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From research assessment exercise (RAE) 2008… To research excellence framework (REF) 2013

Key words: Research assessment exercise (RAE), research excellent framework (REF), bibliometrics

The UK national research assessment exercise (RAE) is reaching its grand finale and on 18 December, the results will be made public. On 5 January, confidential reports will be made available to academic institutions. Before the results have time to arrive and the impact is celebrated or commiserated, we have already switched off RAE 2008 and turned on REF 2013. This is evidenced in the reported 22 institutions that are involved in piloting the new REF assessment process (Higher Education Funding Council for England, 2008a).

We need a robust system to ensure equitable allocation of research funds. However, it is important to note: research funding allocation is a global issue. There are no valid and reliable measurement systems available and the Higher Education Funding Council for England (HEFCE) is acting appropriately by piloting the new bibliometric citation index: 'As bibliometric techniques have the potential to provide robust and usable indicators of research quality across a number of disciplines. However, citation data should be used with caution to construct indicators that can be used in research assessment. They must be constructed using robust methods, the indicators should be interpreted by experts who understand the limitations and the patterns of citation behaviour in that discipline, and they should be used alongside other indicators of research quality' (HEFCE, 2008b).

Our RAE provides individual and institutional assessment data analyses on publications, research grants, students, environment and peer review. The now 'outdated' UK RAE was assessed in relation to the rest of the world and was congratulated on its overall comprehensive approach (Thelwall, 2008). In comparison to other countries, it is surprising to discover that somewhere like the US has no national system for research assessment, and funding allocation depends on competitive grants with national evaluations of little concern. Peer review forms only a small part of the Australian research evaluation system with greater emphasis placed on research income (Thelwall, 2008).

Leaving 2008 RAE in the hands of the assessors let us move forward to prepare ourselves for success in REF 2013. Guidance at this stage is difficult and although I have sought advice from the UK's eminent academics, the repeated nature of the response is familiar and similar: focus remains on publication, peer review, research grants and citations. Therefore, the important message is to develop a deeper understanding of publication impact factors (IF) and bibliometrics.

Bibliometrics is an electronically-supported process in which measures of the number of publications, their properties, word frequencies, citation analysis, co-word analysis and author details can be collated at the touch of a button. The recognised index systems are the Institute for Scientific Information (ISI) and Science Citation Index (SCI) developed by Eugene Garfield in 1955 (Garfield, 2006) primarily to support scientific literature searching. In 1992, Garfield sold ISI to Thomson Scientific who provide citation data on approximately 7000 of the 23,000 journals available. It is useful to note that new competitors, Google Scholar and Scopus (Elsevier Science) are now producing large-scale online databases, which contain embedded citation indices (Thelwall, 2008). However, the original value of citation systems remains the same as its primary focus was and is to provide researchers with citation data that enables them to know how other researchers have cited a research paper and whether or not the research has been updated. It also provides data on scattered publications in non-mainstream journals thus ensuring collective knowledge acquisition. The ability to review citations and produce statistics on their numbers, all articles by an author, research group or country led to the development of the IF.

Noble assumptions that counting citations would be a reliable measure of scientific value were evidenced in the perception that the more influential the research was, the more likely it was to be cited (Mowday, 1997). However, it was not long before many of the process' and system's limitations were identified: lack of assessment of the citations' quality, poor comparability between subject specific groups and across groups, self-citation and the bias towards English language (Dong and Mondray, 2005).

The formula for determining the IF is calculated by the number of citations from ISI-indexed articles published in year x to articles in the journal published in the years x-1 and x-2, divided by the number of citable items published in years x-1 and x-2.

New developments are constantly facing us and one important new challenger is 'webometrics'. This name is given to the quantitative analysis of all web data. One major advantage of the webometrics is the speed at which citation data can be produced. One major disadvantage is the lack of quality control.

In conclusion, our preparation for REF 2013 must be to keep our focus on doing high-quality research that makes a difference to public health and wellbeing. IF is going to continue to be a major indicator of research output. With rapidly developing new technologies and five years for globalisation impact, who can really plan with confidence for a sea of change?

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Feasibility study to test Designer Breastfeeding™: a randomised controlled trial

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Abstract

Background. The World Health Organization challenges health professionals to increase breastfeeding rates, which means increasing initiation and duration rates. Initiation rates in the UK are improving, but evidence on duration is equivocal. Research shows increased maternal confidence and professional and peer support as key determinants in increasing breastfeeding duration rates.

Aim. To compare current breastfeeding instruction with a motivationally-enhanced version. It was hypothesised that increased motivation to breastfeed would lead to increased persistence to breastfeed.

Design and setting. Single, blind, randomised controlled trial with participants blinded to group membership. The setting was a single suburban hospital and community health and social care Trust serving an urban and rural population.

Participants. Primigravid women (n=182) recruited at the 20-week antenatal appointment gave written informed consent to participate.

Intervention. Application of a model of motivational instructional design to routine breastfeeding instruction led to the creation of an intervention package intended to increase maternal confidence through routine antenatal and postnatal instruction.

Outcome measures. Women's motivation to sustain breastfeeding, as measured by three components of the breastfeeding motivational instructional measurement scale: total value placed on breastfeeding, total perceived midwife support and total expectancy for success.

Results. The motivationally-enhanced instruction significantly increased maternal confidence ($t=4.81$; $df=89.22$; $p<0.001$) and perceived midwife support ($t=7.21$; $df=80.39$; $p<0.001$). Secondary outcomes included increased persistence to breastfeed on discharge ($\chi^2=5.64$; $df=1$; $p<0.02$) and at three weeks postnatal ($\chi^2=16.26$; $df=1$; $p<0.001$).

Conclusions. Breastfeeding is a complex behaviour with known benefits and influences. The findings present breastfeeding educators and researchers with two challenges: to explore the role of expectancy for success further in relation to women's perceived experience of breastfeeding and to re-direct the development and testing of interventions based on the trial findings.

Key words: Motivation, breastfeeding value, expectancy for success, support, randomised controlled trial

Introduction

Breastfeeding is beneficial for baby, mother and society as it has nutritional, psychological and economic benefits. The World Health Organization (2005) recommends that breastfeeding is sustained for at least six months. Strategies such as the Baby Friendly Initiative (1998) have been put in place to protect and support breastfeeding. Across the world, initiation rates have increased significantly; however, national and international statistics show that although more women are starting to breastfeed, many stop long before the recommended six-month period (European Commission 2004; Infant Feeding Survey, 2005). Moreover, Dykes (2006) reported that almost a fifth of women stopped breastfeeding before leaving hospital and figures reveal a steady decline in breastfeeding behaviour resulting in a negligible number of women in the UK breastfeeding for the recommended six months. Faced with evidence of this behavioural decline, midwives and researchers need to continue investigating the factors associated with breastfeeding persistence. Consequently, the study of human motivation has become central to the health professionals' understanding and support of successful breastfeeding.

The two significant determinants of motivated behaviour are the subjective value and the perceived probability of success of each available option (Jacobs and Eccles, 2000) – this is a conceptualisation of motivation, known as expectancy-value. Central to all expectancy-value theories is the recognition that actions and their potential consequences are embedded in a complex means-end structure. Motivated behaviour is not associated with any one factor, but is the result of a complex cognitive process which can be summarised as follows:

- Individuals search for information then cognitively process and decide how they might use it
- The decision to perform the behaviour or not is influenced by an ability to imagine how they will manage the consequences of their potential choice
- Based on the resulting evaluation, individuals will then set personal goals and then regulate their behaviour to reach these goals.

The motivational requirements related to breastfeeding persistence have been explored using an expectancy-value theory, namely the 'theory of planned behaviour' (Janke, 1994; Wambach, 1997; Duckett et al, 1998; Avery et al, 1998; Dick et al, 2002; Dodgson et al, 2003) and the findings consistently suggest that value (measured in terms of attitudes towards breastfeeding) and expectancy for success (measured in terms of maternal confidence) are the key factors related to sustained breastfeeding behaviour.

It is recognised that there is a need for health professionals to provide breastfeeding instruction that balances subjective value with expectancy for success; however, this does not automatically translate into practice. Research evidence suggests that routine instruction by health professionals is lacking in the factors associated with expectancy for success, namely the confidence-building components (Mozingo et al, 2000; Schmied et al, 2001; Chezem et al, 2003; Hanss, 2004). Stockdale et al in 2005 reported on the intricacy of the expectancy-value balance in routine breastfeeding instruction by midwives, and concluded that midwives' instruction is the un-named factor in the motivational triad. Furthermore, current best practice as proposed by the National Institute for Health and Clinical Excellence (NICE) (2006) was observed to influence the value women placed on breastfeeding. However, it was concluded that the same instruction may be perpetuating women's low expectancy for success.

Objectives

The research aimed to test the effectiveness of a motivationally-enhanced version of midwife instruction as a means of increasing women's expectancy for successful breastfeeding, compared to best practice. Based on previous work by Stockdale et al (2005, 2008), significant mean differences were expected in two of three motivational factors: total perceived midwife support and total expectancy for success. While it was hypothesised that these two motivational factors would increase in the experimental group, it was also predicted that there would be no significant group differences in the total value placed on breastfeeding, already regarded as high in the authors' context.

Research governance procedures were followed and ethical approval was obtained prior to the commencement of the trial from the University of Ulster, the Trust and the Office of Research Ethics Committees for Northern Ireland.

Design and setting

A feasibility study consisting of a single, blind, randomised controlled trial was conducted in one suburban hospital and community health and social services Trust, serving both urban and rural areas. The breastfeeding instruction offered by midwives was given in accordance with best practice as defined by NICE, and the Trust held the Baby Friendly Initiative Award. Two maternity wards and two lactation midwives were assigned to support either the control or intervention groups for the duration of the study. To determine baseline equivalence, the hospital statistics for the year 2005 were explored. No differences were noted in the incidences of breastfeeding between the wards on discharge from hospital or the average postnatal length of stay (mean three days).

Participants, assignment and blinding

The lack of comparable studies meant that a priori power analysis could not be undertaken. Therefore, on statistical advice a pragmatic approach to sampling was conducted, this involved several calculations, including the monthly birth rate and an estimation of monthly attendance at the routine 20-week scan, resources and time available for data collection. The advice was first – a four-month recruitment phase would be adequate to address the study objectives and secondly, this could be confirmed using a post-hoc power analysis.

Recruitment by the researcher and parent education midwife took place between December 2005 and March 2006. Included were primigravid women who intended to have their baby within the Trust and who attended the routine 20-week antenatal appointment during the recruitment phase. Women who did not speak English (or did not have interpretation services available) were excluded, along with those who experienced infant-maternal separation and incidences of newborn abnormalities that required additional infant-feeding support. Following written informed consent, participants were assigned using computer-generated random numbers to one of the two groups. Participants remained blind to group membership – a colour-coded sticker on the patient-held records indicated group membership to the midwives who were responsible for delivering the intervention.

A total sample of 234 primigravid women were approached and 191(81%) were eligible to participate. Exclusions were due to anticipated infant-maternal separation (n=1), language barrier (n=3) and teenagers who had already attended a breastfeeding workshop (n=30). Nine women declined to be involved prior to obtaining information about the research project because of a strong intention to bottle feed (n=3), intention to move home prior to birth of the baby (n=3) and maternal illness (n=3). A further nine women declined involvement after receiving information, resulting in an overall response rate of 95% (182 women giving antenatal consent). Following consent a further 38 (19%) withdrew or were excluded: 14 in the antenatal phase and 24 in the postnatal phase. A total of 144 women completed the study (see Figure 1).

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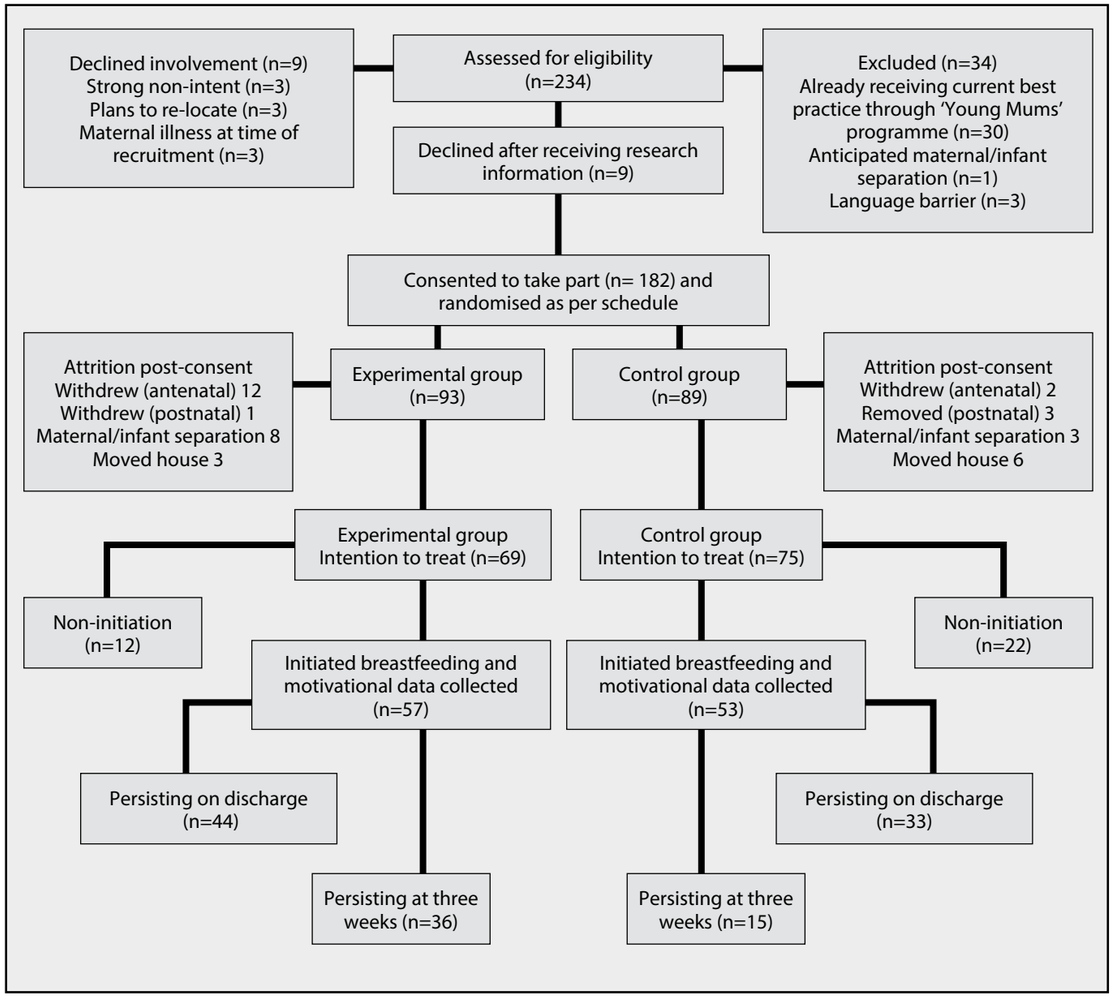
Figure 1. Participants' flow through the randomised controlled trial, from assessment of eligibility at 20 weeks to three weeks postnatal



Intervention

Three midwifery experts, one breastfeeding expert, two pregnant women and one non-pregnant woman were involved in the intervention development. The intervention was also informed by the outcomes of earlier observation studies (Stockdale et al, 2005, 2007) and the application of the breastfeeding motivational instructional measurement scale (BMIMS) (Stockdale et al, 2008).

Six motivational strategies that theoretically increase expectancy for success were incorporated into the intervention design:

- A mastery-orientated environment was created where participants were encouraged to think of breastfeeding as a learned behaviour rather than one that was based on instinct or which occurred naturally
- A goal structure for breastfeeding was introduced in the antenatal phase. The emphasis of the goal structure was to match women's antenatal expectancy of breastfeeding with common postnatal experiences. To achieve this, specific breastfeeding situations that would normally have been referred to as 'breastfeeding problems' were introduced in the antenatal period as common breastfeeding 'challenges'. Thus, by 'normalising' what is often referred to as 'problematic', the cognitive evaluation could be motivationally controlled
- In order to increase participants' sense of control, the goal structures offered were extended to include an element of choice. Those related to essential breastfeeding instruction such as 'helping your baby learn how to latch on' were separated from less essential breastfeeding instruction such as 'breastfeeding and your sexuality'. Hence, women were made aware of the difference between essential knowledge and optional additional information
- To increase women's control and confidence over breastfeeding in the postnatal environment, performance feedback indictors were introduced that were designed to help sustain breastfeeding effort, by addressing perceived insufficiency of milk
- To ensure the perceived relevancy of the instruction, goal structures for specific breastfeeding situations were presented in a user-friendly format. Clinical terms such as 'the areola' were avoided and a common language between midwives and women provided. This facilitated early detection when breastfeeding was not satisfactory. The user-friendly format of the instructional materials could be used as a quick reference tool
- A motivational name was developed for the intervention materials. The name Designer Breastfeeding™ was selected as it suggested to women that they could design and take control over their own breastfeeding experience.

In an attempt to avoid potential contamination between women in the control group and those receiving motivationally-enhanced instruction, copies of the motivationally-enhanced resources were only available to participants in the experimental environment. The timing of the intervention mirrored the schedule of current best instruction, thus resulting in a motivationally-enhanced intervention consisting of four components:

- Antenatal infant-feeding class (32 to 36 weeks' gestation)
- A breastfeeding information book (provided in the antenatal phase)
- A breastfeeding CD-ROM
- Postnatal instructional support provided by midwives (up to three weeks postnatal) and additional lactation consultancy on request.

The postnatal midwives who supported the intervention attended an additional one-day training session that focused on the role of human motivation and the use of effective strategies to increase participants' expectancy for success.

Outcome measures

The main outcome measure was women's motivation towards breastfeeding. This was measured using the newly-developed BMIMS by Stockdale et al (2008). The BMIMS measures three essential motivational components associated with duration to breastfeed: total value placed on breastfeeding (reliability coefficient, r=0.86), total perceived midwife support (r=0.85) and total expectancy for success (r=0.87).

Important difference and trial size

The expected variance in relation to the motivational outcomes was unknown, due to the lack of previous motivationally-designed interventions, therefore the minimum clinical important differences (MCIDs) in the study focused on the secondary outcomes related to the initiation and duration rates of breastfeeding. Previous statistics within the Trust for the period 2002 to 2005 recorded that 61% to 63% of primigravid women initiated breastfeeding. For the same period, 39% to 41% of primigravid women were classified as 'breastfeeding' on discharge from hospital. MCIDs were also guided by a previous breastfeeding study that aimed to increase duration by 10% (Graffy et al, 2004). As a result, breastfeeding on discharge from hospital was predicted to increase by 10% to 15% and to reflect the motivational impact of the expectancy for success component, persistence to breastfeed at three weeks was predicted to increase by 20%.

Data and data collection procedures

On an intention to treat basis, data about infant-feeding was collected from all women in the trial at two points: one to two hours prior to discharge as a structured interview and at three to four weeks postnatal by telephone. Prior to discharge, women who started breastfeeding were asked to provide data relating to the primary outcomes (motivational persistence) and data relating to the secondary outcomes (initiation, duration and exclusivity of breastfeeding). To enable the accurate evaluation of the motivationally-designed instruction to increase persistence, the conceptualisation of 'exclusive' breastfeeding was applied as defined in the Infant Feeding Survey (2005) – that is, the baby is being exclusively breastfed and has been for a minimum of 48 hours.

Secondary outcomes were recorded again at three to four weeks postnatal by telephone. Likewise, women who never gave any breast milk – defined as non-initiation – were interviewed on discharge concerning their infant-feeding decision and again at three to four weeks postnatal (as it is possible to initiate breastfeeding after leaving hospital). Data were collected by the researcher and when the researcher was unavailable, the parent education co-coordinator who received training on interviewing techniques conducted the structured interview. Follow-up for all participants ended in August 2006.

Analysis

The data sets were entered into SPSS (11.5), which included the 34 Likert items of the BMIMS along with initiation, duration and demographic data. Demographic data included maternal age, occupation, age of infant on discharge, delivery type and analgesia used in labour. Likert items that represented a negative statement, such as 'I hate breastfeeding' were re-coded. Composite scores were created for the three motivational components (total value, total perceived midwife support and total expectancy for success). Preliminary analyses described the sample demography, confirmed the accuracy of the entries and the random occurrence of missing values (<5%). The primary outcome measures of motivation from the BMIMS (total value, total perceived midwife support and total expectancy for success) were compared using independent t-tests for unequal variances, with group membership as a selection variable. Secondary outcomes (initiation and duration rates) were analysed using chi-square analysis on an intention to treat basis.

Results

Of the 182 women who consented to participate, 144 completed the study, of which 69 were in the experimental group and 75 were in the control group. The majority of women, 79 of

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Table 1. Cross-tabulation analysis of sample characteristics to explore group equivalence between the control and experimental groups

	Pearson chi-square value	Asymp. sig. (two-sided)	p value
Attendance at antenatal class	20.21	0.000	<0.001*
Maternal age	4.81	0.186	NS
Maternal occupation	4.81	0.172	NS
Age of baby on discharge	14.80	0.002	<.01*
Analgesia in labour	4.26	0.511	NS
Delivery type	1.63	0.802	NS

NS Not significant *Indicates statistical significance

144(55%), were aged between 21 and 30 years, with a further 53(37%) between the age of 31 and 40 years. Eight women (6%) were aged 20 or less, two women (1%) were 40 years or older. Two women (1%) did not provide details of their age.

A wide range of occupations was noted – 38(26%) of women reported to be professionals, while 20(14%) were not working. The majority 76(53%)* of women experienced a normal vaginal delivery, while 29(20%) women experienced a vacuum-assisted birth, 28(20%) women a caesarean section and 11(7%) women a forceps-assisted birth.

Regarding analgesia in labour, 29(20%) women used Entonox only, a further 25(17%) had a narcotic injection while 21(15%) had a narcotic administered by an infusion device. A further 43(30%) women had an epidural or spinal anaesthesia, while 26(18%) women reported having a combination of analgesia. The majority of women (92%) were discharged from hospital within 72 hours of birth, in that 13(9%) women went home less than 24 hours following birth, 67(47%) were discharged between 24 and 48 hours and 53(36%) between 48 and 72 hours. A total of 11 women (8%) were discharged from hospital more than 72 hours following birth.

Group equivalence

Cross tabulations were performed to explore group equivalence in relation to key factors that could impact upon women's motivation to sustain breastfeeding. The two groups had similar demographic characteristics, however there were two significant differences. First, an earlier discharge was evident for mothers and babies in the control group (24 to 48 hours compared with 48 to 72 hours in the intervention group) and secondly, 49 of 69 (70%) of women in the intervention group attended the antenatal infant-feeding class compared with 41 (53%) of women in the control group (see Table 1).

Power analysis was calculated on a post-hoc basis using GPOWER software*** (Faul and Erdfelder, 1992). On an intention-to-treat basis (experimental group, n=69, control group n=75) using an effect size d=0.5, χ=.05, one-tailed test determined that statistical power was high at .90. This confirmed that the number of women recruited was sufficient to show clinically significant differences between the two groups.

Primary outcomes

Table 2 shows the motivational outcomes in relation to women who initiated breastfeeding. As expected, the total value women placed on breastfeeding did not differ between the experimental and control groups. The prediction that women who received the intervention would perceive a greater degree of midwife support and greater expectancy for success was supported.

Secondary analysis

Theoretically when expectancy for success is coupled with value, through perceived relevant instruction, persistence to perform the behaviour will increase. Chi-square analysis was performed as a proportionate measure of initiation and duration rates between groups. Initiation of breastfeeding, breastfeeding on discharge from hospital and at three weeks postnatal were obtained. As summarised in Table 3, the difference in the initiation rate as expected, remained non-significant with 53 women in the control

Table 2. The motivational outcomes (total value, total perceived midwife support and total expectancy for success) in relation to the instruction received

	Total value placed on breastfeeding					Total perceived midwife support					Total expectancy for success				
	N	Mean	SD	t value	p value	N	Mean	SD	t value	p value	N	Mean	SD	t value	p value
Baby Friendly Initiative	51	88.4	10.6	t=1.51	p=0.133	52	31.4	9.44	t=7.21	p=0.000	52	41.05	15.72	t=4.81	p=0.000
Designer Breast-feeding	55	91.4	9.7			57	42.2	5.49			51	53.72	10.51		

Table 3. Chi-square analysis of initiation and duration of breastfeeding on an intention to treat basis

	Initial breastfeeding (%)	Breastfeeding on discharge (%)	Breastfeeding exclusively at three weeks (%)
Control group	53/75 (70)	33 (44)	15 (20)
Experimental group	57/69 (82)	44 (64)	36 (53)
χ^2	2.84	5.64	16.26
Asymp. sig. (two-sided)	p=0.092	p=0.018	p=0.000

group and 57 in the intervention group starting breastfeeding****. Significant differences were noted between exclusive breastfeeding on discharge from hospital and at three weeks postnatal.

Discussion

Principal findings

Application of the motivationally-enhanced instruction by midwives resulted in significant differences in the way in which women perceived routine support (p <0.001) and also their confidence levels in relation to their ability to successfully breastfeed (perceived expectancy to succeed p<0.001). Key to increasing these motivational factors was the introduction of different conceptualisations of 'normal' breastfeeding to women in the antenatal phase.

The secondary outcomes provided support for the motivational intervention, in that the duration rate on discharge from hospital and at three weeks postnatal increased. Breastfeeding on discharge from hospital increased by 20%, (χ^2 test p<0.02) and the breastfeeding rate at three weeks postnatal increased by 33% (χ^2 test, p<0.001).

Strengths

The application of a motivational framework to routine breastfeeding instruction by midwives has provided evidence that it is possible to systematically increase women's motivation to sustain breastfeeding. Through increasing the relevancy and effectiveness of professional instruction, the barriers associated with the introduction of breastfeeding problems in the antenatal phase can be overcome. In addition, application of a motivational measure of success (BMIMS) provides future researchers with an important baseline measure.

Limitations

Limited time and research resources impacted upon the size of this feasibility study. This may have introduced bias; however, response bias is unlikely to result in persistence to perform a behaviour. Instead, motivation to sustain behaviour is the result of motivational factors such as perceived confidence, relevance and satisfaction (Keller, 1979). This research was limited to motivationally enhancing the instruction provided by midwives and the end point was set at three weeks postnatal, after which the breastfeeding instruction was provided by health visitors. Further research is required to develop and test the intervention beyond the role of the midwife.

Relevance of the results

Comparison of these results with previous findings is difficult as there is a lack of similar studies where motivational interventions were tested. One study by Coombes et al, (1998) which did report the testing of a motivationally-enhanced version of breastfeeding instruction found significant increases in initiation rates but no group differences in relation to women's perceived self-efficacy and breastfeeding persistence. When compared with the current study, the same motivational strategies were applied, for example, the introduction of a goal structure and positive feedback. However, an important difference lies in the incorporation of potential breastfeeding challenges in the antenatal phase.

Previous research has tested the efficacy of introducing women to the idea of potential breastfeeding 'problems' in the antenatal period (Lavender et al, 2005), but found no significant difference in the breastfeeding outcomes. Globally, researchers are suggesting that the disadvantages of equating 'normal' breastfeeding with 'problem-free breastfeeding' may be outweighed by the advantageous opportunity for women to prepare psychologically and manage breastfeeding (Mozingo et al, 2000; Hong et al, 2003; Gill, 2001). Available evidence also suggests that there continues to be a discrepancy between what information and advice women feel is relevant to their breastfeeding experience and what health professionals perceive to be relevant to their experience (Loiselle et al, 2001; Hong et al, 2003; Chezem et al, 2003; Hanss, 2004). It makes sense that if health professionals' breastfeeding instruction is to be effective, it must be relevant to women's breastfeeding experience.

Meaning of the findings

To achieve higher relevancy, antenatal instruction requires more than a pre-warning of potential problems but a re-writing of the breastfeeding curriculum and re-organisation of the support infrastructure. By normalising different breastfeeding experiences in the antenatal phase through motivationally-enhanced instruction, the research gave women the opportunity to imagine, anticipate and visualise how they would cope with the normal situations that were expected to arise when their baby was learning how to breastfeed. In addition, when women recognised their postnatal experience of breastfeeding as being in step with the expectations created in the antenatal phase, their primary source

* This statistic does not represent the annual normal vaginal delivery rate within the unit. Analysis showed no relationship between delivery mode and breastfeeding behaviour.
*** GPOWER is a general power analysis program that performs high-precision statistical power analyses for the most common statistical tests in behavioural research.
**** The chi-square results are calculated on the basis of 1df and reflects the dichotomy of the items, while the analysis reported in the published Research Summary (ISBN 3 978-1-85923-227-9) represents the analysis of more detailed responses and therefore reports 2df.

of confidence was protected. Moreover, this change in the presentation of breastfeeding 'problems' to one of breastfeeding 'challenges', forced a transition in the instructional environment from one where women learned to breastfeed in a performance-orientated environment, to a mastery-orientated environment. Women who learned to breastfeed in a mastery-orientated environment had greater confidence in their ability and expectation to succeed.

By introducing different conceptualisations of 'normal' breastfeeding in the antenatal phase, not only were women's expectations of breastfeeding successfully moderated, but so were their perceptions of the support and advice they receive. Through motivational enhancement, midwife instruction became more relevant to women's experience of breastfeeding. Thus, when health professionals provide a motivational match between antenatal expectancies and postnatal experiences, women will have the opportunity to receive relevant instruction that effectively sustains their breastfeeding behaviour.

Future research

This study provides preliminary evidence that motivationally-enhanced instruction is effective. Future research must focus on re-defining 'normal' breastfeeding and re-writing the breastfeeding curriculum. The support infrastructure provided by health professionals must also be motivationally adapted. Further research is required in relation to the proposed concept and intervention development.

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Ability to detect intrauterine fetal growth restriction… 'Must try harder'

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Abstract

Background. In total, 4000 stillbirths (one in every 200 births) occur every year in the UK, and the babies are often growth restricted, however, this is rarely identified before birth.

Key questions. Why are they undetected? Could they have been detected? Who should detect them? Does UK professional positioning deter their detection? Do doctors interfere too much? Do midwives not interfere enough? Should methods of interference be reassessed? Is our performance good enough, or should we try harder?

Conclusion. Attempts are made to address the above questions in the following paper and the suggestion is made that routine ultrasound of fetal wellbeing should be considered for all pregnancies, and that all mothers would benefit by receiving care from both midwives and doctors.

Key words: Intrauterine fetal growth restriction (IUGR), professional positioning, routine ultrasound, stillbirth, low risk

Background

I am not sure exactly what is written in our job descriptions as midwives and obstetricians, but would hope and believe that it should say that we are 'committed to caring for UK mothers, and must endeavour to make every effort to ensure that they are delivered of healthy babies as safely and successfully as possible'. At the time of writing this paper, I believe that our annual appraiser would sign us off with the words, 'Must try harder'.

This paper will evaluate the present ability of accoucheurs and accoucheuse in the UK to clinically detect intrauterine fetal growth restriction (IUGR), and thus potentially prevent the unacceptably high incidence of stillbirth, which is often associated with abnormal fetal growth patterns. Should we continue to rely on the traditional manual abdominal assessment of growth when perhaps simple low technology ultrasound could be employed to the benefit of all the Confidential Enquiries into Maternal and Child Health (Lewis, 2007)?

Difficulties in detecting IUGR

Over 700,000 babies are born in the UK annually. The vast majority of the mothers of these babies have not only come through the process in a healthy manner, but are indeed grateful for the care they have received. Our responsibility, as the provider of this care, is to make sure that nature does not get up to her old trick of only believing in 'survival of the fittest'. We see far too much of the outcome of that policy in the under-resourced world, where nature sees mothers as instantly replaceable, and babies often as 'toxic by-products of pregnancy', which is how one of my earliest paediatric teachers, Dr Muriel Fraser thought most obstetricians considered babies.

Surely, many correctly ask, nature is best? She allows healthy, happy mothers to give birth to healthy, happy babies. In the majority of cases, this is exactly what happens, but Lewis (2007) tells us with constant repetition that in the UK mothers still die needlessly, and an incredible 4000 babies are stillborn every year, the majority are associated with growth restriction. The majority of these babies are unacceptably classified as 'unexplained', when in fact the majority were 'unpredicted' and could have been saved.

The Confidential Enquiry into Sudden Death in Infancy (1997) stated that '45% of stillbirth was associated with sub-optimal care, poor risk assessment, poor referral patterns, and failure to detect IUGR'. Furthermore, 'failure to respond to decreased fetal movement, and poor communications' were identified as the main areas for improvement. The most recent report from Lewis (2007) repeats the message, and reveals that while the number of stillbirths occurring in the intrapartum period have fallen dramatically over the last decade, antenatal ones have significantly increased. This cannot be

Table 1. A case scenario

Consider the following scenario:

'Low-risk' mother attends clinic at 36 weeks.

Midwife thinks: 'Good sized big baby... must be 7lbs'. Writes 'well' on chart.

Sees the doctor next week at 37wks... She thinks: 'Good size baby... must be 7lbs', writes 'well' on chart... and so on for each week...

At 41 weeks, appointment for induction given for term +10 days.

Mother admitted at T+9... no fetal heart. Baby 7lbs...

All say: 'How tragic, good size dead baby... diagnosis must be unexplanied stillbirth'. When in fact its IUGR, as the baby has not grown for almost six weeks. It has not fulfilled its growth potential. Its death is not unexplained. It is unpredicted.

allowed to continue.

Perinatal mortality (PNM) causes are of multi-origin. Antenatal fetal death, for 'unexpected' reasons, accounts for 50% of fetal deaths, two-thirds of which occur after the 35th week, and at a time in the pregnancy when it is least expected (Gardosi et al, 2005). The persistent finding antenatally of a mother with no apparent problems encourages the carer to think: 'All has been going well in the pregnancy. No problems have been identified. Why should it go wrong now?' (see Table 1).

Major fetal abnormalities, which in the past led to higher PNM rates have all but been excluded from the national statistics by a vigorous government-promoted antenatal screening policy.

Pre-term delivery, although increasing in incidence is not the problem, it was thanks to the judicious use of prenatal steroids and the endeavours of our paediatric teams.

The extremes of fetal weight are now the most worrying categories of perinatal death on our horizon, with being too small or too large the areas of highest risk in trying to address the problem of unexpected (unexplained) death.

Of particular concern is the increasing age of mothers when they are becoming pregnant, and especially those with a sub-optimal economic status (Frøen et al, 2004). However, poor past obstetric history, cigarette smoking and alcohol consumption are not associated with 'unexplained' death, though when these features actually do come to the attention of those proffering antenatal care, the mother is invariably placed into a 'high risk' category from which she finds it difficult to escape.

Undetected IUGR is invariably the problem (Ahlenius et al, 1995). Yet, how do we blame those who fail to detect IUGR, when its very definition is not universally agreed? Even though we accept that children and adults are all appropriately different sizes, we do not accept the same premise for the fetus. Rather, if the estimated fetal weight is assessed to be less than the tenth centile, as denoted from whole population birthweight statistics, the baby 'may be in trouble'. If it is assessed to be on the 11th centile, it is deemed to be normal. Around 70% of IUGR is undetected until delivery, while at the same time, for every three mothers where the problem is suspected, only one will be confirmed (McKenna et al, 2003).

Failure to identify an appropriate fetal weight for a particular pregnancy, and failure to determine when the fetus has not reached the weight is the major failing of fetal antenatal care being provided throughout much of the UK and the Republic of Ireland. We must universally implement customised fetal growth charts forthwith, at present only approximately one-third of units in the UK use them (Gardosi et al, 2005).

We have known about the problems of poor fetal growth for 30 years. Williams et al (1982) commented that of the 23,000 fetal deaths in California, the strongest causal link was between low fetal weight for gestational age and fetal demise. Why are we continuing to let this occur? One of the reasons may be that antenatally, an undue focus is given by carers to the method and experience of birth, rather than the health and welfare of the fetus. Mothers in general are now fairly healthy in the developed world. This has allowed the emphasis antenatally to shift from the nine months of pregnancy to an undue emphasis on the 12 hours of labour.

The accoucheur or accoucheuse, given the responsibility of providing antenatal care assumes that a low-risk mother will give birth to a low-risk fetus. This premise probably arises from the known fact that high-risk mothers often carry, and give birth to high-risk fetuses. Therefore, much high-risk obstetrics in the UK is focused on the care of high-risk mothers only.

Until our research colleagues can find out what causes IUGR, and point the way to the problem being treated or avoided, we are left with the imperative to improve our ability to detect it antenatally, so that appropriate management strategies may be implemented.

Meanwhile, too many perfectly normal pregnancies are being falsely identified as being at high risk, with its attendant intensive antenatal investigations and maternal anxiety being engendered, before an actually normal pregnancy is confirmed. At the same time, two-thirds of mothers who actually have fetuses with IUGR, fail to have the problem detected antenatally. Many of these babies come to no harm when nature wisely induces labour, but in many cases this does not occur, and stillbirth follows. With only 35% of fetuses with IUGR being diagnosed antenatally, perhaps we need to identify not who looks for the problem, but what means are used to detect it? (McKenna et al, 2003).

Low-risk verses high-risk mothers

The problem starts right at the beginning. In the UK, pregnancies are divided at booking into low risk and high risk. In general, midwives care for low-risk and obstetricians care for high-risk mothers. Historically, the mothers in our charge really were not healthy specimens at all. High parity, anaemia, rheumatic fever and poor social environment were frequently noted and were associated with poor outcome. Today, we do not have such widespread profound social deprivation. We still can, however, identify high-risk mothers as determined by high maternal age, obesity, diabetes and medical disorders. These mothers receive incredibly intensive antenatal care for themselves and their fetuses, often perhaps far more than they need. Rarely for those born and bred in the UK, do they or their offspring come to any harm. The National Perinatal and Maternal Mortality statistics show that they are highly likely to have a very successful outcome.

Mothers not in the above category are identified as low risk, and are offered very low level fetal antenatal care, with the premise that they are unlikely to run into problems. 'Unlikely' is probably a fair word, but it is not 'impossible'. The very use of the words 'low risk' does not imply no risk. I am not being profession-specific here, as Tucker et al (1996) identified that there was 'no clinical or consumer benefit to women, with normal pregnancies, being seen by obstetricians'. It is not a matter of who sees our mothers, but what they do with them.

The reader of this paper does not need reminding that death is not the only outcome of IUGR. The Barker hypothesis (Barker et al, 1993) has suggested that IUGR not only causes stillbirth, but is more likely to be associated with childhood diseases, with learning problems, and adult disease such as ischemic heart disease, diabetes, stroke and premature death. There is benefit to many for the timely diagnosis and management of IUGR.

How do we detect IUGR? The National Institute for Health and Clinical Excellence (NICE) guidelines (2007) recommend that we should monitor the size of the fetus by measuring the size of the mother's uterine fundal height in centimetres. There is no doubt that careful, repeated measurement can improve the detection rates of IUGR over the 'laying on of hands' method, but even this method will leave up to 50% of affected babies undetected (Tucker et al, 1996).

Detecting high-risk fetuses in low-risk mothers

Professor David James of the University of Nottingham (personal communication, 2007) has shown that in singleton, normally formed fetuses, PNM in the UK is now four times higher in low-risk pregnancy than in high-risk ones. When a pregnancy is identified as high risk, usually via the determination of the mother being in this bracket, a baby is rarely lost once 26 weeks' gestation has been reached. However, it would appear that we all live with a false sense of security in apparently low-risk pregnancies, where PNM is in the region of eight per 1000. This low-risk group of mothers now includes most of the perinatal deaths in the UK (D James, personal communication, 2007).

What is it that we do with high-risk pregnancy, which perhaps we should be doing with low-risk pregnancy? We must find some compromise whereby we start detecting the high-risk fetus in the low-risk mother, and at the same time stop over-interfering in completely normal pregnancies. Perhaps improved application of current knowledge would help decrease the fetal death rate caused by IUGR?

The Euronatal Audit Study (1987) suggests that 'a statistical reduction in stillbirth could be delivered by improved detection of IUGR and improved management of same'. No one is suggesting that we apply full biophysical assessment to all pregnancies at all visits at all times. However, there does seem to be enough evidence already to suggest that by taking some features of the biophysical profile and applying them to apparently normal pregnancies, we could detect the high-risk fetus in the low-risk mother. At the same time, by applying this technology, perhaps we could decrease inappropriate interference in perfectly normal pregnancies.

We know that older mothers are more likely to suffer unexpected fetal death. Fretts et al (2004) divided mothers over the age of 35 into two groups. Those with normal care, had no antenatal biophysical testing, and were offered induction of labour at 40 weeks and ten days' gestation. The second group had weekly biophysical fetal assessment from 37 weeks onwards. When a positive risk factor was determined, induction of labour was introduced immediately. If the profiles were normal, the mother was left to have labour induced at 41 weeks. In the first group having normal low-risk care, the stillbirth rate was five per 1000. In the second group, who received the weekly fetal assessments from 37 weeks, the stillbirth rate was one per 1000. It would appear that this policy is worthy of further assessment.

Bricker and Neilson (2007) studied the routine use of ultrasound in low-risk pregnancy after 24 weeks, involving 25,000 women in seven studies, and showed no benefit to mother or fetus as revealed by perinatal mortality improvement. The problem with this meta-analysis was that the ultrasound was used to determine the structural normality of the fetus, and not the health of the fetus and the surrounding environment.

In Belfast, McKenna et al (2003) showed that using low technology ultrasound on two occasions at 29 and 35 weeks' gestation, and by observing three parameters: inappropriate placental maturity, low estimated fetal weight and decreased amniotic fluid volume, followed by induction of labour when poor growth was identified, the incidence of IUGR could be reduced from 10% to 7%.

IUGR can be identified in an apparently low-risk pregnancy, and the fetus can be identified before it falls below the tenth centile.

These three parameters were chosen as Proud and Grant (1987) showed that the identification of an inappropriately mature placenta occurs in 15% of cases at 35 weeks' gestation, and this group of mothers has a higher PNM. Perhaps even more important was that they showed that by informing the accoucheurs of this finding, and timely intervention being offered, the PNM of this ultrasonically-detected high-risk group could have their PNM reduced to that of the normal population. The association of oligohydramnios and an increase in perinatal mortality and morbidity has been known for 20 years. Estimating fetal weight by ultrasound seems a very obvious way of detecting IUGR.

Conclusion

Stillbirth should be an embarrassment to all of us who offer antenatal care. It is often unpredicted, potentially avoidable, shameful, and tragic, but rarely 'unexplained'. There is no doubt that there is a well meaning, but misguided lobby that seems to be quite comfortable with this huge number of stillborn babies, and appears to accept that the number cannot be reduced.

The evidence is there that the vast majority of these babies can be saved, and by appropriate detection and timely delivery can lead perfectly normal lives. Perhaps what is needed is a trade-off, where we increase the number of appropriate interventions in all pregnancies, while at the same time reduce the amount of inappropriate interventions in truly identified normal pregnancies. Multidisciplinary, multicentred research is needed to find how best to do this.

Why are we in this sad situation? It is because the care of pregnant mothers in the UK is profession-centred, rather than mother-centred. If all low-risk mothers had low-risk fetuses, and high-risk mothers had high-risk fetuses, then the system whereby midwives look after apparently low-risk mothers and obstetricians look after high-risk ones, would work. Sadly nature is not like that. The system that we have in place in the UK does not account for nature's low-risk mother with the high-risk fetus, and produces far too much interference for the allegedly high-risk mother with the low-risk fetus.

Obstetricians in the UK medicalise far too much. Each year we perform 100,000 inductions of labour for prolonged pregnancy, with all its attendant risks, to save 200 babies, when it would certainly be better to develop a system whereby we induced, perhaps 1000 mothers in order to save those babies.

Midwives normalise too much, for such is their desire to care for normal mothers that they keep examining them until they are normal. Pregnancies with problems need expert midwifery skills as much as pregnancies that have no problems. Pregnancies without apparent problems need expert medical skills to determine that they are such. All mothers should be looked after by both midwives and medics.

We owe it to mothers to stop dividing the spoils up largely based on apparent maternal risk at booking. Nature at her best is beautiful. Nature at her worst is lethal. We have the ability to know when to let her blossom, while at the same time stop her strangling some of her youngest and most beautiful flowers. We 'must try harder'.

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Routine screening and detection of fetal anomalies in a predominantly midwifery-led ultrasound service

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Abstract

Background. To assess the sensitivity of a routine ultrasound examination programme performed predominantly by midwives to detect fetal anomalies in an unselected population.

Setting. Tertiary referral centre in the Republic of Ireland with over 8000 births per year.

Methods. A total of 16,511 pregnant women had a routine ultrasound performed in a tertiary referral maternity hospital in Dublin and were eligible for analysis. All of the examinations were performed between 2004 and 2005 and were reviewed retrospectively. Postnatal ascertainment of birth defects was obtained by reviewing neonatal case notes and/or postmortem examinations from all infants born over 500g. The main outcome measure was the efficacy of a one-stage programme in detecting fetal anomalies.

Results. Altogether 389 infants were born with anomalies, giving an incidence of 2.3%. However, the number of infants born with an anomaly scanned by midwives was 229 giving an overall sensitivity of the midwifery-led ultrasound screening service of 57.2% (95% confidence interval [CI], 50.5 to 63.6). In total, 101 were detected in the second trimester, yielding a sensitivity of 46.8% (95% CI, 0.39 to 0.53) before 24 weeks' gestation. A total of 98 infants remained undiagnosed (false negatives) with an additional two fetuses detected later in pregnancy, which gives an overall specificity of 99% and a positive predictive value of 100%. Almost all anomalies suspected were confirmed postnatally. The median gestational age at diagnosis was 22 weeks. The sensitivity for detecting anomalies ranged from 15% to 75% according to the fetal anatomical system.

Conclusions. Ultrasound is a powerful tool in fetal anomaly detection in an unselected population, even when checklists of the anatomical structures to be examined are not in use. The data demonstrate that routine ultrasound performed by midwives can achieve a sensitivity rate comparable with tertiary centres. However, a high specificity rate is influenced by whether soft markers are reported routinely.

Key words: Congenital anomalies, routine ultrasound screening, detection rates, midwifery, audit, sensitivity, specificity

Background

Recent decades have seen ultrasound revolutionise the management of pregnancy and its possible complications (Goldberg, 2000; Hemmingway, 1991). Its contribution in this regard is uncontested (Bucher and Schmidt, 1993; Campbell et al, 1985; Eik-Nes et al, 1984; Nakling and Backe, 2005). Ultrasound screening for fetal anomaly has been the subject of much debate, (Levi, 2002) due, in part, to the broad range in detection rates (5.8% to 90%) that have been reported (Boyd et al, 1998; Boyd et al, 2004; Carrera et al, 1995; Chitty et al, 1991; Ewigman et al, 1990; Garne et al, 2005; Goncalves et al, 1994; Grandjean et al, 1999; Hagenfeldt et al, 1998; Levi et al, 1991; Nakling and Backe, 2005; Tabor et al, 2003). Major congenital anomalies have a significant impact on perinatal morbidity and mortality, and despite their low prevalence (2% to 4% of all births), they account for approximately 30% of perinatal deaths in the developed world (Grandjean et al, 1999). A systematic review of the effectiveness of ultrasound prior to 24 weeks' gestation has found that a reduction in perinatal mortality secondary to screening is achievable under certain conditions, that is, 'if detection of fetal malformations is an important objective and a high level of diagnostic expertise exists and if termination of pregnancy for fetal abnormality is widely accepted in the population screened' (Bricker et al, 2000: 11). Consequently, health service providers outside the Republic of Ireland offering screening for fetal anomalies also offer access to termination of pregnancy services to the couple, as 'this knowledge allows them to prepare for the birth of their child, or to consider termination of pregnancy' (Boyd et al, 1998: 1577).

The situation in Ireland is unique, and in order to provide context for the reader, an overview of the differences between the legal situation regarding abortion between mainland UK (Scotland, England and Wales), Northern Ireland and the Republic of Ireland will be highlighted. Termination of pregnancy is legally available in the UK and its regulation is addressed within the Abortion Act of 1967. Although several amendments to the Act have been made, section 1(1)(d) includes the situation where 'there is a substantial risk that if the child were born, it would suffer from such physical or mental abnormalities as to be seriously handicapped'. Because fetal abnormality is specified as a ground for termination of pregnancy, it suggests that a termination of pregnancy for serious abnormality can be offered legally without gestational restrictions.

The law relating to termination of pregnancy in Northern

Ireland differs from the rest of the UK as the Abortion Act of 1967 does not extend to Northern Ireland, and the relevant law is contained in sections 58 and 59 of the Offences Against the Person Act, and in section 25(1) of the Criminal Justice Act (Northern Ireland) 1945, and is interpreted with reference to the Bourne judgement (case of R v Bourne (1939)). Termination of pregnancy in Northern Ireland is only legal if there is either a threat to the life of the mother or a risk of real and serious adverse harm to her long-term or permanent health. The presence of a fetal abnormality is not recognised as a specific ground for termination in the absence of a real and serious risk to the health or life of the mother.

The law in Ireland is even more restrictive, in that the right to life of the unborn has an equal right to that of the mother in the Irish Constitution (Government of Ireland, 1999). Article 40.3.3 states: 'The State acknowledges the right to life of the unborn and, with due regard to the equal right to life of the mother, guarantees in its laws to respect, and, as far as practicable, by its laws to defend and vindicate that right.' However, an amendment to the Constitution was made in 1992 that said that the State shall not limit the freedom of travel between Ireland and another State to access termination of pregnancy. Subsequent referenda have failed to result in a change to the law.

Given the current situation, it is debatable as to whether fetal anatomical surveys should be offered routinely in Ireland (Byrne and Morrison, 1999), given that others have shown little impact on perinatal mortality in the absence of termination of pregnancy (Bricker et al, 2000). However, given the visual appeal of ultrasound to couples, withdrawal of a routine ultrasound service, albeit with the intention of confirming gestation, multiple pregnancy and so on, is likely to meet with much resistance. However, the practice of offering a first trimester screening test for Down's Syndrome and the second trimester detailed scan (with detection of fetal anomaly as an imperative) in line with the National Institute for Health and Clinical Excellence (NICE) and UK National Screening Committee recommendations (National Collaborating Centre for Women's and Children's Health, 2008) are not readily adaptable to the Irish context. Hence, a situation exists where there is no national consensus or professional guidelines for practice. Therefore, it is unsurprising that an Irish survey of antenatal ultrasound services has shown that wide variations in practices exist between the ultrasound programmes offered at unit level (Lalor et al, 2007). Even so, second trimester ultrasound is the most common examination offered nationally with 95% (n=21) of units offering the test either routinely or selectively (Lalor et al, 2007) .

Most previously published studies have focused on detection rates in selected hospitals, where the examination has been conducted according to a protocol or checklist of specific structures to be examined. This paper, in contrast, describes the fetal anomaly detection rate of a routine ultrasound service, where the purpose of the examination was not targeted fetal anomaly detection, but rather to confirm fetal number and viability, localise the placenta, subjectively assess amniotic fluid volume and estimate gestational age, and outrule and/or confirm multiple pregnancy. However, during the course of the examination and as biometry is measured, a fetal anomaly may be detected and the pregnancy managed accordingly.

Given the context of practice, the authors' aim was to assess the sensitivity for detecting congenital anomalies of a routine one-stage ultrasound examination (USS) programme, to examine the gestational age at detection and to describe the variation in detection rates by anatomical system when targeted screening was not the imperative of the examination.

Design

Since 1995, a routine second trimester USS has been offered by the hospital to all women. The routine ultrasound examination offered to women with a low risk of carrying a baby with a fetal anomaly is performed by midwives. Fetal medicine specialists are involved in the care of women at high risk of carrying such a baby. The findings from the examination have been recorded prospectively in an USS database since 2000.

A review of routine obstetric ultrasound examinations performed by midwife ultrasonographers from 2004 to 2005 was conducted. At the time of data collection, clinical audits/studies that did not include the recruitment of participants did not require formal approval from the hospital ethics committee. A total of 16,511 pregnancies with a birthweight greater than 500g were included in the analysis. The routine ultrasound service was provided by seven midwives and one part-time radiographer. As this radiographer was not involved in the detection of any anomalies and mainly conducted gynaecological examinations, the service will be referred to as midwifery led.

Approximately 50% of the midwives held a recognised ultrasound qualification at the time and ranged in experience performing ultrasound from one to ten years. Two midwives had been awarded a higher diploma in medical ultrasound and two others were completing the course at the time of data collection. The routine examination was scheduled to take place between 18 and 22 weeks; however, the examinations were conducted between 12 and 41 weeks for a variety of reasons. Most women in the hospital booked for care in the second trimester, while others did not attend until the advanced stages of pregnancy. Some women were booked for a second trimester USS between 18 and 22 weeks based on menstrual dates and the gestation was estimated to be between 12 and 17 weeks using ultrasound measurements. In these instances, an ultrasound estimated date of delivery was assigned and women were not offered an additional examination routinely. The USS report recorded in free text that no obvious abnormality was seen; however, a checklist of anatomical structures to be examined was not in operation. Consequently, the extent to which fetal structures were studied may vary at an individual level. As there is no consensus regarding the predictive value of isolated soft markers such as choroids plexus cysts, shortened femur, pyetelectasis and echogenic foci (Getz and Kirkengen, 2003; Krantz et al, 2004), their presence in isolation was not recorded or reported. So reliable specificity calculations could not be estimated. Fetal anomalies detected through first trimester screening, invasive testing or those referred for a second opinion to a fetal medicine specialist from another site were excluded as midwives were not involved in the diagnostic process. Three specialists in fetal medicine provide a tertiary referral service for suspected or confirmed anomalies from the routine second trimester clinic.

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Data were collected from four main sources:

- The USS database record of all structural malformation
- Syndromes and chromosomal anomalies detected antenatally (including a search of all cytogenetic reports)
- The neonatal database record of diagnosis and immediate outcome of all infants born with a congenital defect
- In cases of in-utero fetal death, miscarriage or stillbirth, maternal case notes and pathological (postmortem) reports were searched to achieve maximum postnatal ascertainment.

The pregnancy data from each woman were compared with those obtained at birth (neonatal case notes or autopsy reports for intrauterine and perinatal deaths). Abnormalities unlikely to be diagnosed during the second trimester USS were excluded (clicking hip, minor deformities of the nose, ears and face, umbilical/inguinal hernia, undescended testes, hydrocele, phimosis, hypospadias, isolated skin lesions and functional cardiac murmurs). Sensitivity calculations of the second trimester USS were based on the following classifications:

- 'True positive' when the diagnosis was confirmed by postnatal examination (clinical or autopsy findings)
- 'False negative' if the anomaly was discovered later in pregnancy or at birth and undetected at the examination
- 'True negative' if the USS examination had no abnormal findings and the neonatal examination was normal or identified an excluded anomaly
- 'False positive' if an anomaly was recorded at the second trimester USS that was not confirmed at birth.

The 20 women that travelled to the UK for termination of pregnancy were classified as lost to follow-up as postmortem examinations were not conducted.

Chromosomal anomalies at birth were also included and classified as false negative even though it could not be ascertained if a structural anomaly was present at the second trimester USS. Sensitivity and specificity of ultrasound were calculated as follows: sensitivity=true positive/(true positive+false negative), specificity=true negative/(true negative+false positive).

Data were managed and analysed using SPSS (12).

Materials and methods

The ultrasound programme was a one-stage second trimester ultrasound offered to all women. Serum biochemistry was not performed routinely. Only 15 minutes were allocated to conduct the examination, which included introductions to the woman/couple, the ultrasound assessment and report writing. The standard procedure comprised biometric measurements of the bi-parietal diameter and femur length, localisation of the placenta, fetal number and subjective amniotic fluid assessment. An overall view of the fetal anatomy occurred particularly as biometric measurements were obtained. There was no requirement to obtain specific views, and a checklist to guide the conduct of the examination was not used. When a fetal anomaly was suspected or identified, a second opinion was sought from another midwife sonographer or referral to a fetal medicine specialist within the unit was arranged and the examination was repeated. If a multiple pregnancy was identified, in the absence of a first trimester ultrasound, efforts to determine chorionicity were made. The ultrasound examinations were performed abdominally on an Aloka and Voluson with 3.5MHz and 5MHz curvilinear transducers.

Sample

From 2004 to 2005, 16,573 infants (16,353 singletons, 110 twin pairs) were born in the hospital, and 389 were born with an anomaly. However, only 229 of these infants were scanned by midwives at the routine clinic. Women referred directly to a fetal medicine specialist based on obstetric or family history or from a regional centre for confirmation of a diagnosis were excluded from the analysis (see Table 1).

All fetuses with a gestational age between 13 and 24 weeks (biparietal diameter (mm) >28 and <67) were included in the analysis and formed the basis of sensitivity calculations (see Table 2). However, not all women attended for their first hospital visit prior to 24 weeks' gestation. Women booking late were offered an ultrasound following their booking visit (irrespective of gestation). Consequently, data on anomalies diagnosed in the third trimester are also presented (see Table 2). These data were presented in order that women booking late and incidences where the anomaly was undetected at the second trimester ultrasound, but identified later in pregnancy were described. Data presentation was based on a study conducted by Nakling and Backe (2005) to facilitate comparison. Descriptive data are presented as percentages.

Definitions

Malformations were coded according to the anatomical system (see Table 2) and their likely clinical consequences (see Table 3) as proposed by RCOG (1997).

Results

The prevalence of fetal anomaly in the hospital population was 2.34%, and 229 infants born with an anomlay were diagnosed antenatally by midwives. Some 62 of the infants were diagnosed by fetal medicine specialists during nuchal translucency measurement, invasive testing or through external referral for an expert opinion from a regional centre. Therefore, these infants were excluded from the sensitivity calculations (see Table 2).

With the exception of 13 examinations (for women booking late), all examinations were conducted up to 24 weeks' gestation. In total, 131 anomalies were detected antenatally (true positive), yielding an overall sensitivity of ultrasound screening in pregnancy (second and third trimester combined) for fetal anomaly of 57.2% (95% confidence interval [CI], 50.5 to 63.6) in an unselected population. There were no false positive scans

Table 1. Sample selection from hospital population

Total population	Number	%
Number of hospital births	16,573	100
Number of births included in the study	16,511	99.6
Number of infants born with a congenital anomaly	389	2.3
Number of infants born with a congenital anomaly scanned by ultrasonographers	229*	1.39
Number of infants referred directly to fetal medicine specialists	62	0.4

*Included in the study

Table 2. Detection of congenital anomalies from a total of 16,511 fetuses (n=229)

	Discovered at routine scan by midwife	Discovered in 3rd trimester by midwife	Discovered at birth	Sensitivity for routine scan by midwife
Central nervous system (CNS)				
Sacrococcygeal teratoma			1	
Anencephaly	3			
Spina bifida	3	2	2	
Encephalocoele	3			
Ventriculomegaly	5	3		
Holoprosencephaly				
Dandy-walker anomaly	1			
Other	1	1		
Total CNS	16	6	3	69.5
Pulmonary system				
CDH	2			
CCAM	1			
Other			1	
Total lung	3		1	75
Cardiac system				
ASD/VSD	2	1	4	
Hypoplastic left heart	1		1	
Coarctation			4	
Arrhythmia		4		
Other complex		1	4	
Total cardiovascuar system	3	6	13	15.7
Gastrointestinal system				
TOF			1	
Gastroschisis	5		1	
Omphalocoele	3	1	1	
Duodenal/jejunal atresia	1	1	3	
Abdominal cyst	1			
Other (e.g. dilated bowel)	2	3		
Total Gastrointestinal	12	5	6	57.1

CDH = congenital diaphragmatic hernia, CCAM = congenital cystic adenomatoid malformation of the lung, ASD = atrial septal defect, VSD = ventricular septal defect, TOF = tracheal oesophageal fistula

as soft markers were not reported routinely.

A total of 20 women opted to travel to the UK and terminate the pregnancy following diagnosis of the following anomalies: central nervous system (CNS) (n=8), gastrointestinal tract (n=2), musculoskeletal (n=5) and chromosomal (n=5) (see Table 3). Sensitivity of the second trimester ultrasound examination for fetal anomaly is 51.2% (95% CI, 44.7 to 57.7), if the 20 cases are included in the analysis. When they are excluded, sensitivity levels of 46.8% (95% CI, 0.39 to 0.53) were found. It can be seen in Table 2 that there were marked differences in the sensitivity for the different malformations based on anatomical system.

In total, 101 anomalies (46.7%) were detected prior to 24 weeks' gestation (median gestation of diagnosis 22 weeks). The most common defects identified were found in the renal system (32%), CNS (16%), musculoskeletal system (15%) and the gastrointestinal tract (12%). The lowest rate of detection was for cardiac anomalies (15.7%); however, those amenable to detection using a four chamber view were more likely to be identified than those requiring visualisation of the outflow tracts (see Table 2).

There were no false positive tests. This is likely due to the fact that soft markers are not reported routinely. Confirmation of the anomaly on postmortem examination following termination of pregnancy (n=20) was not possible within an Irish context. Antenatal images of the defect were therefore examined by two of the authors (JL and NR) in order to classify the findings as true positives for statistical purposes. Some 98 infants remained undiagnosed (false negatives, with an additional 17 anomalies detected later in pregnancy (that is, undetected at the second trimester scan, but subsequently identified when referred for ultrasound for an obstetric indication).

The sensitivity of the second trimester scan ranged from 15.7% to 75% according to the fetal anatomical system (see Table 2). The prevalence of congenital anomalies was 2.3% when infants screened by fetal medicine specialists were included, suggesting that postnatal ascertainment was likely to have been accurate. There were three twin pregnancies. In one case, both fetuses were affected by omphalocele-exstrophy-imperforate anus-spinal defects complex. Of the two other cases, each had one affected and one normal fetus, one with anencephaly and one with obstructive uropathy.

There were 31 infants born with undetected chromosomal anomalies, 20 were diagnosed in pregnancy and offered karyotyping. A total of 17 were detected at the second trimester scan because of co-existing structural

Table 2 continued. Detection of congenital anomalies from a total of 16,511 fetuses (n=229)

	Discovered at routine scan by midwife	Discovered in 3rd trimester by midwife	Discovered at birth	Sensitivity for routine scan by midwife
Urinary tract anomalies				
Hydronephrosis	19	6	1	
Renal dysplasia	5	1	2	
Renal agenesis (uni/bilateral)	2		4	
Obstructive uropathy	6			
Total urinary tract	32	7	7	74.4
Skeletal anomalies				
Dwarfism				
Talipes	13		26	
Lethal musculoskeletal inc skeletal dysplasia, limb body wall defect	1	1		
Foot deformity			1	
Hand deformity		1	3	
Absent long bones/limbs	1			
Total musculoskeletal	15	2	30	32.6
Other				
Cystic hygroma	1			
Facial cleft	1		6	
Syndrome	1	1		
No diagnosis available			1	
Total other	3	1	7	30
Chromosomal abnormalities				
Turner's (XO)	1		1	
Trisomy 21	2	2	24	
Trisomy 18	4	1	2	
Trisomy 13	4			
Triploidy	3			
Other chromosomal	3		4	
Total chromosomal (n=51)	17	3	31	34
Total (n=229)	101	30*	98	32

*Some 17 anomalies were missed at the routine scan and detected in the third trimester. A total of 13 women booked late (>24 weeks), as the anomaly was detected in the third trmiester they are excluded from sensitivity calculations

anomalies. Two infants born with trisomy 21 were detected after 24 weeks, due to the appearance of small bowel obstruction not evident at the second trimester scan, and one case of trisomy 18 was detected in a woman who booked late, indicated by the presence of structural anomalies.

Of the 17 cases where a second trimester scan was performed and the diagnosis made in the third trimester, two lesions were low sacral meningoceles with no cerebral signs. The case of ventriculomegaly was not evident on review of the second trimester images, suggestive of development post scan. There was one case of bowel dilatation due to meconium ileus, one case of cardiac arrhythmia and three cases of hydronephrosis, which could also have developed after 24 weeks. With regard to the 13 women who booked after 24 weeks and did not have a routine second trimester scan, the following anomalies were identified: ventriculomegaly (n=2), arrhythmia (n=3), gastrointestinal (n=2), hydronephrosis (n=3), hand deformity (n=1), trisomy 18 (n=1) and other (n=1). These women were offered a third trimester scan to assess fetal wellbeing, and predominantly to assess fetal weight.

For lethal anomalies, the overall sensitivity of detection was 74% versus 49% for anomalies associated with possible survival or long-term morbidity (see Table 3).

Limitations

Although all ultrasound examinations were recorded prospectively, the retrospective nature of postnatal data collection in order to conduct sensitivity calculations is a limitation, in that, empirical evidence of improvement in perinatal outcome for infants in the group who were identified antenatally when compared with those identified at birth could not be ascertained. However, cognisance must be taken of the work of others who have failed to show an improvement in neonatal outcome for antenatally-detected fetuses (Skari et al, 1998) even when such data are available. Although attempts to ensure all steps were taken to include every case during the time period, the possibility that some cases were not identified cannot be excluded. Similarly to others (Garne et al, 2005; Grandjean et al, 1999), difficulties were encountered with postnatal ascertainment and confirmation of the ultrasound diagnosis, as the ultrasound and neonatal information databases were not linked. Postnatal ascertainment was further limited by the lack of postmortem confirmation of the diagnosis following termination of pregnancy, as the cost of pathological examination of the

Table 3. Subgroups of fetal anomalies classified according to likely clinical consequences (n=16,511 births). They were classified using the four pragmatic groups of congenital anomalies proposed by the RCOG based on likely clinical consequences (RCOG, 1997)

	No fetuses discovered at screening/ total number with the anomaly	Prevalence per 1000	Termination outside Ireland (N)	Detection rate %
Lethal anomalies	20/27	1.63	8	74
Hypoplastic left	1/2			50
Anencephaly	3/3		2	100
Lethal musculoskeletal	2/2		2	100
Bilateral renal agenesis	2/6			33
Trisomy 18	5/7		1	71
Trisomy 13	4/4		2	100
Triploidy	3/3		1	100
Anomalies associated with possible survival/ long-term morbidity	50/99	6.0	9	49
Spina bifida	5/7		2	71
Dandy-Walker anomaly	1/1		1	100
Congenital diaphragmatic hernia	2/2			100
CCAM	1/1			100
Pleural effusion	0/1			0
Other	0/1			0
Ventriculomegaly	8/8		2	100
Encephalocele	3/3		1	100
Cystic hygroma	1/1			100
Trisomy 21	4/28		1	14
Turner's Syndrome	1/2			50
Complex cardiac malformations	6/17			27
Anterior abdominal wall defects	9/12		2	75

fetus is not funded within the NHS system for non-residents, and must be borne by the individual concerned.

Discussion

The data demonstrated that even when confirmation of gestational age is the primary purpose of the second trimester examination, obtaining biometric measurements to confirm/ establish gestational age will inevitably lead to the identification of fetal anomalies as demonstrated by an overall sensitivity for the second examination of 51.2%, ranging from 15% to 75% depending on the fetal anatomical system. These findings support the claim that ultrasound is a 'powerful' tool (Boyd et al, 1998: 1581), and although one may conduct the examination for a particular purpose, visualisation of the fetus can reveal much more information than was requested. These data compare favourably with other studies of midwifery-led services designed to detect the presence of fetal anomalies, as overall sensitivity rates vary from 21% (Eurenius et al, 1999) to 39% (Nakling and Backe, 2005), raising the question as to whether good views obtained for biometry are in fact the mechanism by which most structural anomalies are diagnosed. Additional views that are required during the conduct of a fetal anatomical survey (RCOG, 2000) were not obtained, and this is reflected in lower detection rates for facial, musculoskeletal and cardiac abnormalities.

Opinion varies as to what anomalies can be detected with second trimester ultrasound, highlighting the fact that there are limitations to the technology. Nine of the 17 cases (53%) showed no evidence of the anomaly's presence on review of the second trimester images stored with the report. The sensitivity rate is dependent upon many factors not least the purpose of the scan, the time available and the presence or absence of checklists to guide the conduct of the examination. Therefore, the sensitivity calculations based on these data may be artificially low when compared with other studies with varying protocols. Given the context, the sensitivity for the detection of lethal anomalies is high at 74% and compares favourably with the figure (76%) quoted in the literature (Bricker et al, 2000). Unfortunately, with the exception of hypoplastic left heart syndrome, the high detection rate in this group will have little or no impact on perinatal outcome. Offering more detailed screening is complex, as it may lead to increased detection rates and consequent limitations in the options available to women following diagnosis. At present, although women are free to travel and utilise termination of pregnancy services in another jurisdiction, the legality of establishing a referral mechanism to another health service provider outside of the State remains uncertain. Women wishing to use this option must access services in the UK or elsewhere without clinician involvement. Yet the data show that the majority of women that were given a diagnosis of lethal anomaly continued the pregnancy (n=12, 60%).

Sensitivity of ultrasound to detect fetal anomalies

The sensitivity rate for the identification of anomalies with short-term/long-term morbidity rates ranged from 49% to 100%. For congenital cardiac defects the sensitivity rate was low, possibly due to the fact that visualisation of the outflow tracts was not part of the examination. In the cases that were identified, it could not be ascertained if an antenatal diagnosis had a positive impact on the outcome for these infants. However, 24-hour neonatal consultant presence on-site is not routine, and as vaginal birth is the favoured mode of delivery in the hospital, it is likely that some of these infants were born out of office hours where access to paediatric specialists at consultant level may be delayed. It is also important to note when considering ultrasound alone as opposed to in combination with serum screening, the detection of chromosomal anomalies depends entirely on the presence of associated structural defects, and although it was 34% in this instance, it can be as low as 18% (Bricker et al, 2000). Other studies have reported detection rates between 12% and 19% (Bricker et al, 2000; Chitty et al, 1991; Levi et al, 1991) without performance of maternal biochemical serum markers prior to the examination. These findings must be evaluated within that context. Fetal karyotyping was performed on the basis of the structural anomalies identified, with most lethal chromosomal anomalies detected with ultrasound alone. The organisation of the routine ultrasound clinic within the clinical site could also bias this result, as fetal medicine specialists work alongside the midwife ultrasonographers in the unit. It is possible that they may be requested to give an opinion regarding a variant which if normal is not recorded.

In relation to detection of anomalies associated with possible survival, 49% were detected antenatally comparing favourably with other studies (18.2% to 70.5%) (Chitty et al, 1991; Levi et al, 1991; Luck, 1992; RCOG, 1997). Other non-physician-led services that adhere to checklists of fetal organs to be visualised have achieved a detection rate of 33.7% (Nakling and Backe, 2005) for anomalies associated with possible survival, demonstrating that this midwifery-led service compares favourably at 49%.

In relation to anomalies with short-term or immediate morbidity, facial clefting and talipes accounted for 47% of infants in this group. If the purpose of the examination was to move towards targeted fetal anomaly screening, this figure is likely to improve as anatomical views of fetal structures are extended. However, training in the detection of cardiac anomalies specifically would likely increase detection rates with an anticipated improvement in perinatal mortality/ morbidity for this group of infants.

Conclusion

The data demonstrate that ultrasound is a valuable tool for the detection of congenital anomalies in an unselected population, but this may be further enhanced when checklists of the anatomical structures to be examined are in use. Some may question the value of assessing the effectiveness of a one-stage USS programme, given that most centres have moved to a two-stage programme of first trimester screening for Down's Syndrome and the second trimester routine fetal anomaly scan, in line with NICE guidelines (National Collaborating Centre for Women's and Children's Health, 2008). However, knowledge of the effectiveness of ultrasound as a screening tool in isolation is vital in situations where women refuse first trimester screening or attend too late to take up the offer of the test. In addition, there are many countries where targeted detection of fetal anomalies in combination with first trimester screening culminating in termination of pregnancy may not be acceptable to the population or indeed to the staff in a position to offer the test. In Ireland, extending the purpose of the examination to include a fetal anatomical survey requires consideration, as management options after diagnoses are limited. Any potential guideline developed for the purposes of national implementation must be culturally acceptable,

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Table 3 continued. Subgroups of fetal anomalies classified according to likely clinical consequences (n=16,511 births). They were classified using the four pragmatic groups of congenital anomalies proposed by the RCOG based on likely clinical consequences (RCOG, 1997)

	No fetuses discovered at screening/ total number with the anomaly	Prevalence per 1000	Termination outside Ireland (N)	Detection rate %
Tracheo-oesophageal fistula	0/1			0
Small bowel obstruction/atresia	7/10			70
Syndrome	2/2			100
Other/no diagnosis available	0/1			0
Anomalies amenable to intrauterine therapy	6/6	0.36		100
Obstructive uropathy	6/6			100
Anomalies associated with possible short-term/immediate morbidity	55/97	5.9	3	56.7
Non-complex cardiac anomalies/arrhythmia	7/9			77
Facial cleft	1/7			14
Sacrococcygeal teratoma	0/1			0
Talipes	13/39		1	33
Foot deformity	0/1			0
Hand deformity	1/4		1	25
Absent long bones in limb	1/1		1	100
Renal dysplasia	6/8			75
Hydronephrosis	25/26			96
Abdominal cysts	1/1			100
Total	131/229	13.9	20	57.2

CCAM = congenital cystic adenomatoid malformation of the lung

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support a uniform approach to screening and ensure equity and access for all pregnant women receiving care in each maternity unit. Seeking both parents' and clinicians' views in this area is critical to future service development. Since this review was undertaken, additional time has been allocated to the examination in the hospital highlighting the critical need to audit the service for quality of outcome (Lalor et al, 2007) and to make adjustments accordingly. Given the variation in standards in relation to the conduct of ultrasound examinations in Ireland, the development of uniform and reproducible guidelines for the content of the examination, with ongoing access to professional development and training for those performing USS are likely to be important factors in maximising the sensitivity of the examination (Lalor et al, 2007). This would assist further in benchmarking the service fairly against other units. A cost-benefit analysis of a midwifery-led service warrants consideration when planning the development and provision of prenatal screening programmes in the future, as detection rates for congenital anomalies in the midwifery-led service are comparable with other tertiary centres.

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Vaginal or caesarean delivery? How research has turned breech birth around

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Abstract

Background. Breech presentation, where a baby is buttocks or feet first rather than head occurs in about 3 to 4% of singleton pregnancies at term. Worldwide, the vast majority of babies identified as breech are now delivered by planned caesarean section.

Aim. To identify relevant published research evidence relating to vaginal and caesarean breech birth and then to discuss the evidence, subsequent controversy and clinical implications that have influenced an ongoing obstetrical debate.

Method. A structured literature review was undertaken using the Cochrane Library, CINAHL, EMBASE and MEDLINE databases. Different permutations of 'breech' ('frank' or 'complete' or 'extended' or 'flexed') and 'vaginal' or 'caesarean' ('cesarean' or 'cesarian' or 'caesarean') and 'term' and 'singleton' in the title, key words or abstracts were the terms used.

Results. Over the last 50 years, there has been an increasing trend toward the routine use of caesarean section as a preventive way of reducing the poor outcomes associated with breech presentation. Research evidence has also played a pivotal role in influencing the routine use of caesarean breech birth and, in particular, a single research trial, the Term Breech Trial (TBT) has substantially influenced current policy and practice. There is no other area of research that has such an impact upon clinical practice in such a short period of time.

Conclusions. The speed and extent to which the recommendations of the TBT were implemented has given rise to new controversy surrounding the safety of breech birth, while raising important questions about how the findings of research are used in practice.

Key words: Breech presentation, safety of breech birth, vaginal delivery, caesarean delivery, research evidence, Term Breech Trial, dissemination

Introduction

It is imperative that midwives have a good knowledge base and awareness of the best available evidence to enable them to discuss with women the benefits and risks of vaginal versus caesarean birth for breech presentation. Fortunately, the majority of babies are a cephalic presentation at term, with only 3% to 4% presenting in the breech position (Royal College of Obstetricians and Gynaecologists, 2006). A presenting breech fetus may be in one of the following three positions:

- Extended or frank breech – hips flexed, with the thighs against the chest, and feet up by their ears
- Flexed or complete breech – hips flexed with thighs against the chest, but knees also flexed with the calves against the back of the thigh and feet just above the bottom
- Footling breech – as above, but hips not flexed so much, and the feet lying below the bottom.

The most common breech position is the extended or frank breech, the prevalence of which has been estimated to be 65% of all breech presentations (Banks, 1998).

The purpose of this paper is to identify relevant research evidence relating to vaginal and caesarean breech birth and then to discuss the evidence, subsequent controversy and clinical implications that have influenced an ongoing obstetrical debate.

Search strategy

At present, there is an ongoing obstetrical debate regarding the evidence to support the most safe and effective mode of delivery for breech presentation. The debate instigated the authors to carry out a search of the published literature and the implications this has had on clinical practice over the last 50 years. Literature was identified by systematically searching the Cochrane Library (Issue 2008), CINAHL (1982 to 2008 week 5), EMBASE (1980 to 2008 week 5) and MEDLINE (1950 to 2008 week 5). Different permutations of 'breech' ('frank' or 'complete' or 'extended' or 'flexed') and 'vaginal' or 'caesarean' ('cesarean' or 'cesarian' or 'caesarean') and 'term' and 'singleton' in the title, keywords or abstracts were used. The search strategy was specifically designed to identify research studies and commentary papers relating to the controversy surrounding

whether breech presentations should be delivered vaginally or by planned caesarean section (CS).

The search strategy identified a total of 324 papers, of which 190 were exclusions or duplicates. A total of 47 research papers were identified: four reviews, nine reporting the findings of randomised controlled trials (seven of these relating to the Term Breech Trial (TBT)), six prospective studies, 28 retrospective studies. A total of 87 papers were commentaries discussing breech birth and the controversy surrounding breech presentation and vaginal or caesarean delivery.

The studies identified varied in their quality and the best available evidence was provided by a Cochrane review (Hofmeyr and Hannah, 2003) and papers relating to the TBT and following this trial. It was however, apparent from several commentaries that the unparalleled impact of the TBT on current policy and practice had now given rise to new controversy surrounding the safety of breech birth.

This paper will, therefore, focus in particular on the impact of the TBT and opinions concerning the apparent ongoing controversy surrounding breech birth.

Breech presentation

Breech presentation is more common when:

- The woman has had a previous pregnancy
- History of a previous breech presentation
- It is a multiple pregnancy (twins or more)
- Amniotic fluid is either too much or too little
- Shape of uterus is abnormal
- Abnormal growths in the uterine wall (fibroids)
- Placenta praevia
- Prematurity (American College of Obstetricians and Gynecologists, 2007; RCOG, 2006).

There is evidence to suggest that a breech presentation is associated with higher risks than a cephalic presentation (Albrechtsen, 1998). Higher risks such as congenital abnormalities, birth asphyxia and birth injury have been reported (Pritchard and MacDonald, 1980; Cheng and Hannah, 1993). In addition, a higher rate of cord prolapse has recently been reported in non-frank breech presentations (Broche et al, 2005). Therefore, in particular, a footling or flexed breech presentation is regarded as unfavourable for a vaginal breech delivery (RCOG, 2006). In general, a breech presentation irrespective of mode of delivery is associated with an increased risk of subsequent infant physical or mental disability (Danielian et al, 1996).

Breech birth

Independent midwife Mary Cronk has suggested that if the labour progresses spontaneously, (that is, the contractions come often, last longer, get stronger, the cervix effaces and dilates, and the breech descends through the pelvis), the baby will be born. If this does not happen there is no place for augmentation, that is, trying to push the baby through the pelvis with contractions driven by oxytocic drugs. Nor is there any place for trying to pull breeches through the pelvis with managed breech extractions. Labours that do not progress are telling us that the baby should be born by CS (Cronk, 1998). The RCOG has recommended that a CS should be considered if there is a delay in the descent of the breech at any stage in the second stage of labour (RCOG, 2006).

However over the last 50 years, there has been an increasing trend toward the routine use of CS as a preventive way of reducing the poor outcomes associated with breech presentation. This trend has coincided with the transition from home births to hospital births since the 1970s. The subsequent controversy surrounding the best approach to deliver breech babies has also contributed to the overall rising CS rates. In 2000, the national CS rate for England was reported as 21.3%, with breech presentation as the primary indication for 10% of all caesareans performed (RCOG, 2001). The National Sentinel Caesarean Section Audit (RCOG, 2001) found that overall, 88% of breech presentations were delivered by CS (56% of these were planned and 44% were emergency). Statistics have shown and it has been suggested by Alarab et al (2004) that the increasing use of CS for breech presentation, particularly for primigravidae women was already happening prior to evidence from randomised trials that the benefits outweighed the risks.

There were two randomised controlled trials of vaginal versus caesarean delivery for breech presentation undertaken in the early 1980s (Collea et al, 1980; Gimovsky et al, 1983). A Cochrane review of planned CS for term breech delivery (Hofmeyr and Hannah, 2003) includes both of these trials, however the majority of the data in this review and the meta-analysis undertaken were collected from Hannah et al (2000) in a large, multi-centred RCT – the TBT.

The Term Breech Trial (TBT)

The widely known TBT was a multi-centred trial of planned CS versus planned vaginal birth for breech presentation at term. It was undertaken at 121 centres in 26 countries, with 2088 women with a singleton fetus in a frank or complete breech presentation – they were randomly-assigned planned CS or planned vaginal birth. The primary outcomes were perinatal mortality, neonatal mortality, or serious neonatal morbidity and maternal mortality or serious maternal morbidity. There are several publications reporting the findings of this trial. These include the primary paper, which reported outcomes at delivery (Hannah et al, 2000), a paper reporting outcomes at three months (Hannah et al, 2002) and papers reporting maternal and child outcomes at two years (Hannah et al, 2004; Whyte et al, 2004). There is also a paper reporting the financial costs of planned caesarean section versus planned vaginal birth in the TBT (Palencia et al, 2006).

The primary paper from the TBT was published in October 2000 (Hannah et al, 2000). The required sample size for the trial was to be 2800 women. However, following an interim analysis on the first 1600 women randomised, an independent data monitoring committee recommended that recruitment be stopped early owing to a significantly higher event rate than expected. Of the 1041 women assigned to the planned caesarean group, 941 (90.4%) were delivered by CS and of the 1042 women assigned to the planned vaginal birth 591 (56.7%) delivered vaginally.

An intention to treat analysis of the findings reported that perinatal mortality, neonatal mortality or serious neonatal morbidity was found to be significantly lower in the planned CS group compared with the planned vaginal birth group (17 of 1039 (1.6%) vs 52 of 1039 (5%)). There was no difference reported between the two groups in terms of maternal mortality or serious morbidity (41 of 1041 (3.9%) vs 33 of 1042 (3.2%)).

Impact of the TBT findings

Within a few months, the TBT had transformed obstetric practice worldwide (Turner, 2006). Glezerman (2006) has stated 'rarely in medical history have the results of a single research study so profoundly and so ubiquitously changed practice'. For example, within two months following publication of the primary paper from the TBT, the overall CS rate for breech presentation in the Netherlands was reported to have increased from 50% to 80% (Reilberg et al, 2005). Moreover, in the Australian state of New South Wales, the rate of vaginal breech birth declined from 17% in 1999 to 14% in 2000 and 4.5% in 2001 (Roberts et al, 2004). In a survey of all obstetricians practising in Australia and New Zealand, 72% reported routinely offering vaginal breech birth for uncomplicated singleton breech pregnancies prior to the publication of the TBT, after which this rate declined to 20% (Phipps et al, 2003).

A survey of term breech trial collaborators, from 80 centres in 23 countries, reported a 92.5% changed rate in clinical practice to planned caesarean birth for all term breech babies (Hogle et al, 2003). In 2001, the American College of Obstetricians and Gynecologists recommended a planned CS for women with a persistent breech presentation and in the UK, the RCOG (2001) also recommended the planned surgical operation for an extended or frank breech presentation in its guidelines. However, since then considerable debate and some criticism around the clinical conduct of the TBT, interpretation of the findings and the applicability of the findings to clinical practice have been voiced. The RCOG has recently published a more balanced set of guidelines to incorporate these concerns and evidence produced since the TBT (RCOG, 2006).

Controversy surrounding the TBT

Roberts et al (2004) stated 'that decades of controversy over the safe management of breech birth at term were resolved by the Term Breech Trial'. However, the following seven and a half years since the first TBT publication have given rise to new controversies about both vaginal breech birth and planned caesarean breech birth.

When undertaking research there is usually a considerable time lapse between the research study being undertaken, interpreting the findings and the report being placed in the public domain. However, this has not been the case with the TBT. The primary paper was fast-tracked for publication in The Lancet and appeared in print six months after recruitment stopped. This fast-tracking approach and peer-review criteria have recently been challenged (Bewley and Shennan, 2007). One of the original reviewers Susan Bewley did recommend in view of the importance of the results that it was not fast-tracked until detailed queries were addressed, in particular, issues around the differential findings and implications for resource-rich and poor countries. Peer-reviewing, however, is subject to all the pitfalls of any judgement process and Bewley and Shennan (2007) have suggested that fast-tracking might only be appropriate when there is unanimous support from all peer-reviewers. It is well recognised that all studies inevitably have limitations and it would have been helpful for the TBT authors to be more transparent and highlight the possibility of variation in study selection criteria, skill of the operator and optimal care, as much of the debate is now around these issues.

The main criticisms of the TBT appear to be centred on the clinical conduct of the study (in the majority of participating centres), the interpretation and applicability of the results. Acknowledgement of these limitations of the TBT by the researchers might have reduced the subsequent controversy that has now arisen.

The limitations that have been highlighted by some critics are:

- Violation of inclusion criteria
- Incompatible variation of standard of care between participating centres
- Most cases of perinatal mortality were not related to mode of delivery
- Conclusions that were based on various categories of neonatal morbidity
- Problems associated with labour, not mode of delivery (Keirse, 2002; Glezerman, 2006; Turner, 2006).

Keirse (2002) claimed that study guidelines 'doomed' vaginal delivery from the start, an assertion fiercely refuted by actual trial collaborators including Walkinshaw (2003).

The seventh annual report of the Confidential Enquiry into Stillbirths and Deaths in Infancy (CESDI) highlighted the most avoidable factor in causing breech stillbirths and death among breech babies was suboptimal care in labour, in particular, with respect to the assessment of fetal well-being (Confidential Enquiry into Stillbirths and Deaths in Infancy, 2000).

Many of the 121 centres involved in the TBT were in North America, where 13% of breech presentation at term was delivered vaginally (Lee et al, 1998). However, individual centre rates of vaginal breech delivery at baseline were not reported, but the TBT achieved an overall successful vaginal birth delivery rate of 57% by asking those centres with vaginal birth rates under 40% in the labour group to increase the rate or withdraw from participation (University of Toronto Maternity Infant and Reproductive Health Research Unit, 1996). Many centres would have increased the vaginal birth delivery rate significantly to participate in the study and this increase would constitute a significant

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bias (Kotaska, 2004).

Glezerman (2006) has recently suggested the need for another trial as the results obtained in the TBT were not meaningful, because of inadequate clinical set up and the two-year follow-up study results are in contrast to the earlier findings. RCTs do improve the quality of evidence to guide clinical practice, but when applied to complex phenomena they have limitations. Kotaska (2004) therefore, has challenged the randomised trial methodology as an inappropriate method to use when evaluating complex phenomena and case studies of vaginal breech birth.

Other issues to consider when undertaking research around breech birth are:

- Complex patient populations
- Poorly quantifiable variations between individuals
- Complex procedures requiring skill and clinical judgement
- The lack of experienced and skilled practitioners to undertake vaginal breech deliveries
- Alternative methods to reduce the risk of breech presentation at term.

Ultimately however, women's preferences, views and experiences must be considered and her wishes respected.

Implications for clinical practice

CS is not without risks, but has the pendulum swung too far towards routine CS for breech presentation? It appears that many obstetricians, policy-makers, midwives and women have accepted this intervention and it has become routine practice. The long-term outcomes are unknown and the worldwide implications of adopting this practice as routine need to be considered. How many countries can sustain a planned CS policy for breech presentation and for how long? The risks and benefits debate is ongoing and much of the challenges and criticisms have come from other parts of the world.

While Reilberg et al (2005) report a policy of routine planned CS, which has been followed by improved neonatal outcomes, Schutte et al (2007) assert that planned CS for breech presentation does not guarantee the improved outcome of the child and may increase risks to the mother. The Dutch Maternal Mortality Committee registered and evaluated four maternal deaths following planned CS for breech presentation from 2000 to 2002 – 7% of the total direct maternal mortality in that period (Schutte et al, 2007).

By choice or default, vaginal breech births will continue to take place, which means attention is still warranted to skills and techniques that may improve outcomes for the baby. It is now apparent that midwives and obstetricians have become 'deskilled'. RCOG (2006) guidelines recommend vaginal breech delivery should be undertaken in a consultant-led unit with theatre facilities and experienced clinicians. However, if the majority of women have a planned CS, this raises the clinical dilemma as to how this experience is gained. Literature from the Netherlands reports the lack of opportunities for practitioners to gain skills to undertake vaginal breech deliveries. In the UK, to address this deficit, emergency skill drills and simulation training have been introduced using videos, models and scenario teaching (RCOG, 2006). Simulation training has been shown to improve performance in the management of a simulated vaginal breech delivery (Clinical Negligence Scheme for Trusts criterion 5.2.1, Deering et al, 2006).

The research concerning TBT has certainly made a huge impact on the management of breech presentation and mode of delivery throughout the world and there is no other area of research that has had such an impact in such a short period of time.

Conclusions

There is evidence to suggest that a breech presentation is associated with higher risks than a cephalic presentation, and that the most avoidable factor in causing breech stillbirths and death among breech babies is suboptimal care in labour, in particular, with respect to the assessment of fetal wellbeing. A breech presentation, irrespective of mode of delivery is associated with an increased risk of subsequent infant physical or mental disability. Nevertheless, the vast majority of babies identified as breech are now delivered by planned CS. Over the last 50 years, there has been a growing trend toward women having a casearean section when a breech presentation has been diagnosed as a way of reducing the poor outcomes associated with such presentation. Controversy surrounding the best approach by which to deliver breech babies has coincided with and contributed to the overall rising CS rates over the last 50 years. Evidence from the TBT and a Cochrane review impacted greatly on the shift towards CSs being performed when breech presentation was diagnosed. The findings from the trial and review reported better outcomes for the baby when a planned CS was performed, compared with a vaginal breech birth. However, there is an ongoing debate about the validity of these findings and in general, the risks of CS upon the woman's health, as it is associated with increased maternal morbidity, mortality and risks to subsequent pregnancies.

The main criticisms of the TBT appear to be centred on first, the clinical conduct of the study in the majority of participating centres and secondly, the interpretation and applicability of the results. Acknowledgement of these limitations by the researchers might have reduced the subsequent controversy that has now arisen. The speed and extent to which the recommendations of the TBT were implemented has to be considered, as there is no other area of research that has had such an impact upon clinical practice in such a short period of time. There appears to have been an urgency to publish and disseminate the findings, even when a peer-reviewer recommended not to 'fast-track' publication until detailed queries were addressed, in particular, issues around the differential findings and implications for resource rich and poor countries. It appears research, publication and clinical biases have all played a role in the transformation of obstetric practice and in influencing the routine use of caesarean breech birth.

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Midwife and nurse responses to miscarriage, stillbirth and neonatal death: a critical review of qualitative research

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Abstract

Background. Miscarriage, stillbirth and neonatal death are not uncommon events within the UK. There is substantial evidence that parents experience such loss as intensely painful (Gold, 2007), yet there appears to be little recognition of the potential impact on those staff providing care. Indeed staff are encouraged to be emotionally giving to the bereaved family (Kohner, 2007). Understanding the potential impact of such work may help staff better look after themselves and the women and families under their care.

Aim. To explore what is known about the psychological responses of midwifery and nursing staff to miscarriage, stillbirth and neonatal loss in their workplace.

Method. A systematic narrative synthesis of qualitative literature, exploring midwifery and nursing staff responses to miscarriage, stillbirth and neonatal loss was undertaken. The principles of transparency and systematicity (Meyrick, 2006) were used to analyse the literature, and content analysis was utilised to elicit themes.

Conclusion. Theoretical and conceptual frameworks to understand staff experiences are largely absent; nevertheless evidence suggests that midwives and nurses appear to experience significant and personal adverse effects as a result of caring for families experiencing loss. Staff regard the support they have for this type of work as lacking and, while collegial support is welcomed, it does not appear to protect staff from adverse effects. The need to provide empathetic interactions is demanding for staff and appears to conflict with their need to protect themselves emotionally, for example, by withdrawing from the family. Further research using phenomenological methods, and more explicit use of current psychological models to understand staff distress is warranted.

Key words: Midwife, pregnancy loss, staff stress, professional grief/loss, staff reaction/morbidity, psychological distress

Introduction

Miscarriage, stillbirth and neonatal death are not uncommon events in the UK, with 15% of known pregnancies ending in miscarriage. Ten infants are born stillborn each day and 11 die neonatally (Stillbirth and Neonatal Society [SANDS], 2006; UK Statistics Authority, 2007). There is substantial evidence that parents experience this loss as intensely painful (Gold, 2007), that their experience and needs vary widely (Kohner, 2007) and that the intensity of loss experienced does not appear to be correlated with the gestation of the infant (Gold, 2007; Lasker and Toedter, 1994; McCreight, 2005; Mander, 2006). At this very difficult time, grieving parents value the emotional support and focused attention provided by staff for mother and baby (Gold, 2007; Lasker and Toedter, 1994).

Department of Health guidelines recognise the need for families to be adequately supported. They encourage staff to engage with families emotionally and respond empathically, as well as undertaking diverse practical tasks encompassing rituals to support parental grieving, discussion of funeral or disposal arrangements and completion of paperwork (Kohner, 2007).

The challenging nature of this work, in its complexity and emotional tenor, may have a personal impact on the staff member involved and, while each loss is unique and devastating for the parent, it may be a reoccurring experience for staff. Staff may be required to set aside their own responses and simultaneously manage the varying tasks demanded by their work context and the grieving family. The balancing of these roles has been recognised as potentially precarious for the staff member, with withdrawal from the family being noted as not uncommon (Foster, 1996; Ujda and Nediksen, 2000), but possibly compromising the needs of the bereaved family.

Greater understanding of the impact of loss in these contexts can acknowledge the experience as a sad part of work (Papadatou, 2001), but can also ensure that mechanisms are in place to support staff and enhance quality of patient care, hence the current review.

'Neonatal' has been used to describe both perinatal and neonatal loss. The 'perinatal' period is defined in diverse ways and appears to relate to between the 20th and 28th week of gestation ending seven to 28 days after birth. 'Neonatal' relates to the period four weeks after birth. A neonatal loss involves the loss of an infant who is deemed to be alive immediately following birth.

Aims

The aim of this review is to explore what is known about the psychological responses of midwifery and nursing staff to miscarriage, stillbirth and neonatal loss in their workplace.

The review critically examines published evidence relating to psychological responses to dealing with neonatal death in the workplace, focusing on midwifery and nursing staff, synthesising the literature to produce a robust review beyond a descriptive account. Quantitative studies were initially considered to form part of the review and were screened accordingly (Deeks et al, 2003); however, none provided sufficient data to merit inclusion. This review therefore focused on the studies using qualitative methods.

Wallbank S, Robertson N. (2008) Midwife and nurse responses to miscarriage, stillbirth and neonatal death: a critical review of qualitative research. Evidence Based Midwifery 6(3): 100-106

Methods

Search strategy

This involved identifying key words and synonyms related to the review topic. The medical subject headings key words 'professional: loss / grief / distress / psychological / stress / reaction-morbidity / bereavement / grief / stillbirth / miscarriage / neonatal death' were used to interrogate the relevant databases, which were MEDLINE (1951-present), psycINFO (1887 to date) and the British nursing index (BNI) (1994 to date). Initial searches were then replicated replacing 'professional' with 'staff', then 'nurse' and 'midwife'. Due to the plethora of descriptors used, references were also obtained through manual searches of relevant works.

Inclusion criteria

Papers published in English between 1887 and October 2007 (excluding books, book chapters and dissertations) were included, focusing on studies using qualitative methodology to investigate staff experiences of miscarriage, neonatal death and stillbirth, which took place within a hospital setting. The titles and abstracts of 84 papers were initially examined to determine which papers met the inclusion criteria. A total of 29 papers remained and were obtained in full. Reading of the full papers revealed that a further 20 papers did not meet the inclusion criteria (were not relevant to the topic), thus nine papers were retained for the review.

Quality considerations

Meyrick's (2006) model was adopted to ensure that transparency and systematicity were evident throughout the research process. Transparency assesses whether all relevant research steps are disclosed to the reader (Yardley, 2000), while systematicity refers to regularity of data collection and analysis, from which any deviations are noted and justified (Meyrick, 2006).

This permitted studies to be given comprehensive consideration, outlining techniques to establish rigour at each stage and avoiding checklists, which can limit the quality assessment to the write up, ignoring methodological processes in the research phase.

Reflexivity

The authors had no explicit theoretical position in mind prior to the conduct of the review. As clinical psychologists employed in physical health settings, the authors have worked with clients who have experienced loss, and staff referred through occupational health services, and are familiar with psychological models of loss and bereavement, and organisational models used to explain staff distress.

Identification of review methodology

To synthesise literature beyond a merely descriptive account, a means of producing a systematic and methodologically robust review was required, acknowledging movement to develop concepts and theories to account for the data. Narrative synthesis was selected enabling interpretation of data under consideration, permitting higher levels of abstraction, and moving beyond an aggregate account of the data to an understanding of the processes occurring (Popay et al, 1996).

Lack of transparency has been problematic in reviews of this kind (Dixon-Woods et al, 2005), so this review explicitly details its process.

The process

Recommendations for assessing the quality of each paper as headings were constituted in a grid (Meyrick, 2006), enabling evaluation of identifiable recruitment processes; demographics, including ethnicity of the sample; credibility; findings grounded in data; systematic analysis; and use of quotes. Both authors extracted and refined themes.

Developing a preliminary synthesis

Textual descriptions, groupings and clusters, data translation and tabulation (Popay et al, 2006) were developed for preliminary synthesis (see Tables 1 and 2), with a grid constructed to identify common and contrasting themes and outcomes (see Table 2). Themes were then examined for inter-relationships and a taxonomy of findings developed (see Table 3).

Methodological overview

The majority of papers adopted a phenomenological stance, examining the respondents' perceptions of themselves and their world. While these permitted greater understanding of individually meaningful experiences, theory generation was not addressed.

Studies reviewed were conducted in the main by researchers related to respondents, either as colleagues or supervisors, and absence of overt reflexivity within the papers makes it difficult to judge the researchers' influence on the data. It is a matter for speculation how such pre-existing relationships might have affected data. While participants may have felt more comfortable and free to reveal the impact of work, they may equally have been cautious if uncertain how their responses would be used.

Studies appraised deployed focus groups, interviews and diaries for data collection; however, quality or impact of method could not be adequately judged because of sparse detail. Most interviews used semi-structured questionnaires without specifying structure, content or probes, so that potential priming could not be assessed. In studies using focus groups, no study considered whether group dynamics affected responses, and where respondents were asked to recall past experiences, no study considered the possibility of priming and retrospective bias (Keuler and Safer, 1999).

Use of theoretical perspectives

The most common conceptual descriptor within papers reviewed construed staff reactions as 'grief'. Papers did not define grief and it was unclear whether the term described an affective state or process. Also, given grief is usually conceived of as a staged, chronological process (Kubler-Ross, 1989), no study could support analysis of the process since all were cross-sectional. Where other theoretical perspectives were offered, for example McCreight's (2005) use of 'emotional labour' explaining acceptability of the

Table 1. Summary of data analysis process

Author, (year) and country	Sample	Method of data collection	Method of data analysis	Coherent epistemo-logical position	Theoretical perspective	Reflexivity	Quality issues	Transferability
Gardner (1999)	37 UK 33 Japanese 44 US midwives U	Open-ended questionnaires developed through pilot and staff discussion	Content analysis – limited detail	None	Grief	None	T	I
Farrell et al (2000)	46 neonatal nurses U	Open-ended questionnaires developed through pilot and staff discussion	Thematic content analysis	None	None	None	T S Q C	I
Raeside (2000)	76 nurses/ midwives Scotland U	Quantitative questionnaires with 'some qualitative questions asked'	Content analysis – limited detail	None	Grief	Consideration of participant researcher	C D E S T Q	X
Yam et al (2001) Hong Kong	Ten midwives R U	Semi-structured interviews	Content analysis – unrelated expressions excluded?	None given	Work stress	None	T Q C E	I
Walpole (2002) Australia	Eight midwives randomly selected from a pool of 20 U	Five researchers conducted an hour long semi-structured interview	Thematic analysis of interviews, transcripts and themes shared differences resolved through collaboration	Phenom-enological framework Considered situational context and internal world of midwife	Implicit discussion of midwife grief	No consideration of impact of participant researchers	E	A
Begley (2003) Republic of Ireland	50 student midwives U	Triangulation of data from group and individual interviews and diaries	Thematic analysis – respondent validation	Phenom-enological framework Hermeneutic, collaborative approach	None	Researchers own position considered. No reflections on research process	None	A
McCreight (2005)	14 nurses U	Semi-structured interviews	Content analysis without evidence of process	Collaborative exploration of constructs	Emotional labour	None	S D E C	I
Nallen (2006/07)		18 midwives	Focus group discussions until data saturation – three took place	Thematic content analysis using Collaizzi (1978) framework	None given	None	Researcher's position. No information on research as process	C

Sample	Quality issues	Transferability
R = Recruitment issues not identified U = Ethnicity unreported	C = Credibility issues not addressed D = Does not appear to be grounded in data E = Data seems to be excluded S = Does not appear systematic in analysis of data T = Transparency lacking in presentation of analysis Q = Quotes are not identified	A=Transferability issues not explicitly addressed I = Insufficient context detail to gauge transferability X= Does not appear to be transferable

Wallbank S, Robertson N. (2008) Midwife and nurse responses to miscarriage, stillbirth and neonatal death: a critical review of qualitative research. Evidence Based Midwifery 6(3): 100-106

Table 2. Summary of the thematic content analysis

Author (year)	Stated aims	Themes	Conclusions
Gardner (1999)	To study cultures of care extrapolated from midwives' experiences of perinatal death.	1. Issues that concern nurses when working with a family 2. Nurses' coping strategies 3. Needs of colleagues who work with bereaved 4. Affirmation working with bereaved.	1. Caring for bereaved families has tremendous impact on staff 2. Staff experience grief and feel they lack knowledge about the grieving process and bereavement care 3. Staff report communication difficulties with families from cultural minorities 4. Staff need spiritual, psychological and emotional support.
Farrell et al (2000)	Exploration of nurses' experiences and attitudes towards physical appearance of dying infant and impact on their engagement with those bereaved	1. Nurses' attitudes reflect societal attitudes and values 2. Nurses' stress when caring for dying infants 3. Nurses' stress when supporting parents of dying infants 4. Nurses experience difficulties in meeting their own needs 5. Lack of support from colleagues.	1. Nurses experience difficulties in caring for infants of abnormal appearance 2. Where physical appearance abnormal, nurses experience cognitive dissonance and perceive less support from colleagues 3. Nurses feel inadequate in supporting parents and relating to the infant.
Raeside (2000)	Assessing whether and how nurses experience an adverse response caring for a dying baby, and whether a structured bereavement programme aids coping.	1. Uncertain self concept 2. Role function 3. Physiological mode/response.	1. Nurses find caring for a dying baby stressful 2. Senior staff experience more stress 3. Bereavement seminars or in-service sessions might assist grief resolution.
Yam et al (2001)	Exploration of neonatal nurses' experience in Hong Kong caring for dying infants.	1. Disbelieving 2. Feeling ambivalent/helpless 3. Protecting emotional self 4. Providing optimal physical care 5. Providing emotional support to family 6. Lack of knowledge and counselling skills 7. Conflicting values in care.	1. Nurses developed coping mechanisms to shield emotional distress 2. Care limited by lack of knowledge and counselling skills 3. Support needed.

professional to display emotions, it was unclear from quotes used how the researcher had determined that 'emotion work' offered a valid explanation of the nurses' responses.

Epistemological positions and reflexivity

The majority of papers provided no overt coherent epistemological position. Some papers (Walpole, 2002) made their use of a phenomenological framework explicit, some are less explicit in explaining a contextual relationship of the framework to the research (Begley, 2003), and while others used respondent validation (McCreight, 2005), authors did not discuss why this had been used and with what benefit.

Methods of analysis

All studies reviewed used thematic or content analysis, with the process of theme generation varying in methodological rigour. Some studies (Nallen, 2006) deployed an explicit, robust framework, others made their triangulation of data evident (Begley, 2003). The remaining studies used content analysis on qualitative data elicited from closed questions, but were vague when considering how framing of questions affects subsequent analysis.

Sampling

Participant numbers and sampling strategy within the papers were generally not discussed, with the exception of Nallen (2006) who used 'purposeful sampling' and continued running focus groups until data saturation was achieved. However, selection of group members and group constitution was unclear. Overall, researchers gave little consideration to the difficulties inherent with what appeared to be opportunistic sampling, and recruitment decisions could appear capricious and were scantily reported if at all.

Transparency

Lack of transparency was evident in most studies, with insufficient detail regarding theme generation. Where theme generation was well articulated (Walpole 2002; Nallen, 2006), it remained unclear how researchers achieved consensus agreement or how external validation was sought.

Systematicity

The lack of transparency undermined assessment of systematicity. The majority of papers reviewed provided insufficient detail to identify whether or not analysis was systematically undertaken. Additionally, papers in which the epistemological position was unclear or where theme generation lacked validity suggest assumptive rather than systematic approaches to data collection and analysis.

Credibility

Two of the papers identified issues of reliability and validity (Walpole, 2002; Begley, 2003) and seek triangulation of data, potentially at odds with a phenomenological perspective. The remaining papers lacked the information to judge credibility issues.

Use of data

Papers reviewed tended to omit information regarding cases that deviated from identified themes. While some papers (Nallen, 2006; Raeside, 2000) were explicit about ensuring that all data were included, some appeared to remove case deviants without rationale (Yam et al, 2001).

Transferability

The majority of papers failed to address transferability issues explicitly. Most papers cautioned against generalisation given the sample size, yet go on to make recommendations to the wider midwifery or nursing community despite the qualitative paradigm used and circumscribed numbers of participants involved.

Given these methodological vulnerabilities, there were some difficulties establishing meaningful weighting criteria for the findings without privileging only a few papers. The reviewers are therefore cautious when appraising the themes and conclusions generated. However, despite the lack of systematicity, themes generated within the papers share significant commonality allowing some confidence in the overall findings.

Impact for staff

Themes relating to the personal and adverse impact for staff were common to all of the papers and appeared to manifest in psychological, emotional and physical symptoms (Gardner, 1999; Farrell et al, 2000; Raeside, 2000; Yam et al, 2001; Walpole, 2002; Begley, 2003; Nallen, 2006). Staff consistently alluded to the need to manage their responses actively and the difficulty and ambivalence associated with a need to retain a professional persona. There appeared to be dissonance surrounding what constituted acceptable or professional displays of emotion, while trying to ensure any response was containable and appropriate. While empathising by sharing personal responses could be rewarding (McCreight, 2005), more frequently staff described feeling 'awful because they cried with the patient' (Raeside, 2000) and experienced staff had relayed how this 'sort of behaviour' was considered inappropriate (Begley, 2003).

Emotional and physical symptoms were often framed in the immediate aftermath of a neonatal death, but the impact could endure. Staff discussed a persistence of affective responses, with both professional and personal triggers. Staff could recall the experiences of a significant loss for extensive periods of time, often reflected upon with new experiences of loss in the workplace (Downey et al, 1995). Other respondents reported intrusive reflections in certain domestic contexts apparently unrelated to their experience at work (Nallen, 2006).

Table 2 continued. Summary of the thematic content analysis

Author (year)	Stated aims	Themes	Conclusions
Walpole (2002)	Inference of effects of perinatal loss in second or third trimester on midwives.	1. Staff respond personally 2. Staff respond professionally 3. Coping strategies 4. Mitigating the impact.	1. Valued support comes from colleagues 2. Need for education on grief processes and counselling 3. Minimise care for bereaved and non-bereaved parents simultaneously.
Begley (2003)	Exploration of student midwives' experiences of care for women suffering stillbirth, miscarriage or neonatal death.	1. Inarticulateness 2. Ambivalence about care delivered 3. Crying like a fool.	1. Respondents significant distress when caring for women experiencing loss 2. Respondents reporting unresolved grief, guilt and anxiety about own performance 3. Structured support and education requested.
McCreight (2005)	Exploration of nursing staff experiences regarding the emotional impact of patients' pregnancy loss and their training	1. Emotional labour of nursing care 2. Tears 3. Knowing what to say.	1. Potential role for reflective practice to support nurses 2. Being empathic requires potentially painful emotional engagement with parents 3. Legitimacy of staff emotional response appears linked to professional competence.
Nallen (2006-2007)	Exploration of needs of midwives supporting bereaved families.	1. Role recognition 2. Prerequisites for bereavement support 3. Perceived barriers to bereavement support 4. Coping strategies.	1. Bereavement during childbirth one of the most challenging aspects of midwifery practice 2. Recognition that midwife can shape long-term emotional outcomes for parents 3. Regular review of midwives' needs to ensure they are equipped for challenge.

Professional behaviour

Understandably, midwifery and nursing staff found that the pursuit of physical care offered a zone of competence they could exercise, and drew strength from operating at this level (Walpole, 2002; Nallen, 2006). Nevertheless, most studies emphasised the need for staff to deliver psychological care, be it through basic counselling skills or more active interventions with the bereaved families, yet frequently feeling ill-equipped to do so (Gardner, 1999). Unsurprisingly, when faced with role uncertainty and a perception that they were not competent to deal with potential overwhelming material and emotion, staff retreated and withdrew. Conversely, successful interactions were reported to enhance self-efficacy (Gardner, 1999; Begley et al, 2003), yet advance planning is difficult. Losses can be unpredictable and staff must react to diverse losses being experienced by the bereaved in different ways, perhaps exacerbating what is already a difficult time and contributing to staff uncertainty of what to say and do to provide optimal psychological care.

Coping

Despite respondents in all studies discussing the difficulties implicit in their work, they reported ways of mitigating stressors. Personal coping activities were reported, using both

Table 3. Taxonomy of findings

Theoretical descriptors Grief – for the family, for yourself Emotional Labour
Personal impact Feelings – Distress, anger, helplessness, frustration, overwhelmed, ambivalence Physical symptoms – Increased arousal, drained Persistence – endures and resonates long after event Affirmation – comforting family, feeling needed
Managing impact Control emotions – difficult, try to impose boundaries, inadequate Perception of emotions – dismissed, weakness, inappropriate, unwilling to express
Professional behaviour Physical care – easier than psychological care, benefit of activity, secondary to counselling role Interaction with family – painful, fluid boundaries, avoidance/withdrawal, reciprocity, positive, success interacting increasing confidence, reflected by societal values Role uncertainty – emotional and/or psychological support, communication between professionals Inarticulateness – unprepared for loss, awkward, no protocols because each case differs
Coping Using others – peer debrief / support, personal support, disclosure, offering continuing care Using self – rationalising, time out, distancing, praying, reflecting, accepting Enabling coping – forewarning of loss, personal resources (experience, knowledge, personal factors), organisational resources (debriefing, collegial support, time, continuing care, cultural competence) Disabling coping – personal (perceived impotence, lack of knowledge/experience), professional (conflicted role, perception of incomplete care, parental communication/reaction, time)
Support Perception – insufficient, isolation, type of loss dependant Needs – emotional, physical, colleague support

cognitive strategies (rationalising the loss, reflection and acceptance) (Gardner, 1999; Farrell et al, 2000) and behavioural self-management (such as time away from work) (Nallen, 2006, 2007). Studies consistently articulated coping strategies contingent on relationships both within and outside the workplace. The former encompassed relating to peers for debriefing in the period immediately after loss, more general collegial support and disclosure, and the relationship with the bereaved family by offering continuing care, the latter included personal relationships. There was, however, variability in the extent of support requested by staff, with some staff wishing to give full vent to their experiences yet others finding that level of self-disclosure somewhat threatening (Begley, 2003; Nallen 2006, 2007).

Organisational factors were also suggested as instrumental in attenuating or exacerbating the effects of neonatal loss on the staff member. Lack of time and compromised continuity of care recurred. The intense activity of the labour ward appeared to contribute negatively to the staff members' experience of the loss (Nallen, 2006; Begley, 2003). Caring both for the bereaved and complete families required diversion of attention, could be ruptured because of other pressing demands, and quite different engagements with patients were needed to offer appropriate care. Such intrinsic role conflict and ambiguity seemed unacknowledged by employers, yet is a significant contributor to occupational stress and a factor in job dissatisfaction and propensity for job abandonment (Cordes and Dougherty, 1993).

Notable to all the accounts discussed, was the perception of limited or absent organisational support and resources. Additionally, a consistent overarching theme was that of staff isolation, with repeated expression of staff need for greater overt support, particularly given the unique demands of each bereaved family potentially requiring tailored interventions. In virtually all papers concrete suggestions for change, be it provision of protected time to reflect on loss, formal training and education on bereavement, or reviewing workload and patient allocation, were offered. While understandable and laudable, the suggestions were extrapolated from an absence of support without formal needs assessment. This would be a necessary first step before resources were diverted without assurance that their development would necessarily benefit either staff or patient care. Nevertheless, while the concept of support tended to be somewhat nebulous and lacking in specificity, its consistent request does imply some form of unmet need.

Implications of findings

The review suggests that it is not just families who experience significant distress in response to neonatal death, but staff experience distress also, with both immediate impact, and longer-term resonance. While the phenomenon is consistently described there is little attempt to frame experiences within models of staff distress, other than with reference to a grieving process that may not be appropriate. Organisational models of stress seemed little considered, which may be an artefact of methodologies focusing on personal experience and meaning; however, this lack may have reinforced staff appraisals that their emotional responses were invalid and signified unprofessional behaviour. This is certainly articulated in the studies, as is the absence of support for staff distress, which appeared barely recognised by the healthcare system.

There is growing awareness of the emotional and cognitive repercussions of staff exposure to distressing events and engagements in the workplace, evidenced by a burgeoning literature on occupational stress (Firth-Cozens and Payne, 1999) and increasing understanding of secondary or vicarious traumatisation (McCann and Pearlman, 1990; Sabin-Farrell and Turpin, 2003). Although indirect, this

review evidence might suggest that painful engagement with bereaved families could be constructed in these terms. Given enhanced models to explain staff distress, it is timely to evaluate whether staff exposed to the repeated psychological pain of bereaved families, are themselves traumatised (Gold, 2007; McCreight, 2005; Mander, 2006) and might also suffer. Organisations have a duty of care to employees and in this capacity can become more aware of the potential for psychological change that could compromise patient care while considering how they can improve investment in staff.

In many of the papers, conclusions drawn from the evidence focus on the demands placed on staff and the inadequate support currently provided. Additional qualitative research embracing anthropological and sociological perspectives, seeking saturation, using sampling methods to challenge emerging themes and seeking out negative cases, could test the robustness of findings reported here as could further external review. Further research can build on these qualitative studies to provide greater detail on the prevalence of distress within current health and organisational psychological models. Such research can provide quantitative detail of the extent and type of difficulties faced by staff delivering this challenging facet of care. It can also suggest evidence- and theoretically-based interventions. These can both acknowledge emotional responses to the bereaved, thus normalising rather than pathologising staff responses, and can help evolve stepped, supportive interventions for staff who will have varying needs at different times throughout a career. In this way staff can truely be enabled to adhere to national guidance, and maintain empathic, engaged and emotionally congruent care, to help families at a most difficult time, without detriment to themselves.

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Information for authors

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News and resources

Antenatal screening study

A study aimed at helping parents make more informed decisions on antenatal screening has been carried put by Dr Heather Skirton from the University of Plymouth and the University of Ulster's Dr Owen Barr.

Focus group meetings were held with prospective parents and healthcare professionals and questionnaires were completed by 111 parents and 78 midwives across the UK.

The researchers made a number of recommendations including the need to use visual as well as written formats to communicate information on antenatal screening to parents. It should also be made clear to prospective parents that the ultrasound scan might detect problems with the pregnancy. More information can be obtained by contacting Dr Skirton at: heather.skirton@plymouth.ac.uk

RSM meeting

The maternity and the newborn forum of the Royal Society of Medicine is to hold a meeting on 'Academic health sciences centres: what are they and what will be their impact on women's health' on 23 September.

To book a place at the meeting, please contact Andrea Török at: maternity@rsm.org.uk

New issue of The Cochrane Library

A new issue of The Cochrane Library will be published on 8 October and will feature ten new reviews, 11 new protocols and five updated reviews from the Pregnancy and Childbirth Group.

The Baby Friendly Initiative

The Initiative has produced an update on the latest breastfeeding research. It describes studies on measuring babies' urine output and stooling to assess the adequacy of breastfeeding, the impact of kangaroo care on breastfeeding for premature babies and frenulotomy. More information can be found at: www.babyfriendly.org.uk

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