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Clinical interventions and outcomes of One-to-One midwifery practice

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Abstract

Background Changing Childbirth became policy for the maternity services in England in 1994 and remains policy. One-to-One midwifery was implemented to achieve the targets set. It was the first time such a service had been implemented in the Health Service. An evaluation was undertaken to compare its performance with conventional maternity care.

Methods This was a prospective comparative study of women receiving One-to-One care and women receiving the system of care that One-to-One replaced (conventional care) to compare achievement of continuity of carer and clinical outcomes. The evaluation took place in The Hammersmith Hospitals NHS Trust, the Queen Charlotte's and Hammersmith Hospitals. This was part of a larger study, which included the evaluation of women's responses, cost implications, and clinical standards and staff reactions. The participants were all those receiving One-to-One midwifery practice (728 women), which was confined to two postal districts, and all women receiving care in the system that One-to-One replaced, in two adjacent postal districts (675 women), and expecting to give birth between 15 August 1994 and 14 August 1995. Main outcome measures were achievement of continuity of care, rates of interventions in labour, length of labour, maternal and infant morbidity, and breastfeeding rates.

Results A high degree of continuity was achieved through the whole process of maternity care. One-to-One women saw fewer staff at each stage of their care, knew more of the staff who they did see, and had a high level of constant support in labour. One-to-One practice was associated with a significant reduction in the use of epidural anaesthesia (odds ratio (OR) 95 per cent confidence interval (CI) = 0.59 (0.44, 0.80)), with lower rates of episiotomy and perineal lacerations (OR 95 per cent CI = 0.70 (0.50, 0.98)), and with shorter second stage labour (median 40 min vs 48 min). There were no statistically significant differences in operative and assisted delivery or breastfeeding rates.

Conclusions This study confirms that One-to-One midwifery practice can provide a high degree of continuity of carer, and is associated with a reduction in the rate of a number of interventions, without compromising safety of care. It should be extended locally and replicated in other services under continuing evaluation.

Keywords: One-to-One midwifery practice, caseload, evaluation, clinical intervention

Introduction

Changing Childbirth, the report of the Expert Maternity Group,[1] became policy for the maternity services in England in 1994,[2] following the conclusions of the health committee chaired by Winterton.[3] In the preceding decade, attempts to provide greater continuity of carer and to have midwives play a fuller role in the provision of maternity care were mainly through the development of team midwifery or midwifery-led units.[4,5] Few schemes achieved high levels of continuity across the mainstream of the service[6] or across all stages of care, and there is evidence of high levels of occupational stress and burn-out in team midwifery.[7]

Changing Childbirth identified fundamental principles for the maternity services. These included greater choice, continuity and control for women, and that care should be effective, accessible and responsive to their individual needs. Ten 'indicators of success' focused on factors that were seen as being crucial to achieving these principles in practice. Amongst the most difficult of these to achieve, and arguably the most fundamental, were the targets for achievement of continuity of carer, midwifery-led care, and a shift of care to the community. One-to-One midwifery was designed to put these principles into practice.

The overall study was planned to evaluate how the new One-to-One model would work in practice; that is, whether it would achieve the degree of continuity anticipated, and whether it was associated with similar clinical standards and outcomes, responses of women and professionals and use of resources, to those found in the conventional service.

In this paper we report on the evaluation of the rate of clinical interventions associated with One-to-One midwifery practice. This is a caseload approach, which means that each midwife follows individual women through the system of care

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rather than being ward or community based. The approach had been described theoretically[8] but had not been tested in the National Health Service. One-to-One was intended to overcome some of the limitations to achieving continuity of care that had become apparent in the earlier innovations, for example, in team midwifery.[5]

Methods

Background

One-to-One midwifery practice was implemented in November 1993. In this approach to practice a named midwife follows each woman through the entire episode of maternity care, plans and provides most of the midwifery care and adopts the role of lead clinician where appropriate. One-to-One midwives work closely with a midwife partner, who will provide care when the named midwife is not available. The service aimed to provide woman- and family-centred care in two ways: first, through a structural reorganization of care to provide a high degree of continuity and community based care; second, through developing evidence-informed practice and effective interpersonal relationship skills for midwives. Openings in the One-to-One Practice were advertised internally within the local maternity service, and midwives were invited to apply. Midwives were selected after an application process that included an interview. Twenty midwives were appointed. On the demographic characteristics of age, qualifications and experience the group seemed to be fairly representative of the general population in the same service. One midwife was 24 years old, the majority were between 27 and 32 years, and there was one each of 33, 35, 42 and 45 years old. Three had been qualified for 12–18 months, five for between 18 and 24 months, six for over 2 years, and one each for over 3, 4, 5, 6, 8 and 18 years. Three were community midwives before starting, the rest were working within the hospital service. At the start of the evaluation of the group of 20, 11 midwives were married or had long-term relationships. One had a young child. Twenty One-to-One midwives carried individual caseloads of 40 women. That is, they provided the majority of care for women in their caseload, throughout the entire pregnancy, labour, birth and postpartum period. They cared for low- and high-risk childbearing women and their families, working in the community and two hospital sites, providing care to most women in a specific location. The organization allowed midwives flexibility in work patterns and encouraged professional autonomy, and adequate managerial support was given. In the system of care it replaced (the control group), midwives are community or 'ward' based and women progress through the system, being cared for by a number of different professionals.

Study aims

The objective of this study was to evaluate One-to-One midwifery and compare the care and delivery of the system with the system of care it replaced (mainly consultant-led shared care). As one of the main aims of the change was to improve continuity of care, clear targets for continuity were set, and their achievement was measured. As well as rates of intervention and measures of perinatal health reported here, we surveyed women's satisfaction with their care, responses to pregnancy and birth,[9] clinical standards of care,[10] reactions of staff to the change and the use of economic resources.[11] Women in the One-to-One group were more positive about care and the experience of pregnancy and birth than women in the control group. One-to-One midwifery practice costs no more than conventional care. One-to-One midwives manage a higher number of births per head than those in conventional practice.

Study population

To avoid selection bias all women receiving One-to-One midwifery care (study group) and all women receiving the system of care it replaced, living in two prospectively identified postal districts (control group) and expecting to give birth in the same NHS Trust, between 15 August 1994 and 14 August 1995, were invited to enter the study. Invitation came through an explanatory letter that accompanied the antenatal questionnaire. There were no exclusion criteria on the basis of risk because women of both low- and high-risk pregnancies were cared for in the One-to-One service. Ethics approval was gained from the NHS Ethics Committee. Consent to participate in the survey of women's responses was given by return of the first questionnaire. The notes of all women in the study and control groups were audited; consent was not sought for this aspect of the study. Women giving birth before 28 weeks of pregnancy and those who moved into or out of the relevant area during the study period were not evaluated.

Study design

This was a comparative prospective evaluation of two concurrent systems of care. The change of the pattern of care relied on moving hospital-based midwives to a community base and replacing traditional community midwives. Evaluation and comparison of practicability and cost effectiveness required coverage of a discrete geographical area. Randomization of individual women was therefore not possible. Randomization of midwives was also considered but rejected on practical grounds because of the necessary contractual changes. For comparison, records were collected from women living in two neighbouring postal districts and having their baby in the same NHS Trust.

The study was designed to collect 450 cases per group after drop-out and refusals, giving 90 per cent statistical power to detect a 15 percentage point difference from the 50 per cent epidural rate under conventional care.

Data collection and analysis

Audit of medical records was conducted to assess number and continuity of carers, clinical risk status, interventions and

outcomes in labour. Following professional consultation, development and piloting of the audit tools, auditing was conducted by three qualified midwives with independent double-checking of 5 per cent of notes to ensure accuracy and reliability. Blinding to type of care during audit for counting number of carers was impossible because counting depended on recognizing signatures. Lack of blinding was not likely to affect the estimation of other objective outcomes considered here. A survey of women's responses to care, using longitudinal self-completion questionnaires at 35 weeks of pregnancy, and 2 and 13 weeks postnatally, incorporated closed and open questions about responses to all aspects of care and some clinical outcomes including breastfeeding. Data on socio-economic characteristics of respondents were collected from questionnaires and routine hospital statistics. Data were validated by cross-checking information across the range of data sources: routine hospital statistics, medical records, questionnaires and interviews.

Inferential statistics are from regression models adjusting group comparisons for differences in the women's demographic and clinical history data. Factors adjusted for were maternal age (quintiles), ethnic group (white, other), existence of partner (yes, no), home ownership (owned, rented), education (above GCSE, not), and parity (primiparous, not). To alleviate problems associated with multiple comparisons, only a limited number of pre-specified outcome measures were formally assessed.

Results

Most of the outcomes reported here, including achievement of continuity of carer, were from audit data and were therefore objective. The only exception is for breastfeeding rates, which were taken from questionnaires.

Available records

Labour records were available for 374 (89 per cent) of the study group and 528 (91 per cent) of the control group at the main maternity unit (Table 1). Results are not reported for the smaller maternity unit here, as numbers of women in the control group using this unit were too low for meaningful statistical analysis. Records were available for 23 (96 per cent) of women in the control group using Hammersmith Hospital. Questionnaires were sent to 420 in the study group and 575 in the control group at Queen Charlotte's Hospital. Questionnaire response rates were 248 (59 per cent) for the study group and 345 (60 per cent) for the control group at 2 weeks postnatally, and 258 (61 per cent) and 334 (58 per cent) respectively at 13 weeks. The sample sizes for clinical audit and questionnaires were the same.

Table 1 Records available for analyses (numbers, with percentages given in parentheses)

Site	Group	Audit	Labour	PN1	PN2
QC	One-to-One	420	374 (89)	248 (59)	258 (61)
	Conventional	579	528 (91)	345 (60)	334 (58)
HH	One-to-One	226	204 (90)	85 (38)	90 (40)
	Conventional	24	23 (96)	10 (42)	8 (33)

QC, Queen Charlotte's Hospital; HH, Hammersmith Hospital; PN1, postnatal 1; PN2, postnatal 2.

Table 2 Group characteristics (numbers, with percentages given in parentheses)

Factor	One-to-One	Controls
Clinical high risk	140 (37)	193 (36)
Nulliparous	175 (47)	279 (53)
Previous c/s	25 (7)	36 (7)

c/s, caesarean section.

Characteristics of the two groups

Women in the study group had a lower level of educational attainment and were more likely to be without the support of a partner, in rented accommodation, and in manual rather than professional or managerial occupations. They were of greater ethnic mix and less likely to be white and English speaking. Risk assessment criteria were agreed at the beginning of the project. The groups were similar in terms of obstetrical history and clinical risk status (Table 2).

Continuity of carer

High rates of continuity of carer were achieved in One-to-One care, exceeding Changing Childbirth targets (Table 3). Women in the study group saw fewer staff at all stages of care with a median of 16 vs 24 ($p < 0.0001$) and yet knew more of them. For example in labour, of three staff seen by One-to-One women one had been seen before, whereas in the control group, of the five staff seen in labour none had been seen before.

Labour experience

One-to-One care was associated with lower rates of several key interventions in labour (Table 4). Following an adjusted analysis controlling for the factors most likely to influence these outcomes, we drew the same conclusions. Caesarean and

Table 3 Median (iqr) number of staff seen and known to women

Time	Staff seen		Staff known	
	One-to-One	Controls	One-to-One	Controls
Antenatal	8 (6, 11)	11 (8,15)	N/A	N/A
Intrapartum	3 (2, 5)	5 (3, 7)	1 (1, 1)	0 (0, 1)
Postnatal	5 (3, 8)	8 (6, 10)	2 (1, 2)	1 (0, 2)

N/A, not applicable; iqr, inter-quartile range.

Table 4 Labour experience (numbers, with percentages given in parentheses)

Intervention/outcome	One-to-One	Controls
Induction of labour*	56 (17)	118 (24)
Continuous electronic foetal monitoring	210 (54)	364 (69)
Oxytocic augmentation	91 (24)	171 (33)
Artificial rupture of membranes	160 (46)	217 (44)
Combined spinal epidural anaesthesia	194 (52)	352 (67)
No pain relief	36 (10)	27 (5)
Assisted deliveries (forceps/ventouse)	52 (14)	100 (19)
Caesarean deliveries (elective and emergency)	71 (19)	93 (18)
Episiotomy	71 (19)	156 (30)
Intact perineum	124 (34)	132 (26)
Oxytocin in third stage	229 (73)	299 (72)

*In women not given pre-labour caesarean section.
Denominators vary as a result of numbers of non-applicable cases.

assisted delivery rates were similar: odds ratio (OR) (95 per cent confidence interval (CI)) for One-to-One vs standard care was 0.88 (0.65, 1.22). Rates of combined spinal epidural anaesthesia were significantly lower under One-to-One care: OR (95 per cent CI) = 0.59 (0.44, 0.80). Fewer One-to-One deliveries entailed episiotomy or perineal tears: OR (95 per cent CI) = 0.70 (0.50, 0.98).

Labour duration showed similar patterns in the first and third stages but median (iqr; inter-quartile range) second stage duration was marginally lower for One-to-One women (40 min (15, 85) vs 48 min (17, 102)).

Infant outcome and breastfeeding

There was no indication of poorer outcomes for babies in the One-to-One group. Apgar scores, cord pH and admissions to special care were similar in the two groups (Table 5). Breastfeeding rates were also similar (Table 6): OR (95 per cent CI) at 2 weeks was 1.3 (0.93, 1.9).

Discussion

We consider this concurrent controlled study to have been the best practicable design for evaluation. Lack of randomization limits inferences that can be drawn from the results. However, we are aware that the artificial set-up created by a randomized trial would have destroyed the geographical base of the service, a characteristic essential to its efficient running. The only alternative would have been randomization of a large number of areas, entailing co-ordination over several NHS Trusts at substantially greater expense for a service of unestablished merit.

Table 5 Infant outcome (numbers, with percentages given in parentheses)

Infant outcome	One-to-One	Controls
Apgar scores below 7 at 1 min	32 (8)	60 (11)
Apgar scores below 7 at 5 min	1 (0)	8 (1)
Admission to SCBU	18 (5)	27 (5)
cord pH < 7.05	5 (1)	17 (3)

SCBU, special care baby unit.

Table 6 Breast feeding (numbers, with percentages given in parentheses)

Women's reports of breastfeeding	One-to-One	Controls
Intending to breastfeed at 35 weeks	223 (77)	322 (80)
Full breastfeeding at 2 weeks p.n.	151 (62)	201 (59)
Full breastfeeding at 13 weeks p.n.	108 (42)	130 (39)

p.n., postnatal.

The two most likely sources of bias in a non-randomized study of this kind are differences between women in the geographical areas and differences between midwives of the two services. Even if it had been practical to randomize women between the two systems, this would not have controlled for bias that is likely to arise from the selection of midwives for the new service.

Although similar in terms of obstetric histories, the women under the One-to-One service were generally less affluent. These demographic differences may be associated with poorer health outcomes[12] and may affect intervention rates. The factors most likely to affect clinical outcomes include maternal age, parity, and indicators of socio-economic differences (ethnic group, existence of a partner, home ownership and education). These factors were controlled for in the regression analysis.

A number of differences were identified between One-to-One and conventional care through this study. One-to-One care as it is described here provides a high degree of continuity of carer throughout maternity care. In addition, the rate of some important and invasive interventions is decreased in association with this form of care. Other studies of midwifery-led and continuity-oriented models of care have indicated similar reductions in the use of analgesia and episiotomies, as well as improved satisfaction with care.[13–16]

The increases in normal delivery rate reported in studies of continuous care in labour were not found in this study.[17] Additionally, even where the interventions were reduced significantly they remained high in comparison with other maternity services. The figures reported here were from a teaching hospital with a traditionally high rate of intervention. It may be unrealistic to expect a significant change in mode of delivery at the introductory stage of such a development.

It was hypothesized that increasing continuity of carer, by providing greater social support and consistency of advice, would support women in breastfeeding and so increase the rate.

Analysis indicates no difference in breastfeeding rates between the groups.

The midwives

The randomization of midwives was considered but was judged to be impractical owing to the radical change required in the job description. Although the demographic characteristics indicate this was a fairly representative group it is impossible to say with certainty that midwives who apply to practice in an innovation do not differ in important ways from those who do not. Midwives volunteering for the One-to-One model of care may well have been more enthusiastic and more highly motivated. What did stand out from later interviews with them was their degree of dissatisfaction with the conventional way of practice; in general, there was a feeling that they would have left the profession if this opportunity had not occurred. Midwives who practised in the One-to-One system expressed intense satisfaction. However, we cannot say that all midwives would want to practice in this way; it is likely that some midwives, and midwives in particular circumstances, may not.

Only with the extension and evaluation of One-to-One midwifery over time, with the likelihood that midwives recruited to continuing services will be more typical, can definitive answers be given as to whether the observed benefits were due to the system or the quality of carers. However, it cannot be assumed that the two factors, the system and quality of care, are separable.[17]

Although anxiety has been expressed that midwives practising in One-to-One midwifery practice may be prone to 'burn out' evidence of this did not emerge in what were very candid interviews with midwives. It may be that burn-out is more likely to occur when midwives enter a scheme to provide better continuity and improved professional autonomy, and find that this does not happen, even when they take an 'on call' commitment, as has happened with a number of team developments. One-to-One was set up with particular attention to giving midwives flexibility in their work patterns, professional autonomy including control over their work and work patterns, and a system of good support. The high degree of continuity achieved enabled the midwives to develop meaningful relationships with women. These are all factors that Sandall has identified as being necessary in sustaining such a style of practice.[7]

Conclusions

This study confirms that One-to-One midwifery practice can provide a high degree of continuity of carer, and is associated with a reduction in the rate of a number of interventions, without compromising safety of care. It should be extended locally and replicated in other services under continuing evaluation.

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