

Predictors of exclusive breastfeeding duration in a hospital without Baby Friendly Hospital Initiative accreditation: A prospective cohort study.

Aim: The aim of this study was to investigate the maternity care factors associated with exclusive breastfeeding duration at three months and six months postpartum in a setting without BFHI accreditation.

Methods: A prospective cohort design. Participants from one tertiary maternity hospital were eligible if they intended to exclusively breastfeed, had birthed a live, term baby; were breastfeeding at recruitment; were rooming-in with their baby; were healthy and well; and understood English. Participants completed an infant feeding survey using 24-hour recall questions at three time-points. Data were analysed using descriptive statistics, bivariate analysis and regression modelling.

Findings: We recruited 424 participants of whom 84% (n=355) responded to the survey at 3-months and 79% (n=335) at 6-months. Women who avoided exposure to intrapartum opioid analgesia (e.g. intramuscular, intravenous or epidural) were more likely to be exclusively breastfeeding at 3-months postpartum (adjusted odds ratio (aOR) 2.09, 95% Confidence Interval (CI) 1.15 - 3.80, probability value (p) 0.016). The only other modifiable predictor of exclusive breastfeeding at 3-months was non-exposure to artificial formula on the postnatal ward (aOR 2.44, 95% CI 1.43 - 4.18, $p < 0.001$). At 6-months postpartum, the rate of exclusive breastfeeding had reduced to 5% (n=16) which rendered regression modelling untenable.

Discussion: Strategies to decrease exposure to opioid analgesia in birth settings and the use of infant formula on the postnatal ward may improve exclusive breastfeeding at three months.

Conclusion: Results suggest that both intrapartum and postpartum maternity care practices can predict long-term breastfeeding success.

Keywords: Breastfeeding; Infant formula; Opioid analgesics; Epidural analgesia; Midwifery; Postnatal Care

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Statement of significance

Problem or issue

Exclusive breastfeeding significantly improves health outcomes for women and babies. In Australia, despite high numbers of women wanting to breastfeed and initiating breastfeeding at birth (96%) the breastfeeding rate falls dramatically by 3 months (39%) and 5 months (15%).

What is already known

Modifiable factors (maternity care in hospital) associated with exclusive breastfeeding at 5 months include skin-to-skin contact at birth, attempted first breastfeed within 60 minutes of birth, rooming-in on the postnatal ward and no exposure to artificial formula.

What this paper adds

In a cohort of healthy women modifiable maternity care factors predicting exclusive breastfeeding at three months included no intrapartum opioid analgesia and avoidance of artificial formula on the postnatal ward.

Introduction

The World Health Organization (WHO) and National Health and Medical Research Council (Australia) recommend that infants are breastfed exclusively for six months and continue to receive breastmilk for 12 months or longer.^{1,2} Exclusive breastfeeding significantly contributes to improved health outcomes for both women and babies including protection against infection and the development of chronic diseases.¹ Potentially modifiable hospital practices including exposure to obstetric intervention, artificial formula supplementation, and separation of mothers and babies at birth, all negatively impact breastfeeding duration.^{3,4} The Baby Friendly Health Initiative (BFHI) was introduced by the WHO in 1991 and involves *Ten Steps to Successful Breastfeeding* designed to improve the promotion and support provided by hospitals to breastfeeding mother-baby pairs.⁵

Literature Review

A systematic review of BFHI involving 14 countries reported an upward trend in both exclusive breastfeeding, and breastfeeding overall, following BFHI implementation.⁶ In

countries where breastfeeding initiation rates were low, the BFHI positively affected both initiation and duration rates of exclusive breastfeeding.⁷ A systematic review of breastfeeding interventions found that BFHI was likely to have a positive effect, particularly when combined with midwifery and peer support.⁸

In Australia, 96% of women initiate breastfeeding although rates fall dramatically to 39% exclusively breastfeeding (3 months) and 15% (5 months).⁹ Some suggest the evidence which supports the efficacy of BFHI in countries with low initiation rates, may not be transferable to Australia where initiation rates are high.¹⁰ Furthermore, the implementation of BFHI in Australia has been negatively affected by lack of financial or policy incentives; and an absence of any measurable strategies to assess progress towards targets.¹¹ A large survey of Australian women across four settings (one a BFHI-accredited hospital) concluded that when breastfeeding initiation rates were high and evidence-based breastfeeding practices were common, BFHI accreditation had little effect on exclusive or any breastfeeding rates.¹² However, participants who were exposed to each of the following four practices were significantly more likely to be breastfeeding at four months compared to women who did not experience all four practices: 1) skin-to-skin contact, 2) attempted first breastfeed within 60 minutes of birth, 3) rooming-in on the postnatal ward and 4) no exposure to artificial formula.¹² A 2010 literature review, reported the intrinsic factors associated with exclusive breastfeeding at six months to be, women's breastfeeding intention, breastfeeding self-efficacy and social support.¹³ The aim of this study was to investigate the extrinsic (maternity care) factors associated with breastfeeding exclusivity, and duration, at three months and six months postpartum in a setting without BFHI accreditation.

Methods

The prospective cohort design enabled the outcome of interest, exclusive breastfeeding duration, to be measured through maternal self-report at discharge, three months and six

months postpartum. Ethical approval was granted by the Health Service (1620M) and University (Q2011-42) Human Research Ethics Committees.

Setting

The setting for this study was a tertiary-level maternity facility, which conducts approximately 10,000 births annually and does not have BFHI-accreditation. Nevertheless, several of the 'ten steps' had been met at the time of the study. For instance, there was a written breastfeeding policy (Step 1), all pregnant women were informed about the benefits of breastfeeding (Step 3), and mothers were referred to breastfeeding support groups on discharge from hospital (Step 10).⁵ Both publically and privately insured childbearing women accessed the hospital birth suite and either a public or private postnatal ward following birth. The hospital provided two weeks of home-based postnatal care for all women who lived within the hospital catchment. Support for breastfeeding was also available through the breastfeeding support centre for a 'fee for service'. Recruitment occurred on the postnatal wards of the hospital during August to October, 2011. Follow-up data collection continued until May 2012 when the infants of all participants were at least six months of age.

Participants

This study used a convenience sample of new mothers who had given birth in the research setting and had transferred to the postnatal ward. Women were eligible if they: intended to exclusively breastfeed at hospital booking visit; birthed a live, term baby; were breastfeeding; were rooming-in with their baby (i.e. their baby had not been admitted to a neonatal nursery); were healthy and well; and understood English. Participants were ineligible if they: had a stillbirth or preterm birth; had a baby who had been admitted to a separate nursery; did not intend to breastfeed at booking; were medically unwell at time of recruitment; or did not speak English.

Potential participants were identified by the team leaders of each postnatal ward at the beginning of each shift. A research assistant (RA) approached eligible women with a participant information sheet then returned at the end of each shift to offer participation in the study and invite written informed consent.

Variables

The primary outcomes were:

- the proportion of women who were exclusively breastfeeding at three time-points: discharge from the postnatal ward, three months and six months postpartum; and
- predictors of exclusive breastfeeding at three months and six months postpartum.

The following demographic characteristics were analysed:

- maternal age (< 25 years, 25-34 years, ≥35 years);
- parity (nullipara, multipara);
- education status (< Year 12 / ≥ Year 12);
- ethnicity (Caucasian, Asian, Other);
- marital status (partnered / unpartnered);
- Socio Economic Index for Areas (SEIFA) quintile score (1-5);
- insurance status (public / private); and
- smoking at booking (yes / no).

The following intrapartum and postpartum characteristics were analysed:

- labour onset (spontaneous, induced, no labour);
- exposure to intrapartum opioids i.e. pethidine, morphine, regional analgesia (includes fentanyl) (yes/no);
- mode of birth (vaginal birth / caesarean section);
- skin-to-skin contact after birth (< 30 minutes duration / 30 minutes or longer); and
- infant formula given in hospital (yes / no).

Secondary outcomes included: the proportion of babies who were fully breastfed, predominantly breastfed, partially breastfed, artificially fed, or complementary fed, at the aforementioned time points (see Table 1).

Data sources and measurement

Routinely collected demographic and clinical data were extracted from the hospital's electronic database. Interviews occurred at discharge (face-to-face) and at three and six months postpartum (via telephone). The RA completed the interviews using a data collection tool (survey), which was able to be scanned to produce electronic data using Remark office software. The survey used 24-hour recall questions based on those recommended by the WHO (1991) and adapted for use in Australia.¹⁴ The survey collected information about infant feeding in the previous 24-hour period which could then be categorised according the aforementioned breastfeeding definitions. Categorical data were generated through questions which were closed with possible responses limited to yes/no or selection of a limited number of responses. At the end of each survey there was the potential for participants to provide general comments about their infant feeding experience (i.e. free text). Surveys at three months and six months included a question for respondents who were no longer breastfeeding to select which factors influenced their decision to stop; including the option to add a free text response.

Study size

The estimated sample size was based on a previous Infant Nutrition Project ¹⁵ in the same Australian State which reported a 38.0% exclusive breastfeeding rate for participants surveyed at 2-months postpartum. We required 302 participants (80% power, 95% Confidence) to detect a 38.0% exclusive breastfeeding rate +/- 8.0%. We estimated an 8.0% attrition rate at 3-months which increased the sample size to 424 participants.

Statistical methods

The factors associated with exclusive breastfeeding at 3-months postpartum were first investigated by univariate analysis. The factors included in the univariate model were: age, parity, education, ethnicity, marital status, SEIFA score, insurance status, exposure to opioids, mode of birth, and skin to skin contact and formula in postnatal ward. Smoking status at booking was not included in the univariate analysis because of the small numbers. Any variables with a p-value <0.10 in univariate analysis were included in the multivariate logistic regression models. Unadjusted odds ratios (ORs) and adjusted OR (AORs) with 95% confidence intervals (95% CI) were reported. Analysis conducted using Stata 12.0. Statistical significance for all other analyses was set at $p < 0.05$.

Results

Figure 1 shows the flow of participants through each stage of the study. Of the 480 potential participants, 88.3% were recruited and completed the survey at discharge. Response rates for the three month and six month postpartum surveys were 83.7 % and 79.0% respectively. At the three month time point, *non-responders* were significantly more likely to be: less than 25 years of age ($p=0.017$), nulliparous ($p=0.037$), with less than Grade 12 education ($p=0.049$), Asian ethnicity (0.044), without private health insurance ($p=0.001$), and smoking (0.049).

Descriptive data

Table 2 summarises the baseline characteristics of participants who were most commonly: Caucasian, aged 25-34 years, with a minimum of Year 12 education, living in areas of the least disadvantage with a partner; and who had given birth to their first baby. Compared to Australian national data from similar years, participants in this study were more likely to be nulliparous (58% vs. 44%) and to have received care from a private obstetrician (50% vs. 28%).¹⁶ Participants also experienced a lower rate of spontaneous onset of labour (49% vs. 53%) and a higher rate of caesarean section (38% vs. 33%).¹⁶ Both of these findings can be attributed to the higher rate of caesarean section performed in the private obstetric model.

Outcome data

Although 100% of participants intended to exclusively breastfeed, and 99.5% of participants (n = 422) initiated breastfeeding at birth, the rate of exclusive breastfeeding reduced considerably by the time of discharge home (see Table 3). The exclusive breastfeeding rate at 3-months remained well-above the national average (39%), most likely due to the inclusion criteria for this study. However, by 6-months the majority of babies were being fed artificial formula (53%) either on its own or in combination with some breastmilk.

Main results

Exclusive breastfeeding at three months postpartum was reported more frequently by women who were educated to Grade 12 or higher education level or had private health insurance (Table 4). After controlling for confounders ($p < 0.1$) modifiable predictors for exclusive breastfeeding at three months were: avoidance of intrapartum opioids or avoidance of artificial formula during postnatal stay. It was not possible to conduct either univariate or multivariate analysis using data from the six month survey due to the small number of women exclusively breastfeeding (n=16) at this time point.

Women's primary reasons for ceasing breastfeeding prior to the recommended six months are summarised in Table 5. The most common reason at both three and six months was perceived low supply with breastfeeding difficulties being experienced by almost a quarter of all women at both time points and painful nipples also contributing to cessation.

Discussion

Some of the steps that form the BFHI are clearly important in a setting with high breastfeeding initiation. Our results demonstrate that in a cohort of healthy mothers who intended to exclusively breastfeed and initiated exclusive breastfeeding at birth; artificial formula was given liberally to 24% of well babies on the postnatal ward prior to hospital discharge. Exposure to artificial formula is associated with a three-fold increase in breastfeeding cessation.³ Postnatal wards are busy and, at times, chaotic environments where midwives have obstacles to providing effective postnatal care.¹⁷ Barriers include inadequate staff / patient ratios and the use of non-midwives.¹⁸ It is in this setting that babies were commonly given artificial formula, instead of breastmilk, prior to hospital discharge. The participants were well mother-baby pairs with intention at birth to breastfeed and should not have required artificial formula for a medical indication. Some argue that the change to early discharge from the postnatal ward has negatively impacted on midwives motivation.¹⁹ At the same time it has decreased the time available, such that midwives feel unable to provide optimal care.²⁰ Furthermore, mothers or midwives' perception of insufficient milk supply is associated with increased formula supplementation which leads to inadequate breast stimulation and early cessation of breastfeeding.²¹ New mothers commonly request formula supplementation during the first 48 hours in response to fatigue during the night period. Midwives need effective education and communication skills, time and institutional support to encourage new mothers to manage fatigue in ways that do not compromise breastfeeding.²² The BFHI does not specifically address intrapartum factors which can predict exclusive breastfeeding. Specific strategies to protect women from exposure to opioid-based analgesia would increase the likelihood of exclusive breastfeeding at three months postpartum. Epidural analgesia and intramuscular opioid analgesia have been associated with lower rates of exclusive breastfeeding.^{23,24} There is anecdotal concern and emerging evidence that the addition of fentanyl (an opioid) to epidural analgesia, rather than epidural with local anaesthetic only, may contribute to difficulty establishing breastfeeding.^{24,25} One study has reported a dose-response relationship between fentanyl and artificial feeding with the

likelihood of artificial feeding increasing for each microgram of fentanyl administered.²⁶ This is supported by an observational study that found women exposed to epidural analgesia were more likely to have their infants given artificial formula during their hospital stay and were less likely to be fully breastfeeding at discharge.²⁷ Several observational studies have reported an association between epidural analgesia and shorter breastfeeding duration including an increased likelihood of breastfeeding cessation by six weeks²³ and six months.²⁴ High level evidence that addresses this concern is limited as a 2011 systematic review of epidural versus non-epidural or no analgesia in labour did not report on breastfeeding outcomes.²⁸ In order to increase rates of breastfeeding exclusivity at 3-months, maternity services need to create not only a 'breastfeeding culture'¹¹ but a 'normal birth culture' where every element of maternity care supports women to physiologically birth and breastfeed.

Limitations

A key limitation was the potential for response bias. Women who had risk factors for not exclusively breastfeeding (i.e. younger mothers, mothers without health insurance and those without a Grade 12 education) were more commonly non-responders at three months postpartum. The study sample was significantly different to national profile of birthing women which limited generalisability of the findings to the wider population.

Interpretation of factors which were significantly associated with exclusive breastfeeding at three months on bivariate analysis (e.g. skin-to-skin contact for greater than 30 minutes) lost significance in the multivariate analysis; which may be due to the limitation of a small sample size. Finally, the small proportion of respondents who were exclusively breastfeeding at six months was a limitation because this inhibited the ability to conduct multivariate analysis at this time point.

Conclusion

Exclusive breastfeeding at three months is significant because it predicts exclusive breastfeeding at six months in line with WHO recommendations. Two modifiable factors predicted exclusive breastfeeding at three months: 1) no intrapartum opioid analgesia and 2) avoidance of artificial formula on the postnatal ward. In settings without BFHI accreditation, investment in midwifery-led models of care²⁹ and midwifery-led birth settings³⁰ (i.e. birth centre) are associated with higher rates of no pharmacological analgesia in labour, normal birth, and exclusive breastfeeding. Additionally, health services should provide staff with the education, skills and institutional support to avoid artificial formula supplementation for well babies on the postnatal ward. The impact of these strategies in the birthing and postnatal environments on exclusive breastfeeding at three months should be explored through prospective research.

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