SURVEY OF WOMEN'S EXPERIENCES OF CARE IN A NEW FREESTANDING MIDWIFERY UNIT IN AN INNER CITY AREA OF LONDON, ENGLAND: 2. SPECIFIC ASPECTS OF CARE

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Abstract

Objective To describe and compare women's experiences of specific aspects of maternity care before and after the opening of the Barkantine Birth Centre, a new freestanding midwifery unit in an inner city area.

Design Telephone surveys undertaken in late pregnancy and about six weeks after birth. Two separate waves of interviews were conducted, Phase 1 before the birth centre opened and Phase 2 after it had opened.

Setting Tower Hamlets, a deprived inner city borough in east London, 2007-2010

Participants 620 women who were resident in Tower Hamlets and who satisfied the Barts and the London Trust's eligibility criteria for using the birth centre. Of these, 259 women were recruited to Phase 1 and 361 to Phase 2.

Measurements and findings The replies women gave show marked differences between the model of care in the birth centre and that at the obstetric unit at the Royal London Hospital with respect to experiences of care and specific practices. Women who initially booked for birth centre care were more likely to attend antenatal classes and find them useful and were less likely to be induced. Women who started labour care at the birth centre in spontaneous labour were more likely to use non-pharmacological methods of pain relief, most notably water and less likely to use pethidine than women who started care at the hospital. They were more likely to be able to move around in labour and less likely to have their membranes ruptured or have continuous CTG. They were more likely to be told to push spontaneously when they needed to rather than under directed pushing and more likely to report that they had been able to choose their position for birth and deliver in places other than the bed, in contrast to the situation at the hospital. The majority of women who had a spontaneous onset of labour delivered vaginally, with 28.6 per cent of women at the birth centre but no one at the hospital delivering in water. Primiparous women who delivered at the birth centre were less likely to have an episiotomy. Most women who delivered at the birth centre reported that they had chosen whether or not to have a physiological third stage, while a worrying proportion at the hospital reported that they had not had a choice. A higher proportion of women at the birth centre reported skin to skin contact with their baby in the first two hours after birth.

Key conclusions and implications for practice

Significant differences were reported between the hospital and the birth centre in practices and information given to the women, with lower rates of intervention, more choice and significant differences in women's experiences. This case study of a single inner-city freestanding midwifery unit, linked to the Birthplace in England Research Programme, indicates that this model of care also leads to greater choice and a better experience for women who opted for it.

Keywords Midwifery care**,** free-standing midwifery unit, birth centre, service users' views

Introduction

The Barkantine Birth Centre was the first freestanding midwifery unit opened in an inner city area of England in recent years (Rocca-Ihenacho and Herron, 2011). A project was designed with the overall aim of assessing the impact of opening a freestanding midwifery unit in a multi-ethnic inner city area. It did so by comparing the care offered to women at low risk of obstetric complications resident in Tower Hamlets before and after the opening of the birth centre and comparing birth centre care with care provided in the obstetric unit of the Royal London Hospital. Overall the project included an analysis of routine data, an economic evaluation and a survey of women's expectations and experiences. This is the second of two papers describing the survey and its results.

The first paper described the local and national policy context in which the birth centre was opened, the study design and rationale for choosing the methods used, based on a review of previous research using surveys of women to evaluate maternity care and reported women's overall ratings of the care they received (Macfarlane et al., 2014). It showed that women who satisfied the criteria for birth centre care and who booked antenatally for care at the birth centre were significantly more likely to rate their care as good or very good overall than corresponding women who booked at the hospital. Women who started labour care at the birth centre were significantly more likely to have met their midwife before, to have one to one care in labour and to have the same midwife with them throughout their labour and birth. They were also significantly more likely to report that the staff were kind and understanding, that they were treated with respect and dignity and that their privacy was respected.

This article continues by comparing women's reports and experiences of specific aspects of care, including preparation for birth, induction and augmentation of labour, approaches to labour and pain management, labour interventions mode of birth and management of the third stage of labour.

Methods

Design

The survey had two phases. The first stage of the interview survey, described below as the Phase 1 survey, was designed to ascertain women's views of the care available to them and the choices they made before the opening of the birth centre. The second survey, described as Phase 2 below, was undertaken after the birth centre opened. Women who satisfied the Trust's criteria for birth centre care were recruited in late pregnancy. Each survey consisted of a telephone interview in late pregnancy and a follow-up interview after the baby was born. The design of the questionnaires, based on questions adapted from those used in two well-designed postal surveys, the 'Greater Expectations' (Green et al., 2003) and 'First class delivery' (Garcia, et al., 1998) surveys, was described in detail in the previous paper (Macfarlane et al., 2014). The questionnaires were piloted and questions further adapted for use in telephone surveys by bilingual interviewers.

Ethics approval

In November 2006, an application for ethics approval was submitted to the City and East London Ethics Committee. The Committee took the view that the study was a service evaluation and therefore did not need formal ethics approval.

Sample selection

Women who satisfied the Trust's criteria for booking for birth centre care were recruited at antenatal clinics in late pregnancy, to provide initial samples of 259 women in Phase 1 and 361 women in Phase 2. Response rates were around 80 per cent at each stage, but because of attrition between antenatal and postnatal interviews in the highly mobile population, the overall response rates were 66.4 per cent in Phase 1 and 65.4 per cent in Phase 2. These and the approach used in recruitment were described in detail in the previous paper (Macfarlane et al., 2014).

Analysis

The survey data were analysed using SPSS versions 16.0, 18 and 19. Responses from women who took part in both antenatal and postnatal interviews were linked. The analyses reported here are based on these linked datasets. To check for response bias, the linked data records were compared with data from the full set of antenatal interviews.

To explore relationships between women's expectations, experiences, the care they received and their degree of satisfaction with aspects of their care, cross-tabulations were used carried out. The packages Confidence Interval Analysis (CIA) and OpenEpi Version 3.01 were used for statistical tests. Chi-squared tests were used to test for associations in contingency tables. To test for differences between percentages, 95 per cent confidence intervals were calculated. If adjoining cells contained fewer than five cases, they were combined for statistical testing. Percentages and their confidence intervals were rounded to one decimal place and results of chi-squared tests were rounded to three significant figures.

Between the time of interview in late pregnancy and the onset of labour care, some women changed their plans for delivery. Of the 172 interviewed antenatally and postnatally in Phase 1, 166 planned to deliver at the hospital and six at home or in other hospitals. In Phase 2, of the 259 women interviewed both antenatally and postnatally, 114 initially intended to deliver at the hospital, 132 at the birth centre and 13 at home or in other hospitals.

Women's views on antenatal care, induction rates and elective caesarean section rates were analysed on an 'intention to treat' basis according to the women's initial place of booking. Between the antenatal interview and the onset of labour care, some women had changed their plans or had been transferred from the birth centre to the hospital for clinical reasons, so that 75 out of the 132 women who had booked for the birth

centre started their labour care there, while 39 started care at the linked hospital and 18 at other hospitals or at home. We did not have the information needed to assess the extent to which women who chose hospital care would have still been eligible for birth centre care at the time they started labour care, so this could not be used as a basis for analysis. Instead, women who had elective caesareans or were induced were excluded from all comparisons between care in labour in the birth centre and the hospital. Women who had emergency caesareans were excluded from comparisons of care at delivery, management of the third stage and the state of the perineum. These analyses were by 'intention to treat' that is, the findings were analysed and reported by the place where labour care began regardless of whether women who started at the birth centre needed or chose to transfer to hospital during labour. As the birth centre is a freestanding midwifery unit, labour interventions such as epidural pain relief, continuous monitoring of fetal heart rate or augmentation using an oxytocin drip required women to transfer to the linked hospital delivery suite.

Findings

Preparation for birth

Women's use of antenatal classes and their ratings of the antenatal care were analysed according to their intentions at the time of the antenatal interview, as shown in Table 1. Attendance at antenatal classes was higher among women who initially booked at the birth centre, as Table 1 shows, with 62.2 per cent attending compared with 29.5 per cent of those who booked at the hospital in Phase 2 and 34.9 per cent in Phase 1. This related mainly to the higher percentage of primiparae among women booking at the birth centre, but there was also a significantly higher proportion of multiparae attending, 33.3 per cent compared to 11.7 per cent among women who booked at the hospital.

Multiparous women who initially booked for the birth centre were also more likely to say the classes helped them with childbirth, although their numbers were too small to detect a difference statistically. Overall, women planning to give birth at the birth centre were significantly more likely to say that attendance at antenatal classes had helped them with childbirth, as Table 1 shows.

Only 35.3 per cent of women who initially booked at the hospital in Phase 2 said that antenatal classes had helped them a lot with childbirth, as Table 1 shows. The overall percentage was significantly higher, 53.7 per cent, at the birth centre, but lower among those who transferred, suggesting that the classes were likely to be oriented towards practice in the birth centre. There was very little difference between the two phases in the percentages of women planning to give birth at the hospital who found that attending classes had helped them a lot with childbirth, as Table 1 shows.

Many participants quoted antenatal education as being the most important source of useful information about childbirth, followed by the information provided by the antenatal clinic midwife. Friends and family were also

named as important as well as books and the internet. Health advocates were mentioned by women planning to give birth in the hospital, along with knowledge and experience gained during previous pregnancies.

Induction of labour

Table 2 compares induction and elective caesarean section rates by women's initial place of booking. Significant differences in induction practice can be seen, however. Overall, only 10.9 per cent of women initially booked for the birth centre were induced, compared with 20.2 per cent at the hospital in Phase 2. For primiparous women, the differences were wider, with 13.1 per cent of women initially booked for the birth centre being induced, compared with 30.6 per cent of those booked for the hospital in Phase 2. No significant differences were detected for multiparous women, although the numbers were low, as Table 2 shows. Numbers of elective caesarean sections, mainly for breech presentation or placenta praevia, were too small for meaningful statistical comparisons, as Table 2 shows.

Care in labour

In order to compare practice and women's experiences, responses to questions about care in labour and at birth were analysed by planned place of birth at the onset of labour care and restricted to women with labours of spontaneous onset.

The proportion of women who started care at the hospital who had artificial rupture of membranes, 26.7 per cent, was significantly higher than the 13.3 per cent for the birth centre in Phase 2, as Table 3 shows. The difference was wider for primiparous women and narrower for multiparous women. The apparent fall between Phase 1 and Phase 2 in the proportions of women having their membranes ruptured at the hospital could be subdivided into a significant decrease for multiparous women and an apparent but non-significant increase for primiparous women.

The proportions of women who reported having labour augmentation in the form of 'a drip to speed up labour' appeared to be slightly lower in the birth centre group in Phase 2, but their numbers were small and no significant differences were detected, as Table 3 shows. Women who had augmentation with oxytocics were all transferred to the hospital for this but half of the women who had amniotomy remained at the birth centre. Table 3 also shows an apparently more marked but still not significant decrease in rates of labour augmentation between Phase 1 and 2 for primiparous women who booked at the hospital.

The proportions of women who had continuous fetal heart rate monitoring (CTG) were significantly lower among both primiparous and multiparous women who started labour at the birth centre, as Table 3 shows. Although it appeared that proportions for multiparous but not primiparous women were slightly lower at the hospital in Phase 2 compared with Phase 1, the numbers involved were small and the differences were not significant.

Pain relief in labour

Table 4 shows considerable differences between women starting labour care at the hospital and the birth centre in methods of pain relief and in the use of non-pharmacological methods.

Of the women who started labour at the birth centre, 66.7 per cent used a birthing pool, compared with 3.8 per cent at the hospital in Phase 2 and 3.2 per cent in Phase 1. There was also a greater use of other non-pharmacological methods of pain relief at the birth centre. The 48.0 per cent of the women who started labour care at the birth centre who used breathing and relaxation techniques was significantly higher than the 28.6 per cent at the hospital in Phase 2 Similar patterns were reported for moving around and use of massage, as Table 4 shows. Massage was used by 38.7 per cent of women at the birth centre and 21.0 per cent at the hospital in Phase 2.

There were also changes between the two phases of the survey for the women who started labour at the hospital, however, with significant increases in the proportions of women who used breathing and relaxation techniques and massage.

Of the women who started labour at the birth centre, 92.0 per cent reported that they had been able to move around and change position in labour, significantly higher than the 70.5 per cent at the hospital. This was an increase compared with the 61.8 per cent in Phase 1 who said they were able to do so. In Phase 1, seven women reported that they didn't mind, whereas in Phase 2, nine women said that the midwife at the hospital suggested it, but two said they had had to be very assertive.

The use of pharmacological methods of pain relief at the hospital did not change between the two phases but there were some differences between women starting labour care at the birth centre and the hospital in Phase 2, as Table 4 shows. The use of gas and air was similar, with 64.0 per cent using it at the birth centre and 70.5 per cent at the hospital in Phase 2. The proportion of women using pethidine at the birth centre 6.7 per cent, was significantly lower than the 20.0 per cent who did so at the hospital in Phase 2. No significant difference was detected in the rate of epidural use other than for caesareans. This was 13.3 per cent among women who started labour care at the hospital in Phase 2 and 10.7 per cent for those who started labour care of the birth centre. The differences between Phase 2 and Phase 1 in the use of epidurals and gas and air at the hospital were no greater than would be expected by chance, as Table 4 shows.

The percentage of women who reported that they did not use any form of pain relief decreased significantly between Phase 1 and Phase 2 at the hospital, but it was significantly lower at the birth centre in Phase 2, as Table 4 shows. This mirrors the increases and differences in the use of non-pharmacological methods of pain relief.

In the hospital groups, a considerable proportion of the women who said they did not have the pain relief they wanted were those admitted to the antenatal ward for induction of labour or in early labour.

Position at birth

Among women who gave birth vaginally, a significantly higher proportion, 83.8 per cent of women who started labour care at the birth centre reported that had been able to choose their position for giving birth, compared with only 51.6 per cent of who started care at the hospital, as Table 5 shows This proportion was significantly lower than the 69.6 per cent who reported this in Phase 1.

More detailed questions about vaginal births were asked in Phase 2 than in Phase 1. These showed that four fifths of women planning to give birth at the birth centre reported that the midwife had discussed all possible positions with them, compared with just under a third at the hospital. Nearly all the women, 97.8 per cent, planning to give birth at the hospital said they gave birth on a bed and just under a fifth, 18.5 per cent said they gave birth lying down, compared with a much wider range of places and positions reported by women planning to give birth at the birth centre and shown in Table 6. This showed no difference in the proportions, around ten per cent, who reported lying with their legs in stirrups, which is a reflection of the similar proportions having instrumental births.

Pushing

As shown in Table 5, the proportions of women who reported they had had an urge to push and that they were told to push were similar in all the groups. The advice they were given differed significantly, however. In Phase 2, 52.2 per cent of the women who intended to give birth at the birth centre reported that were told to follow their urge to push rather than push as directed by the midwife, compared with 16.9 per cent of those who intended to give birth at the hospital. This percentage was slightly but not significantly higher than in Phase 1, as Table 5 shows.

Mode of delivery

The spontaneous vaginal birth rate for primiparous women starting labour spontaneously at the birth centre was slightly higher, 73.8 per cent compared with 62.2 per cent at the hospital, but the difference was no greater than would be expected by chance, as Table 7 shows. There was no observable difference in the very high rates of 93.8 per cent at the birth centre and 94.1 per cent at the hospital for multiparous women. Table 7 shows no observable difference between spontaneous vaginal birth rates at the birth centre and the hospital, although these comparisons of outcome should be interpreted with caution as it was not possible to account for differences in induction policies. The major difference was in practice with 28.6 per cent of primiparous and 40.6 per cent of multiparous women starting labour care at the birth centre giving birth in water while none of those starting labour care at the hospital did so.

Perineal outcomes

Women were asked whether they had needed any stitches and whether they this was because of an episiotomy or a tear. Because of concerns about the reliability of the replies to this question in Phase 1, in Phase 2 clinical data were also extracted from the Trust's obstetric summaries, derived from the women's case notes. As shown in Table 8, the latter show that rates appeared to be lower for women who started labour at the birth centre and were significantly lower for primiparae. All the episiotomies were done at the hospital. There appeared to be slightly higher rates of first degree tear recorded in the clinical notes of women who started care at the birth centre, and slightly lower rates of second degree tears but these differences were not significant. Similar proportions of women were reported to have an intact perineum, as Table 8 shows.

Data from the interviews showed that 32.4 per cent of the women who started care at the birth centre, reported having tears which needed stitching compared with 48.9 per cent at the hospital in Phase 2 and 43.4 per cent in Phase 1. They were not asked if they had tears, which had not required suturing, in contrast to the information recorded in the obstetric summaries. The percentages of women who had booked at the hospital who reported they needed stitches because of an episiotomy were similar to those in the data derived from the clinical notes and were similar in the two phases of the survey, as were the percentages reporting that they had not needed an episiotomy.

Third stage of labour

Women were asked if they had chosen 'to have the injection for the delivery of the afterbirth'. While the proportions actually having it did not differ markedly, as Table 9 shows, significantly higher percentages of women who started labour at the birth centre reported having made a choice either to have or not have a physiological third stage. On the other hand, 30.5 per cent of women who started care at the hospital reported being given the syntocinon injection without being asked, which was significantly higher than the 4.5 per cent of women giving birth at the birth centre.

Skin to skin contact and breastfeeding

The vast majority of women who started labour at the birth centre group had skin-to-skin contact with their baby at birth, 86.8 per cent, compared with 57.9 per cent at the hospital in Phase 2 and 52.5 per cent in Phase 1, as Table 10 shows. In many cases, as reported by 58.2 per cent at the birth centre and 41.1 per cent at the hospital in Phase 1, this coincided with their baby's first feed. Similar proportions reported being able to breast feed their baby in the first two hours after birth, while more of those who started their care at the hospital reported delays.

Discussion

Women's experiences of maternity care should guide both the design of new maternity services and improvements to existing services (Department of Health, 2004, 2007). There is a lack of research in this field, especially research comparing women's experiences between birth settings, however (Walsh and Downe,

2004). Recent research suggests that freestanding midwifery units are safe and highly appreciated by service users and also provide midwives with an empowering environment in which to work and develop midwifery skills (Walsh, 2004; Walsh and Downe, 2004; Overgaard, 2012).

The Birthplace Prospective Cohort Study used data extracted from case notes for a large national sample of women to provide robust comparisons of clinical outcomes for women with uncomplicated pregnancies who started labour spontaneously (Birthplace in England Collaborative Group, 2011). It showed that, compared with consultant obstetric units, obstetric intervention rates and consequent maternal morbidity rates were lower in midwifery units while rates of adverse outcome for their babies were similar. The results for freestanding midwifery units were particularly promising as obstetric intervention rates were even lower than in alongside midwifery units. In addition Birthplace found that the costs of care were lower in midwifery units than in consultant units (Schroeder et al. 2012).

Our study added to the body of knowledge on women's experiences of maternity care by using telephone survey methods to compare women's views and their reports of specific aspects of care in a freestanding midwifery unit and an obstetric unit. This method of conducting surveys achieved high response rates, with about four fifths responding at each stage and two thirds overall compared with under a third in postal surveys (Picker Institute, 2007). By using bilingual interviewers, we reached women who would have not otherwise felt confident or even able to answer a written questionnaire in English.

Previous surveys of childbirth experiences, such as Great Expectations overcame two preconceived ideas about women's satisfaction with their birth experiences. The first was that information was less important for women in more disadvantaged socio-economic groups (Green et al., 1998). Our study confirmed the importance of information, thus reinforcing the findings of previous research (Green et al., 1998; Overgaard et al., 2012; Esposito, 1999). Preliminary analyses of an ethnographic study of the Barkantine Birth Centre point in the same direction.

Our study also supported earlier findings that if women are prepared for birth and have 'high expectations', this does not necessarily lead to disappointment, as was commonly alleged (Green et al.,1998). A key finding in our study was the consistency between the expectations of being informed, having options, being involved in decision making and making informed choices (Walker et al., 1995), and the midwives' approach and philosophy of care (Green et al., 2003). This emphasises the concept that for women feeling sufficiently in control of what happens to them during labour is important and has an effect on birth experience despite the type of birth (Green et al., 2003; McCourt et al., 2011). At the Barkantine Birth Centre, active birth workshops were an integral part of the care provided, but similar preparation for birth, based on interactive workshop techniques, was not offered at the hospital. These workshops were perceived very positively by women and were scored very high in the survey.

The workshops were facilitated by the birth centre midwives. Being facilitated by the same midwives who provided intrapartum care could have increased consistency between antenatal preparation and the care provided in labour at the birth centre. This may have contributed to the more positive evaluation of the birth plans and the labour care in general. More research is needed to explore this possible link. We could hypothesise that consistency between antenatal preparation, women's expectations and midwives' approach to care leads to positive birth experiences irrespective of the type of birth or the need to transfer. Some emerging evidence supports this hypothesis, for example the Birthplace qualitative case studies and a qualitative study of transfers from midwifery units, linked to Birthplace (McCourt et al., 2011; Rowe et al., 2012)

The Birthplace case studies highlighted more generally women's need to be listened to, supported and their wishes heard. Where women felt unable to speak up or have their options explained, this often led to resentment, frustration or anger and women believed this resulted in delay in the management of complications (McCourt et al., 2011).

A study in Denmark compared the impact of birth in freestanding midwifery units and obstetric units on women's birth experiences and perceptions of care (Overgaard et al. 2012). The study concluded that women had significantly better birth experiences when they chose to birth in the midwifery units. It also found that women without post-secondary education had significantly better experiences in midwifery units than in obstetric units, thus mitigating social inequalities. A meta-synthesis of qualitative research on midwife-led care highlighted the relationally mediated benefits for women receiving care in birth centres resulting in increased agency and empathic care (Walsh and Devane, 2012).

Our study also highlighted the impact of staff attitudes and communication skills on women's birth experiences. Women's views varied considerably, depending on whether they gave birth at the birth centre or at the hospital. Even though the two groups were not homogeneous, the women expressed very similar views about factors which influenced their experiences. Women reported positive views of feeling listened to, supported and cared for by the midwife. Negative experiences were directly linked to staff attitudes and lack of communication skills. Women reported dissatisfaction with their birth experience if they felt they were not listened to, nor involved with decision-making, or informed and if the midwife was rushing. Women who transferred from the birth centre still expressed a positive experience. If the communication between staff was smooth, they felt involved in the decision-making and kept informed as well as feeling reassured about safety

Women's experiences of intrapartum care reported in our study indicated marked differences between the birth centre and the hospital both in midwives' overall philosophy of care and in specific practices. Significant examples were the midwives' approach to discussion on prolonged pregnancy, mobilisation in labour, position for birth and management of the third stage of labour. Although the women booked for the

hospital were younger and therefore less likely to experience complications, induction rates in the hospital group were considerably higher than among women booked at the birth centre. A subsequent qualitative study of induction of labour for prolonged pregnancy explored women's and midwives' views. This found that most women were not keen on induction of labour but mostly felt obliged to accept it. Midwives' attitudes and approach to discussion differed markedly, however, depending on whether their area of practice was in the birth centre or the hospital.

A matched cohort study conducted in the 1980s attempted to address the issue of self- selection bias for freestanding midwifery units by comparing two cohorts of women, one self-selected and the other assigned to midwifery unit care(Scupholme and Kamons, 1987). No differences in outcome were detected, supporting the argument that self-selection is not the primary influence on outcomes of care in midwifery unit settings.
The Birthplace case studies concluded that the geographical separation of freestanding midwifery units seemed to facilitate the development of midwifery practice and a social model of maternity care (McCourt et al., 2011). In contrast, the proximity of alongside units to the delivery suite seemed to have reduced their autonomy, blurring the boundaries and creating interference with practice.

It could be argued that, in view of their safety, cost effectiveness and contribution to a positive birth experience, midwifery units should become the mainstream option for women without complications.. Instead, even though the number of women in England who give birth in midwifery units has grown since 2007, women who do so are still in a small minority (Redshaw, Birthplace in England research programme and mapping group, 2011)

Limitations

There are some limitations to the approach used in this survey. Women were recruited in late pregnancy, using criteria, which they satisfied at the time of recruitment. This means that by the time they started labour care, some who planned to deliver at the birth centre would have selectively transferred their booking to the hospital. This was mainly because of clinical complications but possibly also for other reasons, such as to have an epidural. Analyses by intended place of birth at this stage would not be comparing women who were similar with respect to the clinical selection criteria for birth centre care and we also did not know how many women who initially chose hospital care no longer would have been eligible for birth centre care.

We had hoped to use data from the hospital system to derive some information on this, but this proved to be impossible. As well as having major technical problems, the Cerner Millennium system, installed at the Trust just after the birth centre opened, lacked key data items. For these reasons, overall comparative analyses were conducted in relation to women's initial choice of place of booking. As a consequence, as the aim was to compare practice and experiences rather than outcomes, women who were induced or had an elective caesarean section were removed from analyses of care in labour by planned place of birth at the onset of labour care. Women who had emergency caesareans were excluded from analyses of care at delivery.

Thus our findings cannot be directly compared with those of the Birthplace Prospective Cohort Study, (Birthplace in England Collaborative Group, 2011) in which the inclusion criteria were applied to women's plans at the onset of labour care. This, along with the way in which our sample was recruited, means that the survey cannot be used to estimate rates of transfer from the birth centre to the hospital in labour, but in any case this information is available from an on-going audit conducted by the birth centre midwives. This showed that in 2009, the year in which our Phase 2 survey was conducted, the intrapartum transfer rates were 28 per cent of primiparous women, 5 per cent of multiparous women and 19 per cent overall (Barts and the London Maternity Service, 2012). These are comparable to but somewhat lower than national transfer rates reported in the Birthplace in England study (Birthplace in England Collaborative Group, 2011). The reasons for any differences in rates cannot be determined, but it is possible that the relatively unusual inner-city location of the birth centre studied here, with a short transfer time to hospital, may have had an impact on professionals' and women's decision-making.

Despite these limitations, the findings add further insights to the conclusions of the Birthplace in England study that birth in a freestanding midwifery unit is as safe as an obstetric unit for babies, less costly and with lower rates of intervention and morbidity for mothers (Birthplace in England Collaborative Group, 2011). The comparative surveys highlight described here highlight significant differences between the hospital and the birth centre in practices and in information and choice given to women. Women's experiences of care also differed significantly.

Conclusions

This survey, linked to the Birthplace in England Research Programme, compared a single inner-city freestanding midwifery unit with care in the hospital run by the same NHS trust. It indicated that the model of care in the birth centre leads to greater choice, lower rates of intervention and a better experience for women who opted for this form of care.

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Contributors

Alison Macfarlane was Principal Investigator and Carol Dossett was the administrator for the project as a whole. Lucia Rocca-Ihenacho and Carolyn Roth devised the questionnaires and Lucia Rocca-Ihenacho and Zohra Khanam revised them for Phase 2. Zohra Khanam, Shazna Matin, Lucia Rocca-Ihenacho and the Barts and the London Trust health advocates recruited and interviewed the women. Zohra Khanam and Carol Dossett entered the data and Lyle Turner cleaned and linked the data and did the primary statistical analyses. Alison Macfarlane did further analyses and she and Lucia Lucia Rocca-Ihenacho drafted the original paper. Alison Macfarlane redrafted it as two papers and she and Lucia Rocca-Ihenacho revised these. All authors approved the final version submitted for publication.

Conflicts of interest

We have no conflicts of interest.

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Table 1 Attendance at antenatal classes by place of booking at time of antenatal interview

	Place of booking, numbers			Place of booking, percentages		
	Phase 1	Phase 2		Phase 1	Phase 2	
	Hospital	Hospital	Birth centre	Hospital	Hospital	Birth centre
Analyses by place of booking at time of antenatal interview						
Attendance at antenatal classes						
No previous children						
Attended	61	24	54	82.4	68.6	79.4
Total stated	74	35	68	100.0	100.0	100.0
Difference between hospital in phases 1 and 2 =		13.9	95% CI	-2.6, 31.8		
Difference between hospital and birth centre in phase 2 =		-10.8	95% CI	-29.2, 6.1		
Previous children						
Attended	7	9	14	7.6	11.7	33.3
Total stated	92	77	42	100.0	100.0	100.0
Difference between hospital in phases 1 and 2 =		-4.1	95% CI	-13.9, 5.0		
Difference between hospital and birth centre in phase 2 =		-21.6	95% CI	-37.7, -6.4		
All women						
Attended	58	33	69	34.9	29.5	62.2
Total stated	166	112	111	100.0	100.0	100.0
Difference between hospital in phases 1 and 2 =		5.5	95% CI	-5.8, 16.2		
Difference between hospital and birth centre in phase 2 =		-32.7	95% CI	-44.1, -19.8		
Women who thought attendance helped them with childbirth						
No previous children						
Yes, a lot	23	10	29	45.1	41.7	53.7
Yes, a little	18	11	16	35.3	45.8	29.6
Total stated	51	24	54	100.0	100.0	100.0
Comparison between hospital in phases 1 and 2			Chi squared = 0.988		p=0.610	2 df
Comparison between hospital and birth centre in phase 2			Chi-squared = 1.93		p=0.381	2 df
Previous children						
Yes, a lot	1	2	9	14.3	20.0	69.2
Yes, a little	4	7	2	57.1	70.0	15.4
Total stated	7	10	13	100.0	100.0	100.0

All women						
Yes, a lot	24	12	38	41.4	35.3	56.7
Yes, a little	22	18	18	37.9	52.9	26.9
Total stated	58	34	67	100.0	100.0	100.0
Comparison between hospital in phases 1 and 2			Chi squared = 2.30		p=0.317	2 df
Comparison between hospital and birth centre in phase 2			Chi-squared = 6.72		p=0.0348	2 df
Total number of women booked	166	114	132			

Table 2 Induction and elective caesarean rates by place of booking at time of antenatal interview

	Numbers			Percentages			Comparisons, hospital Phase 2 and Phase 1		Comparisons, Phase 2 Birth centre and hospital	
	Phase 1 Hospital	Phase 2 Hospital	Birth centre	Phase 1 Hospital	Phase 2 Hospital	Birth centre				
Analyses by place of booking at time of antenatal interview							**Difference**	**95% CI**	**Difference**	**95% CI**
No previous children										
Induced	20	11	11	27.0	30.6	13.1	-3.5	-22.1, 13.2	17.5	2.1, 34.7
Elective caesarean section	0	1	2	0.0	2.8	2.4	-2.8	-14.2, 2.7	0.4	-5.9, 11.9
Total booked	74	36	84	100.0	100.0	100.0				
Previous children										
Induced	16	12	3	17.4	15.4	6.7	4.2	-8.9, 15.4	8.7	-4.2, 19.3
Elective caesarean section	3	5	1	3.3	6.4	2.2	-3.1	-11.2, 3.8	4.2	-5.8, 12.1
Total booked	92	78	45	100.0	100.0	100.0				
All										
Induced	36	23	14	21.7	20.2	10.9	1.5	-8.5, 10.9	9.3	0.2, 18.6
Elective caesarean section	3	6	3	1.8	5.3	2.3	-3.5	-9.3, 0.9	2.9	-2.2, 8.9
Total booked	166	114	129	100.0	100.0	100.0				
Total number of women booked	**166**	114	132							

Table 3 Intervention in labour

	Numbers			Percentages			Comparisons, hospital Phase 2 and Phase 1		Comparisons, Phase 2 Birth centre and hospital	
	Phase 1 Hospital	Phase 2 Hospital	Birth centre	Phase 1 Hospital	Phase 2 Hospital	Birth centre	Difference	95% CI	Difference	95% CI
Analyses by planned place of birth at the onset of labour care for women with spontaneous onset of labour										
Having waters broken										
No previous children	15	13	7	28.3	35.1	16.7	-6.8	-26.0, 12.0	18.5	0.8, 36.6
Previous children	31	15	3	43.7	22.1	9.4	21.6	6.0, 35.8	12.7	-4.3, 25.5
All	46	28	10	37.1	26.7	13.3	10.4	-1.7, 22.0	13.3	1.2, 24.3
Drip to speed up labour										
No previous children	17	7	6	32.1	18.9	14.3	13.2	-5.7, 29.6	4.6	-11.9, 21.7
Previous children	4	4	1	5.6	5.9	3.1	-0.2	-9.2, 8.5	2.8	-10.4, 11.4
All	21	11	7	16.9	10.5	9.3	6.5	-2.7, 15.3	1.1	-8.7, 9.9
Continuous monitoring of the fetal heart										
No previous children	29	20	10	54.7	54.1	23.8	0.007	-19.3, 20.8	30.2	8.7, 48.4
Previous children	33	19	2	46.5	27.9	6.3	18.5	2.5, 33.3	21.7	5.0, 34.2
All	62	39	12	50.0	37.1	16.0	12.9	0.0, 25.1	21.1	8.0, 32.7
Total number of women with labour of spontaneous onset										
No previous children	53	37	42							
Previous children	71	68	32							

Not stated	0	0	1
All	124	105	75

Table 4 Pain relief for women with labours of spontaneous onset

	Numbers			Percentages			Comparisons, hospital Phase 2 and Phase 1		Comparisons, Phase 2 Birth centre and hospital	
	Phase 1 Hospital	Phase 2 Hospital	Birth centre	Phase 1 Hospital	Phase 2 Hospital	Birth centre				
Analyses by planned place of birth at onset of labour care for women with spontaneous onset										
Pain relief							**Difference**	**95% CI**	**Difference**	**95% CI**
Non pharmacological										
Bath or shower	10	21	14	8.1	20.0	18.7	-11.9	-21.3, -3.0	1.3	-10.8, 12.6
Hot compresses or bottle water	0	1	0	0.0	1.0	0.0	-1.0	-5.2, 2.2	1.0	-4.0, 5.2
Birthing pool	4	4	50	3.2	3.8	66.7	-0.6	-6.5, 4.7	-62.9	-72.8, -50.3
Breathing and relaxation	13	30	36	10.5	28.6	48.0	-18.1	-28.3, -7.9	-19.4	-33.0, -5.1
TENS machine	5	3	17	4.0	2.9	22.7	1.2	-4.5, 6.6	-19.8	-30,6, -10.3
Moving around	36	63	60	29.0	60.0	80.0	-31.0	-42.4, -18.2	-20.0	-32.1, -6.3
Massage	7	22	29	5.6	21.0	38.7	-15.3	-24.5, -6.6	-17.7	-30.9, -4.3
Aromatherapy	0	2	5	0.0	1.9	6.7	-1.9	-6.7, 1.4	-4.8	-12.9, 1.3
Hypnobirthing	0	4	7	0.0	3.8	9.3	-3.8	-9.4, 0.0	-5.5	-14.5, 1.8
Pharmacological										
Gas and air	79	74	48	63.7	70.5	64.0	-6.8	-18.5, 5.5	6.5	-7.1, 20.3
Pethidine	29	21	5	23.4	20.0	6.7	3.4	-7.5, 13.0	13.3	3.0, 22.8
Epidural not for caesarean	26	14	8	21.0	13.3	10.7	7.6	-2.4, 17.2	2.7	-7.7, 12.0
Used nothing	29	11	1	23.4	10.5	1.3	12.9	3.1, 22.3	9.1	1.8, 16.5
Women replying	**124**	**105**	**75**	**100.0**	**100.0**	**100.0**				

Note: Percentages add up to more than 100 as some women used more than one method of pain relief

Were you able to move around and change position in labour?										
Yes, I wanted to		63	69		60.0	92.0	Proportion of women who were able to move			

Yes, the midwife suggested it	9	0	8.6	0.0		-21.5	-31,8,-10.0
Yes but i had to be very assertive	2	0	1.9	0.0			
No	31	6	29.5	8.0			
Women replying	**105**	**75**	**100.0**	**100.0**			

Table 5 Care at birth for women with labours of spontaneous onset and vaginal birth

	Numbers			Percentages			Comparisons, hospital Phase 2 and Phase 1		Comparisons, Phase 2 Birth centre and hospital	
	Phase 1 Hospital	Phase 2 Hospital	Birth centre	Phase 1 Hospital	Phase 2 Hospital	Birth centre	Difference	95% CI	Difference	95% CI
Analyses by planned place of birth at onset of labour care for women with spontaneous onset and vaginal birth										
Had choice of position for birth	71	49	57	69.6	51.6	83.8	18.0	4.4, 30.8	-32.2	-44.3, -17.9
Total women with vaginal births replying	102	95	68	100.0	100.0	100.0				
Pushing										
Did you have the urge to push?										
Yes	93	90	63	91.2	94.7	92.6	-3.6	-11.3, 4.1	2.1	-11.3, 4.1
Total women with vaginal births replying	102	95	68	100.0	100.0	100.0				
Were you told when to push										
Yes	78	78	55	76.5	82.1	80.9	-5.6	-16.8, 5.8	1.2	-10.5, 13.9
Total women with vaginal births replying	102	95	68	100.0	100.0	100.0				
What were you told to do?										
Hold breath and push as long as possible during contraction	65	28	5	64.4	31.5	7.5	32.9	18.8, 45.2	24.0	11.6, 35.1
Push when you feel you need to	12	15	35	11.9	16.9	52.2	-5.0	-15.3, 5.1	-35.4	-48.5, -20.5
Total women with vaginal births replying	101	89	67	100.0	100.0	100.0				

Table 6 Position at birth for women with labours of spontaneous onset and vaginal birth

	Numbers Phase 2		Percentages Phase 2		
	Hospital	Birth centre	Hospital	Birth centre	
Analyses by planned place of birth at onset of labour care for women with spontaneous onset and vaginal birth					
Position for birth					
Sitting, supported by pillows	23	16	24.7	24.6	
On my side	2	1	2.2	1.5	
Standing/squatting	1	13	1.1	20.0	
All fours	4	24	4.3	36.9	
Lying down	55	3	59.1	4.6	
Lying with legs in stirrups	3	2	3.2	3.1	
Lying with legs in stirrups-instrumental birth	5	4	5.4	6.2	
Kneeling against pool	0	1	0.0	1.5	
Kneeling on the ball	0	1	0.0	1.5	
Total women with vaginal births replying	93	65	100.0	100.0	
Comparison between lying, sitting or on side and all other positions combined					
Comparison between hospital and birth centre in phase 2		Chi-squared = 65.4		p<0.001	2df
Where did you give birth?					
Bed	91	12	97.8	18.5	
Mat/floor	1	18	1.1	27.7	
Birthing stool	0	11	0.0	16.9	
Pool	0	23	0.0	35.4	
Other	1	1	1.1	1.5	
Total women with vaginal births replying	93	65	100.0	100.0	
Comparison between bed and all other places					
Comparison between hospital and birth centre in phase 2		Chi-squared = 106.3		p<0.001	1 df

Table 7 Mode of delivery for women with labours of spontaneous onset

	Numbers			Percentages		
	Phase 1 Hospital	Phase 2 Hospital	Birth centre	Phase 1 Hospital	Phase 2 Hospital	Birth centre
Analyses by planned place of birth at the onset of labour care for women with spontaneous onset of labour						
Method of delivery						
No previous children						
Spontaneous vaginal, all	29	23	31	54.7	62.2	73.8
Water	0	0	12	0.0	0.0	28.6
Ventouse or forceps	8	7	6	15.1	18.9	14.3
Emergency c-section	16	7	5	30.2	18.9	11.9
Total stated	53	37	42	100.0	100.0	100.0
Comparison between spontaneous vaginal, operative vaginal or emergency caesarean						
Comparison between hospital in phases 1 and 2			Chi squared = 1.48		p=0.476	2df
Comparison between hospital and birth centre in phase 2			Chi-squared = 1.28		p=0.526	2df
Previous children						
Spontaneous vaginal, all	59	64	30	83.1	94.1	93.8
Water	0	0	13	0.0	0.0	40.6
Ventouse or forceps	6	1	0	8.5	1.5	0.0
Emergency c-section	6	3	2	8.5	4.4	6.3
Total stated	71	68	32	100.0	100.0	100.0
Comparison between spontaneous vaginal and operative						
Comparison between hospital in phases 1 and 2			Chi squared = 4.14		p=0.0419	1 df
Comparison between hospital and birth centre in phase 2			Chi-squared = .00522		p=0.942	1 df
All women with labour of spontaneous onset						
Spontaneous vaginal, all	88	87	61	71.0	82.9	82.4
Water	0	0	25	0.0	0.0	33.8
Ventouse or forceps	14	8	6	11.3	7.6	8.1
Emergency c-section	22	10	7	17.7	9.5	9.5
Total stated	124	105	74	100.0	100.0	100.0
Comparison between spontaneous vaginal, operative vaginal or emergency caesarean						
Comparison between hospital in phases 1 and 2			Chi squared = 4.60		p=0.100	2df
Comparison between hospital and birth centre in phase 2			Chi-squared = .0144		p=0.993	2df
Total number of women with labour of spontaneous onset						
No previous children	53	37	42			

Previous children	71	68	32
Not stated	0	0	1
All	124	105	75

Table 8 State of the perineum and management of third stage for women with spontaneous onset and vaginal birth

	Numbers Phase 2		Percentages Phase 2		Comparisons, Phase 2 Birth centre and hospital	
	Hospital	Birth centre	Hospital	Birth centre		
Analyses by planned place of birth at onset of labour care for women with spontaneous onset and vaginal birth						
					Difference	95% CI
Women with episiotomy recorded in their clinical notes						
No previous children	11	7	40.7	20.0	-35.4	-48.5, -20.5
Previous children	4	0	6.6	0.0	6.6	-6.5, 15.7
All	15	7	17.0	11.1	5.9	-6.0, 16.7
Women included						
No previous children	27	35				
Previous children	61	27				
All	88	63				
State of the perineum reported in clinical notes						
First degree tear	15	16	17.0	25.4	-8.4	-21.9, 4.6
Second degree tear	29	18	33.0	28.6	4.4	-10.7, 18.5
Third or fourth degree tear	1	3	1.1	4.8	-3.6	-12.0, 2.3
Episiotomy	15	7	17.0	11.1	5.9	-6.0, 16.7
Intact	28	19	31.8	30.2	1.7	-13.4, 16.0
Total women replying	88	63	100.0	100.0		

Table 9 Management of third stage for women with spontaneous onset and vaginal birth

	Numbers Phase 2		Percentages Phase 2		Comparisons, Phase 2 Birth centre and hospital	
	Hospital	Birth centre	Hospital	Birth centre		
Analyses by planned place of birth at onset of labour care for women with spontaneous onset and vaginal birth						
					Difference	95% CI
'Did you choose to have the injection for the delivery of the afterbirth?'						
I chose not to have the injection	14	20	14.7	29.9	-15.1	-28.2, -2.3
Nobody asked me, I didn't have the injection	5	2	5.3	3.0	2.3	-5.6, 9.1
I chose to have the injection	28	32	29.5	47.8	-18.3	-32.6, -3.2
I was given the injection but nobody asked me	29	3	30.5	4.5	26.0	14.6, 32.3
I had an instrumental birth and the injection	6	5	6.3	7.5	-1.1	-10.6, 6.9
I don't remember	13	5	13.7	7.5	6.2	-4.2, 15.6
Total women with spontaneous onset and birth replying	95	67	100.0	100.0		

Table 10 Care at birth for women with labours of spontaneous onset and vaginal birth

	Numbers			Percentages		
	Phase 1	Phase 2		Phase 1	Phase 2	
	Hospital	Hospital	Birth centre	Hospital	Hospital	Birth centre
Skin to skin contact with baby in the first two hours after birth						
Yes, I planned it	53	55	59	52.5	57.9	86.8
Yes, even if I didn't plan it	12	12	4	11.9	12.6	5.9
No, I didn't plan it	12	18	0	11.9	18.9	0.0
No, even if I planned it	24	9	4	23.8	9.5	5.9
Not applicable	0	1	1	0.0	1.1	1.5
Total stated	101	95	68	100.0	100.0	100.0
Comparison between Yes, I planned it, Yes even if I didn't plan it and No						
Comparison between hospital in phases 1 and 2			Chi squared = 1.07		p=0.585	2 df
Comparison between hospital and birth centre in phase 2			Chi-squared = 17.2		p=0.00019	2 df
Were you able to breastfeed your baby in the first two hours after birth						
Yes	1	2	0	1.0	2.1	0.0
Yes, while doing skin to skin	39	39	39	39.4	41.1	58.2
Yes, after a while	20	32	14	20.2	33.7	20.9
No	39	19	11	39.4	20.0	16.4
No, I planned to bottle feed	0	3	3	0.0	3.2	4.5
Total stated	99	95	67	100.0	100.0	100.0
Comparison between Yes, including while doing skin to skin and No						
Excludes women planning to bottle feed.						
Comparison between hospital in phases 1 and 2			Chi squared = 9.43		p=0.00894	
Comparison between hospital and birth centre in phase 2			Chi-squared = 4.34		p=0.114	