

Preferences for mode of delivery after previous caesarean section: what do women want, what do they get and how do they value outcomes?

Clare L. Emmett BSc MSc PhD,* Alan A. Montgomery BSc MSc PhD* and Deirdre J. Murphy MD MRCOG† On behalf of the DiAMOND Study Group

*Academic Unit of Primary Health Care, University of Bristol, Bristol and †Academic Department of Obstetrics and Gynaecology, Trinity College, University of Dublin, Dublin, UK

Correspondence

Dr Clare Emmett
Academic Unit of Primary Health Care
University of Bristol
25–27 Belgrave Road
Clifton
BS8 2AA
UK
E-mail:Clare.emmett@bristol.ac.uk

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Abstract

Background Women with one previous caesarean section must decide which mode of delivery they would prefer in their next pregnancy. This involves a choice between attempted vaginal birth and elective caesarean section.

Objective To explore women's mode of delivery preferences and the values placed on the outcomes of decision making. Greater insight into these issues could benefit both clinical care and future research.

Design Observational study using longitudinal data collected within a randomized controlled trial.

Setting and Participants Seven hundred and forty-two women with one previous caesarean section recruited at four antenatal clinics in South West England and Scotland.

Main outcome measures Mode of delivery preference recorded at 19 and 37 weeks' gestation and visual analogue scale ratings of health and delivery outcomes.

Results Comparison of mid and late pregnancy preferences and actual mode of delivery shows that 57% of women hold the same mode of delivery preferences at both times and 65% of women actually have the birth they prefer. The visual analogue scale ratings show variation in the way women value the outcomes of the decision.

Discussion and Conclusions Understanding the way women's mode of delivery preferences change, how these relate to actual mode of delivery and how women value the outcomes of their decision will be beneficial to health professionals who wish to support women both during pregnancy and after birth. In addition, the visual analogue scale ratings provide evidence that may improve the development of population-level and economic models of decision making.

Background

The decision about mode of delivery after one previous caesarean section (CS) is considered preference sensitive, that is, a decision where the 'best' course of action is uncertain and a trade off of harms and benefits is required. For most pregnant women with one previous CS, this involves consideration of their preference between attempted vaginal birth after caesarean (VBAC) or elective repeat CS. A number of previous studies have explored women's reasons for preferring VBAC or elective CS.¹⁻⁴ Several qualitative studies have also highlighted the variability in levels of certainty across women making this decision. Some women were found to experience high levels of uncertainty and change their preference frequently during pregnancy.^{2,3,5,6} However, quantitative data showing the extent to which women change their preference are currently lacking.

Unlike many other health-related treatment decisions, considerable uncertainty remains about the outcome of the decision even amongst women who hold strong preferences about mode of delivery. Health complications, early labour, overdue pregnancy or difficulties during labour may result in delivery not proceeding as planned. It has been reported that 24–28% of women who attempt VBAC are unsuccessful and up to 10% of women planning an elective CS go into labour prior to their pre-booked CS date.⁷ To calculate these figures, mode of delivery after previous CS is conceptualized in two categories; elective repeat CS and attempted VBAC, with the latter category including women achieving a vaginal delivery and those having an emergency CS. This simple categorization may be sufficient for epidemiological research, but it does not capture the more complex relationship between preferred and actual mode of delivery from the woman's perspective. Greater understanding of this is likely to benefit clinicians' ability to support women both before and after delivery.

There is currently a lack of data concerning the value women place on the outcomes of decisions about mode of delivery after previous

CS. This information would be particularly beneficial to attempts to model decisions about mode of delivery at a population level. Previous studies modelling this decision have either omitted preference data,⁸⁻¹⁰ or used expert-generated estimates.¹¹ The need for further research to establish health-state utilities to facilitate robust economic modelling in this area was highlighted in the UK Royal College of Obstetricians and Gynaecologists guidelines on Birth after Previous Caesarean Birth.⁷

We conducted a randomized controlled trial (RCT) of two computer-based decision aids compared with usual care which aimed to assist women with previous CS with decision making about mode of delivery in their next pregnancy. One decision aid provided descriptive information about the risks and benefits of the available delivery choices, along with presentation of the probabilities of the possible health complications. The second decision aid included a formal decision analysis along with the information.^{12,13} During the RCT, we collected information about women's mode of delivery preferences during pregnancy, their actual mode of delivery and the values they placed on health and delivery outcomes. These data can be used to explore a number of research questions which have received limited attention in the existing literature. In particular, we aimed to investigate the extent to which women change their preferences during pregnancy, the extent to which women actually have the delivery they prefer, and the magnitude and variability of the values women place on the outcomes of their decision.

Methods

Participants

The sample comprised 742 pregnant women with one previous lower segment caesarean section. Women of all parities were included, but their most recent delivery must have been a caesarean section. Women with limited ability to speak or understand English were excluded.

Recruitment setting and procedures

Recruitment took place between May 2004 and January 2006 in three maternity units in South West England and one unit in Scotland. The overall caesarean section rates in these units in 2005/2006 were between 23 and 26%. Women were recruited to the study by a research midwife during their initial booking visit at the antenatal clinic, usually between 10 and 20 weeks' gestation. Ethical approval for the study was granted by the South West Multi-Centre Research Ethics Committee.

Design

This paper presents longitudinal observational data collected during an RCT. In the RCT, women were randomized to receive either usual care, the Information Program decision aid in addition to usual care, or the Decision Analysis Program decision aid in addition to usual care. The protocol for the delivery of the decision aids and a more detailed description of their content are published elsewhere.^{12,14}

Data collection

Table 1 provides a summary of the data collected. Self-reported outcome measures for the study were collected using postal questionnaires. Questionnaires were completed immediately prior to randomization (baseline) and at 37 weeks' of pregnancy. Delivery preference was assessed by asking the woman to indicate which method of delivery she was planning from the following options:

1. Attempt trial of labour (vaginal birth);
2. Planned caesarean section;
3. I am not sure.

Visual analogue scale ratings for health and delivery outcomes were collected from women randomized to the Decision Analysis Program group only. The rating scales were incorporated into the Decision Analysis Program which women in this group completed as part of the study. A researcher visited the women within 2 weeks of randomization, bringing a laptop on which the programme was accessed. Two rating scales were used; on the first, nine maternal and five infant health outcomes were considered including perfect health and death; on the second, four combinations of planned and actual modes of delivery were rated. The participant was asked to rate each outcome on the scale between 0 and 100, where 0 indicated their worst possible outcome and 100 indicated their best possible outcome. Actual mode of delivery data were collected from electronic records at participating hospitals within a few weeks of the birth.

Statistical analysis

Appropriate descriptive statistics, *n* and %, mean and standard deviation (SD) or median and range, were used to quantify mode of delivery preferences, association between preferred and actual delivery, and visual analogue scale ratings of health and delivery outcomes. Multivariate regression models were used to test differences between the groups in the RCT and *t*-test or chi-squared were used, as appropriate, to explore differences in baseline characteristics between women providing or not providing follow-up data.

Table 1 Summary of data collection

Data collected	Timing of collection	Source
Mode of delivery preference	Baseline (approx. 19 weeks of pregnancy) and 37 weeks of pregnancy	Self-reported postal questionnaire
Visual analogue ratings	During use of Decision Analysis Program (within 2 weeks of baseline)	Self-reported (Decision Analysis group only)
Actual mode of delivery	Within a few weeks of birth	Hospital records

Results

The mean age of the 742 participating women was 32.6 (SD 4.7) years. The study included women with a spread of self-reported annual household income and educational attainment. One fifth of women reported a household income of less than the £20 000/year. Two fifths of women reported GCSE (or equivalent) as their highest educational attainment, just under one-fifth reported A-level as their highest and two-fifths reported education to degree level or above. A small proportion of women (4.0%) reported having no formal qualifications of any type. Ninety percentage women were parity one at trial entry and therefore their only personal experience of childbirth was by caesarean section. The mean length of gestation at baseline was 19.0 (SD = 4.4) weeks. Preference data were available for 742 and 603 participants at baseline and 37 weeks' gestation, respectively. The mean time between these measurements was 19.2 weeks. Comparison of the baseline characteristics of the 603 who provided 37 week preference data with the 139 who did not, showed that those not providing follow-up data were younger and had a higher deprivation score. However, there was no evidence of any difference in mode of delivery preference at baseline ($P = 0.21$).

Randomization was stratified by baseline preference; therefore, the proportions holding each preference at baseline were very similar in each of the three randomized groups. There was no evidence that changes in preferences between baseline and 37 weeks varied among the three intervention groups ($P = 0.99$). Therefore, analyses of preference data reported in this paper are for the cohort as a whole. Mode of delivery data were obtained for 713 participants. Visual analogue scale ratings were available for 241 of the 245 women randomized to the Decision Analysis Program group.

Mode of delivery preference during pregnancy

Table 2 shows the preferences held by women at baseline and at 37 weeks' gestation. At both time

Table 2 Preferred mode of delivery at baseline and 37 weeks' gestation

	Preferred mode of delivery, <i>n</i> (%)		
	Attempted VBAC	Elective CS	Unsure
Baseline (~19 weeks) (<i>n</i> = 742)	334 (45.0)	155 (20.9)	253 (34.1)
37 weeks' gestation (<i>n</i> = 603)	344 (57.1)	240 (39.8)	19 (3.1)

Table 3 Congruence between preferences at baseline and 37 weeks' gestation

Congruence between baseline and 37 weeks' gestation	Number of women (%) (<i>n</i> = 603)
Same preference at both times	343 (56.9)
Changed from unsure to a preference	192 (31.8)
Changed from one preference to the other	49 (8.1)
Changed from a preference to unsure	14 (2.3)
Unsure at both times	5 (0.8)

points, a majority of women stated a preference for attempted VBAC. The greatest overall change between the time points was from being unsure, to stating a preference. This is unsurprising since at 37 weeks' gestation, the baby's birth is imminent and therefore a decision must be made. Table 3 shows the extent to which women's preferences changed between baseline and 37 weeks' gestation. The majority of women held the same preference at both times. Amongst the 49 women who changed their preference at 37 weeks' gestation, most (76%) had changed their preference from attempted VBAC to elective CS.

Preferred and actual mode of delivery

Overall, 332 (47%) women had an elective CS delivery, 230 (32%) had a successful VBAC and 151 (21%) had an emergency CS. Table 4 shows mode of delivery preference at 37 weeks' gestation and actual mode of delivery. A higher proportion of the women who preferred elective CS had a delivery consistent with their prefer-

Table 4 Relationship between mode of delivery preference at 37 weeks' gestation and actual mode of delivery*

Preference at 37 weeks' gestation	Actual mode of delivery	Number of women (%)
Elective CS (<i>n</i> = 239)	Elective CS	205 (85.8)
	VBAC	13 (5.4)
	Emergency CS	21 (8.8)
VBAC (<i>n</i> = 343)	VBAC	176 (51.3)
	Emergency CS	95 (27.7)
	Elective CS	72 (21.0)

*Does not include women for whom preference data at 37 weeks gestation are missing or women unsure at 37 weeks' gestation.

ence compared with women who preferred VBAC (86% vs. 51%). Overall, 65% of women had the mode of delivery that they preferred shortly before their due date.

Ratings of health and delivery outcomes

Ratings of health and delivery outcomes were obtained from women in the Decision Analysis Program group using two visual analogue scales. Table 5 shows the median and mean ratings for the health complications. Aside from maternal and infant death, we observed notable between-participant variation in the ratings of specific complications, indicating the personal nature of the value that women placed on avoidance of such outcomes. Table 6 shows the

Table 5 Visual analogue scale ratings of maternal and infant health outcomes*

Health Complication	Median (range)	Mean (SD)
Death of baby	0 (0–10)	0.2 (1.1)
Death of mother	0 (0–10)	0.2 (1.2)
Infant brain injury	6 (0–92)	9.6 (13.3)
Blood clots	16 (0–91)	22.6 (19.0)
Surgical damage	20 (0–81)	24.5 (16.7)
Baby in poor condition	20 (0–89)	25.4 (19.7)
Hysterectomy	20 (0–95)	26.2 (21.7)
Haemorrhage	21 (0–88)	26.8 (20.7)
Baby breathing difficulties	25 (0–91)	29.1 (20.2)
Severe perineal damage	25 (1–80)	29.2 (17.4)
Incontinence	35 (0–92)	37.2 (20.6)
Infection	50 (5–97)	51.8 (21.6)

*Ratings on a scale between 0 and 100, where 0 indicates a woman's worst possible outcome and 100 indicates her best possible outcome.

Table 6 Visual analogue scale ratings for combinations of planned and actual delivery*

Planned and Actual Delivery	Median (range)	Mean (SD)
Planned VBAC, Actual VBAC	100 (0–100)	87.6 (23.2)
Planned CS, Actual Elective CS	85 (0–100)	78.2 (23.8)
Planned CS, Actual Emergency CS	50 (0–100)	48.5 (25.8)
Planned VBAC, Actual Emergency CS	50 (0–100)	47.4 (29.9)

*Ratings on a scale between 0 and 100, where 0 indicates a woman's worst possible outcome and 100 indicates her best possible outcome.

median and mean ratings for the delivery outcomes. Emergency CS was rated as the worst delivery outcome, regardless of the planned mode of delivery. These data also show between-participant variation.

Discussion

Data collected during a randomized controlled trial of two computer-based decision aids for women with a previous caesarean show that the majority of women had already formed a mode of delivery preference by mid-way through their pregnancy and most held the same preference shortly before they gave birth. However, a substantial minority (11%) were found to either change their mind during pregnancy or were unsure at 37 weeks' gestation. Overall, 65% of women achieved the mode of delivery they preferred at 37 weeks. Women preferring elective CS were more likely to have a delivery consistent with their preference than women preferring VBAC. The values women place on health outcomes for mother and baby and on different scenarios of planned and actual mode of delivery were found to vary between individuals.

Comparison with existing literature

The proportions of women holding each preference mid-way through their pregnancy was similar to the preferences stated by women in a previous study who were surveyed 6 months after their first CS.¹⁵ When looking at how mid-

pregnancy preference compares with those stated close to the end of pregnancy, our data reveal high levels of consistency. However, more than one in ten women were found to change their preference or reported being unsure. Healthcare professionals need to be sensitive to the needs of this group of women. In particular, they should not assume that preferences held early in pregnancy will necessarily reflect a woman's final choice. A previous qualitative study found evidence that clinicians may be making this assumption.⁵

Previous epidemiological evidence suggests upwards of 70% of women attempting VBAC and 90% of women planning elective CS, actually have the delivery they planned.⁷ Amongst women in our study, 62% of women attempting VBAC had a successful vaginal delivery and 89% of those planning an elective CS had the delivery they planned. However, it can be argued that these figures do not capture the more complex picture when looking from a woman's perspective. For example, they assume that every woman who has an elective CS has planned to have one. Whilst in one sense this is true, the experience of a woman who has a preference for elective CS and has one at 39 weeks' gestation is different from that of the woman who has a preference for VBAC, but resorts to an elective CS at 41 weeks' gestation because she is yet to go into labour and is unsuitable for induction. Although the delivery outcome is the same, the decision-making process involved and the psychological impact are likely to be different in each case. Furthermore, a woman who planned an elective CS, goes into labour spontaneously, attends hospital and immediately requests an 'emergency' CS, may be classified as an unsuccessful attempted VBAC, even though she had no intention of attempting to deliver vaginally. Looking at the comparison between preference at 37 weeks' gestation and actual delivery, our data would therefore suggest that when taking a woman's perspective, mode of delivery success rates are reduced with 51% of women who wanted a VBAC, actually having one, and 86% who wanted an elective CS, actually having one. This is important given the

negative impact that emergency intervention during delivery has been shown to have on fear of childbirth, plans for future pregnancies and acute trauma symptoms.^{16,17} These issues should be discussed with women during the decision-making process in order that they can form preferences that are fully informed.

Our study makes available, for the first time, directly measured 'utilities' to demonstrate the value women place on the outcomes of the decision about mode of delivery after previous CS. The data, collected using visual analogue scales, show that there is variation in the way in which women value the outcomes of their decision. It is important that clinicians take this variation into account to support women to make decisions that are right for them as individuals. In addition, the visual analogue scale data may be of use to researchers who aim to model decision making at a population level. In a previous study, Chuang and colleagues included expert estimated utilities in their model and found that the outcome was sensitive to variation in the value placed on successful and unsuccessful vaginal delivery.¹¹ In their model, the disutility associated with unsuccessful vaginal delivery was estimated at 0.15; however, our data suggest that women may assign higher levels of disutility to a delivery that does not proceed as planned.

Future research should aim at exploring the reasons for women's changes in preference, whether the values women place on maternal and infant health outcomes predict actual birth choice, and how incorporating more realistic measures of disutility associated with outcomes alters the predictions of population level decision models.

Strengths and limitations

The strength of our study is that it provides a source of prospective data, collected from a large sample of women with previous CS, which has allowed us to address a number of previously unexplored research questions. The trial achieved adequate levels of recruitment and retention. However, we acknowledge that those

from lower educational attainment or ethnic minority backgrounds are likely to be under-represented in our sample. In addition, questionnaire follow-up at 37 weeks' gestation was missing for 19% of women, and these women were found to be younger and have higher deprivation scores. Just under half of the missing data were due to women delivering prior to 37 weeks' gestation or withdrawing from the study. Furthermore, ensuring the completion of questionnaires within the short timeframe before the baby was born, and in circumstances where research was unlikely to be a priority, was challenging.

The information we collected about the values women place on the outcomes of their decision is both unique and potentially useful; however, it should be noted that the use of visual analogue scales to collect 'utility' information has a number of limitations. These include evidence of biases such as context bias, where the rating given to a health state depends on the number of better and worse states presented at the same time, and end-aversion bias, where respondents are reluctant to rate items at the extremes of the scale.^{18,19} Furthermore, ratings gathered using this method have been found to vary from utilities elicited using theoretically superior methods such as standard gamble or time trade off. We acknowledge that a small number of individuals gave unexpectedly high ratings for adverse health outcomes. Whilst it is likely that these ratings reflect either lack of understanding or lack of engagement with the task or confusion about the direction of the scale, we considered it inappropriate to exclude outliers as this would require imposing arbitrary thresholds outside of which ratings would be considered to be incorrect. We also acknowledge that use of a 0–100 point scale may increase variability in ratings compared with a shorter scale (such as 0–10), but a wider scale provides greater flexibility for participants to express the different values they hold for the variety of health outcomes being rated. Notwithstanding these issues, we regarded the visual analogue scale method as the most appropriate and pragmatic way to elicit values, primarily because of the large number of out-

comes to be valued, as well as benefits in ease of self-administration.¹⁹

Conclusions and implications for practice

A majority of women with previous CS were found to hold consistent preferences for mode of delivery at the mid-point and close to the end of their pregnancy. In addition, the majority of women also had the delivery they planned. Nonetheless, the needs of the substantial minority of women who either changed their preference or were unsure, and those who were unable to deliver in the way they preferred should not be overlooked by clinicians. The findings of this study also highlighted the variability in value women place on the different outcomes of their decisions. Taken together, our findings support the NICE Guideline recommendation that decision making about mode of delivery after previous caesarean section should consider each individual woman's preferences and priorities.²⁰ This could be achieved by ensuring that women have access to information about the risks and benefits of different delivery options, for example, by using decision aids, and by providing sufficient opportunities within consultations for women to ask questions and express their fears and concerns about possible outcomes. Furthermore, models of service delivery must take account of changes in preference. Access to care later in pregnancy should not be limited by preferences expressed at an earlier stage. Women should feel that they have time to reflect on their options and be provided with opportunities to review decision making with their obstetrician later in pregnancy if they wish. Finally, due to the uncertainties inherent in giving birth, clinicians must strike a balance between supporting women to develop and express preferences, and managing their expectations about the likelihood of their preference being fulfilled in the end. Skilfully managing women's expectations is likely to minimize the feelings of distress or disappointment, which can often follow for women who do not achieve the delivery they planned, thus improving women's experience of the healthcare they receive.

Conflicts of interest

None.

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