



ROYAL
COLLEGE
OF MIDWIVES

ISSN: 1479-4489 March 2015 Vol.13 No.1

EVIDENCE
BASED
MIDWIFERY



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COLLEGE
OF MIDWIVES

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March 2015
Volume 13 Issue 1

EVIDENCE BASED
MIDWIFERY IS
A STANDALONE
PEER-REVIEWED
JOURNAL
PRODUCED BY THE
ROYAL COLLEGE OF
MIDWIVES

Evidence Based Midwifery
Royal College of Midwives
15 Mansfield Street
London W1G 9NH
United Kingdom

Publishers:
Redactive Media Group

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'Inside looking out... outside looking back': post-REF 2014 personal reflections

Key words: HEFCE, REF 2014, personal reflection, evidence-based midwifery

In December last year, the long-awaited REF 2014 results were published by the Higher Education Funding Council for England (HEFCE) and I felt like I was watching another demonstration of 'switching on the Christmas lights', only this time it was not a small local event, instead it was a major national event with illumination on research excellence across the whole of the UK providing insight on institutional research power that ranged in quality, strength and impact. HEFCE reported that '30% of our research was world leading (rated 4*), 46% was internationally excellent (3*), 20% recognised internationally (2*) and 3% recognised nationally at 1*. Academic staff, totalling 52,061 across the UK, submitted 191,150 research outputs and of these, 6975 were the new impact case studies'.

The 'excellence' of our UK research had been appraised and now the response from the press, public and researchers would be unwrapped and their delight, disappointment and uncertainty would be revealed. I was not surprised to read about the accusations of game play, threshold setting, fierce staff selection procedures and potential loss of innovation; finger-pointing straight at the research institutions. In January this year, in keeping with the post-Christmas spirit, the emphasis quickly focused on the financial impact and the discussions on potential funding models for quality-related research distribution. However, this has not yet been revealed and speculation will continue until HEFCE finally publish its decision.

As a member of the REF 2014 panel for nursing (including midwifery), allied health professions, pharmacy and dentistry, I reflected on my experience as a member of the decision-making panel and felt comfortable with the process and outcome of the work that I had been involved in.

It was the calibration exercises for each aspect of the evaluation process, the double-blind peer reviewing of papers, the triple reviews for case studies with consumer involvement and the audit trail created where evidence of the justification for the decision-making in complex cases could be archived that led to me feeling this internal sense of coherence and stability amidst a raging public, professional and academic discourse of capitalism, elitism and game playing.

When I was on the inside of the processes of REF, my goal was primarily to do the business with rigour, accountability and justice. This was not without challenges and occasional arguments, but the judiciary approach of seeking third-party review and panel discussion when necessary to reach arbitration provided the necessary transparency and robustness, satisfying my personal conscience. As a researcher with expertise in midwifery, I gained a breadth of understanding about the overall UK profile of midwifery research including insight into the range of

methodologies being used, outcome studies on effectiveness of interventions, qualitative studies on women's pregnancy, birth and early motherhood experiences including impact case studies demonstrating how midwives had contributed to the institutional profiles across the UK.

In REF, the sub-panels were tasked for the first time with assessing 'reach and significance of impacts on the economy, society and/or culture that were underpinned by excellent research conducted in the submitted unit, as well as the submitted unit's approach to enabling impact from its research' (REF, 2011). These new impact case studies contributed to 20% of the overall score and it is here that midwives have the greatest potential to make a significant difference in the next REF 2020.

On a very personal note, I did try to have midwifery in the title of our panel, however, it was not possible on this occasion, but the request was recorded. For the future REF exercises, midwives need to be more visible as researchers with more publications, more impact case studies and more people submitted. If we can focus on achieving these goals for the next REF, we will have more substance and evidence to substantiate our request for recognition and representation on the requisite panel having earned the honour of having midwifery named on the title of the panel.

Our challenge is to undertake top quality research using appropriate methodologies and to make the dissemination of this research accessible, easily understood and contextually relevant. Speaking as your editor of *Evidence based midwifery (EBM)*, I was delighted to see several of our high-quality research papers included in the REF 2014 and this is important to share with you, because HEFCE made it clear that we were to focus on the quality of the papers submitted and not the impact factor of the journal. This is important for our readership to note, as we strive to achieve our impact factor this year. Citations were used to aid decision-making only, but they may have a bigger part to play in the next assessment exercise so it is important to keep this in mind. I can't emphasise enough how proud I am to see midwifery being recognised by the respective institutions, so many midwives being submitted to REF 2014 and papers from *EBM* being submitted.

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Why do some women choose to freebirth? A meta-thematic synthesis, part one

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Abstract

Background. Freebirthing or unassisted birth is the active choice made by a woman to birth without a trained professional present, even where there is access to maternity provision.

Aim. To integrate the findings of the current literature on the phenomenon of freebirthing, asking the question: ‘Why do some women choose to freebirth?’

Design. A metasynthesis was carried out based upon Noblit and Hare’s (1988) meta-ethnography. Searches were carried out in March 2013 and updated in March 2014 using 15 key databases. Inclusion criteria were applied: primary qualitative work, in English, focusing upon women who had freebirthed intentionally. A quality appraisal was carried out. This paper reports the findings from international studies, as there were no studies based on a UK population.

Findings and key conclusions. Four studies were found that incorporated data collected from 272 women. The studies identified were based in the US (n=3) and in Australia (n=1). Four key themes were generated: rejection of the medical and midwifery models of birth; faith in the birth process; autonomy; and agency. There was a prevailing sense of opting to freebirth in order to retain choice, control and autonomy over their bodies during the birth process.

Implications for practice. For some, within their particular context of maternity provision, the biomedical model of childbirth is clearly not acceptable, therefore, it is important practitioners identify and address women’s bio-psychosocial needs. Even the midwifery model of childbirth is apparently not satisfactory, suggesting the gulf between the midwifery philosophy of care and that which is currently practised needs attention. For some women, a previous negative experience with maternity care provision motivated their decision to freebirth. It is, therefore, important that maternity service providers improve the quality of care provision so women feel dignified, supported, and are participatory in the care that they receive. A UK-based study is being undertaken in order to establish the motivations of women who choose to freebirth in the UK.

Key words: Childbirth, freebirth, unassisted birth, autonomy, metasynthesis, qualitative, evidence-based midwifery

Introduction

This paper is the first in a two-part series exploring the phenomenon of freebirthing. This paper sets out the foundation, which has led to the current ongoing qualitative research study into the phenomenon of freebirthing in the UK, due to the lack of primary data based in a UK setting.

Internationally, a minority of women choose to birth without the assistance of a midwife or doctor. Instead, they choose to either birth alone or with lay birth supporters present (NMC, 2013; NCT, 2011).

This is known as freebirthing, or unassisted childbirth. This is a different occurrence to that of a concealed pregnancy, which is often characterised by a denial of the pregnancy (Friedman et al, 2007), or where women have restricted or no access to maternity care. Thus it is a unique phenomenon, whereby women make an active choice not to utilise the maternity services that are available to them. In the UK, the proportion of women who choose to freebirth is unknown, but anecdotal evidence demonstrates its occurrence (Edwards and Kirkham, 2013; NMC, 2013; Cooper and Clarke, 2008; Nolan, 2008; Wickham, 2008).

While no research exists directly on the risks of freebirthing due to its covert nature, a parallel in terms of risk relates to when women give birth unintentionally without a healthcare practitioner present, known as ‘born before arrival’ (BBA).

A cohort study, carried out by Loughney et al (2006), suggested this occurs in 0.14% to 0.44% of pregnancies. BBAs are unplanned and associated with an increased morbidity for mother (excessive blood loss) or baby (failure to retain body temperature), although overall outcomes are normally good (Loughney et al, 2006). The freebirthing woman and her baby are at potential increased risk of morbidity or mortality.

Uncommon practices such as this may reflect tensions between standard care provision and women’s experiences of care. It is, therefore, vital that maternity services explore this phenomenon to understand why women make this choice. The aim of this meta-thematic synthesis was to integrate the findings of the current literature on the phenomenon of freebirthing, asking the question: ‘Why do some women choose to freebirth?’

Method

A metasynthesis was the justifiable method to answer the research question as it aims to ‘bring together’ bodies of research that focus on the same topic (Ring et al, 2010). Thomas and Harden (2008) argue that metasyntheses are important tools to inform policy-making and evidence-based practice, which are the cornerstones of current health and social care. An established method is that of meta-

ethnography (Ring et al, 2010). This method was designed by Noblit and Hare (1988) in the 1980s, primarily in the field of education. However, the principles of this approach have emerged as a leading qualitative synthesis method in healthcare research (Ring et al, 2010). Britten et al (2002) describe it as a method that involves induction and interpretation, resembling the qualitative methods of the studies it aims to synthesise.

Data collection

A systematic search strategy was conducted in March 2013 and updated in March 2014 with the key words: 'freebirth', 'unassisted birth', 'unattended birth', 'unassisted homebirth', 'DIY birth' and 'do-it-yourself birth'. These were initially applied through key health databases: CINAHL, British Nursing Index, Cochrane, MEDLINE, and MIDIRS.

But due to a limited number of findings, the search was extended to include: Sociological Abstracts, AMED, ASSIA, HMIC, PsycINFO, Web of Science, Zetoc, OpenSIGLE, Academic Search Complete and International Bibliography of the Social Sciences. Boolean operators and the truncation of terms was used to maximise findings. Duplication of papers provided reassurance that the search was comprehensive. Papers were hand-searched for relevant studies, known

as 'berrypicking' (Bates, 1989), to ensure all key papers were retrieved. All relevant papers were obtained via the databases or directly from the authors. A thorough quality appraisal was carried out using the Critical Appraisal Skills Programme (CASP) assessment tool (Critical Appraisal Skills Programme, 2013).

Inclusion/exclusion criteria

As there were few papers, the inclusion criteria were kept broad and all papers of primary qualitative research in English of women that had chosen to freebirth were included. Anecdotal and opinion pieces were excluded. Table 1 presents the included studies; their characteristics, findings, initial concepts and quality rating.

Participants

The four studies incorporated data collected from birth stories, surveys and interviews from 272 women. Three studies were from the US (n=252) and one study was from Australia (n=20). All participants were female, except one male partner who participated in a survey (Freeze, 2008). The majority of women were Caucasian and educated to high school level or above, indicating a high level of socio-economic status.

Table 1. Characteristics of studies

Author	Country	Aim	Sample	Recruitment	Theoretical framework, method and analysis	Verification of data	Concepts	Quality rating
Miller (2009)	US	Explore women's narratives of why they freebirth; to reveal how they process discourses in medicine and midwifery to construct their own truth	n=133: 127 online birth stories; six postnatal interviews; all women freebirthed	Online; freebirth communities purposive-snowballing	Narrative discourse, grounded theory to analyse 127 birth stories, and six in-depth interviews	Triangulation	Decision-making, rejection of medical and midwifery models, information sources, safety, doing it myself; control and autonomy, safety, birth experience, emotional impact, relationships with partners and God	B
Freeze (2008)	US	Explore why women choose to freebirth; knowledge sources used, concepts of safety, risk and responsibility	n=84: 60 surveys, 13 postnatal telephone interviews; all women freebirthed	Online; freebirth communities purposive-snowballing	Phenomenology, web discussion, survey responses and semi-structured interviews	Triangulation	Decision-making, discovery, previous experience, choices, transformation, knowledge, safety, risk (reframing), responsibility, reconciling midwifery and freebirthing	C
Brown (2009)	US	Explore women's motivations to freebirth and the lived experience	n=35: 26 demographic survey, nine postnatal telephone interviews; all women freebirthed	Online; freebirth communities purposive-snowballing	Feminist theory, demographic survey, unstructured interviews, grounded theory analysis, qualitative interpretative analysis	None stated	Rejection of the medical and midwifery model, previous experience, search for alternatives, avoiding unnecessary intervention, personal choice, preparation, experience, practicalities, and sources of information	B
Jackson et al (2012)	Aus	Explore how women make the choice to birth outside the system and how they perceive the associated risks	n=20: semi-structured interviews postnatally; nine women freebirthed, 11 birthed at home against advice	Initial purposive recruitment at conference followed by snowball technique	The theoretical framework not discussed	None stated	Birth always has element of risk, including death; the risks are greater in hospital; rejection of the biomedical model of birth, rejection of hospitals	B

Quality appraisal

A quality appraisal was carried out using the validated CASP assessment tool (2013). This tool assesses three broad issues when appraising qualitative literature: whether the results are valid, what the results are and whether the results will help locally. A total of 10 questions are used to assess the appropriateness of: research design, methodology, data collection, data analysis, reflexivity, and ethical issues.

With these in mind, hallmarks of trustworthy qualitative data include: appropriate methodology to answer the research question, appropriate recruitment of suitable participants, use of triangulation where applicable and a clear demonstration of the themes to provide meaningful findings (CASP, 2013). The studies underwent a quality grading (Walsh and Downe, 2006) to further categorise the quality and weight of the findings. This was to support the process of using the CASP model while enabling a demonstrable grading of the papers that the reader may identify with.

In the case of the included studies, some methodological limitations need to be noted. While Freeze (2008) and Brown (2009) were unpublished PhD dissertations, they were included due to the paucity of literature in this area. Miller (2009) and Freeze (2008) provided insufficient detail of data collection, methodology, and data analysis. Miller (2009), Brown (2009) and Jackson et al (2012) demonstrated only limited reflexivity upon their roles as researchers throughout their methodology and analysis. In addition, no researcher utilised participant validation or a second researcher to confirm their findings. While it is clear that the findings needed to be treated cautiously, it was felt that the studies would provide a useful insight into this marginalised phenomena, and warranted the next stage of analysis.

Data analysis

In line with thematic synthesis methods, the papers were synthesised using inductive thematic analysis (Ring et al, 2010; Thomas and Harden, 2008) founded in the framework by Noblit and Hare (1988). Each paper was individually labelled with key phrases or words. Similar phrases and words were then grouped and coded.

The codes were then cross-referenced against the other papers to identify similarities or differences between studies. These codes were repeatedly refined using an iterative process until saturation of the developed codes was reached. Once this was achieved, the codes formed the basis of sub-themes (concepts). In addition, the process of translating (Thomas and Harden, 2008) was used, as Noblit and Hare described (1988), this is when the concepts generated are examined across the papers in order to move beyond simple description of the data.

This then allowed for a 'third line' construct in which the lead researcher used interpretation of the data to formulate the themes described in the results section. The process was iterative, where several attempts at developing themes were made. This synthesis was a part of an undergraduate and postgraduate degree and interpretations were informally checked by supervisors.

Findings

Four key themes were generated as third line constructs (Noblit and Hare, 1988): rejection of the medical and midwifery models of birth; faith in the birth process; autonomy; and agency. The themes are presented below using quotes from the participants, interpretations of the original authors and analysis from the authors of this paper.

Rejection of medical and midwifery models of birth

All studies identified that the decision to freebirth stemmed from a criticism of the medical model of birth (Jackson et al, 2012; Brown, 2009; Miller, 2009; Freeze, 2008). Brown (2009) and Freeze (2008) found that this largely arose from a previous traumatic or disappointing experience:

"You know, everybody's really scared of it [birth in a hospital], it's very frightening, very traumatising, and when you think of hospital births, you think of being out of control, being in pain, being frightened of dying like that" (Amber, Brown, 2009: 18).

Miller (2009) reported a minority of women gave religious beliefs as a reason, although insufficient detail about the women's belief systems was provided. Brown (2009) and Freeze (2008) found that women with prior experience of birth reported similar perceptions of hospital care. These women described routine obstetric practices that they felt were unnecessary, harmful and did not support their personal need for privacy, choice, or control, leaving them feeling that they had received poor treatment (Brown, 2009; Freeze, 2008). Jackson et al (2012) found that women framed this rejection by their perception of risks associated primarily with hospitals, procedures and routine care provision:

"I would also say it [freebirth] is about safety because I don't think hospitals are safe places to have babies and I don't think some midwives are safe people to have babies with" (Freebirth 08, Jackson et al, 2012: 564).

This led women to seek alternatives. The internet seemed to be the main source of information, in which participants 'stumbled' upon freebirthing:

"We discovered story after story of couples who had given birth at home, in familiar, peaceful surroundings, unmedicated, un-'managed' and un-'manipulated'. The effect of this exercise – reading other couples' birth stories – was very powerful..." (online participant, Miller, 2009: 63).

Freebirthing also provided women with an alternative to the midwifery model of birth. Some women believed a midwife as simply unnecessary (Miller, 2009). Others had had a previous negative experience with midwifery care or viewed midwives as the first stage of intervention and, therefore, rejected their involvement (Brown, 2009; Freeze, 2008).

Faith in the birth process

All four papers reported that the participants had strong faith in their ability to give birth safely. They believe, if prepared emotionally, physically and spiritually and left to her own devices, a woman is able to access an instinctive and intuitive place within herself to birth her baby safely:

"What makes birth safe is for the birth process to be interfered with as little as possible, for the mother to feel

safe, and for her neocortex to be unstimulated. To disturb the birth process with various kinds of rituals and practices does not in itself make birth safer; to the contrary, it complicates birth and when the midwife [or doctor] “saves the day”, it furthers the myth that this essentially automatic process of the body needs to be made to happen” (Hessel, Freeze, 2008: 196).

This was reflected in the women’s own risk assessment, from which they concluded that having a qualified birth attendant or going to hospital was riskier than freebirthing:

“I felt as a first timer [primiparous woman] that the biggest threat to my safety and my baby’s safety was unnecessary intervention and you know, I was young and I knew I was healthy and I knew that if I went into a hospital I was going to have to fight really hard to get my baby out safely” (Freebirth 08, Jackson et al, 2012: 564).

Religious beliefs led some women to relinquish the birth outcome to ‘God’s will’ (Miller, 2009: 63). Commonly, the holistic approach was regarded as fundamental to safe outcomes for mother and baby: the majority of women took the mind-body-spirit connection seriously.

Women demonstrated this by ongoing preparation throughout their pregnancies. This involved an array of self-care methods, ranging from acquiring knowledge about the birth process, incorporating good nutrition and exercise, to meditative practices in order to ‘unlearn’ cultural fears of birth, as well as preparing for potential birth emergencies such as neonatal resuscitation.

Autonomy

All studies found that the majority of women reported a desire to freebirth in order to retain their sense of choice, control, and autonomy over their childbirth (Jackson et al, 2012; Brown, 2009; Miller, 2009; Freeze, 2008).

“Early on, I made a list of all the factors and elements I did or did not want to be part of this experience. My main focus was on creating an absolutely uninterrupted, undisturbed process of birthing, controlled entirely by me. I wanted no input from anyone else while giving birth. I wanted no suggestions, no instructions, no checking, measuring, or labelling. I had total confidence that I would have a safe and normal birth” (participant, Miller, 2009: 64).

Miller (2009) found that the women perceived they could not retain autonomy if there was a birth attendant present because they would take charge. This finding was also reported by Freeze (2008), who found that women’s prior experience of reduced control and autonomy were a catalyst for choosing to freebirth:

“The biggest thing is that WE the birthing moms are in control and there are NO medically trained persons there telling us what to do” (Suzie, Freeze, 2008: 2).

Brown (2009) and Jackson et al (2012) reported that prior experiences of lack of control and choice were experienced as traumatising:

“If women could be respected as intelligent beings capable of making choices and taking responsibility for them, they would probably choose to have some help, but there’s no help available to them, that works for them, that treats them

like human beings with a brain, capable of making their own decisions” (Ronii, Brown, 2009: 19).

Brown (2009) highlighted how women believed that they had a right to make their own birth choices, one that was felt not to be respected by midwives or doctors, which led them to freebirth:

“...doctors and the medical community in general will definitely push you around for their convenience and their budget and their bottom line, and it’s our right to not be at the mercy of that” (Suzie, Brown, 2009: 25).

Agency

The decision to freebirth as a method of exerting agency over their bodies was reported across all the studies:

“I have always been a woman who did what I wanted, and did it well. When people have told me over the years that I couldn’t do something, I’d laugh. My response has always been: ‘The only thing that stops you, is you. Nothing else’” (participant, Miller, 2008: 64).

In a wider context, Miller (2009) proposed that the decision to freebirth reflected the rejection of the medical discourse in favour of a new holistic discourse in childbirth. Using Foucault’s theory of bio-power (1973), she suggested that women are exerting agency over their bodies during birth by resisting mainstream birth practices. Brown (2009) elaborated upon Foucault’s theory of bio-power, linking feminist theory with women’s embodied experiences of practices of power, noting that the body is a source of control over women. She viewed freebirthing as a power force that challenged the misogynistic hegemony of current childbirth practices which assists in the process of redefining women’s experience of childbirth. Freeze (2008) suggested that freebirthing illuminated the dominance of the medical model and motivated some women to exert their agency by choosing to freebirth. Jackson et al (2012) suggested that the women reject the current risk discourse of childbirth, exerting agency by ‘opting out of the system’.

Discussion

This metasynthesis analysed four primary papers exploring why some women choose to freebirth to provide an insight into the women’s decision to make such a radical birth choice. Despite the methodological limitations of the studies, they generate useful insights. However, it must be noted that the maternity provision in the countries cited differ greatly to that of the UK. Therefore, the findings cannot be transferrable to a UK setting.

The rejection of both midwifery and medical models of birth demonstrated a mistrust that the women’s needs for childbirth within the context of their maternity provision would not be met. They felt that the current midwifery and obstetric practices were riskier than freebirthing. Furthermore, through the process of discovering freebirth, the women demonstrated their own risk assessment and it emerged that they had a strong faith in the physiology of an undisturbed birth. There was a prevailing sense of choosing to freebirth in order to retain choice, control and autonomy over their bodies during the birth process. Furthermore, in a

wider context, the original authors' interpretation of women choosing to freebirth in order to exert their agency over their bodies provides a useful insight into how freebirthing is framed within the context of the local maternity practices.

This metasynthesis clearly demonstrated the women's criticism of the biomedical model of childbirth, however, this criticism is not unique to these women. It is a longstanding contentious debate by a number of feminist writers (Davis-Floyd et al, 2009; Walsh, 2009; Hunter, 2006; Symon, 2006; Kitzinger, 2005; Odent, 2003).

These writers argue that the medical model of birth is based upon a male dominant mechanistic Cartesian philosophy, where the woman's body is attended to like a machine, where parts can be separated in order to be 'fixed'. In turn, this leads to women's experiences and the bio-psychosocial aspects of birth being marginalised over the medical care provided (Walsh, 2009; Kitzinger, 2005).

The rise of obstetric practice was believed to reflect the industrialisation of developed countries and the growing economics of production whereby technology, medicine and subsequently hospitals were seen to provide improved efficiency as well as improved safety (Martin, 1987). The impact of the biomedical model has been felt internationally with rising obstetric interventions (Renfrew et al, 2014). Of particular concern are wide variations of CS and operative births, as these medical procedures are associated with physical and psychological morbidity (Renfrew et al, 2014).

However, what is unique to the findings of this metasynthesis is the women's rejection of the midwifery model of birth. This must be contextualised, that the midwifery provision available to these women, may be different to how it is provided within the UK, perhaps impacting upon the women's decision-making. Although, internationally, the midwifery model is cited to be grounded in a holistic approach which ascribes equal importance to women's bio-psychosocial and physical needs (International Confederation of Midwives, 2014), in practice in various countries, this may not be the case (Renfrew et al, 2014).

It defines normal childbirth outside of an illness model and sees its role largely as supporting and enabling the woman to utilise her own resources, and only intervening when the physiology deviates from 'normal' (Renfrew et al, 2014). Considerable evidence supports the midwifery model of care. Four different Cochrane reviews, totalling 53 randomised controlled trials and over 50,000 women, demonstrate key interventions, such as continuity of midwifery care (Sandall et al, 2013), continuous support during labour (results were pooled with midwives, lay supporters, and semi-professional supporters) (Hodnett et al, 2013), midwife-led care (Sandall et al, 2013) and alternative birth setting (Hodnett et al, 2013) lead to positive outcomes.

These outcomes relate to reduced obstetric intervention, for example, induction, augmentation, monitoring, analgesia, episiotomy and instrumental deliveries. Furthermore, women had an increased number of vaginal births and greater satisfaction without any adverse effects to either mother or baby. However, barriers to implementing this model of care are well known, and will be discussed further.

It is of particular interest to maternity providers, that the women in these studies rejected this model of care. For some, they simply felt a midwife was unnecessary, for others they had a previous bad experience and for others they regarded the midwife as the first stage of intervention. This was felt to be detrimental to the flow of birth, and indeed the women used this an example of their own risk assessment; that a midwife as the first step of intervention was riskier than going it alone. These themes are particularly challenging for maternity professionals – it challenges the current norms and expectations of a midwife's role while attending the birthing mother. This is particularly topical as maternity professionals are being challenged to justify their practices which have become socially encultured, rather than based upon firm evidence (Renfrew et al, 2014).

Furthermore, it can be argued that the dominance of the biomedical model has had a direct influence upon the implementation of the midwifery model of care. Structural and organisational hierarchies (Sheridan, 2010; Healthcare Commission, 2008; Department of Health, 2007; Walsh, 2006), limited resources and increased focus on risks and litigation (Edwards and Murphy-Lawless, 2006; Symon, 2006; Walsh, 2006) all lead to situations where midwifery models of care are not always followed in practice. Midwives often feel disempowered by organisational constraints which have adverse effects upon their own wellbeing, as well as the care that they provide to women (Ball et al, 2003). For some women care is fragmented, unduly medicalised and their choices are not prioritised (NCT, 2009; Healthcare Commission, 2008).

Gaps in the literature

The studies identified in this literature review were based in the US (n=3) and in Australia (n=1). There are notable differences between maternity provision between those two countries and the UK. Consequently, the findings of the metasynthesis cannot be transferrable to other settings, leaving a gap in terms of understanding this phenomenon and its occurrence from a UK perspective. As previously stated, there is clear anecdotal evidence demonstrating that the practice occurs in the UK, but to date, there is no primary research exploring the phenomenon. Given the potential risks to mother and baby, it is an important topic to explore further and justifies primary research being undertaken in a UK setting.

Implications for practice

For some, within their particular context of maternity provision, the biomedical model of childbirth is clearly not acceptable, therefore, it is important practitioners identify and address these women's bio-psychosocial needs. Even the midwifery model of childbirth is apparently not satisfactory, suggesting the gulf between the midwifery philosophy of care and that which is currently practised needs radical attention. For some women, a previous negative experience with maternity care provision motivated their decision to freebirth. It is, therefore, important that maternity service providers improve the quality of care provision so women

feel dignified, supported, and are participatory in the care that they receive.

Conclusion

This metasynthesis provides a unique contribution to the body of knowledge of the relatively unknown phenomena of freebirthing. It illuminates complex decision-making

and the various motivations that drive women to make this radical choice; these insights contribute to the debate and discussion about the current childbirth discourses and how this impacts women's birthing decisions. Furthermore, it has provided the platform for the current qualitative study exploring women's choice to freebirth in the UK which will be published as part two of this work.

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Midwives' experiences of working in a new service delivery model: the next birth after caesarean service

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Funding support was received from the Nursing and Midwifery Office within the Health Department of Western Australia and the Western Australian Nurses Memorial Charitable Trust.

Abstract

Aim. The next birth after caesarean service is a midwife-led service for women who have experienced a previous CS and includes a small skilled midwifery team embedded within a collaborative network. The antenatal service integrates continuity of midwifery care and provision of evidenced-based information. The study aim was to describe midwives' experiences of working in the new service.

Method. A descriptive qualitative design was used. Six midwives, who had worked in the service since its establishment, whose experience ranged from three to 30 years and who had worked previously in continuity of care models, were invited to participate in a face-to-face recorded interview. Thematic analysis was used. To ensure credibility and trustworthiness of the analysis, all members of the research team reviewed the transcripts and contributed to the development of emerging themes. Ethical approval was granted by the King Edward Memorial Hospital for Women ethics committee and Curtin University.

Findings. Four themes were identified. 'Getting to know the women' sets the scene with the midwives' perceptions of working in a new midwife-led model of care and the enhanced opportunity to get to know women. 'Layers of support' illustrates how midwives value women's choice and the support of midwifery colleagues. 'Under scrutiny' reflects the attention directed towards the service and their midwifery practice. 'Facing the challenges' describes issues around the day-to-day operation and the physical environment, including challenges for the future of the service.

Conclusion. Midwives expressed satisfaction in being able to provide antenatal continuity of care. They felt rewarded in their relationships with women and their colleagues, being able to provide information and support and having an opportunity to grow professionally. Although facing a medically-focused system of maternity care, midwives wanted to redefine care to be responsive to the needs of the women, rather than the institution. Sharing their experiences in overcoming challenges may offer insight and inspiration to other midwives facing opportunities for innovation.

Key words: Midwifery-led care, midwives' experiences, caesarean section, evidence-based midwifery

Introduction

Midwives play a major role in the care of women during pregnancy, labour, birth and the postnatal period. While continuity of midwifery care is popular, with benefits such as increased maternal satisfaction, lower rates of CS and epidurals and higher rates of breastfeeding, there remains limited research into midwives' experiences of working in these models (Edmondson and Walker, 2014).

Within existing research, recurring themes around increased autonomy and job satisfaction are beginning to emerge regarding midwives' experiences within midwife-led models in birth centres and midwifery group practices (Carolan-Olah et al, 2014; Edmondson and Walker, 2014; Gu et al, 2011). Chinese midwives providing continuity of care described a positive relationship with women, greater job satisfaction and personal and professional achievement (Gu et al, 2011). Midwives working in a midwifery group practice in Australia expressed satisfaction from providing continuity of care and building relationships with women and their families; they also appreciated the opportunity to

practise autonomously (Collins et al, 2010). An Australian study of seven midwives' experiences of working in a birth centre revealed five themes: autonomy of practice, good work-life balance, guidelines for practice, effective working relationships and continuity of care (Edmondson and Walker, 2014). These findings build upon the work by Carolan-Olah et al (2014), which identified two themes involving a supportive environment and midwifery attributes when exploring the experiences of 22 midwives working in an Australian public maternity hospital. Additional themes related to the barriers to providing continuity of care included time pressures, working in a risk adverse culture and women's expectations (Carolan-Olah et al, 2014).

In response to concern about the rising CS rate in Western Australia (WA), which was 33.6% in 2010 (Joyce and Hutchinson, 2012), and limited services for women wanting a vaginal birth after a caesarean (VBAC), an innovative clinical practice initiative, the next birth after caesarean (NBAC) service was started in 2008 at King Edward Memorial Hospital (KEMH). KEMH is WA's only tertiary public

maternity hospital and provides care to approximately 6000 childbearing women annually. The NBAC service includes a small skilled midwifery team embedded within a collaborative network. This antenatal service integrates continuity of midwifery care and provision of evidence-based information to facilitate awareness of options such as a VBAC or repeat CS. Information about birthing options is provided and, regardless of women's chosen mode of birth, they continue antenatal care in the clinic unless ongoing specialist medical care is indicated. Findings from a comparative study show that providing pregnant women using the NBAC service with evidence-based birth option information increased their knowledge, confidence and satisfaction with care (Martin et al, 2014).

Introduction of new models of care necessitates exploration of their impact on midwives working within the model. This information is 'crucial to the development of such initiatives, as their success is partly based on the midwives' attitudes to their professional role and whether or not they enjoy working in a new system of care' (Turnbull et al, 1995: 117).

Aim

The study aim was to describe midwives' experiences of working within the NBAC service.

Method

A descriptive qualitative design was selected. By its nature, qualitative research is applicable to midwifery practice (Streubert and Carpenter, 2011). Qualitative researchers adopt a person-centred and holistic perspective. The descriptive mode of qualitative enquiry allows for understanding of a life situation and is relevant to any study that aims to discover and recognise the richness of human experiences (Schneider et al, 2013; Pope and Mays, 2006). Moreover, Schneider et al (2013) suggest that qualitative methodology is also useful in the exploration of change or conflict. Approval to conduct the study was obtained from King Edward Memorial Hospital ethics committee (1469/EW) and the human research ethics committee at Curtin University. This study was part of a larger evaluation of the NBAC service, which examined specific outcome variables for women attending the service (Martin et al, 2014).

The NBAC service was established with a core group of six midwives, who had worked in the NBAC clinic since its establishment. They were invited to participate in a face-to-face tape-recorded interview. While midwives were assured that their data would be treated with the utmost respect and de-identified, the research team also considered the possibility that the midwives' contribution may be recognised, given the small number of participants and unique nature of the service. All the midwives were aware of this potential consequence and remained committed to participate.

A non-midwife research associate, not affiliated with the service, conducted the interviews. This approach afforded a degree of distance to enhance analysis and the interpretation of the findings for the research team who were all midwives (Pope and Mays, 2006). The research team included five midwives: one clinical manager, two education-focused

midwives and two research midwives. The following questions were asked: 'Why did you want to work in the NBAC clinic?' 'What was your experience of working in the NBAC clinic?' and 'What were the challenges of working in the NBAC clinic?' Interview transcripts were de-identified and a coding system used to provide confidentiality.

Thematic analysis was used to analyse the interview data. The thematic data analysis process reflected what Polit and Beck (2010) describe as 'editing analysis style'. This began with listening and reading the verbatim transcripts and then editing them for flow. Line-by-line coding was used to reduce the data into concepts (Polit and Beck, 2010). Once the data were effectively 'pulled apart', a process of grouping like concepts was started and statements were clustered into themes and organised in a pattern (Streubert and Carpenter, 2011). The research team analysed all the transcript data to ensure credibility and trustworthiness of the analysis, the emerging themes were discussed and disagreements negotiated by referring back to the transcripts. Data saturation was achieved despite the small sample. Member checking in the form of a presentation of the preliminary findings was delivered to four NBAC midwifery participants who confirmed that the themes accurately reflected their experiences.

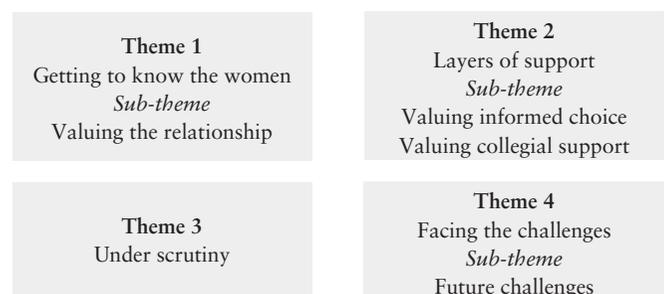
Findings

The six midwives interviewed ranged in age from 30 to 52 years, with midwifery experience ranging from three to 30 years. Three completed their midwifery education in Australia, two in the UK and one in Europe. All had previously worked in continuity of care models across the childbirth continuum. Four themes emerged (see Figure 1). 'Getting to know the women' provides insight into perceptions of working in a new midwife-led model of care. The NBAC clinic provided midwives with the opportunity to get to know the women, as they saw the same women throughout their pregnancy. One of the reasons offered for joining the service was the ability to get to know the women and provide continuity of care. All expressed satisfaction at getting to know women and building trusting relationships:

"There is the continuity as well, you see the ladies a few times during the antenatal visits and after a while we just sit and chat and that's really nice" (midwife 1).

Midwives considered that providing continuity of care was not only beneficial for women, but also for themselves.

Figure 1. Themes and sub-themes: Midwives' experiences of working in a new service delivery model



They were able to better assist women achieve their goal to have a safe and satisfying birth, but also understand their individual needs. Continued contact when providing continuity of care helped them grow professionally.

'Valuing the relationship' was a sub-theme under 'Getting to know the women'. Participants felt their role was valued by women, which assisted relationship building:

"They do quite like seeing the same practitioner and they feel cared for and also nurtured; that's what they are telling me" (midwife 3).

One participant described being part of the NBAC clinic as *"a step forward"* both professionally and personally:

"You know your women... it's more, what's the word, satisfying for you and for them" (midwife 4).

Midwives described the importance of feeling like they were truly supporting women:

"They want that support antenatally and that we are on their side – they've got to be supported and not judged... if I can do this, I've done a good job" (midwife 6).

The second theme, 'Layers of support', describes how midwives felt valued and supported by women and each other. The first sub-theme related to supporting women and valuing choice and the second sub-theme was associated with midwives supporting each other, being on the same page, having the same focus and working with the same philosophy. The concept of providing information to the women was to enable informed choice and reflected the first sub-theme of 'Valuing informed choice':

"It is an important part of the clinic to offer women choice, informed choice" (midwife 5).

NBAC midwives appreciated talking with the women about their previous experience:

"Many women don't really understand why they had their previous section... they have no previous understanding at all; it's the first time that they actually heard" (midwife 5).

When asked how they perceived women reacted after receiving the information, they used words such as *"enlightened"* and *"informed"*:

"It's like a light bulb goes off in the woman's mind," (midwife 4).

'Valuing collegial support', the second sub-theme, reflected the importance and satisfaction gained by midwives feeling supported by each other and senior staff. All midwives *"liked being part of a very supportive and nurturing team"* (midwife 3). Participants used words such as *"approachable"*, *"collegial"*, *"supportive"* and *"facilitative"* to describe the role of the coordinator and the manager of the service played:

"I think the support that has come from the coordinator and from the manager has been superb" (midwife 3).

Having student and graduate midwives coming through the clinic and promoting its philosophy was also reassuring.

Working with like-minded midwives provided an opportunity to discuss ideas and debrief about issues:

"Not only collegially, but professionally as well... working in the team has been absolutely great" (midwife 3).

The midwives reiterated the benefits of being part of a cohesive team that was supportive and nurturing and one where they all helped each other. One midwife spoke of a

medical officer who was very supportive of the clinic:

"The doctors' responses have always been very positive... the senior registrar was really fantastic about the information she gave the woman" (midwife 5).

The third theme, 'Under scrutiny', outlined experiences of feeling targeted or under scrutiny. While this did not seemingly undermine the midwives' sense of satisfaction, it did initially create some tension and the team worked hard to put it in perspective while supporting each other:

"Many midwives don't understand the clinic and what we are trying to do... some midwives hate us" (midwife 5).

Once the service started, it became clear that there was going to be significant attention directed towards those working in the service:

"[There was a] feeling really that the clinic was a new clinic, it was being heavily scrutinised... it was a new clinic; I was so wanting to do the right thing" (midwife 3).

Knowing there was going to be constant surveillance was unsettling, but perhaps not as disconcerting as a perceived level of lack of medical support from some colleagues:

"The overall obstetric antagonism was very destructive... I found the obstetric people intimidating" (midwife 2).

There was an escalating sense of animosity and negativity, with the midwives feeling increasingly anxious and afraid of doing something wrong:

"I must just be extremely mindful of women's situations and I read the special instructions sheet much, very, very carefully now" (midwife 3).

The effect of this surveillance was hyper-vigilance. Midwives talked about taking on additional administrative duties, so the service would not be jeopardised if something was missing from a woman's medical record. There were also occasions when they described feeling unsupported and undervalued, particularly in the early set up and operation of the service:

"It didn't feel we were starting something in a supportive environment at all" (midwife 4).

This was expressed as lack of feedback, lack of communication and lack of acknowledgement from some medical and midwifery colleagues:

"This continued silence, negativity, lack of collaboration... midwifery initiatives are not accepted, recognised or included... and there would be comments like 'you know the NBAC clinic think they are so special'" (midwife 2).

Eventually, barriers began to be eroded:

"They started to realise and see that what we're doing is actually really good... staff who come down here give us really positive feedback and that has been encouraging" (midwife 3).

The final theme, 'Facing the challenges', explored issues midwives experienced in relation to time management and the physical environment noted as the space and not enough time. The service was co-located in one of the older buildings, separate from the mainstream antenatal clinic, but sharing the space with other outpatient clinics. On days when there was more than one clinic running, space was at a premium:

"We have to work around the other clinics that are working on the day and we often don't have rooms"

available" (midwife 5).

Managing time was another concern:

"There is lots to talk about and lots to discuss and in a 15-minute appointment, it is really difficult to cover all of that" (midwife 3).

'Future challenges' was a sub-theme about the service providing continuity of care during pregnancy, but midwives not having the opportunity to follow women across the childbirth continuum. One participant said:

"[There is] huge potential for this model to continue for women throughout their labour and birth" (midwife 2).

Participants saw this as a challenge, rather than an obstacle:

"We need to be a bit creative around how else we can provide the level of support for women" (midwife 3).

Discussion

Developing meaningful relationships with women

Our qualitative findings confirm that providing continuity of care and developing a positive relationship with women, especially across the antenatal period, are key in promoting job satisfaction. This supports the growing body of evidence on the benefits of continuity of carer models for not only women, but also midwives (van Kelst et al, 2013; Freeman, 2006; Lavender and Chapple, 2004; Walker et al, 2004; Page, 2003; Watson et al, 2002). The concept of job satisfaction resulting from a continuity of care model supports Australian research involving 32 midwives who highlighted the importance of developing a trusting relationship and getting to know the woman to enhance woman-centred care (Homer et al, 2008).

Women valuing midwives supporting women

Participants confirmed feeling valued by women, which supports evidence indicating that midwives feel more valued in continuity of care models than in routine, fragmented models of care (McCourt et al, 2006; Sandall, 1998). Early work by Sandall (1997) suggests that providing continuity of care was a major source of satisfaction to all midwives, while the inability to develop meaningful relationships with women was a source of frustration and stress.

Enhancing practice

NBAC midwives were able to practise in an antenatal continuity of care model and provide consistent evidence-based information relevant to each woman's past experience. Homer et al (2008) suggest that midwives who work within a continuity of care model may gain a sense of authority in their role and responsibility for those in their care. By knowing the woman personally, the midwives were able to question and challenge decisions, as they could see how decisions affected the woman. Another Australian study found that midwives who have that sense of autonomy and expanded scope of practice have the potential to deliver woman-centred continuity of care, increase their work satisfaction while promoting professional autonomy and responsibility (Watson et al, 2002). Choice and control are central concepts of woman-focused care (Carolan and Hodnett, 2007). Information

provided by NBAC midwives was tailored for each woman, which supports the work of Page (2003) who described continuity of care as being multi-dimensional, with informational continuity being one of these dimensions.

Contested relationship

Midwives perceived a level of negativity and resentment during the initial implementation of the service. Homer et al (2008) describe this phenomenon occurring with the introduction of new models, which place the midwives working in that model in the spotlight. Midwives working in a midwife-led model in Queensland identified situations where there was a pervasiveness of professional hierarchy, which included constant surveillance from management, midwives and obstetricians and being blamed for situations that already existed (Walker et al, 2004). Conversely, midwives providing standard care may feel resentful as it is not seen in a positive light; by association they are perceived in this context and may be resentful towards those who are working in continuity type models (Homer et al, 2008; Watson et al, 2002).

An English study found midwives working in continuity of care models sensed the reluctance of their midwifery colleagues to engage with the new model, which created criticism and conflict (Pollard, 2011). Few studies have evaluated the impact of continuity of midwifery care on the core midwives who are affected by the introduction of these models (Walker et al, 2004). For NBAC midwives, effective collaboration was limited by tensions over role boundaries and power; skills and qualities that form the basis of professional courtesy need to be recognised as essential to good collaborative practice (Skinner and Foureur, 2010). Having a shared commitment to continuity of care and effective relationships is well described (Skinner and Foureur, 2010; Homer et al, 2008; Hollins et al, 2006). What is not well articulated is the commitment to women-centred continuity of care between midwives and obstetricians. Collaboration with obstetricians is possible, but there needs to be further work to describe successful collaboration and how it might be fostered.

A new service operating in an old system

The environment was noted as a negative aspect related to sharing space and resources. There is little information about the continuum of care in relation to place; which may include the home, a community facility or a hospital (Kerber et al, 2007). However, it is suggested that midwives working in a continuity of care model need a place 'they can call home' (Homer et al, 2008: 9). Ideally, midwives working in this model should have premises in the community to increase accessibility for women. Findings from an English study suggest that midwives working in a dedicated place, such as a freestanding unit, had a better relationship with women and their families and greater job satisfaction (Lavender and Chapple, 2004).

In addition to space, time to meet the demands of the service and the needs of the women was a concern. Women who have had a traumatic birth experience and subsequent

fear of childbirth require extra support and resources (Salomonsson et al, 2010). Identifying women who have fear of childbirth is time-consuming and often requires extra assessment by the midwife and time to talk through past experiences. Evidence recommends that twice as much time is needed for implementing a new model providing antenatal care (von Both et al, 2006). NBAC midwives acknowledged the time required to truly provide woman-centred care.

Limitations

There is variation in the definition and measurement of continuity of care models, which in this study only relates to the antenatal period. Findings from this study represent the experiences of NBAC midwives working in one WA service and cannot be generalised.

Conclusion

Participants identified key themes in their experience of working in the NBAC service. Their satisfaction of providing antenatal continuity of care to women who had experienced a previous CS was rewarding, including the relationships with the women, the information and support they were able to provide and the collegial relationships. Challenges around professional discord to conform to a medically-focused system of maternity care contributed to feeling unsupported during the early stages of the service. Despite challenges, the midwives were optimistic and saw the NBAC service as an opportunity to enhance and promote woman-centred, midwife-led continuity of care. It is hoped that sharing experiences in overcoming challenges may offer insight to other midwives facing opportunities for innovation.

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Community midwifery care and social care pathways

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The authors would like to thank the community midwives who agreed to participate in the survey and took the time to complete the questionnaire and the staff at the West Midlands Perinatal Institute, particularly Ian Bird, for administrative support.

Abstract

Background. Social issues are an important aspect of maternity care. In 2008, Birmingham Health and Wellbeing Partnership commissioned the West Midlands Perinatal Institute to conduct a regional confidential enquiry into perinatal deaths. As the majority of pregnancy care takes place in the community, a questionnaire accompanied the enquiry in order to give background information concerning workload as well as perceived confidence and competence of community midwives (CMWs) in giving care.

Aim. To investigate how well CMWs considered themselves able to deal with social issues and care.

Method. A retrospective total population semi-structured postal questionnaire about community midwifery was developed, incorporating workload and provision of care, as well as specific questions about social issues and confidence in making referrals or providing care. All community midwives (n=278) working in six large inner city maternity hospitals in the West Midlands between 2008 and 2009 were sent a questionnaire. As part of a confidential enquiry into perinatal deaths in the West Midlands, ethical approval was not deemed to be necessary.

Findings. A total of 213 (77%) of the questionnaires were returned. The majority of the respondents were experienced midwives; 153 (72%) had been qualified for over 10 years, although 71 (33%) had been working within community for less than five years. There was wide variation in knowledge of social care pathways, and in the confidence and compliance of their use. Pathways where CMWs had the highest knowledge were child protection, mental health issues, drugs and alcohol, smoking and teenage pregnancy. All of these areas had high rates of referrals. There was, however, a lack of knowledge of social care pathways for women with physical and learning difficulties, new migrants and asylum-seekers, and those claiming benefit and with housing issues. These areas had low referral rates, and referrals were not consistent with available care pathways.

Conclusion. There appeared to be a large disparity in social care offered by CMWs across the trusts surveyed. Many CMWs considered that they were not able to appropriately manage women with specific social needs, most notably new migrants or asylum-seekers and women with learning or physical disabilities. The study highlights the need for clear, standardised social care pathways, as well as training and ongoing support to improve quality and equity of care both within and across trusts. This may also increase CMWs' confidence and competence to appropriately identify and support vulnerable women.

Key words: Community midwife, confidence, social care pathway, vulnerable women, referrals, community midwives' perceptions, evidence-based midwifery

Introduction

Community midwives (CMWs) provide the majority of antenatal and postnatal care for mothers and almost all care for those who choose home birth. With the rise in birth rate over the last decade (Office for National Statistics, 2013), an increasingly high-risk maternal population (Tyler, 2012) and a propensity to discharge from hospital as quickly as possible, it would also appear that the community workload has increased.

Maternity care aims to be safe, accessible, supportive and individualised, particularly for those considered vulnerable (Department of Health (DH), 2009). Women with social risk factors need to be identified and appropriately supported, as there are well-documented links between social deprivation and increased risk to health, including a higher risk of poor outcomes in pregnancy (Schölmerich et al, 2014; RCN, 2012; Francis et al, 2009; Lewis, 2007).

Francis et al (2009) suggest a correlation between the high deprivation rates within the West Midlands and the high stillbirth and infant mortality rates. Additional social support

for vulnerable women during pregnancy has not been shown to reduce mortality rates, but improves outcomes, such as reductions in antenatal admission rate and CS rate, and increased satisfaction with services (Hodnett et al, 2010). There may also be a reduction in incidence of postnatal depression associated with more frequent visits over a longer period of time (MacArthur et al, 2002).

CMWs' competency and confidence, however, in routinely assessing women's general social care risk at booking or their ability to appropriately signpost women is not known. Furthermore, while there is a NICE guideline on what is considered social risk (NICE, 2010), trusts appear to still vary in their interpretation and provision of services for these vulnerable groups.

Midwives have always had a public health role; this aspect of care is becoming more central to the profession, rather than being seen as a specialist area (McNeill et al, 2012; DH, 2010). This is partly due to an increasing understanding of the close relationship between social, psychological and physical health (Helman, 2007). It is also because midwives

are widely considered ideally placed to discuss wider health issues with families (DH, 2009). Additionally, pregnant women expect and accept that they will be asked about social factors or related health issues (Salmon et al, 2013; Taylor et al, 2013). This period is considered a ‘window of opportunity’ to improve the overall health status of the family and this more relational health promotion and holistic aspect of care often appears to rest with CMWs.

There is a gap in the research regarding how well CMWs consider themselves able to fulfil this role, and a lack of information regarding what factors influence CMWs’ ability to give appropriate care. Likewise, there is a lack of information about perception of the role.

The aim of this study was, therefore, to give an insight into the overall working practices of the CMW in order to increase understanding of the role: workload, knowledge, confidence and competencies, as well as what influences a CMW’s ability to fulfil the role. In this paper, the aspect of social care will be discussed.

Method

A retrospective total population semi-structured questionnaire was developed to obtain both quantitative and qualitative data. It included four sections:

- General community work
- Midwifery care and service provision
- Knowledge, skills and training needs for social care pathways
- Job satisfaction, stress and perceived support.

Pilot

The questionnaire was piloted in one trust (n=15) in order to assess the acceptability and clarity of the questions. As only minor changes were subsequently made, the piloted responses were included in the main findings.

Inclusion criterion

Midwives needed to be currently working in the community at the time of the questionnaire distribution. There was no exclusion criterion.

Sample

All CMWs (n=278) working in participating trusts (n=6) in the West Midlands were sent a questionnaire and a prepaid response envelope to their workplace address. The study took place over a period of one year (2008-09). Non-responses were followed up with a reminder letter and then a telephone call, if applicable.

Ethical approval

The questionnaire was part of a confidential enquiry into perinatal deaths in the West Midlands, commissioned by the Birmingham Health and Wellbeing Partnership in 2008, and carried out by the authors as employees of the West Midlands Perinatal Institute, an NHS organisation funded by primary care trusts until 2013 (West Midlands Perinatal Institute, 2011). As an evaluation of current community midwifery practice was agreed by each of the trusts involved

in the enquiry, ethical approval was not deemed to be necessary. The questionnaire was considered to add valuable background information to the perinatal death reviews in terms of midwives’ caseloads in the trust, as well as in perceived confidence and competence in caring for women.

Data analysis

Quantitative data from the questionnaire were inputted onto Microsoft Access and then analysed using Microsoft Excel software. The qualitative data were collected and thematically coded by the lead researcher and cross-checked by another researcher in the team to ensure consistency and accuracy (Polgar and Thomas, 2013).

Findings

The overall response rate was 213 (77%). The majority of the respondents were experienced midwives; 153 (72%) had been qualified for over 10 years, although 71 (33%) had been working within community for less than five years (see Table 1).

Routine midwifery care

The average (mean) caseload was 148 (range of 127 to 187) per whole-time-equivalent CMW across the trusts during 2009 (see Table 2). Many respondents also raised the issue of high and/or complex workloads:

“Workload in community has increased. Ever-increasing, comprehensive info giving is important and necessarily time-consuming... High standards is our aim, time to achieve this is imperative” (Q338).

“Approx 224 caseload shared by two part-time midwives

Table 1. Length of time qualified as a midwife and working in the community

Years	Length of time qualified as RM		Length of time as CMW	
	Number	%	Number	%
<1	0	0	15	7.0
1 to 5	26	12.2	56	26.3
6 to 10	30	14.1	47	22.1
11 to 15	22	10.3	45	21.1
16 to 20	50	23.5	28	13.2
21 to 25	40	18.8	12	5.6
>25	41	19.3	7	3.3
Not answered	4	1.8	3	1.4
Total	213	100	213	100

(0.6 each)” (Q079).

“My caseload is 186, very complex with a high number of asylums, drug users, mental health and child protection issues. I love my job, however, this trust is very unsupportive and takes the view of ‘just get in and do the job’, which is not helpful at all” (Q205).

Most midwives conducted booking appointments both in the home and in a clinic setting and while there was a wide range (10 to 90 minutes) of time spent conducting booking appointments, on average women were given more time at home, compared to clinic. It appeared that clinic appointments were generally considered too short, while those conducted at home were more relaxed. The most frequent (mode) length of time for routine antenatal appointments was 11 to 20 minutes:

“Ten-minute appointments, no time for parent education” (Q023).

“Generally not enough time allocated for appointments as consultations invariably take longer... Need more time to enable a more thorough and satisfying consultation for women and midwife” (Q339).

“Booking at home leaving plenty of time to do” (Q168).

Postnatal visits were on average (mean) 24 minutes, but some midwives expressed concern at the limitations that were placed on postnatal visits:

“Not enough visits are performed postnatally and those that may well be rushed due to workload” (Q018).

“Limited visits now due to time; postnatal clinics being utilised” (Q337).

“I find it a worrying trend towards increasing reduction of postnatal care for example x trust do three postnatal visits. Worrying situation for problems breastfeeding, jaundiced babies, mental health, to name but a few” (Q168).

Social care

There was high awareness from CMWs of available local or trust support for some social risk factors including smoking (100%), pregnant teenagers (95%), child protection (95%), mental health issues (95%), drug/alcohol misuse (95%), domestic abuse (90%) and non-English speakers (81%) (see Table 3).

Many CMWs were also confident to manage smoking (97%), teen pregnancy (89%), child protection (87%) and mental health issues (82%):

“Have given them appropriate information and contact numbers” (Q079).

“I regularly refer and have many leaflets” (Q024).

“Ongoing training [re: domestic abuse]. Pack with contact numbers for each midwife” (Q176).

However, for other social risk factors, there was a lack of awareness and confidence regarding management of issues:

“Despite training still find this subject [domestic abuse] hard to deal with” (Q147).

“Generally often feel rushed and don’t have enough time

Table 2. Caseload per whole-time-equivalent (WTE) CMW by trust during 2009 (Kuypers, 2009)

Trusts	Total births	No of WTE CMWs	Annual caseload per CMW	No of WTE needed	No of extra WTE CMWs needed	
A	7296	49.9	146.2	74.4	24.5	32.9%
B	3533	24.1	146.6	36.1	12.0	33.2%
C	7585	52.6	144.2	77.4	24.8	32.0%
D	3527	25.8	136.7	36.0	10.2	28.3%
E	5633	30.1	187.1	57.5	27.4	47.7%
F	5664	44.5	127.3	57.8	13.3	23.0%
Total	33,238	227	148.0	339.2	112.2	33.1%

to deal with complex issues. Don’t feel confident, never have referral forms” (Q031).

“Don’t always feel I have the right words” (Q031).

The social care pathways that were best known were child protection (95%), mental health issues (87%), drugs and alcohol (83%) and smoking (77%).

“Fairly good referral route in this area” (Q040).

“Specialist midwife is available for discussion of concerns” (Q049).

The social care pathways least well-known were inadequate housing (9%), claiming benefit (11%), new migrants or asylum-seekers (15%) and managing women with a disability (23%):

“Having a clear pathway of appropriate referrals would be helpful – benefits/housing issues do seem to change frequently” (Q158).

“Community mental health support appears to be stretched and it’s difficult to make urgent referrals too” (Q048).

These care pathways also had a correspondingly high rate of CMWs who had never made a referral (25%, 31%, 62% and 65%, respectively). CMWs made referrals to a variety of places on identification of social risk factors (see Table 4). The most consistent referrals were for smoking (to smoking cessation) and obesity (to the obstetric consultant and/or dietician). In contrast, for women with disabilities and new migrants or asylum-seekers, where there were referrals, they were often generic and multiple, such as to the health visitor, GPs, safeguarding midwife and children’s centres:

“I regularly refer... the more HPs [healthcare professionals] involved the better” (Q018).

“Have excellent support from safeguarding midwife” (Q170).

Considering that CMWs were aware and confident in some areas of social care, the majority still wanted further training, in particular for new migrants and asylum-seekers (87%), women with disabilities (87%), benefits (84%),

housing (82%), domestic abuse (82%) and obesity (81%):
 “More knowledge [of domestic abuse] would hopefully benefit the women” (Q152).
 “Find this a difficult subject [obesity] to talk to women about. I don’t know who to refer to – training is needed” (Q141).

There appeared to be different social issues training available for CMWs across trusts with the exception of child protection, which was conducted in each trust. While training was provided, it was often considered to be good, but not consistent. Additionally, midwives were sometimes

unable to attend due to workload:
 “Already excellent training [in mental health] available through trust” (Q112).
 “Had training in past, would like this regularly” (Q241).
 “We have regular training sessions [child protection]” (Q190).
 “Would like to be updated, but not released to do so, as workload too great. No one able to take over” (Q324).

Attitudes toward social care

There was a range of attitudes from CMWs that emerged from the qualitative data concerning social factors. The majority flagged up a lack of time for all aspects of community care, including social issues. Many CMWs wanted to give effective support and care, and where referral pathways were not available, improvised using experience and local knowledge.

Others appeared to not want to get involved. Attitudes and reactions towards social care appeared to fall into four main categories:

- Advocate (often going the extra mile):
 “Support and access appears to be very poor for those women [asylum-seekers] – had to beg, borrow and steal basic equipment after discharge from hospital” (Q047).
 “Have wrote numerous letters on behalf of patients to housing depts etc [sic]” (Q154).
 “Own help, offering forms and going through form with patient” (Q035).
- Stressful (complex and ever-changing):
 “Drugs, child protection issues, deprivation, poverty, mental health issues are what for me cause the biggest stress” (Q330).
 “Feel anxious, in case under- or over-react when making referrals” (Q158).
 “Referrals can be made, but only for women who live in certain areas” (Q140).
 “Communicating with social services can be very frustrating” (Q190).
 “Don’t think [there] is much support available, very difficult” (Q160).
 “I have always ref [sic] to M/W at Sure Start, but no M/W now” (Q024).
 “Programmes start, funding ends, then gap until new project begins. Lack of continuity” (Q354).
 “Due to amount of applications now informed not to book interpreters, too costly for GPs” (Q039).
- Unwanted time-consuming additional role:
 “Lots of social issues deflecting away from midwifery role, sometimes feel like a social worker” (Q192).
 “Generally exhausted and frustrated with the role expanding into social carer” (Q346).
 “The time to deal with these complex issues as well as giving routine AN care would help” (Q031).
 “Can double appt [sic] time with language problems, but no extra time allotted” (Q346).
 “Thank god for pregnancy outreach workers because now at least I’ve got someone I can refer to and leave

Table 3. Awareness and knowledge of social care pathways

Social risk factors	Response total	Aware of available support	Confidence to manage issue	Knowledge of care pathway	Never made referral	Needs training
Smokers	n=211	211	201	156	5	103
	%	100	95.3	73.97	2.3	48.8
Teen pregnancy	n=211	201	184	149	9	134
	%	95.3	87.2	70.6	4.3	63.5
Drugs/ alcohol	n=210	199	145	165	26	160
	%	94.8	69.0	78.6	12.4	76.2
Obesity	n=209	141	123	107	60	162
	%	67.5	58.9	51.2	28.7	77.5
Claiming benefit	n=209	121	89	22	60	171
	%	57.9	42.6	10.5	28.7	77.5
Inadequate housing	n=207	97	68	18	46	165
	%	46.9	32.9	8.7	22.2	79.7
New migrant /asylum-seeker	n=206	74	49	30	117	168
	%	35.9	23.8	14.6	56.8	81.6
Non-English speakers	n=211	171	147	63	40	128
	%	81.0	69.7	29.9	19.0	60.7
Physical/ learning disabilities	n=207	61	47	45	122	171
	%	29.5	22.7	21.7	58.9	82.6
Mental health issues	n=208	198	168	172	7	149
	%	95.2	80.8	82.7	3.4	71.6
Domestic abuse	n=210	190	137	155	56	147
	%	90.5	65.2	73.8	26.7	70.0
Child protection	n=212	201	181	196	11	140
	%	94.8	87	95.4	5.2	66.0

them to it” (Q031).

- Intentionally ignoring:

“Not had a lady tell me she is a victim [of domestic abuse] or had reason to think she is” (Q121).

“Working in an affluent area I would possibly have forgotten the contents of any concerns related to these topics before I would need to use the service [mental health]” (Q024).

“Unsure of how to [claim benefit] and usually women already have forms etc” (Q038).

“Have had no need in caseload [to make referrals for non-English-speaking women]” (Q008).

“Pts usually are directed to social services or health visitor for help with these matters [housing issues]” (Q058).

Discussion

Maternity services have national recommendations to identify and support families with significant social risk factors, including domestic abuse, homelessness and mental health issues (DH, 2013; 2010; 2009). However, to our knowledge, this is the first study which has looked at the overall workload, competence and training that CMWs have or need to fulfil this essential health and social care role in NHS maternity services.

At the time of the study, national directives emphasised reducing health inequalities, as well as improving the quality and individualisation of care (DH, 2008; 2007). This included the identification and management of social risk factors such as smoking, obesity, excessive alcohol consumption and teenage pregnancy. Current guidelines have

moved the responsibility of public health care from national to local authority (DH, 2013; 2011), and this may result in more regional differences as to how recommendations are interpreted and targets reached. Nevertheless, the emphasis on public health has been maintained and intensified over the past few years, with healthcare professionals encouraged to utilise all opportunities to support health promotion (RCN, 2012; Tyler, 2012; NICE, 2010).

The average caseload at the time of the questionnaire meant that CMWs were doing nearly 50% more work than recommended by the RCM (2009); each trust needed a third more whole-time-equivalent CMWs to achieve the recommended target caseload of 98 women. This appeared to have a direct impact on quality of care and appointment times. CMWs considered that often they could not give the care that was needed in the time available with social issues being sometimes seen as a resource heavy, additional burden on top of clinical care. However, many expressed concern and frustration in trying to ‘do the right thing’ for women with social risk factors, where even making a referral could be challenging due to either not having a specific care pathway or frequent changes of care, personnel or location in an existing pathway.

The areas where CMWs felt the most confident in managing were smoking, teen pregnancy, child protection and mental health issues. These correspond with the trusts in the study employing specialist midwives or specific healthcare support for each of the risk factors; a known and available contact for referral, advice or information may offer reassurance. However, for social issues without a local specialist, CMWs appear to improvise using experience and local knowledge.

Table 4. Social care pathways referrals – where women were referred

	Not answered	Specialist midwife	Obstetric consultant	Specialist practitioner	Social services	Health visitor	GP	Children’s centre	Support group	Outreach worker	Phone/web support
Smokers	17	-	7	180	-	3	10	9	-	-	4
Drugs/alcohol	44	72	19	80	14	6	4	1	-	1	-
Obesity	80	-	91	55	-	-	6	-	-	-	-
Claiming benefits	77	-	1	72	5	1	1	29	18	35	2
Inadequate housing	68	-	-	29	8	5	6	11	12	33	-
Mental health issues	68	97	11	35	-	-	13	-	2	-	-
Non-English speaking	74	-	-	46	1	1	-	7	15	35	4
New migrants/asylum-seekers	147	2	2	18	2	3	1	5	6	13	2
Teen pregnancy	40	102	3	-	5	9	1	15	36	13	-
Child protection	32	100	-	-	135	32	21	2	2	5	-
Domestic abuse	81	62	-	-	58	19	15	6	11	7	9
Physical / learning disabilities	143	11	1	-	12	10	5	7	12	7	-

*CMWs identified one or more referral per social care pathway

Sometimes this resulted in CMWs making several referrals for each woman, hoping that one of them would provide appropriate support. Furthermore, some CMWs appeared to use pregnancy outreach workers (supporting mothers with social risks alongside other health and social services), children's centres or the Sure Start midwife as a local 'safety net' when unsure about where or who to refer. Clearly identified social care pathways may reduce the number of inappropriate referrals and increase equity and efficacy of support for women, but this needs further research.

The findings of this study suggest that recommended good practice for social risk factors has not been implemented equitably. For example, benefit and housing advice should be offered to pregnant women (NICE, 2008), but there appeared to be poor knowledge, a wide variety of referrals and high numbers of CMWs requesting further training. Additionally, women need to be asked whether they are new migrants or asylum-seekers, as this constitutes both high social and obstetric risk and a full medical examination is needed as early as possible in the pregnancy (NICE, 2010). But some CMWs appeared uncomfortable and lacking in confidence to ask questions about social circumstance, which supports findings of previous studies (Baird et al, 2013; Lee et al, 2012). While some issues, such as a teenager or a non-English speaker, may be more obvious without direct questions, others, like domestic abuse or mental health issues, are often hidden and require specific questioning.

There appear to be three key issues surrounding the appropriate support of women with social risk factors relating to the identification and the follow-up.

Firstly, regarding the identification, there are practical issues, such as adequate time in appointments to ask sensitive questions and talk about issues, welcoming environments that provide privacy so that conversations are not overheard, non-judgemental attitudes of all staff interacting with women, provision of an acceptable professional interpreter, if needed, and seeing the woman alone for at least one appointment (Baird et al, 2013; NICE, 2010; Phillips et al, 2007). This needs to be facilitated by appropriate management structures. Secondly, there are factors concerning the midwife (or other HP) screening for social risk factors. This study supports previous reports identifying confidence as a key issue to encourage midwives to identify and appropriately manage social risk factors (Baird et al, 2013; Passey et al, 2012; Lazenbatt et al, 2009). Confidence appears to be directly linked to increased knowledge and training as well as ongoing support.

A new finding in this study was that the majority of midwives wanted further training in social risk factors, particularly those identified less often, such as mental disability. There was a significant increase in the frequency of routine enquiry as well as in midwives' self-reported confidence and competence to deal with disclosure following mandatory training over a five-year period (Baird et al, 2013). While there is regular trust training for some social risks factors, such as child protection, training and ongoing support in other social issues also need to be considered. However, new training programmes take time to embed and change practice.

Other factors needed to increase disclosure of social issues, besides training and increased confidence, include adequate time (Lee et al, 2012), direct questions and non-judgemental attitude (Phillips et al, 2007). Additionally, continuity of carer is of particular importance for vulnerable women (Tyler, 2012) and, while it has not been established as a means of increasing disclosure or appropriate follow-up, the findings of a small quantitative study suggest a link (Phillips et al, 2007). Whatever model of care is utilised, nevertheless, CMWs need time to develop trusting and productive relationships with mothers, which may require longer appointment times or smaller caseloads.

Thirdly, there need to be clear social care pathways available for referrals by the multidisciplinary team. Policies or care pathways may need to be written and/or services put in place and this information disseminated among healthcare providers. Shaw (2013) warned that multidisciplinary collaboration is essential for safe and effective care but that it was not characteristic of community maternity services. This is an issue that also needs to be addressed. Managers and commissioners need to ensure that there are clear multidisciplinary care pathways, effective management structures, as well as regular auditing of social care in place (Bacchus et al, 2012).

Limitations

The findings represent views from the West Midlands, which may not be generalisable to the rest of the UK, although the authors' findings agree with other studies examining social care in midwifery. The study was also conducted between 2008 and 2009, which may not reflect current workload, attitudes and care. However, while the midwife to birth ratio across the West Midlands has reduced since this time, the majority of trusts still have a higher ratio than recommended (Kuypers, 2014) and so it is anticipated that issues raised are relevant for maternity services today.

Conclusion

This study has, for the first time, shown a window into the reality of how CMWs identify and support women with social risk factors. While there are clear national recommendations to do so, this study found a large disparity of social care between and within trusts offered by CMWs. Some CMWs considered that social care was an additional and unwanted role, but many considered that they were not able to appropriately care for women with specific social needs; most notably, this included new migrants or asylum-seekers and women with learning or physical disabilities. A lack of time, as well as poor knowledge of social issues, resulted in referrals going to a wide variety of voluntary organisations, social and healthcare professionals that may or may not have been appropriate.

There is an urgent need for clear care pathways in all social risk factors, as well as training and ongoing support in order to standardise and improve quality of care both within and across trusts. This may increase CMWs' confidence and competence to appropriately identify and care for vulnerable women.

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Diffusing research into routine midwifery practice

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The authors acknowledge the Commonwealth Government of Australia for funding the National Smokefree Pregnancy Project and Cancer Council Queensland for hosting the project.

Abstract

Despite awareness of the dangers of smoking in pregnancy and public health measures to prevent smoking-related disease, women continue to smoke in pregnancy. While evaluations of public health measures have found that smoking cessation interventions during pregnancy increase stopping rates, interventions are often conducted poorly or not at all. Midwives understand why women smoke in pregnancy and are aware of associated risks, but they require specific knowledge and skills to support and advise pregnant women on smoking behaviour and smoking cessation.

Comprehension of change processes is crucial to the implementation of new health promotion interventions.

This research applied Greenhalgh et al's (2005) organisational change theoretical framework and a case study method approach to explore the process of implementing a smoking cessation intervention for pregnant women. The study was carried out according to the principles laid down in the *National statement on ethical conduct in human research* (National Health and Medical Research Council, 2007), produced by the National Health and Medical Research Council, Australia. Ethical approval for the research was sought and received from Queensland University of Technology human research ethics committee, prior to the start of the study.

The sample constituted four participants who had been involved in the process of disseminating a training programme for midwives to implement a smoking cessation intervention. Eight semi-structured interviews were undertaken with these participants and the interviews and background programme data were subjected to theoretical analysis.

The data were analysed through the lens of the Greenhalgh et al (2005) framework. The iterative analysis involved movement back and forward between framework elements to ensure a non-linear approach and to raise the conceptual level. The result was a disaggregation and (re)aggregation of data in the formation of an analytical outcome (Charmaz, 2006).

The research findings demonstrated that, although there was an identified need for the intervention, limited time, capacity and lack of infrastructure support resulted in the innovation not being adopted as routine practice.

Key words: Smoking cessation intervention, maternity care, innovation, implementation, evidence-based midwifery

Introduction

It has been estimated that 20% of pregnant women in Queensland continue to smoke throughout pregnancy (Laws et al, 2006). This is despite the known health risks of smoking in pregnancy for mothers, the pregnancy and the unborn child (Laws et al, 2008; Albrecht et al, 2006; 2004; Cnattingius, 2004). These risks include placental abruption, placenta praevia, premature labour, ectopic pregnancy and miscarriage, low birthweight, small-for-gestational-age and higher admission rates to special care nurseries (Laws et al, 2006; 2001; 1999; 1997). Smoking during pregnancy also has a substantial impact on medical care expenditure and has been identified as the key modifiable factor in poor pregnancy outcomes (Albrecht et al, 2004; Fang et al, 2004). It is proposed that smoking cessation intervention in pregnancy should be an integral component of antenatal education and appear early in the maternity care process (Albrecht et al, 2004).

Pregnancy is a point at which women become more aware of their health issues (Anderson, 2001) and it presents a unique opportunity to assist women in quitting smoking. Nonetheless, programmes to assist women to quit smoking have not been uniformly implemented into routine midwifery clinical practice (Grangé et al, 2006). In response to the known and substantial impact of smoking in pregnancy,

the Commonwealth Government of Australia funded a National Smokefree Pregnancy Project (NSPP) that was hosted by Cancer Council Queensland (CCQ) from October 2007 to July 2009. The objective was to provide evidence-based training to public sector midwives who would then transmit knowledge and skills that would instil in colleagues a confidence to institute interventions to support smoking cessation in pregnancy as part of routine maternity care. A 'train-the-trainer' programme was introduced at the latter stages of the NSPP. It was expected that this programme would disseminate widely the knowledge and skills in support of pregnant women to quit smoking. The research reported on here explored the complex process of implementing a smoking cessation intervention in maternity care through a case study of one programme.

Underpinning theoretical literature

Rogers defined the classical diffusion of innovations as a mass learning process that assumes an s-shaped curve, whereby people in a social system adopt new ideas starting with a slow opening phase which accelerates over time (Rogers, 2003). What this theory failed to explain, however, is why some people adopt an innovation, at what stage the adoption will occur and how the organisational context shapes the complex process of adoption of innovations.

Diffusion of innovation theories have evolved over time around these essential questions and their implications.

Sibthorpe et al (2004: 2) argued that healthcare systems were not like machines that work with linear relationships as thought, but were 'much messier and more complex'. From here it was proposed that complexity science be used to better understand healthcare organisations and systems (Sibthorpe et al, 2004). Greenhalgh et al (2004) brought complexity theory to their work, initially through an extensive literature review that questioned how we can spread and sustain innovations in health service delivery and organisation. Essentially, diffusion of innovation refers to the different stages of the process of a particular innovation (Greenhalgh et al, 2008; 2005; 2004).

This theory informed the research of these authors and underpinned their further work; specifically the development of a conceptual model that explains how innovation is conveyed through particular channels to constituents of a social system over a period of time.

In exploring the innovation central to this research the Greenhalgh et al (2008; 2005; 2004) theoretical model provided a framework for the generation and analysis of research data. For the purposes of this research, the model was termed the DDI model, which reflects the determinants of diffusion, dissemination and also implementation of innovation.

Method

A case study method was adopted to explore the process of implementing a smoking cessation intervention training programme for midwives. Through the case study, the research sought to generate rich data that would provide insight into the actions of individuals and the organisation and their interactions and thus generate a broad structural view of the research phenomenon.

Although the case study method has faced some criticism over issues of rigour and generalisability (Corcoran et al, 2004), the value of flexibility is that it allows for the incorporation of the contexts of the social world and the study of both process and the end product (Luck et al, 2006; Corcoran et al, 2004; Yin, 1999). A process of inquiry that generated rich data and provided insight into inter-relationships between key actors in the research situation and organisations was considered more valuable than generalisation.

A suggested strategy in response to the rigour criticism is to employ a theoretical framework to structure the study (Noor, 2008). The operational framework in the current research, drawing on the Greenhalgh et al (2004) DDI model, informed the framing of what was to be studied and the questions to be addressed. This is not to argue for a rigidity of research design; rather, the emphasis was on flexibility in order to enhance the possibilities of discovery during the research process (Yin, 1999).

Sample

A purposeful sample constituted three midwives and one midwife project officer, all of whom had attended the

smoking cessation in pregnancy programme for midwives.

In total, eight interviews with four participants constituted the final sample size. The sample was drawn from midwives working in metropolitan and regional areas of Queensland and the midwife project officer was employed on the NSPP Queensland.

The midwives who had attended the 'train-the-trainer' programme during the final phase of the NSPP Queensland were contacted via email and invited to participate in the research. Five midwives responded to the email and were provided with detailed information and a consent form. Four of the five respondents agreed to participate. Each participant engaged in two face-to-face, semi-structured interviews, four months apart. Two participants were interviewed at the home of the interviewer and two were interviewed at their respective homes.

The face-to-face interview was the key method of data generation. The interviews were conducted in two phases, where each participant undertook two interviews, four months apart. Questions were formulated around the components of the DDI model where each interview question referred to one defined area of the model. The questions were semi-structured to allow for full and reflective responses.

Rapport between the interviewer and respondents had been established during the training phase of the project and was sustained through an informal interview technique. The interview structure further encouraged trust and open communication. The second interview enabled further exploration of those issues that had emerged as significant in the analysis of initial interview data.

Data analysis

The theoretical bases of the DDI model underpinned the analytical process. Data were organised around the key stages of diffusion, dissemination and implementation of the smoking cessation programme and analysed manually. The conceptual model provided a framework for generating first a description and subsequently an analysis of data. Thus, the intention was to explore the data through the lens of the model and provide insight into aspects of outcomes and their relationships.

Importantly, this was a non-linear process of disaggregation and (re)aggregation of data, whereby the analysis moved back and forth between model elements, the grouped data and data as a whole to raise the conceptual level of the groupings and to extend their scope. It was this iterative process that gave direction to the second phase of interviews and gave focus to the analytical process. It should be noted that data frequently covered multiple areas of the model. Decisions were ultimately made to situate data according to analytical strength.

Ethics

The study was carried out according to the principles laid down in the *National statement of ethical conduct in human research* (2007), produced by the National Health and Medical Research Council in Australia. Ethical

approval for the research was sought and received from Queensland University of Technology human research ethics committee, prior to the start of the study.

Results

The analytical findings are organised around the key components of the DDI model as depicted in Figure 1. In applying the DDI framework, the stages and processes of diffusion and implementation of the smoking cessation intervention are addressed below. Significant concepts and issues generated from the analysis are explored under the respective framework components.

The innovation

The need for the innovation was justified due to the lack of training and expertise in the research area and the introduction of new documentation:

“If it was something less important, I wouldn’t have given it as much attention” (P4).

“An absolute minimum requirement that they needed in order to assist women to quit smoking” (P1).

While the innovation was considered simple to adopt, many factors contributed to the complexity of the process. A significant factor was that the programme was not compulsory or policy-driven and it competed with existing mandatory education already part of the busy schedules of midwives; the innovation also appeared poorly defined. This is depicted in the DDI model as ‘fuzzy boundaries’ that represent a soft periphery.

A soft periphery allows for adaptation to specific contexts and thus is a crucial element of an innovation (Greenhalgh et al, 2004; Denis et al, 2002). Nonetheless, where there is a soft periphery and uncertainty about structure and policy, there is greater scope for conflict or diversity of interests. Structure and policy ensure that an intervention is diffused with appropriate resources.

Communication and influence diffusion – dissemination

Of relevance here was the effort to actively engage the train-the-trainer midwives to implement the interventions in their maternity units. While champions for the intervention were identified as integral to the process of dissemination position, power and motivation of the train-the-trainer midwife within their own health

area was important:

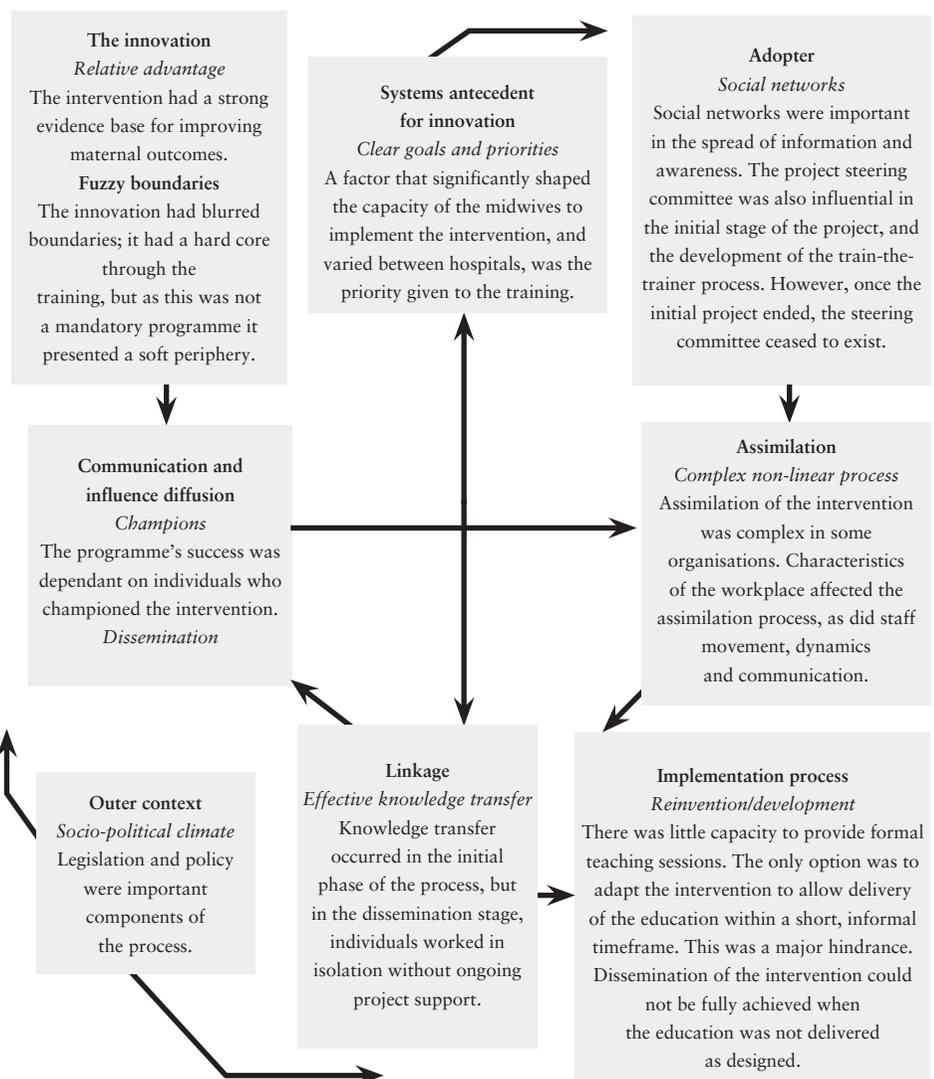
“There was a doctor up in North Queensland who was extremely enthusiastic. He had a lot of power in his area and could really train” (P3).

Diffusion, the uncontrolled instinctive spread, occurred to some extent, because once knowledge was obtained, there was a natural process whereby the issue appeared on the agenda in communications with pregnant women and other midwives. Dissemination, however, which is more concerned with the conscious efforts to proliferate knowledge and skills, emerged as a more difficult process (Green et al, 2009).

Problems materialised in the process of institutionalising the intervention. Where the earlier processes of diffusion, dissemination and communication are clearly understood, there is a better chance of planning for sustainability through institutionalisation of interventions (sometimes termed ‘routinisation’) (Wilson and Kurz, 2008).

Further to the above, Green et al (2009) refer to the classical transfer of knowledge as narrowing, filtering and vetting; all concepts that do not work in a linear fashion in public health as they do work in standard biomedical

Figure 1. Findings of the smoking cessation intervention based on DDI framework



interventions. The diversity of psychological processes, cultural contexts and socio-economic conditions all augment complexity (Green et al, 2009).

Outer context

The transfer of knowledge and evidence into practice is both a technical and political process. Political issues are often the common threads of sustainability (Sibthorpe et al, 2004).

The political directives in the research context, such as new anti-smoking legislation, changes in prescribing guidelines for nicotine replacement therapy and the wider health costs of women smoking, were seen as significant factors:

“With all the anti-smoking laws and areas you know that you can smoke... it was good to also have the depth of information coming through” (P2).

“Women that smoke in pregnancy cost the organisation and our society a lot of money... if we decrease the amount of women smoking in pregnancy, it has a huge domino effect on the cost for that pregnancy and subsequent health issues” (P3).

Diffusion and dissemination of innovation in organisations is more feasible in a favourable socio-political environment with national-level directive (Greenhalgh et al, 2008).

In the current research, while the political input came in the form of government funding for the initial project, there was no sustained government support following completion of the initial stage.

Linkage

Recognised catalysts required for the dissemination of innovations are local and national champions, effective linkages with regional health planning and timing in tune with national policy directions (Sibthorpe et al, 2004). Each of these mediums appeared to some extent in the current research.

Yet, sustainability of the midwifery innovation was contingent on ongoing external support, as noted above, and strong internal infrastructure support.

It is not then simply the existence of the catalysts but also the form those catalysts take that is critical to the success of an innovation. Once again, this points to the non-linear nature of this process. The train-the-trainer midwives were provided with appropriate information during the training sessions on facilitating knowledge transfer and specifically early-phase knowledge transfer:

“The support on those two days was great and the fact we had time for questions was really, really good” (P2).

A dominant approach in the area of innovation is the instrumental view of knowledge utilisation that assumes that once knowledge has been transmitted, it will immediately be put in to action. It appeared that such an assumption underpinned the train-the-trainer programme, evidenced by the short duration of input and lack of ongoing support. There is little evidence, however, to support the instrumentalist view (Green et al, 2009).

Thus the programme understudy appeared to focus on the instrumental aspects of training midwives to train other midwives, without giving consideration to long-term

institutionalisation. The importance of institutionalisation as an end product in the process of moving toward change appears to be a relatively under-researched area and particularly in relation to what makes institutionalisation possible (Wilson and Kurz, 2008).

Systems antecedents for innovation

It was clear that structural factors affected the capacity of the midwives to implement the innovation. These were, specifically, the respective departments within which the train-the-trainer midwives worked, rotation of staff, the train-the-trainers' involvement in education and organisational procedures for education. Further features were the day-to-day running of each unit, transient staff and the size of units (smaller units had more effective lines of communication). These factors were identified as affecting information transmission and standardisation of practice and thereafter sustainability.

Systems more likely to accept innovation are those that are traditionally creative, have a flat hierarchical structure and are committed as a group to instituting change. By contrast, healthcare systems generally assume a bureaucratic hierarchical form with different organisational structures for each professional group (Sanson-Fisher, 2004):

“I found that where hospitals put this as high importance and gave staff proper time out of their working day to attend sessions... it was much better and well-received” (P3).

In relation to structure, while larger established organisations that are divided into departments/units are considered more likely to implement innovations, innovation is controlled by additional factors, including the ‘radicalness’ of the innovation and the point of adoption (Greenhalgh et al, 2004). This reinforces the notion that although there are key areas of significance, it is the interplay of concepts that is more important.

In the current research there appeared to be good relationships with upper management – an important factor within the dissemination process (Green et al, 2009) and this was evident in the initial commitment to the innovation through the designation of staff to the train-the-trainer course.

However, management leadership and support was present only in the adoption phase and did not extend to implementation. Yet the state of readiness for the innovation was fundamental. It depended upon the inter-relationship between the amount of allocated and dedicated time and resources, as well as support for the innovation. Additionally, while readiness may be assessed in the innovation planning stage, the state of readiness will change throughout the dissemination and intervention process (Green et al, 2009):

“In one hospital, we had to deliver the education in the tea room and people where coming in and getting their tea break. There just wasn't the same commitment to the process” (P3).

The allocation of dedicated time and resources at an organisational level was a major factor in determining the

effectiveness of the intervention. There was no ongoing funding and a recurring barrier, therefore, was lack of allocated time for training and limited time during antenatal checks to implement the intervention. The amount of funding for dissemination and implementation research should be proportionate to the magnitude of the task (Green et al, 2009). Smoking prevention innovations result in major health cost gains and as a sensitive issue requires training and support.

The adopter

Those individuals responsible for driving the intervention (adopters) were significant to the process. However, motivation alone was not sufficient to address the difficulties encountered in incorporating the intervention into everyday practice. What the process needed was collective responsibility and hence the adopters recognised this as the community of staff within the maternity care organisation and not just the individual midwife.

Assimilation

Assimilation can be confused with implementation or adoption. The concept appears to take into account the various adjustments made in the progression process as innovation moves through the complex areas noted above and especially in health service organisations. The research assimilating factors demonstrated a contextual complexity within maternity care. What appeared at first to be a straightforward innovation was a complex process-based innovation that involved a team of midwives and managers within maternity care organisations.

Implementation process

Many factors were significant to the implementation process. The concept of institutionalisation was of major importance in the movement towards change. Indeed, the findings suggest that a recognised and value-driven intervention failed to be fully integrated into routine antenatal care.

A breakdown in the dissemination process often occurs between the inception of implementation and the integration of the intervention into routine care. Two main problem areas in the process have been identified. The first is when evaluation does not occur within the organisation around the intervention. The second is an absence of structural change to support the intervention (Wilson and Kurz, 2008). In the research context, some evaluation occurred in the initial stages of the project, but this was no longer possible following completion of the programme. Furthermore, rather than any structural change, the innovation was adapted to suit existing conditions in each organisation.

Discussion

The assimilation of the framework, relevant literature and analysis of the complexities involved in implementing a tobacco intervention in maternity care organisations produced two concluding and inter-related theoretical points. Firstly, the implementation of the smoking cessation

innovation was instrumental in its underlying assumptions. The instrumentalist approach assumes that where good ideas are communicated, they will be utilised by those who hear them (Huberman, 1996). A similar supposition is that if scientific evidence is published, it will be acted upon (Green et al, 2009). Indeed, the implicit assumption underpinning the innovation was that dissemination of information alone would lead to change. This explains why midwives, considered the key stakeholders, were trained and assumed the responsibility for the implementation process. Thus the innovation process was linear and its implementation and success (or otherwise) rested with individuals (mainly midwives), rather than a community of people within an organisation.

A second and related finding was that no dedicated process for the institutionalisation of the smoking cessation intervention was established at the organisational or governmental levels. In retrospect, this appeared to result from the adoption of a linear and stage-like process of implementation that reflected Rogers' (2003) linear-flow model.

The strength of Rogers' model is in drawing attention to whether need precedes knowledge, or whether knowledge precedes need. The weakness is in treating the acceptance (or institutionalisation) of knowledge as unproblematic. Nonetheless, although more recent work in complex healthcare organisations has highlighted the need to move away from linear models (Fraser and Greenhalgh, 2001), the linear flow model has dominated the diffusion of innovation processes in health care (Fitzgerald et al, 2002).

In drawing together the above points, this research concludes that institutionalisation of an innovation is crucial for achieving sustained change (Nantel and Tontirsirin, 2002). Furthermore, institutionalisation involves a complex inter-relationship between a range of factors that will vary from context to context. This finding points to the importance of a full analysis of the approach to the implementation of the smoking cessation innovation and the identification of factors that inhibited its institutionalisation.

To return to the rationale for the innovation, there was a demonstrated need and very persuasive scientific evidence underpinning the importance of the public health issue. Yet, as Denis et al (2002) argue, scientific evidence is just one element in the effective dissemination of a healthcare innovation. Moreover, there is no established link between the robustness of evidence and the swiftness of diffusion (Fitzgerald et al, 2002).

Although the initial stage of the NSPP appeared successful in terms of the responses of midwives who attended the training and the increased referrals received by Quitline, it was assumed that midwives would incorporate the innovation into their routine antenatal practice.

There was minimal attention given to infrastructural issues and how these might support (or inhibit) the dissemination of the innovation.

It was assumed that the innovation would fit in with the existing organisational structures. However, dedicated time, resources and ongoing project management were deficient

in the current case study and there were no structures in place to address these issues. Capacity, policy support and guidelines are prerequisites for having dedicated time to allocate to an innovation, as these factors determine if training is prioritised and whether it becomes mandatory.

A further example of the deficit of institutional involvement was the minimal ongoing financial resourcing. Resourcing is a necessary factor if innovations to change practice are to be effective (Swerissen and Crisp, 2004). Although the initial phase of the project and the train-the-trainer programme were fully funded, there was an abrupt end to the financial support prior to implementation.

The absence of a systematic framework to support the programme is very much a feature of the instrumentalist approach. Liao (2009) compared instrumentalism to contextualism where the latter concept positions technology within a socio-economic framework and where successes are dependent on the capacity of stakeholders to meet local needs. Conversely, the instrumentalist approach is a concept that sees technology as superior and one that can be applied to many different purposes (Liao, 2009).

Nonetheless, where technological transfer is perceived to be straightforward and benefits appear mechanical, the instrumentalist approach produces a linear model of innovation. Clearly, an instrumentalist approach is not well suited to healthcare organisations and the myriad interconnecting circumstances, situations and perspectives. On the contrary, these features require an approach that is non-linear and can account for a multi-faceted environment. Instrumentalist assumptions were evident in the train-the-trainer programme. The programme delivered the appropriate information and skills effectively; however when barriers were identified early in the training phase (prior to implementation), there were no processes of planning and assessment to overcome these barriers. In-depth assessment and planning earlier in the process may have mitigated some barriers.

In terms of sustainability, the aim of health promotion is to produce intervention effects that continue over time (Swerissen and Crisp, 2004). There are a number of prerequisites considered necessary to achieve sustainability (Nantel and Tontisirin, 2002). One is that a programme must be owned by the intended community. The second is that the implementers and the intended community must have a good understanding of the problem and how it can be resolved. Third, the community needs to have control over problem-solving. All prerequisites require government support, particularly in relation to the dissemination of information and resources.

In addition to the involvement of end users from the outset, the many variables that determine use, point to the need for input from a wide range of stakeholders involved in either the 'user' or 'receiver' sides (Green et al, 2009). This suggests that the roles of all stakeholders involved in (or affected by) the process be considered and assessed. The numerous stakeholders in the smoking cessation research included management at the varying levels, obstetricians, GPs, the train-the-trainer midwives and those midwives

expected to disseminate the innovation to their pregnant women, as well as those responsible for the rollout of the initial project. The diffusion process was constrained because the midwives were the only stakeholders involved in the implementation phase and they had little endorsement or guidance from other stakeholders.

The intervention was also difficult to sustain because it was not embedded in policy and guidelines and, therefore, did not form part of the mandatory training. Where education is mandatory, this indicates that it is driven by policy and, as such, has dedicated resources. A structural framework to guide the diffusion of an innovation will account for all contextual factors and their inter-connections.

A related issue was standardisation, which was identified as important in the process of building on midwifery education. This concept aligns to some degree with policy and guidelines, as the state-wide or national policy dictates a degree of standardisation. It was deemed essential that all clinicians were communicating reliable information. This also ensured that the practices of midwives and maternity units were compatible, not only in relation to advice and support for pregnant women, but also in documentation and training (Capito, 2009). However, the research findings indicate that the midwifery units differed considerably in context and approach to the innovation and, therefore, standardisation was more difficult than anticipated.

The innovation approach in the current research did not consider the situational background or context for diffusion of the innovation; a factor that has been identified as a fundamental component of the diffusion process (Fitzgerald et al, 2002). The key influence of context on the diffusion process is the multi-layered interplay of inner and outer contexts. Elements including the financial consideration of the additional work and cost of staff time for training, the willingness of patient groups to conform with the innovation requirements, which was challenging due to the nature of the intervention, the lack of policy to sway and the individual practitioners who were clearly uncertain about the innovation requirements. This uncertainty could not be remedied by the standardisation of information.

Limitations

This study involved a relatively small sample, which may not have captured the full dimension of experiences. However, the cohort of possible participants was similarly small. The study also acknowledges the close involvement of the researcher in the process. While the close involvement may be challenged, Green et al (2009) advocate for researchers to be more immersed in their studies, pointing out that knowledge transfer in public health requires a participatory approach where researchers and project teams participate and support the whole process of dissemination and implementation.

Conclusion

In summary, the study findings demonstrate that implementation and sustainability of an innovation is complex and not congruent with a linear approach.

This points to the need to engage with theories surrounding dissemination and implementation, and to consider the ways in which evidence is produced and successfully disseminated. Although the smoking cessation programme clearly identified the health issue and what was required of the midwives in terms of prevention, there were no explicit

theoretical underpinnings to the innovation process and thus a straightforward technical approach prevailed. This approach did not have the capacity to incorporate the complexities of health care or the assessment, ongoing management and evaluation required to implement and institutionalise the innovation within this context.

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A systematic review of the effects of dietary interventions on neonatal outcomes in adolescent pregnancy

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The authors would like to thank information scientist Melanie Gee, who designed the search strategy and identified the original list of relevant articles for the review.

Abstract

Background. Poor nutrition negatively impacts on pregnancy outcome, fetal growth and neonatal survival. Adolescent mothers, with competing demands of a growing baby and their own rising nutritional requirements, often have poor diets. Despite recognition of their physiological immaturity and nutritional inadequacies, along with evidence highlighting significant differences between adolescent and adult pregnancy outcomes, systematic evidence on the effects of supplementation on adolescent pregnancy is scarce.

Aim. To evaluate the effectiveness of dietary interventions on neonatal outcomes in adolescent pregnancy (19 and under).

Method. CENTRAL, EMBASE, CINAHL, Cochrane, Maternity and Infant Care, Scopus and MEDLINE databases were searched using selected terminology. Titles and abstracts were screened with selected papers reviewed in full by two authors against the inclusion criteria. Any randomised controlled trials in which the effects of nutritional interventions were evaluated in adolescent pregnancy were included. Data were extracted on study quality, design, compliance, dose and duration of intervention, and main birth outcomes, and analysed using Review Manager.

Results. Five studies out of 18 identified were included. Four used supplementation (three zinc, one calcium) with one intervention comparing dairy products to fortified orange juice. The limited available data showed a significant effect from zinc supplementation in reducing the likelihood of low birthweight (RR [95%CI]: 0.39 [0.15, 0.98], one study, n=507) and that having four servings of dairy per day increased average birthweight in adolescent pregnancy (MD [95%CI]: 240g [110.83, 369.17]).

Conclusion. High-quality comparative studies between supplements and food sources to improve birth outcomes for adolescent pregnancies, focusing on the clinical effectiveness and acceptability are urgently needed.

Keywords: Adolescent, micronutrient, pregnancy, interventions, randomised controlled trials, evidence-based midwifery

Introduction

Nutrition is an important modifiable factor affecting pregnancy outcome, fetal growth and neonatal survival (Redmer et al, 2004; Lechtig et al, 1975). Infants, who are growth-restricted due to poor intrauterine nutrition, may potentially be programmed to develop cardiovascular disease, diabetes and obesity later in life (Godfrey and Barker, 2000; Barker, 1998).

Poor nutrition is of a greater concern for adolescent mothers who are faced with the demands of a growing baby in addition to their own rising nutritional requirements. The concept of competing growth needs of adolescent mothers with that of their fetuses was first proposed by Naeye (1981) and further strengthened by other investigators demonstrating smaller birthweight in adolescent compared to adult pregnancies (Scholl et al, 1994; Frisancho et al, 1983). In addition, several studies have shown an association between nutritional deficiencies and low birthweight (Baker et al, 2009), pre-term birth (Ramakrishnan et al, 2012), morbidity and mortality for babies born to adolescents (Gilbert et al, 2004). This is further complicated as adolescent mothers are predominantly from socio-economically deprived backgrounds linked to poor diets and smoking (Conrad, 2012).

Micro- and macronutrients have essential roles in optimising fetal growth and pregnancy outcome; however the focus of this review will be on micronutrients. Due to more efficient utilisation and absorption of nutrients, no increase in dietary intake during pregnancy is necessary (Williamson, 2006). However, partly based on survey evidence suggesting poor dietary intake, an increase in several micronutrients, including folate, vitamins B1, B2, C, A and D, is recommended (Williamson, 2006). A UK national survey of adults (19 to 64 years) indicated many women of childbearing age did not meet their nutrient requirements, which have considerable implications for pregnancy outcome (Henderson et al, 2003). Their data also suggests an adverse relation between age and proportion of women with intake from all sources (food and supplements) below the lower reference nutrient intake (LRNI). Poor nutritional intakes and hectic dietary patterns in adolescents have been illustrated by several investigators (Baker et al, 2009; Burchett and Seeley, 2003). Additional maternal calcium intake for adolescent pregnancies has been advised due to rapid growth and bone development in adolescents competing with the needs of the growing fetus (Williamson, 2006).

Despite a common appreciation of the physiological

immaturity in adolescent pregnant mothers and their nutritional inadequacies, along with evidence suggesting significant differences between adolescent and adult pregnancies regarding fetal and neonatal wellbeing, systematic evidence on the effects of nutritional supplementation on their pregnancy outcome is scarce. The existing reviews mainly focus on adult pregnancies and the effects of single or multi micronutrients. They also include a wide age range without specifically reporting the results for teenage pregnant women (Hofmeyr et al, 2014; Ramakrishnan et al, 1999). Given the importance of vitamins and minerals in supporting a healthy pregnancy outcome, and the evidence on nutritional deficits, a systematic evaluation of the impact of nutritional interventions on pregnancy and birth outcomes is needed to inform interventions aimed at reducing health inequalities for these vulnerable women and their babies.

Aim

The aim was to evaluate the effectiveness of nutritional interventions on neonatal outcomes for adolescent mothers, assessed through randomised controlled trials (RCTs). For the purpose of this review, nutritional interventions included both dietary interventions and nutritional supplementation.

Method

Search strategy

The authors searched the following databases, from inception to 2 February 2015, for relevant studies: CENTRAL (via Cochrane Library), CINAHL Plus with Fulltext (via EBSCOHost), Embase (via NICE Evidence), Maternity and Infant Care (via Ovid), MEDLINE (via EBSCOHost) and Scopus. The search strategy had four main strands – pregnancy, adolescents, dietary interventions and RCTs – designed to capture all papers published regarding diet-based interventions during teenage pregnancy. The authors used text words and relevant indexing to capture the concept of nutritional interventions and teenagers and pregnancy. Additionally, the Cochrane Highly Sensitive Search Strategy for identifying RCTs in MEDLINE, sensitivity- and precision-maximising version revision was adapted to limit the search results to RCTs (Higgins and Green, 2011). The reference lists of included papers were assessed for additional relevant studies, which generated one new paper (Cherry et al, 1989). No language restriction was applied.

Inclusion criteria

The authors considered all RCTs in which the effects of nutritional interventions, including vitamin and mineral supplementations (individually or combined) and dietary supplementations, such as foods rich in nutrients, were evaluated in adolescent pregnant women.

Outcome measures

- Low birthweight (birthweight less 2500g)
- Pre-term birth (gestational age less than 37 weeks)
- Birthweight
- Perinatal mortality (fetal death \geq 24 gestational weeks and neonatal deaths in the first week of life).

Data extraction and quality appraisal

Two review authors independently assessed the suitability of identified papers, according to the inclusion criteria. Any disagreement was resolved by consulting a third author. One reviewer extracted data using a specific data extraction form and entered the data into the Review Manager software (Nordic Cochrane Centre and The Cochrane Collaboration, 2012), which was subsequently double-checked by a second reviewer. Clarification was sought from all authors of included studies where there was ambiguity, with no success in receiving additional required information. All the studies were assessed for the risk of bias (Higgins and Green, 2011) and were categorised as high, low or unclear risk of bias in sequence generation (for example, low risk if computerised central randomisation was reported), allocation concealment (for example, low risk if opaque sealed envelopes were used), blinding (for example, low risk if placebo was used), incomplete outcome data (for example, high risk if attrition rate was higher than 20%), selective reporting bias and other sources of bias, such as extreme baseline imbalance or whether the trial was stopped early.

Data synthesis

The authors used the mean difference and standard deviations for presenting outcomes from continuous data and expressed summary risk ratios for dichotomous data with 95% confidence intervals (95% CI), using a random effect model due to both clinical and statistical heterogeneity. Due to variation in the type of intervention (for example, different nutrients) overall meta-analysis was not performed, however, data was pooled together at the sub-group level for each nutritional intervention. The statistical heterogeneity in each meta-analysis was assessed using the T^2 (Tau squared), I^2 and Chi^2 statistics. A substantial heterogeneity was considered if I^2 was greater than 30% and either T^2 was greater than zero, or the P-value in the Chi^2 test was less than 0.10. The data were analysed on the basis of intention-to-treat, therefore, the authors included all participants randomised to each group in the analysis.

Results

The database searches yielded 1224 records, citation and reference searching yielded three additional references, after duplicates were removed, 806 proceeded to screening based on title and abstract, of which 18 articles were deemed relevant. Out of 18 identified potential articles, 13 were excluded and five were included (Chan et al, 2006; Castillo-Durán et al, 2001; López-Jaramillo et al, 1997; Cherry et al, 1989; Hunt et al, 1985).

Excluded studies

Of the 13 studies which were excluded, six were not RCTs (Davis et al, 2013; Tange et al, 1993; Cherry et al, 1991; Dawson and McGanity, 1989; 1988; Dawson et al, 1989). The studies by Diogenes et al (2013a; 2013b; 2011) were very similar RCTs using calcium and vitamin D supplementation to improve maternal bone mass in lactating adolescent mothers, but were excluded as there was no reporting of

outcome measures of interest with a lack of clarity on the quality of the study. Two were excluded due to a lack of sufficient information to allow assessing their eligibility for inclusion and attempts to contact the authors for further information were not successful (Herrera et al, 2006; Nogueira et al, 2003). Meier et al (2003) investigated the effects of iron supplementation, which was excluded due to not reporting the outcomes of interest to this review. Finally, one study (Christian et al, 2013) conducted a three-arm intervention comparing vitamin A, β -carotene and placebo groups in Bangladesh using a cluster RCT design including 7730/17,895 (43%) adolescent mothers, which did not report separate outcomes for the group of interest and the attempts of these authors in contacting Christian et al (2013) failed to provide specific information relevant to this review.

Included studies

The age of participants in the included studies were 19 years or less (see Table 1). The type, dose and duration of supplementation use varied between the five included studies (see Table 1), therefore, the results are reported separately for each type of intervention, where outcomes of interest were reported. Four included studies used supplementation. Three of these studies used zinc supplementation versus placebo (Castillo-Durán et al, 2001) in Chile and (Cherry et al, 1989; Hunt et al, 1985) in the US and one used calcium supplementation versus placebo (López-Jaramillo et al, 1997) in Ecuador. The final study used dairy products compared to orange juice fortified with calcium (those who did not tolerate the fortified orange juice, used calcium supplementation as well) compared to the control group (Chan et al, 2006). Three of the included studies reported that their participants were from a low socio-economic status, a state-supported hospital or rural areas (Castillo-Durán et al, 2001; Cherry et al, 1989; Hunt et al, 1985) and Chan (2006) recruited from the university's teen mother and child programme or private clinics. The age of participants ranged from 14 to 19 years with a mixture of primipara and multipara women.

Risk of bias in included studies

Most of the strategies used to reduce bias in the included studies were poorly described. To limit performance bias, all studies except Chan et al (2006) blinded participants and personnel, which is logistically possible with placebo versus supplements. This was not possible in Chan et al's (2006) intervention, as participants knew if they were taking a calcium supplement, calcium supplement and orange juice or dairy products. Chan et al (2006) clearly mentions random sequence generation and allocation concealment to reduce selection bias, however, the other five studies were not explicit. There was a lack of clear description for the other studies leading to

those being scored as unclear. Chan et al (2006), Cherry et al (1989) and Hunt et al (1985) had very low attrition rates (<13%), but Castillo-Durán et al (2001) had a much higher attrition rate (37%), which could lead to bias.

Effects of interventions

Low birthweight

Two studies were available; one reporting the effects of zinc and the other the effects of calcium supplementation on the incidence of low birthweight in adolescent mothers. Zinc supplementation reduced the likelihood of low birthweight compared to the control group (RR [95%CI]: 0.39 [0.15, 0.98], one study, n=507). In the only study (López-Jaramillo et al, 1997) that reported this outcome for calcium supplementation, there was no incidence of low birthweight in either arms of the study to enable comparison of the results.

Pre-term birth

Three studies reported the results for this outcome; two reporting the effects of zinc and one the effects of calcium supplementation on the incidence of pre-term birth in adolescent pregnancies. The incidence of pre-term birth was not significantly different in the existing studies: zinc

Table 1. Summary of included studies showing the supplement or food dose, duration and compliance

Study	Study aims/ participants' age	Control supplements/ day	Intervention supplements/ day	Timing of intervention	Attrition rate (1%)
López-Jaramillo et al (1997)	Calcium supplementation and pre-eclampsia (Ecuador: <17.5yrs)	(n=135)	(n=125) 2000mg calcium (taken as 4 x 500mg)	20 weeks – delivery	1
Chan et al (2006)	Dietary calcium interventions (US: 15-17yrs)	(n=23)	(n=24) Orange juice + calcium taken as four servings per day, to provide 1200mg Ca (n=25) Dairy taken as four servings per day to provide 1200mg Ca	20 weeks – delivery	0
Hunt et al (1985)	Zinc supplements for low income Mexican-descent adolescents (US: <17yrs)	(n=68) multivitamin	(n=70) multivitamin + 20mg zinc	<19 weeks – delivery	7%
Cherry et al (1989)	Associations between zinc supplementation, maternal body weight and pregnancy outcomes (US: 13.5-19.6yrs)	(n=284) multivitamin	(n=297) multivitamin + 30mg zinc	<25 weeks – delivery	13%
Castillo-Durán et al (2001)	Zinc supplements on pregnancy outcome for adolescents (Chile: <19yrs)	(n=403) 40mg iron	(n=401) 40mg iron + 20mg zinc	6 to 20 weeks – delivery	15%

supplementation study (RR [95%CI]: 0.66 [0.42, 1.05], random test, two studies, n=1063) and no pre-term birth occurred in either intervention or control group in the only calcium study that reported this outcome (López-Jaramillo et al, 1997).

Birthweight

Four studies reported this outcome; two reporting the effects of zinc supplementation and the other two focused on calcium supplementation, one of which included a three-arm study (Chan, 2006) comparing the effects of calcium supplementation with dairy food rich in calcium and control groups in adolescent pregnant women. No significant differences were observed for birthweight between the intervention group in any of the different supplementation groups: zinc supplementation studies (RR [95%CI]: 60.49 [-17.51, 138.49], random test, two studies, n=613), and calcium supplementation (RR [95%CI]: 73.81 [-16.61, 164.23], random test, two studies, n=307). However, a significantly higher average birthweight was observed in a study by Chan et al (2006) in the arm that used dairy products compared with the control group (MD [95%CI]: 240g [110.83, 369.17]).

Perinatal mortality

Of the two studies that provided information on this outcome, López-Jaramillo et al (1997) reported no incidence of perinatal death and the only study (Cherry et al, 1989) in which fetal loss outcome was reported, showed no significant differences between the zinc-supplemented group compared to the control group (RR [95%CI]: (0.57 [0.26, 1.23], one study, n=581).

Discussion

The limited available data showed a significant effect from zinc supplementation (from early pregnancy) in reducing the likelihood of low birthweight. It also showed that nutritional interventions specifically instructing young women to have four servings of dairy product per day (from 20 weeks) can increase average birthweight for this group of women.

This review was to the authors' knowledge the first to specifically focus on adolescents, who have additional nutritional requirements during pregnancy. Other reviews have looked at single supplements (Hofmeyr et al, 2014), iron and folic acid only or multi-micronutrient supplements (Shah and Ohlsson, 2009), or were literature based only (Ramakrishnan et al, 1999) but looked at adult populations in developed and developing countries. Hofmeyr's review (2014) looked at low-dose calcium supplementation <1g/d with or without co-supplements and found calcium reduced the incidence of pre-eclampsia in all nine studies, however, only two of these studies included adolescents at higher risk of pre-eclampsia, but did not report their data separately (Herrera et al, 2006; Almirante, 1998). López-Jaramillo et al (1997) found a significant effect with 2g/d calcium for adolescents, which are in line with the WHO's (2011) recommendation for 1.5-2g/d for pregnant women in areas with low dietary intakes, such as Ecuador. Many factors

should be considered when administering such high doses as calcium >800mg/d decreases iron absorption and the large calcium carbonate tablets may be a barrier to compliance and expensive or heavy to transport in large scale population studies (Hofmeyr et al, 2014).

Zinc reduced incidence of low birthweight in one study. A Cochrane review (Mori et al, 2012) into zinc found a small but significant reduction in pre-term birth, but not in numbers of low birthweight babies. They analysed 20 studies, of which 16 were in low-income settings and three were in adolescents (Castillo-Durán et al, 2001; Cherry et al, 1989; Hunt et al, 1985). However, they did not report any sub-group analysis on the adolescent women. As with many minerals, the controversy around zinc supplementation is in part due to difficulties in measuring baseline zinc status and the bioavailability of zinc from supplements or food sources (Gebreselassie and Gashe, 2011). Many women with zinc deficiency are also deficient in other nutrients (Mori et al, 2012) so would benefit from improvements to their overall diet quality. The mechanism of effects for micronutrients is poorly understood, which can limit finding interpretations.

Brantsæter et al (2012) conducted a systematic literature review of the relationship between maternal dairy consumption during pregnancy, fetal growth and birthweight in six studies, one of which was on adolescents. They found that dairy consumption had a positive effect on birthweight in 4/6 studies, however, the results for birth length were mixed. Moderate dairy consumption was most effective at improving birthweight for those who had very low baseline intakes, but larger doses above the recommended two to three servings a day may lead to excessive gestational weight gain (Brantsæter et al, 2012).

Research is required to investigate the appropriate recommended intake for optimal pregnancy and birth outcomes. In line with other prospective cohort and case control studies (Brantsæter et al, 2012), this systematic review of RCTs showed dairy products can improve birthweight in this group. There is ample evidence to suggest that there is a chaotic dietary pattern among adolescent mothers (Stanner, 2004; Burchett and Seeley, 2003) and that observation by Chan et al (2006) showing adolescent mothers complied well with taking dairy products with positive outcomes, may be worth further exploration.

Strengths and limitations

As the first systematic review of RCTs evaluating the effects of nutritional interventions in adolescent pregnant mothers, this provides collective evidence to inform future research direction for this vulnerable group in society. The scarcity of data available for adolescent pregnancies, in addition to limited understanding of the mechanisms behind the nutrition and birth outcome, restricts our interpretation of the findings. However, the gaps in knowledge identified in this review can direct future research.

The lack of sufficient data prevented the authors from conducting sub-group analyses based on type of interventions (vitamin/mineral supplementation versus foods

sources), duration, timing of intervention, mother's baseline nutritional status, country of origin and level of deprivation.

The possibility of interaction among vitamins and minerals in either facilitating or hindering the absorption of other nutrients may also be another confounding factor in this review. The limited understanding of the complex physiological mechanisms between various nutrients (individual or combined) and birth outcomes may impact on the findings in studies when both the control and intervention group have been given supplements. Cherry et al (1989) and Hunt et al (1985) gave all participants (control and intervention) multivitamins and Castillo-Durán et al (2001) gave all participants 40mg iron, which may have been due to the ethical considerations.

The exact mechanisms and functional pathways of micronutrient supplementation during pregnancy are not fully understood. It is speculated that the beneficial effects of micronutrient supplementation is enforced through enhanced maternal energy metabolism and anabolic processes, as well as expansion of plasma volume due to fluid retention, which can lead to improved fetal growth (Shah and Ohlsson, 2009). In addition, improved haemoglobin levels and increased absorption of iron related to vitamin C and riboflavin, as well as improving the mother's immunity, may reduce the risk of pre-term birth by diminishing the risk of infection. There is, however, a possibility of adverse interactions among the combined nutrients by enhancing or reducing absorption of one another, and the risk of overdose. There is a significant level of clinical and statistical heterogeneity in the included studies, limiting the interpretation of the review findings. More appropriately designed studies are required to detect the effects of simple nutritional interventions.

Despite the importance of nutrition in achieving an

optimum birth outcome (Ramakrishnan et al, 2012; 1999), this review showed there is a significant gap in the literature focusing on adolescent pregnancies. Small sample size, insufficient reporting of exact timing of the intervention and lack of appropriate design for outcomes of interest in achieving statistical power to detect differences among the groups were major limitations in the included studies. This was particularly of importance for perinatal mortality outcome, which is a rare event and requires a much larger sample size to detect any differences between the groups.

Conclusion

The positive effect of dairy food on improving birthweight for teenage pregnancies is encouraging. However, in light of scarcity of evidence, the results should be interpreted with caution. This review highlights the lack of high-quality studies into nutritional interventions and supplement use in adolescent pregnancy. Comparative studies between supplements and food sources to improve birth outcomes for adolescent pregnant mothers, focusing on the clinical effectiveness and acceptability are urgently needed. Further investigations are required to ascertain which dietary interventions and nutrients, or combinations of nutrients, at which dose and for which duration, are most effective at reducing adverse outcomes. Well-designed studies with appropriate baseline nutritional and biochemical measurements are needed to establish whether all adolescent mothers in developed and developing countries would benefit from a supplement, or whether only those who have significant nutritional deficiencies would benefit.

Practical, acceptable and feasible nutritional interventions with specific health behaviour change approaches are required in this vulnerable group of women.

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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 of no longer than 5000 words in length, including references, should be sent to: rob@midwives.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 Ratnaik, 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

Mary Seacole awards open

Applications are now open for the Mary Seacole awards. The awards present an opportunity to undertake a healthcare project or development activity that benefits and improves health outcomes for people from black and minority ethnic communities. There are two award programmes, entries for which are open until 29 May. The leadership awards are up to £12,500 and provide the opportunity to enhance effective leadership and communication skills. The development awards are up to £6250 and provide the opportunity to develop leadership skills. The awards are funded by NHS Employers and the Department of Health, and are awarded in association with the RCM, RCN, Unison and Unite/CPHVA. Visit nhsemployers.org/maryseacole

Focus of scholarships announced

The Florence Nightingale Foundation has revealed key areas of interest for applicants to its scholarships. The foundation is open to applications across all areas of care. However, in 2015-16, it is particularly interested in supporting scholarships relating to enhancing clinical leadership; enhancing patient dignity, health and wellbeing; and long-term conditions. There are six categories: research scholarships, travel scholarships, leadership and emerging leaders' scholarships, scholars reports, scholarship evaluations and scholars articles. Applications opened on 1 March. Visit florence-nightingale-foundation.org.uk

Funded PhD scholarship

Applications are invited for a three-year PhD studentship, funded by the NIHR Collaboration for Leadership in Applied Health Research and Care (CLAHRC) West Midlands at the Warwick Medical School, University of Warwick. Applications are encouraged from individuals with a broad range of quantitative methodological expertise who are interested in engaging with and complementing clinical practice to improve patient care. The closing date to apply is 30 April and interviews for those who are shortlisted will take place on 11 May. Visit nihr.ac.uk/career-development-opportunities

Evidence Based Midwifery editorial panel members

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Professor Billie Hunter, Cardiff School of Nursing and Midwifery Studies, Wales

Dr Julia Magill-Cuerden, University of West London, England

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