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Relationship between prenatal infant feeding intention and initiation and duration of breastfeeding: a cohort study

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Aim: To report the relationship between maternal prenatal intention to breastfeed and the actual initiation and duration of breastfeeding. *Methods:* Pregnant women resident within Avon, UK, expected to give birth between 1 April 1991 and 31 December 1992 were recruited in a longitudinal cohort study. Main outcome measures included maternal infant feeding intention (breastfeed, breast and bottle feed, bottle feed, or uncertain) at 32 wk of pregnancy; intention in the first week, intention for the rest of the first month and intention in months 2 to 4; initiation and duration of breastfeeding up to six months. *Results:* Data were available on 10548 women. Prenatal intention to breastfeed had an influence on both initiation and duration of breastfeeding. Of the women intending to bottle feed from birth, only 3.4% initiated breastfeeding compared with 96.6% of women planning to breastfeed for at least four months. At six months postpartum, the mean duration of breastfeeding for women intending to breastfeed for at least five months was 4.4 mo (95% CI 4.3, 4.4), compared with 2.5 mo (95% CI 2.4, 2.6) for women with a prenatal intention to breastfeed for only one month. Logistic regression, using intended duration as the only explanatory variable, correctly predicted 91.4% of breastfeeding initiation and 72.2% of infant feeding at six months.

Conclusions: This large population-based study confirms the strength of the relationship between maternal prenatal intention to breastfeed and both breastfeeding initiation and duration. Maternal intention was a stronger predictor than the standard demographic factors combined. This should be taken into account in future research, and trials should be undertaken to establish whether interventions could alter maternal intention and thereby increase rates of breastfeeding initiation and duration.

Key words: *Breastfeeding duration, breastfeeding initiation, infant feeding intention, population-based cohort study*

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As the method of infant feeding has short- and long-term health implications for both infant and mother, the aim of public health policies is to increase rates of breastfeeding initiation and duration (1–3). Many women in the developed countries initiate breastfeeding but stop within the first few weeks or months (4). Recently, attention has been focused on the possibility of designing interventions to increase initiation and duration of breastfeeding (5–6).

In a relatively small number of studies the impact of maternal prenatal intention to breastfeed on the rates of breastfeeding initiation and duration (7–10) has been considered, and a relationship between the intended duration of breastfeeding and the actual duration has been suggested. However, all these studies have had a small sample size ($n < 200$) and there do not appear to be any population-based studies.

Older maternal age, higher levels of education and income, non-smoking status and the mother having been breastfed as an infant have been consistently associated with increased rates of breastfeeding initiation and duration in a range of developed countries (11). Less commonly recognized factors such as body image (12) and maternal obesity may also be related to lower rates of breastfeeding initiation and duration (13).

However, since it is known that infant feeding intention is related to the same variables as breastfeeding initiation and duration (12), it may be that these variables act through their effect on intention, rather than directly. Thus, planning for infant feeding may be of more significance than previously realized. If this is the case, it is important to measure the strength of the association between infant feeding plans and actual duration, since it may be possible to intervene in order

Table 1. The 10 most common infant feeding intention patterns.

Intended infant feeding method				
1st wk	Rest of 1st mo	Next 3 mo	Frequency	Percent
Breast only	Breast only	Breast only	4697	44.5
Bottle only	Bottle only	Bottle only	1608	15.2
Breast only	Breast only	Breast and bottle	1200	11.4
Breast only	Breast only	Uncertain	799	7.6
Uncertain	Uncertain	Uncertain	361	3.4
Breast only	Breast only	Bottle only	300	2.8
Breast only	Uncertain	Uncertain	283	2.7
Breast only	Breast and bottle	Breast and bottle	256	2.4
Breast only	Breast and bottle	Bottle only	138	1.3
Breast only	Bottle only	Bottle only	131	1.2

to alter intention either in pre-pregnancy or during the pregnancy.

This paper reports on the relationship between maternal prenatal intention to breastfeed and the actual initiation and duration of breastfeeding in a large population-based cohort study in the UK, The Avon Longitudinal Study of Parents and Childhood (ALSPAC).

Method

Sample

ALSPAC, previously known as Avon Longitudinal Study of Pregnancy and Childhood, recruited over 14000 pregnant women living in the three Bristol-based health districts of Avon who were expected to give birth between 1 April 1991 and 31 December 1992. This was an estimated 85% of the eligible population. Approval for the study was obtained from the Ethics Committees of the three health districts covering the study area and the ALSPAC Ethics and Law Sub-Committee. Further details of the study aims and design are available through the Internet (http://www.ich.bris.ac.uk/ALSPACext/Default.html).

The sample for this study consisted of the 10 548 women who completed at least one of the three questions on breastfeeding intention, and also completed the question on infant feeding at six months postpartum. From the original sample of 13 999 women, 3451 were excluded because of missing data. Thus, the study sample corresponds to 75.3% of the original sample.

Variables

Infant feeding intention was recorded in a questionnaire administered at 32 wk of pregnancy. The questionnaire was divided into three parts: intention for the first week, intention for the rest of the first month and intention in months 2 to 4. For each time period, there were four possible responses: breastfeed, breast and bottle, bottle feed, or uncertain.

There were 55 different patterns of responses from those respondents who answered at least one of the three questions. The 10 most common patterns, accounting for 92.7% of the sample, are presented in Table 1.

Intended duration of breastfeeding was defined as follows: (i) at least 4 mo; (ii) between 2 and 4 mo—intention to breast and bottle feed in months 2 to 4; (iii) one month—intention to breastfeed in the first month, no breastfeeding intention for months 2 to 4; (iv) between 1 and 4 wk—intention to breast and bottle feed in the first month, no breastfeeding intention for months 2 to 4; (v) one week—intention to breastfeed in the first week, no subsequent breastfeeding intention; (vi) less than one week—intention to breast and bottle feed in the first week, no subsequent breastfeeding intention; (vii) bottle feeding from birth.

Breastfeeding initiation and duration were defined using the answers recorded in the six months postpartum questionnaire. Mothers were asked whether the infant had ever been breastfed, and, if so, the age of the baby when breastfeeding was stopped, in months and weeks. Thus, only total duration of breastfeeding (up to six months) was measured, not the degree of exclusivity of breastfeeding.

Analysis

The relationship between intended duration of breastfeeding and actual breastfeeding duration was investigated using Kaplan–Meier survival curves. The log-rank test was used to assess whether there was a significant difference between survival curves of mothers with different intended breastfeeding durations. Logistic regressions were used to investigate the extent to which intended breastfeeding duration correctly predicted breastfeeding initiation and breastfeeding at six months. Data were analysed using the SPSS program.

Results

Of the original sample number, 24.7% of mothers were excluded because of missing data. A relationship was found between intention to breastfeed and missing data

Table 2. Initiation and duration of breastfeeding at six months postpartum by prenatal breastfeeding intention.

Intended duration of breastfeeding	No. in sample	Initiated breastfeeding (%)	Mean duration of breastfeeding in months (95% CI) Total sample	Excluding never breastfed
At least 4 mo	4764	96.6	4.4 (4.3, 4.4)	4.5 (4.5, 4.6)
Between 2 and 4 mo	1577	93.3	3.1 (3.0, 3.2)	3.3 (3.2, 3.4)
1 mo	1204	90.6	2.5 (2.4, 2.6)	2.7 (2.6, 2.9)
Between 1 and 4 wk	288	74.7	1.5 (1.3, 1.7)	2.0 (1.7, 2.2)
1 wk	487	69.8	1.5 (1.3, 1.7)	2.2 (1.9, 2.4)
Less than 1 wk	40	25.0	0.6 (0.1, 1.1)	2.5 (1.1, 3.9)
Bottle feeding from birth	1608	3.4	0.1 (0.0, 0.1)	1.9 (1.3, 2.4)
Uncertain for first week or first month, bottle feeding thereafter	213	23.9	0.4 (0.3, 0.6)	1.9 (1.3, 2.4)
No bottle or breastfeeding plan (i.e. uncertain or missing at all three periods)	367	51.0	1.2 (1.0, 1.4)	2.4 (2.0, 2.7)
Total	10 548	76.0	2.9 (2.8, 2.9)	3.8 (3.7, 3.8)

Mean breastfeeding durations are less than actual because of truncation at 6 mo.

on feeding method at six months postpartum, with the stronger the mother's commitment to breastfeed, the less the likelihood of data going missing. Those who intended completely to bottle feed were more likely to have missing data at six months (21.9%) than those who intended to breastfeed fully or partially for four months (8.6%). Compared with those who answered the breastfeeding questions at six months, mothers for whom data were missing were on average younger, and had a lower level of formal education.

The proportion of women initiating breastfeeding and mean duration of breastfeeding, stratified by prenatal breastfeeding intention, is presented in Table 2. There was a strong positive relationship between rates of breastfeeding initiation and intended duration of breastfeeding, with 96.6% of women who intended to breastfeed for at least four months initiating breastfeeding, compared with 3.4% of women who intended to bottle feed from birth. A strong positive relationship between intended duration of breastfeeding and the mean duration of breastfeeding at six months postpartum was also reported. It should be noted that the actual mean duration of breastfeeding is somewhat higher than the results shown in Table 2 because the results in the Table have been truncated at six months. Of those mothers with an intention to breastfeed, 66% attained at least their intended duration of breastfeeding.

Initiation and duration of breastfeeding over the first six months according to mother's infant feeding intention are presented in Fig. 1. This graph illustrates that prenatal breastfeeding intention clearly influenced both initiation and duration of breastfeeding. Of those women who intended to breastfeed for at least 4 mo, 55.3% (95% CI 53.9, 56.7) were still breastfeeding at 6 mo, compared with 26.4% (95% CI 24.3, 28.6) of women who intended to breastfeed for 2 to 4 mo, 20.2% (95% CI 17.9, 22.4) of women who intended to breastfeed for one month, and less than 1% of women who intended to bottle feed only.

Kaplan–Meier survival curves of breastfeeding duration (not shown) were estimated for intention to breastfeed for at least 4 mo, 2–4 mo, 1 mo and <1 mo. These were all significantly different from each other (log-rank test, $p < 0.005$), indicating that for those women who initiated breastfeeding, the longer the intention to breastfeed the less likely it was for the mother to stop breastfeeding at any point in the first six months.

In Fig. 2 it is shown that for mothers who intended to breastfeed for one month, those with a firm intention to bottle feed in months 2 to 4 had lower rates of initiation and duration of breastfeeding than those who were uncertain about how they would feed the baby in months 2 to 4. Thus, an intention to bottle feed at a later time affects both breastfeeding initiation and duration.

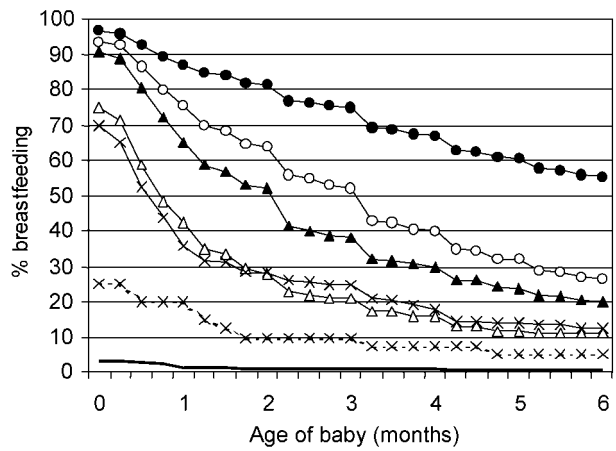

Fig. 1. Percent of infants receiving breast milk during the first six months, according to mother's prenatal infant feeding intention. Infant feeding intention: —●—breast ≥4 mo; —○— breast 2–4 mo; —▲— breast 1 mo; —△— breast <1 mo; —×— breast 1 wk; –×– breast <1 wk; —— bottle only.

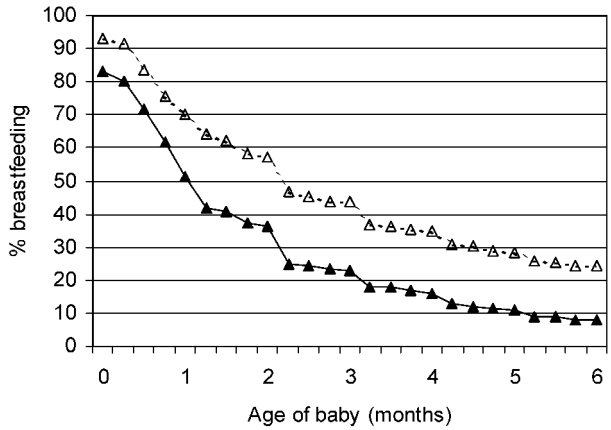

Fig. 2. Initiation and duration of breastfeeding: mothers who intended to breastfeed for one month only. –△– BrU; —▲— BrBo. BrU: Intended to breastfeed for one month, uncertain about months 2 to 4. BrBo: Intended to breastfeed for one month, intended to bottle feed in months 2 to 4.

Similar results were found for those who intended to breastfeed only in the first week. (Table available from the authors).

Two separate logistic regressions were performed using the intended duration variable as the explanatory variable. First, breastfeeding initiation was examined; for initiation (the dependent variable), the percentage correctly predicted was 91.4 (76.2% of non-initiators and 96.2% of initiators correctly predicted). In comparison, using the same data set, Noble and the ALSPAC team predicted breastfeeding initiation using the expected timing of return to paid work and other relevant demographic variables such as education, age, and smoking (14). They found a lower rate of 78.6% correct prediction of breastfeeding initiation (14).

Secondly, using logistic regression to predict breastfeeding duration, with breastfeeding at 6 mo as the dependent variable, the percentage correctly predicted is 72.2 (70% of not feeding at 6 mo and 76.5% of feeding at 6 mo correctly predicted).

Discussion

In this large population-based study we found that maternal infant feeding intention at 32 wk of pregnancy was strongly related to feeding outcomes in the first six months of life. The degree of prenatal "commitment" to breastfeeding in the first four months has a large influence on both breastfeeding initiation and duration. Women who reported any intention to bottle feed in the first four months were likely to have a shorter duration of breastfeeding than women reporting uncertainty about feeding method.

As noted in the Results, there was a biased pattern of response to the survey questions. Women with less prenatal commitment to breastfeeding were more likely not to answer the questions on breastfeeding at six months, and these women were younger and less well-educated than women who answered the questions on breastfeeding at six months. Since younger, less well-educated women are less likely to breastfeed (11), it is probable that the breastfeeding rates of women for whom data were missing were lower than the breastfeeding rates of women in the study sample. It is therefore likely that this study underestimates the difference in breastfeeding between mothers with a strong intention to breastfeed and those with a weaker intent.

Breastfeeding was initiated by 76% of the study sample; 58% were still breastfeeding at 6 wk, and 33% at 6 mo. These rates were higher than breastfeeding rates in the UK in the year 2000, when the corresponding rates were 69%, 42% and 21%. (15) However, the proportion of women initiating breastfeeding in this study was not dissimilar to the regional breastfeeding initiation rate, as the Avon area is situated in one the regions with a higher than average initiation rate. The Southwest region and Wales were reported to have 74% of women initiating breastfeeding in 2000. (15)

The results of this study confirm the findings of previous small studies in which prenatal breastfeeding duration goal was found to be an important predictor of length of breastfeeding (7–10). Although asking women in the postpartum period about their intended duration of breastfeeding is less than ideal, in several studies it has been found that this also predicts actual duration of breastfeeding (16–18).

This study also confirms Marques et al.'s recent findings in Brazil ($n = 364$) where mothers who intended to introduce formula during the first month postpartum were more likely to start formula in this time than mothers with no plans or who planned to introduce formula later (19).

Avery et al., using the Theory of Planned Behaviour (20), present a diagram showing how demographic characteristics (such as age, education, marital status) may influence beliefs and attitudes about infant feeding, which in turn affect breastfeeding intention and finally behaviour (breastfeeding duration) (21). In a study of primiparas interviewed prior to discharge from hospital, variables postulated by the Theory of Planned Behaviour to be direct predictors of intention explained 36% of the variance in intended duration (21).

Another important aspect of infant feeding plans is the timing of this decision. Women who decide to breastfeed prior to pregnancy are likely to breastfed for a longer period than women who decide during the pregnancy (22–24). For instance, women who decided to breastfeed after becoming pregnant were almost eight times more likely to stop breastfeeding in hospital than women who had made their infant feeding decision prior to becoming pregnant (24). Furthermore, increased certainty about intention to breastfeed and

increased self-confidence in ability to breastfeed are significantly associated with length of breastfeeding (25, 26).

In conclusion, maternal infant feeding intention is a very strong indicator of breastfeeding initiation and duration. Asking women about their infant feeding plans is an efficient means of identifying women at risk of short breastfeeding duration (8). Future research into the factors influencing initiation and duration of breastfeeding must take this into account. Trials are needed to establish whether successful interventions can alter maternal intention, thereby increasing breastfeeding initiation and duration.

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