the primary dependent variable rate of operative delivery. Secondary dependent variables were tested. These were as follows: rate of augmentation using oxytocin infusion; rate of siting an intravenous infusion; Apgar score at one, five, and ten minutes; admission to the special care baby unit (SCBU); and neonatal mortality. The duration of labour admission test was also recorded. It was accepted that the value of fetal outcome data would be limited due to the size of the sample.

Method

The RCT was based in a maternity unit in the south-east of England and was registered with the International Standard RCT Number Register (ISRCTN 28370122*). Full ethical approval for the study was granted, as appropriate, by the Mid and South Buckinghamshire Local Research Ethics Committee. The maternity unit employed four consultant obstetricians (rising to six during the period of the study) and conducts 2500 to 2800 deliveries per year, with approximately 40% to 45% of those deliveries being to women whose pregnancy was assessed to be low risk upon admission in labour. During the study

* Full details of this trial can be accessed via: www.controlled-trials.com/isrctn283701222.

period, the Trust operated local policies, procedures and guidelines regarding care in labour that were in line with current NICE guidance and FBS was available. cEFM, intermittent auscultation and FBS were performed in accordance with the NICE (2001) guidelines on the use of EFM.

The sample group consisted of labouring women who upon admission to hospital were considered to be low risk of fetal or maternal complications. 'Low risk' being defined as labouring women who lack all of the criteria for exclusion. These criteria are detailed specifically in Box 1.

Women were recruited to the study via the following steps. Those fulfilling inclusion criteria were asked if they would join the trial during their pregnancy. A consent form was completed at this time if the woman wanted to join the study. Training was provided to midwives who undertook this recruitment as part of a woman's antenatal care. Women were not asked for their consent if they were in established labour.

Following recruitment, the progress of a woman through the trial can be viewed diagrammatically via the trial methodology flowchart (see Figure 1). Upon admission in labour, women were allocated either to the control group (those having intermittent auscultation only) or the experimental group (those having a labour admission test) by the midwife caring for them. Any woman, having developed high-risk exclusion criteria in the period between consent and admission in labour was excluded. Allocation to control and experimental arms was via opening of the next envelope in a series of sequentially numbered envelopes. The contents of these sealed envelopes were pre-determined by the primary researcher via a random number table. Participants were not blind to which group they were assigned to as this was not considered practical.

Auscultation of the fetal heart was undertaken via a pinard stethoscope following initial abdominal palpation for all women entering the study. Those women allocated to the experimental arm undertook a labour admission test lasting a minimum of 15 minutes, the decision to end the tracing and commence intermittent monitoring was that of the midwifery and, where appropriate, obstetric team caring for the individual woman. The tracing was discontinued when it was considered to be 'normal' as defined by the NICE guideline (2001), and therefore, within the accepted limitations of CTGs, judged to be that of a fetus in good health. This timing could, therefore, vary from 15 minutes to the whole period until the birth of the baby depending on the team's decision. The women allocated to the control arm were intermittently auscultated from their admission in labour.

Intermittent auscultation was required to be in accordance with NICE (2001) guidance, specifically one minute of continuous auscultation using a pinard stethoscope or doppler ultrasound device, after a contraction, at least every 15 minutes in the first stage of labour, and every five minutes in the second stage of labour. This guidance remains unchanged with the publication of the *Intrapartum care guideline* (NICE, 2007).

Box 1. Criteria for exclusion (based on NICE guidance, 2001)

Any woman having any of the following indicators of high risk upon admission in labour was excluded from the study:

- Any major maternal medical complication e.g. diabetes, or essential hypertension
- Previous caesarean section
- Pre-term labour (less than 37 completed weeks)
- Multiple pregnancy
- Prolonged pregnancy (over 42 completed weeks)
- Prolonged membrane rupture (over 24 hours)
- Induction of labour
- Meconium-stained liquor
- Maternal pyrexia
- Rhesus sensitisation
- Polyhydramnios
- Oligohydramnios
- Pre-eclampsia or BP over 140/90mmHg
- Abnormal presentation or lie (e.g. breech, transverse)
- High head (5/5ths palpable per abdomen)
- Antepartum or intrapartum haemorrhage
- Known or suspected intrauterine growth retardation
- Any known or suspected fetal medical complication
- Abnormal doppler artery velocimetry
- Known fetal malformation
- Poor obstetric history (e.g. history of stillbirth)
- Unbooked cases.

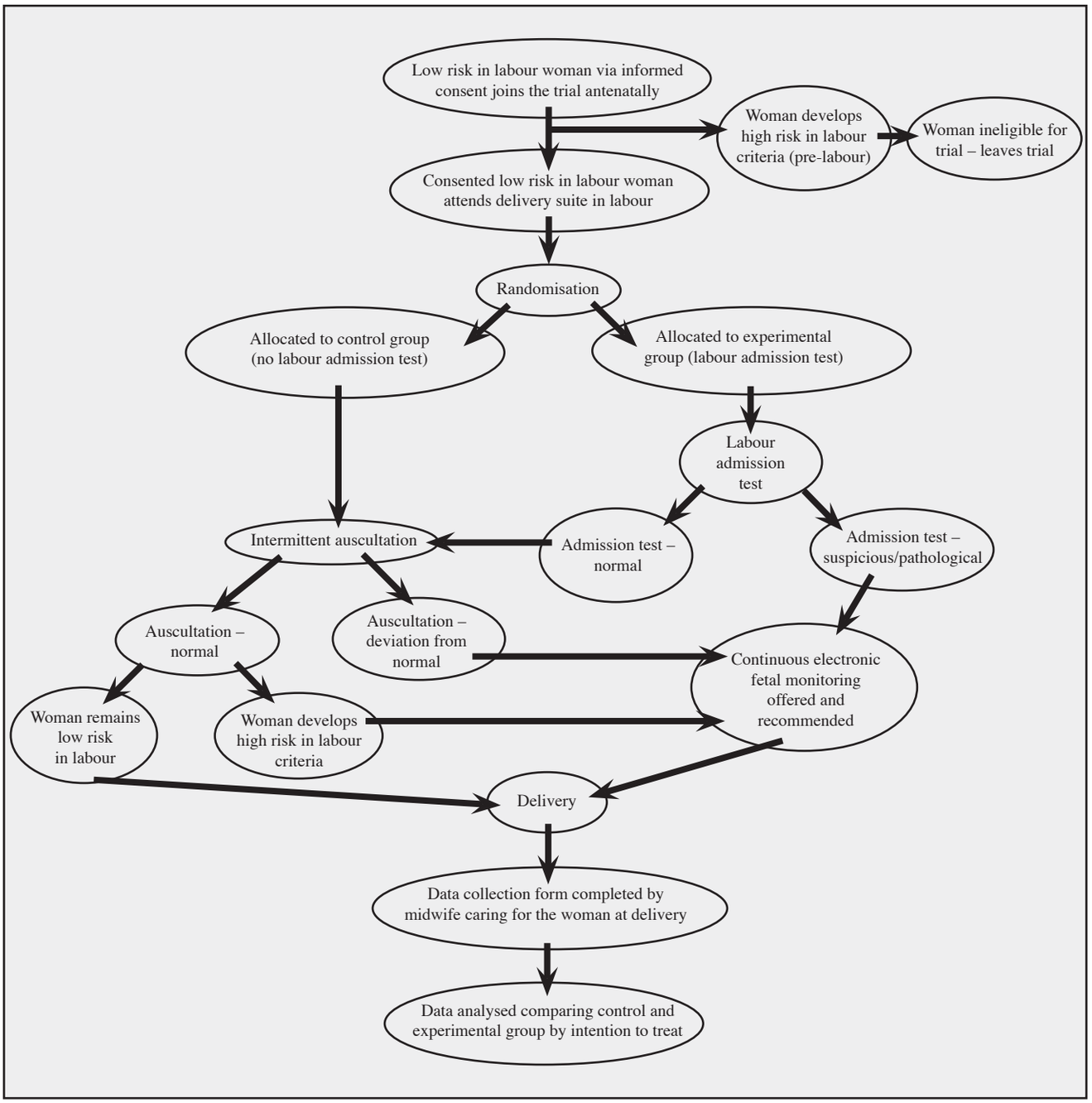
Regardless of the arm of the trial to which the woman was allocated, if at any point following admission the woman was considered to have become high risk according to the study criteria, that individual was not excluded as she fulfilled the criteria upon admission in labour. However, cEFM would be recommended and offered to be commenced or continued as was unit policy and is considered best practice. This included women whose intermittent auscultation revealed a deviation from the normal, according to the NICE definition (2001) (see Box 1). Analysis was by intention to treat, unless otherwise stated.

A data collection tool was provided to the midwife caring for the woman following delivery. The form requested demographic data relating to the randomisation process and details relating to the primary and secondary variables. Any neonatal deaths were recorded by the principal researcher on an individual basis owing to the small numbers involved.

Data were collected using a specialised statistical analysis package (SPSS, version 14.0). Data analysis focused upon the use of statistical tests to compare the control and experimental groups with regard to the primary outcome variable – the rate of operative delivery. Relative risk (RR) with 95% confidence intervals (CI) was reported for the primary and secondary intervals. Analysis of the data was also carried out using the chi-square test for comparison of proportions.

Regular presentations and training sessions were held

Figure 1. Trial methodology flowchart



throughout the period of the study to ensure best practice was maintained over time, and to maximise entry levels into the study. A steering and stoppage committee consisting of the principal researcher for the study, the head of midwifery and associate lead obstetrician for the unit, the principal research associate from the local university, a researcher and statistician from the National Perinatal Epidemiology Unit and a consumer representative. This committee held regular meetings during the study period.

A pilot study involving 90 women was undertaken to test the design of the study and to finalise the sample size. On completion of the pilot study, the steering and stoppage committee met and approved the continuation of the full study directly from the pilot study with no changes in methodology recommended, except a final sample size based upon the pilot results – no changes in the methodology were recommended. The pilot study participants were approved for inclusion in the final sample size at this stage. Ethical approval was gained for this continuation, inclusion and finalised sample size.

Following completion of a pilot study, sample size calculations were formulated using the pilot study operative delivery rate in the control group (21%) in combination with the most recent RCT difference between the control

and experimental groups (Mires, 2001). A calculation for comparison of proportions was used for this, with a power of 0.8 and a p-value of 0.05 providing a final sample size of 750 women for each arm, a total of 1500 women. This would ensure that if operative delivery rates were to remain the same, a difference of the magnitude of the Mires' study finding (5.5%) would be found statistically significant (Everitt, 1994).

Table 1. Equivalence between the control and experimental groups

	Experimental group n=298	Control group n=284
Maternal age	**Mean years (SD)**	**Mean years (SD)**
	29.93(5.02)(95% CI 0.57)	30.28(5.15)(95% CI 0.60)
Parity	Number of women (%)	Number of women (%)
0	203(70%)	199(68%)
1 or more	95(30%)	85(32%)
Marital status	Number of women (%)	Number of women (%)
Married	205(69%)	195(69%)
Single (supported)	81(27%)	77(27%)
Single (unsupported)	3(1%)	5(2%)
Other	9(3%)	7(2%)
Ethnicity*	**Number of women (%)**	**Number of women (%)**
White	260(87%)	270(95%)
Other	32(11%)	14(5%)
Not stated	6(2%)	0(0%)

* Ethnicity grouping as Census, 2001 (Official for National Statistics, 2001)

Results

Recruitment began on 15 December 2002, with the first 90 participants forming the basis of a pilot. Entry into the trial continued until 30 June 2006. Termination of the study prior to recruitment of the target sample was necessary due to the loss of continued funding following relocation of the primary researcher. During the course of the study, a reduction in researcher hours and a lack of external funding were persistent issues despite efforts to address these shortfalls. These issues were cited as reasons for reduced recruitment rates, in addition to the heavy workloads of clinical staff who were key to the recruitment and entry process.

In total, 582 women were entered into the study, 284 were randomly allocated to the control group, who underwent intermittent monitoring of the fetal heart, and 298 women to the experimental group, who underwent a labour admission test.

Some 27 women in the labour admission test group did not undergo a labour admission test, and 12 women in the 'no labour admission test' group underwent a labour admission test. Analysis was by intention to treat unless otherwise stated.

Demographics

Table 1 summarises the data collected relating to the demographic and obstetric variables recorded, in order to assess the effectiveness of the randomisation process. Good levels of comparison were achieved across the control and experimental groups. Overall, the randomisation process appears to have been effective in respect to all related variables.

Primary and secondary outcome measures

The primary outcome – operative delivery – occurred in 84(28%) of the 298 women in the experimental group, those undergoing a labour admission test, and 71(25%) of the 284 women in the control group, those undergoing intermittent auscultation only (RR 1.18; 95% CI 0.82-1.70)(chi-square statistic 0.76, df =1, p=0.38 (ns)) (see Table 2).

Analysis of the data identified a persistent increase in operative delivery rates in the experimental group that was evident throughout the study period. The difference between the groups being greater than 2% throughout the study, having peaks of 6% or above on several occasions, with the difference appearing to settle around 3% to 3.5% in the last 150 cases. This increase in operative delivery rates in the experimental group over the control group was maintained when the sample was considered without the 'intention to treat' data (experimental group 29%; control group 25%) and without the pilot study (experimental group 27%; control group 25%). However, in all circumstances the difference remained unproven in terms of significance in this sample size.

When data were analysed by subgroups within mode of delivery (caesarean section, ventouse and forceps delivery), an increased rate in each subgroup was seen among those having a labour admission test over those in the intermittent auscultation only group (see Table 2). As previously, these increases were not significant in this sample size.

Other measures of intervention, intravenous infusion and augmentation demonstrate no significant difference upon final analysis and no significant pattern to their relationship through the progress of the study (see Table 2).

As predicted, due to their very small rate of incidence in the population, neonatal outcome measures did not provide any statistically significant results (see Table 2).

Table 2. Primary and secondary outcome measures

	Experimental group n=298	Control group n=284	Chi-square statistic df=1	Relative risk (95% CI)
Primary outcome measure				
Operative delivery	84(28%)	71(25%)	0.76 (ns)	1.18(0.82-1.70)
Secondary outcome measures				
Mode of delivery				
Caesarean section	26(9%)	22(8%)	0.18 (ns)	1.14(0.63-2.06)
Instrumental delivery	58(19%)	49(17%)	0.47 (ns)	1.16(0.76-1.77)
Forceps	25(8%)	22(8%)	0.08 (ns)	1.09(0.60-1.98)
Ventouse	33(11%)	27(10%)	0.39 (ns)	1.19(0.70-2.04)
Infusion-related outcome measures				
Intravenous infusion	115(39%) n=297*	107(38%) n=283*	0.05 (ns)	1.04(0.74-1.45)
Augmentation with oxytocin	71(24%) n=296*	71(25%) n=280*	0.14 (ns)	0.93(0.64-1.36)
Neonatal outcome measures				
Five min Apgar<7	0(0.0%)	4(1%)	N/A**	N/A
Admission to SCBU	10(3%) n=297*	7(3%)	0.42 (ns)	1.38(0.52-3.67)
Neonatal mortality	0(0.0%)	1(0.4%)	N/A**	N/A

* Missing data (data not recorded on data collection form)

** Chi-square statistic not appropriate two cells have an expected count less than five on cross-tabulation

It is stressed that this study was not designed to evaluate these indicators.

Further observations

Of interest when analysing the data in more detail was the 'duration of labour admission test' when considered in respect of 'operative delivery'. A large increase in rate of operative delivery was evident in women having a labour admission test that lasted more than one hour or which continued throughout labour (see Table 3). The difference was 23% when those who had no labour admission test 73(24%) were compared with those having a labour admission test lasting more than one hour 38(47%)(RR 2.74; 95% CI 1.64-4.56) (chi-square statistic 15.60(df=1, p<0.0005)).

This large increase in operative delivery rate with labour admission tests over one hour was coupled with another effect that because of its contradiction to existing assumptions was also of interest. For labour admission tests lasting less than one hour, operative delivery is less than that of those having no labour admission test in all the subgroups (3% reduction across the groups) (see Table 3). Not until the labour admission test lasted over one hour was the effect of having a labour admission test greater than that of having no test, then the increase is large, 14% over one hour, and then a further 14% when continuous.

All data relating to the 'duration of labour admission test' has been reported 'by treatment' rather than 'intention to treat' to allow comparison of the complete data set. The rise in operative delivery rate among those having a labour admission test over one hour, or continuous throughout labour, compared with those having no labour admission test, remained at least 19% when analysed without pilot data, without intention to treat data or with neither and therefore, remained significant according to chi-square and RR calculations. The reduction in operative delivery rate for labour admission tests lasting less than one hour when compared to those having no labour admission test persisted in these data sets.

It should be noted that these analyses involved groups that were not randomly selected and therefore, must be viewed with the knowledge that the results are subject to selection biases. However, it is this 'selection' that is the essence of what is of interest about these findings.

In cases where the '15 minute' labour admission test lasts more than one hour, the principal reason for this 'selection' is proposed to be difficulties in interpretation of normality. The labour admission test can be seen to have effectively become cEFM due to its extended duration, with its previously researched lack of long-term advantage and the associated large increase in the rate of operative delivery.

With the 'duration of labour admission test' not having been previously researched, a reduction in operative delivery rate identified among those whose '15 minute' labour admission test lasts less than one hour is a newly-observed phenomenon, therefore the possible causes require the generation of original, but related theories. It is proposed that, the reduction in rate is connected to a reassuring effect for

those involved. Our 'faith' in the technology of EFM perhaps makes us less likely to use the technology later in the labour following this initial short tracing.

Discussion

Due to the early termination of this study: The null hypothesis 'The labour admission test has no effect upon obstetric intervention in low-risk women' cannot be rejected.

The primary outcome measure was operative delivery rate and although an increase of 3% in this measure was found in the author's experimental group, those having a labour admission test, no statistically significant difference was found in the sample size of 582. Analysis of the data in this study did however, identify an increase in operative delivery rates of greater than 2% throughout the study settling at 3% to 3.5% in the last 150 cases.

Table 3. Further secondary outcome measures

	Operative delivery	Spontaneous vaginal delivery	Pearson chi-square statistic (df=1)	Relative risk (95% CI)
Duration of labour admission test*				
No labour admission test	73(24%)	226(76%)		
15-20mins	20(23%)	68(77%)		
20-30mins	13(21%)	50(79%)		
30mins-1hr	11(22%)	39(78%)		
More than 1hr	5(36%)	9(64%)		
Continuous throughout labour	33(49%)	34(51%)		
Cross-tabulation data				
No labour admission test	73(24%)	226(76%)	15.60 p<0.0005	2.74 (1.64-4.56)
More than 1hr and continuous	38(47%)	43(53%)		

* Duration of labour admission test – 1x missing data from labour admission test group (no data recorded)

Sub-group analyses regarding duration of labour admission test offer new insights that could guide further research in this area. The large increase in the rate of operative delivery (23%) among those having a labour admission test lasting over one hour when compared to those having no labour admission test is a finding that links strongly to theories set out in the planning stage of this study. The 282 women in the labour admission test group (by treatment) can be seen to have been 'screened' for the high-risk criteria 'suspicious or pathological EFM'. For the 81(29%) who had a labour admission test lasting more than one hour or continuously, the labour admission test has effectively become cEFM. A total of 38(47%) of the 81 women who had a labour admission test lasting over one hour or continuously then went on to have an operative delivery.

The 'duration of EFM' groups analysed, while not randomly assigned were selected or 'screened' through interpretation of EFM using NICE guidance (2001). This NICE guidance (2001) and later NICE's *Intrapartum care* (2007) is used to a generalisable level in maternity and therefore allows this finding to be considered generalisable in this context.

In no existing study has the variable 'duration of labour admission test' in relation to operative delivery rate been evaluated. The results relating to the protective effect of the labour admission test less than one hour would need to be studied in a larger sample to be considered generalisable. However, for those advocating the labour admission test as a screening test for high-risk labours, these results may suggest the potential value of a short labour admission test. Is it possible that these findings point to some sort of a predictive effect in relation to a reassuring labour admission test? The question remains though: how effective is EFM in identifying those at risk in terms of poor fetal outcome? All the available evidence indicates that it offers no long-term advantage in terms of fetal outcome. If this is the case, why perform a labour admission test?

This study highlights the fact that assumptions have been, and continue to be made, in relation to EFM that are not evidence based and that there is so much we do not yet understand. The findings offer insights that could be used to determine the direction of future research regarding EFM.

It is when they are considered cumulatively and in combination with certain elements of existing research that the findings allow a new theory to be proposed. The author's study suggests that the labour admission tests under one hour may provide no increased risk of operative delivery or even a protective effect; and that a large increase in risk of operative delivery is seen when that test lasts over one hour. However, existing RCTs (Mires et al, 2001; Impey et al, 2003; Cheyne et al, 2003) and the results of this study suggest little or no effect on operative delivery rates with labour admission tests as a whole. Impey et al (2003), Mires et al (2001) and Cheyne et al (2003) all observed that undergoing the labour admission test significantly increased the incidence of the use of cEFM without increasing operative delivery rates. Perhaps it is not the length of time spent on EFM in labour, but when it occurs that influences operative delivery rates.

Overall, the labour admission test group in the Impey et al (2003) study may have spent a greater amount of time on cEFM; however, the key factor may be when in the labour

that occurred. Those in the no labour admission test group may have had the equivalent amount of time on EFM at the relevant times in their labour, making their risk the same, regardless of EFM duration earlier in that labour.

It may be the timing of the cEFM within labour that is as important, if not more important than duration. It would seem logical that cEFM immediately prior to operative delivery would be more significant, perhaps precipitating the decision to undertake the procedure. The use of cEFM in the second stage may have a greater effect in respect of mode of delivery, than in the first stage. Interpretation of cEFM in the second stage of labour is complicated by the presence of normally occurring early decelerations. Is interpretation of these tracings leading to increased operative delivery rates? Alternatively, is it that EFM is a more effective tool in the earlier stages of labour? Or is EFM more effective at predicting poor fetal outcome later in labour, leading to more operative deliveries by necessity?

This study presents many questions that should have been identified and addressed before EFM was widely integrated in midwifery practice over 30 years ago, but they will need to be answered in the current clinical environment with cEFM here to stay, at least in the short term. Good quality retrospective research is the first stage in developing a future research programme aimed at answering all these questions. It seems we are trying to run before we can walk, this study has proven how little we know. We need to start moving forward in this complex area.

Conclusion

Does the labour EFM admission test increase obstetric intervention in low-risk women? No clear answer to this question was reached in this study. However, its findings may help guide the path of future research in this area. Assumptions regarding the nature of the relationship between labour admission tests and operative delivery have been questioned. This study has shown that more research at a fundamental level is needed.

Large, multi-centred retrospective analyses of EFM in all its forms and its effect on operative delivery and fetal outcome are needed.

Introduction of EFM technology without a firm foundation of research evidence has been identified as an historical blunder, a mistake based upon our trust in assumptions and theories, rather than evidence-based practice (Goer, 1995). Health professionals and researchers now need to develop a coordinated approach to addressing the complex issues involved. Useful forward momentum needs to be achieved, rather than 'quick-fix headline' RCTs. The ultimate destination is a clinical environment where evidence-based practice provides optimum care; however the journey is clearly, not over yet.

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Assessing the impact of midwives' instruction: the breastfeeding motivational instructional measurement scale

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The developing and testing of the breastfeeding motivational measurement scale was part of a larger study that aimed to develop and test a motivational version of current breastfeeding instruction. By visiting the Doctoral Midwifery Research Society website – www.doctoralmidwiferysociety.org – interested readers can access a video presentation of the overall research study.

Abstract

Background. It has been reported that professional support is an important motivational factor in breastfeeding outcomes, however evidence suggests this is not necessarily the case. For women to be motivated through routine instruction, the optimal balance between value of breastfeeding with expectancy for success must be achieved.
Aim. To develop and test the breastfeeding motivational instructional measurement scale (BMIMS) as a means of exploring the value and expectancy for success (confidence) that breastfeeding women experience when receiving best breastfeeding practice.
Method. Informed by current literature and previous exploratory work, four motivational theories were incorporated into the BMIMS. A total of 14 items represented the Breastfeeding Self-efficacy Scale – Short Form. The remaining 37 items were transcribed from a previous task-motivation study. The resulting 51-item scale was exposed to expert review. Following ethical approval and verbal consent, the scale was pilot-tested (n=20) and completed via structured interview by a further convenience sample of breastfeeding women (n=182).
Results. Exploratory factor analysis – an analytic technique for exploring underlying constructs or factors – was performed. Parity was used as a selection variable. The results revealed that first-time mothers highly valued the experience of breastfeeding, but low expectancy for success and a low perception of midwife support. Experienced mothers differed in that they reported a positive expectancy for success and were more moderate about the value they placed on breastfeeding.
Conclusions. When value is high and expectancy for success is low, feelings of stress related to the behaviour often results. Although all mothers reported a perceived lack of midwife support, experienced mothers were empowered to sustain their expectancy for success. Current best practice must work to achieve the optimal motivational balance between value and expectancy for success in primigravida women.

Key words: Motivation, breastfeeding, midwife instruction, tool development, factor analysis, value and expectancy for success

Introduction

The 2005 *Infant feeding survey* reported that breastfeeding initiation rates were as high as 78%, however national and international statistics show that many women continue to abandon breastfeeding in the first six weeks (Infant Feeding Survey, 2005; European Commission, 2004). In fact, according to Dykes (2006), almost a fifth of women in the UK will stop breastfeeding before leaving hospital.

Researchers have identified many non-modifiable predictors of early breastfeeding cessation, such as age and parity. However, recent research suggests that it is the routine support offered by health professionals, which is failing to meet women's breastfeeding needs (Mozingo et al, 2000; Gill, 2001; Hong et al, 2003). Faced with the reality that routine professional support is often ineffective and that many women abandon breastfeeding, midwives and researchers are challenged to discover the reasons for this.

In order to motivate women to continue breastfeeding, routine instruction by health professionals must find the intricate balance between two main motivational components – value for the behaviour and expectancy of success (confidence that they will succeed). Grounded in a conceptualisation of motivation known as expectancy-value theory, this motivational approach 'assumes people are motivated to engage in an activity if it is perceived to be linked to satisfaction of a personal need (value aspect) and if there is a positive expectancy for success (expectancy or learning aspect)' (Keller, 1987: 3).

To date, little is known about whether current best instruction achieves the desired motivational balance between encouraging women to value breastfeeding and increasing their expectancies that they will succeed. While communicating the health benefits of breastfeeding can increase mothers' motivation to breastfeed, researchers

have shown that women who value breastfeeding highly often stop before they intended to (Avery et al, 1998). It is thought that the latter is related to women's low expectancy for success (confidence) combined with a lack of professional support (Mozingo et al, 2000; Chezem et al, 2003; Hanss, 2004).

Over the last decade, an expectancy-value theory, namely the theory of planned behaviour (Azjen and Madden, 1986) has been applied in an effort to explain breastfeeding duration (Janke, 1994; Wambach, 1997; Duckett et al, 1998; Avery et al, 1998; Dick et al, 2002; Dodgson et al, 2003). Consisting of three main components, application of the theory of planned behaviour explored the motivational impact of attitudes, subjective norms (influence from others) and women's perceived control over breastfeeding. Supporting the overall conceptualisation of the expectancy-value balance, the above named researchers reported that the key factors in sustained breastfeeding behaviour are positive breastfeeding attitudes and perceived maternal confidence. Based on the evidence to date, current best practice aims to help women create positive attitudes to, and greater confidence in themselves to ensure successful breastfeeding behaviour. Thus creating the optimal balance between value and expectancy for success is critical to women's motivation to breastfeed, because when value is high but expectancy for success low, psychological stress occurs.

Prompted by women's reported stress when breastfeeding and accusations that health professionals fail to provide adequate support, as part of a larger research study that aimed to enhance the motivational impact of current best practice, this paper describes the development and testing of the breastfeeding motivational instructional measurement scale (BMIMS) within a Baby Friendly Initiative (Baby Friendly Initiative, 1998) instructional environment. Two objectives were central to the development and testing of the breastfeeding motivational expectancy-value scale. They were to explore:

- If a motivational balance existed between the value women place on breastfeeding and their expectancy for success
- Women's perception of current best practice in relation to their expectancy-value motivation to continue breastfeeding.

Literature review

Theoretical rationale and development of the BMIMS

There are multiple theories of human motivation that could be used to explain the motivational impact of current best practice on women's motivation to sustain breastfeeding. Selection of four theories was pre-determined as a result of a substantive literature review that focused on an expectancy-value approach to understanding breastfeeding. In addition, two structured observation studies that explored the motivational content of routine breastfeeding instruction informed the theoretical development of the scale (Stockdale et al, 2005, 2007).

Task value

In order to determine the values that women held with regard to breastfeeding, it was necessary to explore the different aspects of task value (Jacobs and Eccles, 2000):

- Attainment value, which refers to the personal importance of doing well and so has a confirming or disconfirming effect on one's persistence and effort to perform the behaviour
- Intrinsic value, which is the enjoyment or satisfaction that the individual gets from performing the behaviour
- Utility value, which is the degree to which the task relates to current and future goals, such as health or career.

Goal theory

Holding a positive value has a positive impact on the goals that people create – in this case the goal to sustain breastfeeding. According to Locke and Latham (1990), goal formation has a positive impact upon individual's performance. Items that focused on the four main goal propositions – goal difficulty, goal specificity, goal feedback, and goal participation were required. Classified in motivational terms mainly as confidence and satisfaction building, goal theory was incorporated into the BMIMS as a means of exploring the underlying constructs associated with women's adopted goal (breastfeeding), but more specifically the goal feedback they routinely received. Satisfaction when breastfeeding was therefore defined specifically in relation to performance feedback, as feedback is directly related to the instruction provided and not to satisfaction per se.

Self-efficacy theory

Even though individuals may value breastfeeding and make it their personal goal, they will also consider their capabilities and the likelihood of surviving the environmental stresses and challenges associated with breastfeeding. To explore this aspect of motivated behaviour, the items that measured women's self-efficacy were required. As a theory of competency and mastery, self-efficacy operates on the premise that initiation and persistence towards a behaviour are determined primarily by the person's cognitive judgements and expectations concerning their ability to perform the behaviour. The acceptance of the concept of self-efficacy is based on the assumptions that people ask of themselves: Do I have the thinking, the resources and the persistence to perform this behaviour and if I do have the knowledge, can I put it into action?

Attribution theory

Although value, self-efficacy and the goal theories provide a multifaceted approach to understanding the motivational impact of routine instruction, there was a need to explore further why women in the same situation can react differently to their experience. To help explore this phenomenon, further items were required in the BMIMS, which focused on Feather's (1982) conceptualisation of

attribution theory. Attribution theory provides a classification process that explains the consequences of why one person can maintain a sense of success, while another will perceive failure. The three main dimensions of attribution theory include internal/external locus, level of control and stability.

Search for measurement tool

A computerised literature search covering the years 1994 to the most up-to-date publications (October 2005) was completed with the aim of finding an established measurement tool that incorporated some or all of the four theories detailed above. Databases included CINAHL, BNI, Cochrane, PsycINFO, and MIDIRS. The *A-Z of electronic journals* was also searched combining key phrases such as 'breastfeeding measurement tool', 'self-efficacy and breastfeeding', 'breastfeeding and goals', 'breastfeeding motivation', 'breastfeeding and confidence', 'value and breastfeeding' and 'breastfeeding satisfaction'. No measurement tool was detected that applied all four theories.

The Breastfeeding Self-efficacy Scale-Short Form (BSES-SF) (Dennis, 2003) shown to be a reliable predictor of breastfeeding behaviour at one week, four weeks and eight weeks postpartum was selected to measure situation-specific self-efficacy. The remaining BMIMS items relating to goals, valence and attribution theories were transcribed from an unpublished PhD that explored individual's motivation to perform a task (Irwing, 1991).

Method

Transcribing the selected items

A total of 37 items were transcribed from the task-motivation context (Irwing, 1991) to a breastfeeding context. The wording of the items was adapted for breastfeeding, while maintaining the declarative nature and clarity of the meaning. Items that became ambiguous when transferred to a breastfeeding context were removed – for example 'There is an obvious beginning and end to this job'. Consideration was given to the approximate equal intervals between points in the rating scales. The self-efficacy scale (BSES-SF) applied five point anchors, however Irving (1991) used a seven-point scale. Early in the development of the BMIMS, both the five- and seven-point rating scales were retained for expert review. As recommended by Nieswiadomy (2001), a set of instructions accompanied each section.

Expert review

Four experts were asked to peer view the instrument – a motivational expert, two health research experts and a midwife expert. In relation to the motivational aim of the items, the reviewers were asked to comment on the clarity and readability of each item. The experts suggested changes that included the use of a seven-point scale as a means of increasing consistency and the variance of items (Pett et al, 2003). In addition the item 'I can always keep wanting to breastfeed' was highlighted as lacking clarity of meaning, that is the term 'always' implied a frequency of having the feeling rather than a measure of intensity of feeling. The item stems that applied the prefix 'I can always' were that of the BSES-SF (Dennis, 2003). As a result of discussion with the expert panel, the prefix 'I can always' was maintained until its inclusion or exclusion was informed by the pilot study.

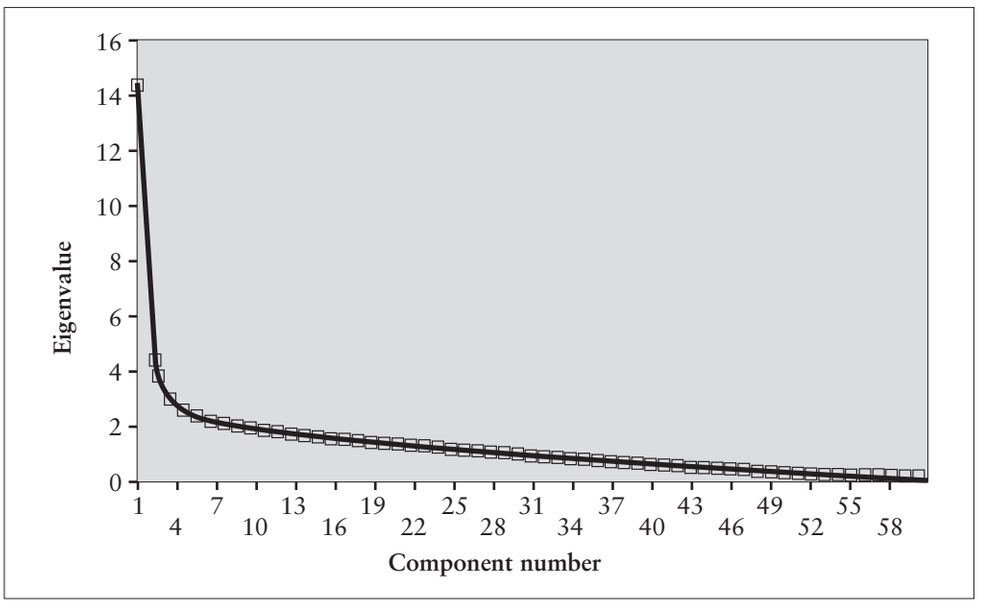
The readability statistics (Flesch-Kincaid Grade, 1997) resulted in a satisfactory score of 7.3 (a score between 7.0 and 8.0 is an indication of a suitable reading level for sixth graders). Ethical approval to distribute the questionnaire to women who were breastfeeding was obtained from the research ethics committee at the local university and from the research committee of the participating Trust. Women were assured of anonymity and confidentiality. Exclusion criteria included non-English speaking women, incidences of infant and mother separation and infant abnormality.

Piloting of the BMIMS

The inventory was piloted with a convenience sample of women who had initiated breastfeeding and were receiving postnatal breastfeeding instruction by midwives in hospital or the community (n=20). Exclusion criteria included incidences of newborn abnormalities that affected infant-feeding behaviour and infant and maternal separation in the early postnatal phase. The inventory took less than 20 minutes to complete and participants were asked for additional information concerning the structure and clarity of the items. Of the 20 participants, 17 were accessed while in hospital (ranging from 24 to 72 hours postnatal). The remaining three women were visited in their homes (ranging from one to two weeks postnatal). A total of 12 participants were employed, the remainder were not. The sample represented all levels of occupations, although not all who recorded their occupation were actively employed – three categorised themselves as 'professional', two at a managerial level, three 'clerical', four described themselves as 'skilled', five 'non-skilled' and one as 'other'. Two women who gave consent informed the researcher that they intended to stop breastfeeding. These two cases were retained on the basis that their experience was relevant to the motivational impact of routine breastfeeding instruction. Due to the small sample size, statistical analysis was not performed. However, the following two amendments were made to the BMIMS as a result of participant feedback:

- Participants expressed their preference to complete the questionnaire as a structured interview and not independently
- Two participants reported that item 21 – 'I can always keep wanting to breastfeed' was difficult to interpret. Further clarification of the meaning of this item was offered to women as a result of the pilot study. Overall, no revision was made to the structure or clarity of the 51-item questionnaire.

Figure 1. The scree plot of the breastfeeding instructional motivation measurement scale shows that three factors explain most of the variance



Sample

At one hospital site over a period of 12 weeks, a convenience sample of all women who met the inclusion criteria, that is women who had initiated breastfeeding and were receiving postnatal breastfeeding instruction by midwives in hospital or the community, were invited to take part in the study. A total of 182 were approached and all agreed to participate. As no structural changes were made to the questionnaire following the pilot study (n=20), the two samples were pooled, resulting in a final sample size of 202 breastfeeding women. Tabachnick and Fidell (2001) advise that pooling samples to increase sample size can on occasions be advantageous in relation to factor analysis.

Data analysis

Factor analysis is a statistical procedure that is usually performed in the early stages of questionnaire development. Although computationally the analytic procedure seems complex, conceptually the procedure is straightforward. Using correlation (-1 to +1), the computer is asked to determine which variables go together to form a concept or construct (called a factor) related to the subject matter. The correlation co-efficients (called factor loadings) indicate the direction and strength of the relationship between the item and the factor that it is placed in. For example, a factor loading of .70 indicates a strong positive correlation between the item and factor, while -.70 indicates a strong negative correlation. Factor loadings of less than .35 are normally excluded from the results. Often the most challenging step for the research team is to find a meaningful interpretation of the resulting factors. In incidences where the factors have previously been determined, interpretation is straightforward (called confirmatory analysis), however when items are being placed together for the first time, exploratory factor analysis is used and interpretation of the results is paramount to understanding the subject. As the relationship between the theoretical measures of goals, self-efficacy, value and attributions had not previously been explored in relation to breastfeeding duration, exploratory factor analysis was used to explore the factor structure of the newly-developed BMIMS. This was achieved by using principle components analysis (PCA) with an oblique rotation.

Following entry of the data into SPSS (11.5), a random sample (25%) of entries was rechecked to ensure accuracy. Given that factor analysis is particularly sensitive to outlying cases (Tabachinick and Fidel, 2000), outliers were detected using hierarchal clustering analysis. Initially two cases furthest from the cluster (cases 24 and 160) were identified and removed, while case 156 also emerged as a further outlier. However, with these three outliers de-selected, discriminant analysis was repeated and no further outliers were evident in the sample. Completed data was available for 188 participants and less than 5% of values per variable were missing. In line with Tabachinick and Fidell (2000), regressional techniques were employed to estimate 11 missing values, thus giving a final sample size of 199 for factor analysing.

Findings

Demographic details

A total of 202 women who were receiving routine midwife breastfeeding instruction were approached and gave consent to complete the BMIMS. Some 166 were interviewed while in hospital and the remaining 36 in the community. On an intention-to-treat basis, it was noted that of the 202 women, 100 of the sample were first-time mothers. The mean age for the total sample was 30 years. A total of 20% of women reported that they did not work, 25% reported having a professional vocation, 12% a managerial vocation, 18% clerical, 11% skilled and 14% non-skilled or other. Overall (n=202) 28 women (14%) had already made the decision to discontinue breastfeeding and so intended to start formula-feeding within hours of completing the interview.

BMIMS instrument

Kaiser's Measure of Sampling Adequacy was 0.900, indicating that the BMIMS items were appropriate for PCA

Table 1. Examples of the rotated factor loadings for the three factor model of the BMIMS when applied to first-time mothers

BMIMS items	F1	F2	F3
I would be upset if I did not manage to breastfeed	0.64		
Breastfeeding is not that important to me in the broad scheme of things	-0.64		
I like breastfeeding	0.56		-0.50
Breastfeeding is very meaningful to me	0.80		
It is very important to me that I know how to work at reaching my breastfeeding goal	0.66		
I hate breastfeeding	-0.51		0.44
I feel a great sense of satisfaction when I breastfeed well	0.74		
I look forward to breastfeeding	0.41		-0.59
Breastfeeding requires me to learn skills through effort over time	0.56		
I receive lots of support and guidance from my midwives		-0.78	
The feedback I receive from the midwives tells me what I want to know		-0.89	
There are things I would like to know about my breastfeeding that I am not being told		0.73	
The midwives let me know how well I am breastfeeding		-0.84	
As a result of feedback, I know I am breastfeeding well		-0.73	
The feedback I get from my midwives is not very useful		0.72	
I don't like breastfeeding, but do it because it is the best way to feed my baby			0.48
I have considerable independence and freedom as to how I manage breastfeeding			-0.60
I feel I cannot use my judgement when breastfeeding			0.62
Generally speaking I am very satisfied breastfeeding			-0.73
I frequently think of quitting breastfeeding			0.75
Overall I am no good at breastfeeding			0.73
Breastfeeding is quite simple and repetitive			-0.47
I have trouble figuring out whether breastfeeding is going well or not			0.69

Note: F1=total value of breastfeeding; F2=perceived midwife support; F3=expectancy for success

(Tabachinick and Fidell, 2000). The initial solution using item loadings >0.35 (Comrey and Lee, 1992), resulted in an 11 factor solution, which explained just over 70% of the variance. In total, 51 BMIMS items loaded onto the 11 factors; however factors five to 11 had between three and one factor loadings and this was not considered an interpretable solution. Cattell and Schuerger (1978) acknowledged that use of eigenvalues alone can result in an overestimation of factors, hence the main criteria used to decide on the number of meaningful factors was based on:

- Kaiser's (1960) eigenvalues* >1 factor extraction rule
- Scree plot** analysis
- The interpretability of the resulting factor structure (Kline, 1998).

Inspection of the scree plot (see Figure 1) indicated that the cut-off point for factor rotation (where the line changes slope) was three (indicating three factors). In addition, parity was used as a selection variable on the basis that previous breastfeeding experience would alter women's perception of successful breastfeeding.

The three factor solution accounted for 46% of the variance in primigravida women and incorporated 34 BMIMS items (see Table 1). The first factor explained 26.1% of the variance and contained 15 items. These items were concerned with the value aspect of motivated behaviour and were named 'overall value of breastfeeding'. However, three items 'I like breastfeeding', 'I hate breastfeeding' and 'I look forward to breastfeeding' loaded on both factors one and three. The second factor had six items and accounted for 11% of the variance

*Eigenvalue is a value that helps the research team decide which factors need to be included in the findings and which do not. For a factor to be considered significant researchers normally expect a factor eigenvalue greater than 1.00.

**A scree plot is a visual representation of the factors and allows the researcher to identify the number of factors that are significant.

Table 2. Examples of the rotated factor loadings for the three factor model of the BMIMS when applied to non-first-time mothers

BMIMS items	F1	F2	F3
I like breastfeeding	0.54		-0.47
I frequently think of quitting breastfeeding	-0.75		
I don't like breastfeeding, but do it because it is the best way to feed my baby	-0.61		-0.50
I have considerable independence and freedom as to how I manage breastfeeding	0.48		
I feel I cannot use my judgement when breastfeeding	-0.50	0.41	
I hate breastfeeding	-0.54		-0.44
I have trouble figuring out whether breastfeeding is going well or not	-0.66		
I receive lots of support and guidance from my midwives		-0.69	
The feedback I receive from the midwives tells me what I want to know		-0.88	
There are things I would like to know about my breastfeeding that I am not being told		0.61	
The midwives let me know how well I am breastfeeding		-0.79	
As a result of feedback, I know I am breastfeeding well		-0.77	
The feedback I get from my midwives is not very useful		0.61	
Whether I breastfeed successfully or not is clearly my responsibility		-0.47	
I would be upset if I did not manage to breastfeed			0.53
Breastfeeding is not that important to me in the broad scheme of things			-0.46
I feel a great sense of satisfaction when I breastfeed well			0.73
Most people who breastfeed feel a great sense of personal satisfaction			0.68
I have trouble figuring out whether breastfeeding is going well or not			0.69

Note: F1=total value of breastfeeding; F2=perceived midwife support; F3=expectancy for success

and seemed to reflect a clear theme of 'perceived midwife support'. Just less than 8.6% of the variance was attributed to factor three, which represented a theme of 'expectancy to succeed' (13 items).

Reliability and validity

The current results indicate substantial internal consistency for the three factors: total value of breastfeeding (α=0.96), perceived midwife support (α=0.85) and expectancy to succeed (α=0.84). Validity was assessed in the following ways:

- Items that cross-loaded into two factors ('I hate breastfeeding', 'I like breastfeeding', 'I look forward to breastfeeding') were interpretable within the suggested solution, in that women may agree to like breastfeeding from a value perspective and its perceived benefits however based on their personal experience and consequential expectancy for success, they did not
- Underpinned by the theory of self-efficacy, it was proposed that the distal effects of self-efficacious beliefs from a previous breastfeeding experience would have a moderating effect on non-primigravida women's motivational profile. A difference was noted in the items that loaded on factor two (perceived midwife support). Two additional items loaded in relation to non-first-time mothers 'I feel I cannot use my judgement when breastfeeding' (0.41) and 'Whether I breastfeed successfully or not is clearly my responsibility' (-0.47) suggesting that experienced mothers felt current midwife support impacted on how they managed breastfeeding (see Table 2)
- To confirm the suggested interpretation, factor one which was defined as 'Value placed on breastfeeding' was re-factored to verify the conceptualised aspects of task value by Jacobs and Eccles (2000). Using PCA with Oblimin rotation, three value-factors emerged:
  - Attainment value for example, 'The amount of effort I put into breastfeeding is worthwhile to me'
  - Intrinsic value which included items of satisfaction such as 'I like breastfeeding' and 'I hate breastfeeding'
  - Utility value, which included items related to present and future goals, for example, 'It is very important to me that I know how to work at reaching my breastfeeding goal' and 'I have a clear breastfeeding goal in mind'.

Discussion

The BMIMS was developed as a diagnostic tool, with the aim of measuring women's value and expectancy for success when breastfeeding and receiving routine instructional support by midwives. Directed by the findings of a previous structured observation study (Stockdale et al, 2005), the scale incorporated four motivational theories: goal theory, attribution theory, self-efficacy theory and valence theory. Self-efficacy was measured using the BSES-SF by Dennis (2003), while the remaining items were transcribed from an earlier study that measured work-related achievement motivation. Expert review confirmed the clarity and meaning of the suggested scale, which contained 51 Likert items. Even though the BMIMS included four motivational theories, analysis of 199 complete data sets revealed a three factor solution that was consistent with the expectancy-value theory of motivation related to routine instruction. The BMIMS demonstrated validity, in that it detected the overall conceptualisation of a value-expectancy approach in relation to known-groups (first-time and non-first-time mothers).

Exploration of first-time mother's motivation to breastfeed revealed high factor loadings in relation to the value placed on breastfeeding, for example 'Breastfeeding is very meaningful to me' (0.80) and 'I would be upset if I did not manage to breastfeed' (0.64). Interestingly, non-first-time mothers also valued breastfeeding, but the factor loadings were moderate in comparison to first-time mothers and formed the third factor rather than the first factor. The idea that first-time mothers place particularly high value on breastfeeding is not new. Other researchers such as Avery et al (1998) and Mozingo et al (2000) have reported that women who abandoned breastfeeding are often those who had planned to breastfeed for much longer. The high value that is generated through promotion of the health benefits related to breastfeeding is most often associated with the idea of utility value. Utility value however is only one aspect of value conceptualised by Jacobs and Eccles (2000). The subjective role of attainment value (the personal importance of doing well) and intrinsic value (the interest the individual has in the behaviour) is important to women's sustained behaviour. The National Institute for Heath and Clinical Excellence (2005) recommend that women should not be introduced to the possibility of breastfeeding problems during their antenatal phase. This stance, although not explained in motivational terms, may act to protect the motivational effects of intrinsic and attainment value of breastfeeding. However, value alone is insufficient to sustain behaviour and so it is important to consider the role of expectancy to succeed.

Total expectancy for success revealed a very different picture to the high value that first-time mothers placed on breastfeeding. Item loadings within the factor 'expectancy for success', such as 'Overall I am no good at breastfeeding' and 'I have trouble figuring out whether breastfeeding is going well or not' revealed that first-time mothers suspected that they would not manage to breastfeed successfully. Non-first-time mothers however reported a positive expectancy for success, which included an additional item, 'I feel I cannot use my judgement when breastfeeding'. The inclusion of this item in relation to expectancy for success in experienced mothers is very interesting in that it cross-loaded onto the expectancy for success factor in a negative way (-0.50), but in a positive way in relation to perceived midwife support (0.41). This suggests that experienced mothers whose expectancy for success is positive feel that current best practice does not permit them to use their judgement when breastfeeding.

Overall analysis revealed that both first-time and experienced mothers perceived midwife support to be inadequate. In fact the highest loadings were noted in relation to the perceived lack of support. As evidence continues to indicate that routine breastfeeding instruction falls short of women's expectations (Hong et al, 2003; Chezem et al, 2003; Hanss, 2004), the need for health professionals to meet women's breastfeeding instructional needs seems judicious. Offering advice, Ertem et al (2001) suggested that health professionals move away from breastfeeding troubleshooting and knowledge provision to focus on bolstering maternal confidence. Loiselle et al (2001) reported that women's perception of support did not meet the criteria of the supportive strategies that health professionals had put in place. Other researchers have called on health professionals to refrain from medicalising breastfeeding and adopt a more flexible woman-centred approach (Schmied et al, 2001). Almost ten years ago, Dykes and Williams (1999) challenged those providing professional instruction to consider their role in protecting women's confidence (expectancy to succeed) in breastfeeding.

Conclusion

Making a clear distinction between value and expectancy to succeed, the BMIMS provided an important consideration for those designing current breastfeeding instruction, namely that despite encouraging primigravida women to place a high value on breastfeeding, current breastfeeding instruction lacks the motivational power associated with balancing that value with a positive expectancy for success. Although it seems sufficient to say that maternal confidence and professional instructional support should go hand-in-hand, it seems evident that maternal confidence is most fragile and attrition highest when women lack expectancy for success and perceive a lack of relevant instruction. Even though these findings are not new but reiterate previous breastfeeding research, the development and application of the BMIMS has brought to focus the main barrier that midwives must overcome in their efforts to motivate women to continue breastfeeding, which is that successful breastfeeding instruction must be designed with an appreciation of the complex cognitive process that requires the optimal motivational balance between creating a more moderate value for breastfeeding and a greater sense of expectancy to succeed***.

Limitations of this study were related mainly to the restricted time-frame of the research study that limited the sample size. Additionally, construct validity requires replication studies in relation to the shortened version of the instrument (34 items), designed to measure first-time mothers' motivation to breastfeed. Therefore, further research is necessary to confirm the factor structure and determine if the BMIMS is reliable and valid when applied in different instructional environments.

***The findings of this factor analysis informed the overall development of a motivationally-enhanced version of current best breastfeeding instruction.

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Information for authors

Evidence Based Midwifery is published quarterly and aims to promote the dissemination, implementation and evaluation of midwifery evidence at local, national and international levels. Papers on qualitative research, quantitative research, philosophical research, action research, systematic reviews and meta-analyses of qualitative or quantitative data are welcome. Papers should be sent to: lisa.leano@redactive.co.uk in MS Word, and receipt will be acknowledged. Suitable papers are subject to double-blinded peer review of academic rigour, quality and relevance. Subject area and/or methodology experts provide structured critical reviews that are forwarded to authors with editorial comments. Expert opinion on matters such as statistical accuracy, professional relevance or legal ramifications may also be sought. Major changes are agreed with authors, but editors reserve the right to make modifications in accordance with house style and demands for space and layout. Authors should refer to further guidance (RCM, 2007; Sinclair and Ratnaike, 2007). Authorship must be attributed fully and fairly, along with funding sources, commercial affiliations and due acknowledgements. Papers that are not original or that have been submitted elsewhere cannot be considered. Authors transfer copyright of their paper to the RCM, effective on acceptance for publication and covering exclusive and unlimited rights to reproduce and distribute it in any form. Papers should be preceded by a structured abstract and key words. Figures and tables must be cited in the text, and authors must obtain approval for and credit reproduction or modification of others' material. Artwork on paper is submitted at the owner's risk and the publisher accepts no liability for loss or damage while in possession of the material. All work referred to in the manuscript should be fully cited using the Harvard system of referencing. All sources must be published or publicly accessible.

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News and resources

DMRS meeting in October

The Doctoral Midwifery Research Society (DMRS), for which EBM is the official journal, is due to hold its next meeting on 3 October at the University of Ulster in Northern Ireland. Guest lecturer Professor Sheila Hunt will be sharing her knowledge on writing successful grant applications, with Dympna Walsh-Gallagher talking about the experiences of women with disabilities facing pregnancy. For further details, please visit: www.doctoralmidwiferysociety.org

June 2008: ICM Congress reminder

The International Confederation of Midwives' 28th Triennial Congress takes place from 1 to 5 June this year in Glasgow. Women's voices and the appropriate use of reproductive and birth technology in newborn health are just two of the themes that will be covered. For further information, please visit: www.midwives2008.org

New publication for the preparation and practice of supervisors of midwives

MA Healthcare – under the guidance of the NMC – have published a new resource aimed at those preparing to become supervisors of midwives. *Statutory supervision of midwives* builds on the NMC's previous work and includes the insight of supervisors of midwives and local supervising authority midwifery officers. To order a copy, please visit: www.markallengroup.com/healthcare

New contact details

This issue of EBM is the first to be published by Redactive Media Group on behalf of the RCM. To contact the editorial team, please email the managing editor, Emma Godfrey at: emma.godfrey@redactive.co.uk or deputy editor, Lisa Leaño at: lisa.leano@redactive.co.uk

Call for submissions to EBM

EBM continues to welcome new manuscripts reporting midwifery research to review for publication. To discuss or submit a paper for consideration, please email: lisa.leano@redactive.co.uk

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