

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) re-

ported 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 ethi-

cal 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).

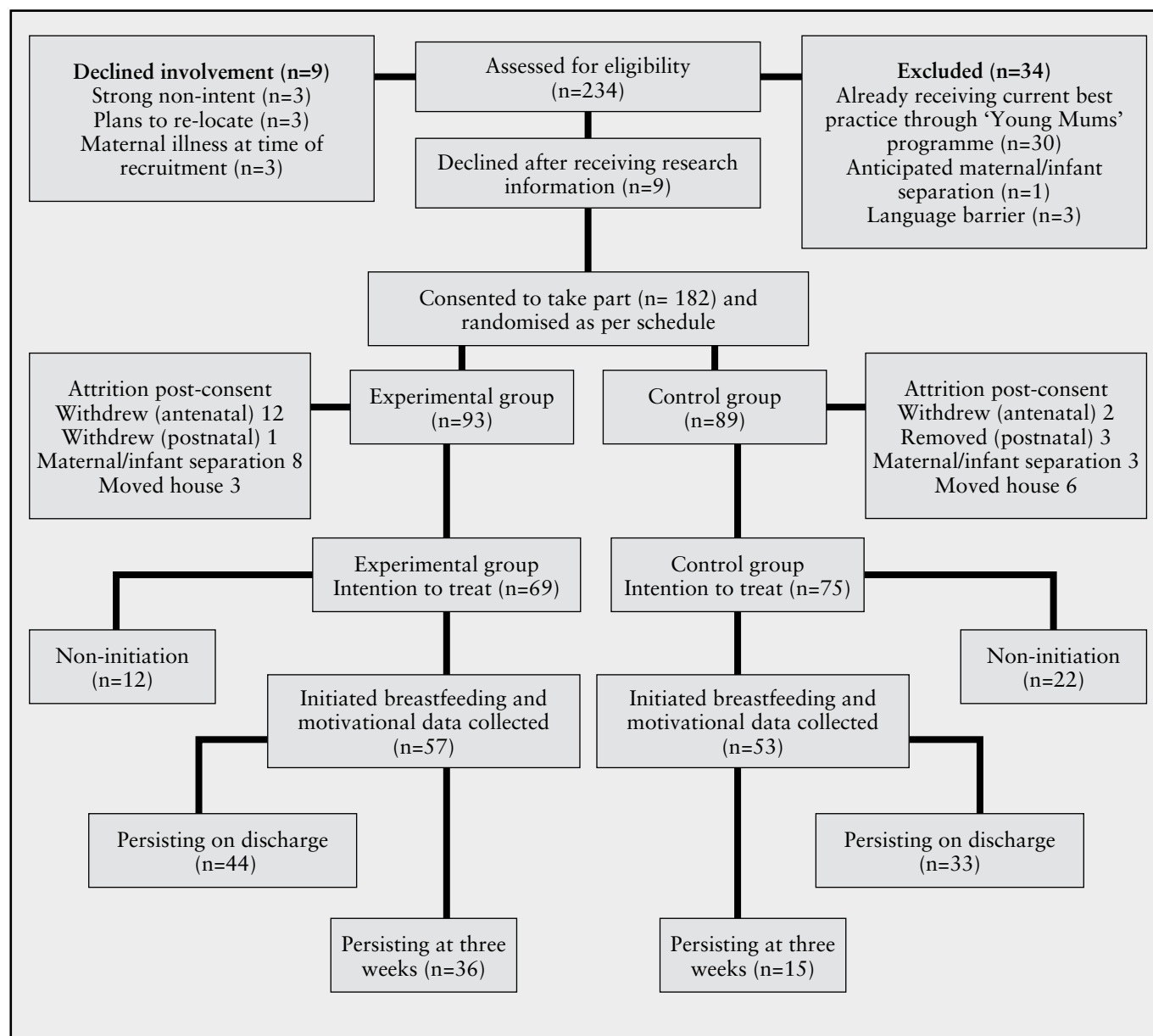
Participants, assignment and blinding

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).

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 indicators* 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

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, $\chi=.05$, 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.

* 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.

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

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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