

A single-center study of the prevalence of breastfeeding at 6 months of previously sick neonates

Sudatip Kositamongkol, Kamolpun Muongsuwan, Sariya Prachukthum

Department of Pediatrics, Faculty of Medicine, Thammasat University, Pathum Thani, Thailand

Abstract

Background: Human milk is recognized to be excellent nutrition for neonates. However, supporting breastfeeding in these hospitalized vulnerable infants entails many challenges. Data are lacking on breastfeeding duration and associated factors for breastfeeding continuation until 6 months, especially in a low-resource setting.

Objectives: To determine the prevalence of breastfeeding for previously hospitalized neonates at least 6 months post-discharge and examine the factors associated with successful breastfeeding.

Methods and study design: This is a prospective study. Mothers were eligible if their infant(s) had been admitted to Neonatal Units within the first 7 days of life. General demographic data and maternal perception scores were collected during admission. Telephone interviews on feeding practices were conducted every 2 months until 6 months post-discharge or at discontinuation of breastfeeding.

Results: Of 87 mothers who completed follow-up, 91%, 71% and 57% were breastfeeding at 2, 4 and 6 months, respectively. The main reasons for discontinuation were maternal perceptions of insufficient milk supply and difficulty in returning to work. Mothers being the main caregivers, above-average family income and maternal perception on breastfeeding benefits and barriers were significant factors for successful breastfeeding for 6 months.

Conclusions: Strategies to encourage breastfeeding are needed for all mothers who return to work and especially for low-income families.

Keywords

Breastfeeding, breastfeeding practice, breastfeeding duration, hospitalized neonates, vulnerable infants.

Corresponding author

Sudatip Kositamongkol MD, Assistant Professor of Pediatrics, Department of Pediatrics, Faculty of Medicine, Thammasat University, Pathum Thani, Thailand; postal address: 95 Moo 8 Phahonyothin Rd, Tambon Khlong Nung, Amphoe Khlong Luang, Chang Wat Pathum Thani 10120, Thailand; telephone: 662-926-9514; facsimile: 662-926-9513; email addresses: ksudatip@staff.tu.ac.th, skositamongkol@gmail.com.

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Introduction

Human milk is widely accepted as a premium food for infants and young children because it consists of various nutrients and immunologic/growth factors. Accordingly, the World Health Organization (WHO) recommends exclusive breastfeeding for the first 6 months of life and continuation with complementary food for at least 2 years [1]. In hospitalized neonates, including preterm infants and/or infants with medical or surgical conditions, human milk has remarkable benefits both in the short and long term by protecting against the main complications of prematurity such as necrotizing enterocolitis [2], retinopathy of prematurity [3], bronchopulmonary dysplasia, sepsis, etc.; consumption of human milk is also associated with shorter hospital stays [4]. Preterm infants show higher brain volumes, better IQs, academic achievements and working memories when predominantly breastfed during the first 28 days of life [5].

Breastfeeding these vulnerable infants faces many challenges such as mother-infant separation, neonatal illness and immaturity, maternal illness, and mothers taking contraindicative medications. Breastfeeding for at least 6 months is sometimes a challenging job in healthy infants and is even more challenging in previously hospitalized neonates. Duration of breastfeeding in these

infants is usually determined by early human milk volume, type of feeding before discharge, gestational age, socioeconomic status, maternal determination to breastfeed, duration of maternity leave, etc. [6-8].

Since 2014, our hospital has been actively promoting and supporting breastfeeding for sick neonates with “Spatz’s ten steps for promoting and supporting breastfeeding for vulnerable infants” [9]. Our hospital has a systematic program for supporting breastfeeding in hospitalized neonates.

After the program launch, the proportion of infants receiving mainly human milk during their hospital stay increased from 45% to 62%, but the continuation of breastfeeding for at least 6 months remains the major goal. Therefore, our study proposed to determine breastfeeding at 6 months post-discharge from our Neonatal Unit and examine factors associated with successful breastfeeding in our setting.

Materials and methods

Design

This is a prospective study with mothers enrolled during their child’s/children’s admission. Participants were interviewed before discharge and follow-up telephone calls were done every 2 months for 6 months or until breastfeeding cessation. Our research was approved by the Human Research Ethics Committee of the Faculty of Medicine at Thammasat University in Thailand (MTU-EC-PE-6-046/58).

Setting

This study was conducted at a tertiary hospital situated in the northern Bangkok conurbation from August 2015 to July 2016. Our hospital has a 10-bed Neonatal Intensive Care Unit (NICU) and a 16-bed Sick Neonatal Care Unit. Neither Unit has a lactation specialist or a breastfeeding resource nurse. There are 400-600 infants admitted to our Sick Neonatal Unit each year. Respiratory problems and preterm delivery are the leading causes of admission. During hospitalization, breast milk feeding was systematically supported using “Spatz’s ten steps for promoting and supporting breastfeeding for vulnerable infants”. This included giving information on the benefits of breast milk feeding in hospitalized neonates to high-risk pregnant women regarding initiation and

establishment of maternal milk supply, breast milk management, oral care, skin-to-skin contact, non-nutritive sucking, transition to breast, preparation for discharge, and appropriate follow-up.

Sample

Mothers were eligible for enrollment if their infant(s) had been admitted to our Units within 7 days from birth. The exclusion criteria were mothers unwilling to breastfeed post-discharge, the presence of contraindications to breastfeeding, foreign mothers unable to understand the Thai questionnaire, and migrant workers with no contact information. Based on our internal, non-published, hospital data, the prevalence of breastfeeding for at least 6 months in healthy babies was 44%. We postulate the prevalence of breastfeeding until 6 months in previously hospitalized neonates at 25%. Thus, we estimated a sample size of at least 65 mothers for 90% power with 5% significance. After infants' admission, mothers were educated and encouraged to express milk for their infants. Mothers were suggested to begin breastfeeding as soon as infants were ready. Before infant discharge, mothers were asked to enroll in our study and written informed consent was obtained.

Data collection

Exclusive breastfeeding was defined as giving no other food or drink, not even water, except human milk to the infants; infants were allowed to receive oral rehydration salt, drops and syrups (vitamins, minerals and medicine) [10]. Mixed feeding was defined as infants who received any percentage of infant formula along with mother's own milk; we relied on self-reported accounts. Formula feeding described infants not receiving human milk. Infants were categorized into a breastfeeding group (exclusive and mixed-feeding group) and a formula group.

After enrollment, mothers were asked to complete a questionnaire divided into 2 parts. Part I was demographic data, including maternal age, gravida, gestational age, nipple problems, years of education and job status, main caregiver of infants, and family type (nuclear family or extended family). We stratified socioeconomic status as high- and low-income families by using the average income per household in Thailand (30,000 Thai baht or 960 USD/month). Part II was a specific breastfeeding questionnaire developed and tested

previously in our hospital with a content validity index of 0.8 [11]. The questionnaire had 3 domains focusing on maternal perceptions of breastfeeding benefits, barriers to successful breastfeeding, and perceptions of the mother's self-efficacy to breastfeed. Each domain was scored 1-5, 5 being the highest score.

Infant variables (birth weight and feeding type at discharge) were derived from medical records. For feeding type at discharge, we used the 24-hour milk record before discharge. If s/he received human milk > 50% of the time versus formula, s/he was classified as being in the predominantly breast milk feeding group.

After discharge, follow-up phone calls were conducted every 2 months until 6 months or the cessation of breastfeeding. The follow-up questionnaire included recall questions on the previous 24 hours of feeding and reasons for breastfeeding discontinuation if occurring.

Data analysis

Data were recorded onto a standard case record form, entered into an electronic database and analyzed using descriptive statistics: percentage and the mean and standard deviation (SD). A simple logistic regression was conducted to identify the potential contributing factors of breastfeeding continuation until 6 months. Then, multivariable logistic regression was done to identify independent factors that contribute to breastfeeding practices. Each factor was selected by theoretical framework and results from univariable analysis. Maternal perception scores were analyzed using Wilcoxon rank-sum test. Only women who had completed the telephone interview were included in the analysis.

Results

One hundred (100) mothers were enrolled, but only 87 mothers completed the telephone interviews. Mother and infant characteristics are summarized in **Tab. 1**. Half of the participants were 25 to 35 years old (49.4%), and 50 (57.5%) women had a vaginal delivery. Most of the participants (59.8%) were primigravida. There were 36 (41.3%) women who delivered before 37 weeks of gestation. For infant birth weight, 49 infants had a birth weight in the range of 2,500-4,000 grams. Forty-nine (49) were in the predominantly breast milk feeding group at discharge.

Table 1. Demographic characteristics of the participants (n = 87).

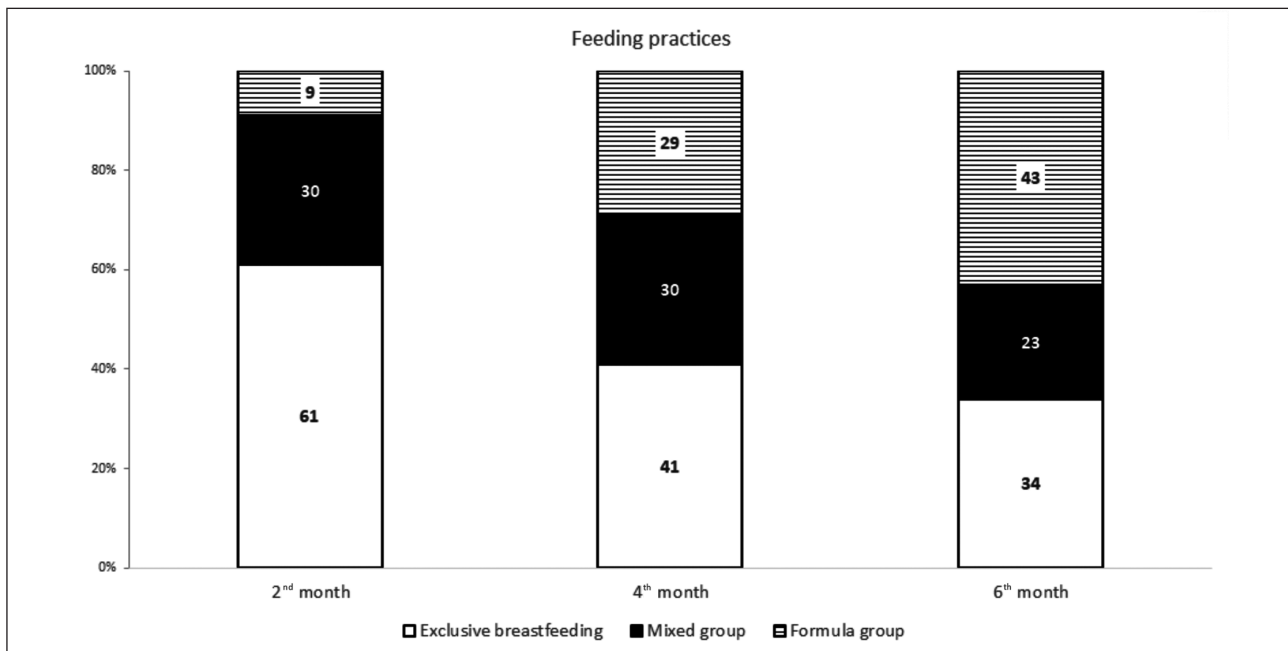
Variable		n (%)
Mother's age (years)	< 25	28 (32.1)
	25-35	43 (49.4)
	> 35	16 (18.3)
Gestational age (weeks)	< 28	2 (2.2)
	28-32 ⁺⁶	10 (11.5)
	33-36 ⁺⁶	24 (27.6)
	≥ 37	51 (58.6)
Birth weight (grams)	< 2,500	35 (40.2)
	2,500-4,000	49 (56.3)
	> 4,000	3 (3.5)
Primigravida	Yes	52 (59.8)
	No	35 (40.2)
Vaginal delivery	Yes	50 (57.5)
	No	37 (42.5)
Education (years)	≤ 9	75 (86.2)
	> 9	12 (13.8)
Family incomes	Low	59 (67.8)
	High	38 (43.7)
Nipple problems	Normal	71 (81.6)
	Abnormal	16 (18.4)
Breastfeeding experience	Yes	42 (48.3)
	No	45 (51.7)
Primary caregiver	Mother	38 (43.7)
	Others	49 (56.3)
Family type	Single	62 (71.3)
	Extended	25 (28.7)
Predominant breastfeeding at discharge (human milk > 50%)	Yes	49 (56.3)
	No	38 (32.2)

Of the 87 mothers who completed the follow-up, 91%, 71% and 57% were breastfeeding at 2, 4 and 6 months, respectively (**Fig. 1**). Sixty-one percent (61%) of mothers were exclusively breastfeeding by the 2nd month, but this rate fell to 34% at 6 months.

The reasons for breastfeeding discontinuation were insufficient milk supply (40%), return to work (41%), mothers not being the main caregiver (5%), and nipple problems (5%).

The factors associated with continuation of breastfeeding at 6 months are summarized in **Tab. 2** and **Tab. 3**. From the univariable analysis, women from high-income families were 3.10 times more likely to breastfeed for at least 6 months (OR = 3.10; 95% CI [1.15-8.40]); likewise, women who were the main caregivers of their child were 3.44 times more likely to succeed in breastfeeding until 6 months (OR = 3.44; 95% CI [1.38-8.58]). These effects were even more noticeable after adjustment for type of delivery, years of education, nipple problems, breastfeeding experience, type of family, and feeding type at discharge.

Maternal perception also played an important role in the continuation of breastfeeding. Even though all mothers received information about the benefits of breastfeeding in this vulnerable group, their perceptions varied. **Tab. 4** shows the maternal perception scores; participants who

**Figure 1.** Feeding Practices at the 2nd, 4th and 6th month.

Exclusive breastfeeding: exclusive breastfeeding was defined as giving no other food or drink, not even water, except human milk to the infants; infants were allowed to receive oral rehydration salt, drops and syrups (vitamins, minerals and medicine).

Mixed group: mixed feeding was defined as infants who received both mother's milk and infant formula.

Formula group: formula feeding described infants not receiving human milk.

Data were described in percent of total 87 mothers.

Table 2. Univariable analysis of factors associated with continuation of breastfeeding at 6 months.

Variables	Odds ratio	SE	p-value	95% CI
Cesarean section	0.87	0.38	0.747	0.37, 2.05
High-income family	3.10	1.58	0.026	1.15, 8.40
Less than 9 years of education	0.70	0.44	0.574	0.21, 2.39
Nipple problems	1.29	0.74	0.653	0.42, 3.94
Breastfeeding experience	0.97	0.42	0.952	0.42, 2.28
Mother as main caregiver	3.44	1.60	0.008	1.38, 8.58
Nuclear family	0.86	0.42	0.762	0.34, 2.22
Predominantly breastfeeding at discharge	1.42	0.62	0.422	0.60, 3.35

SE: standard error; CI: confidence interval.

Table 3. Multivariable logistic regression analysis of factors associated with continuation of breastfeeding at 6 months.

Variables	Odds ratio	SE	p-value	95% CI
Cesarean section	0.95	0.49	0.925	0.34, 2.61
High-income family	4.14	2.45	0.016	1.3, 13.20
Less than 9 years of education	0.68	0.49	0.588	0.17, 2.78
Nipple problems	0.96	0.63	0.945	0.26, 3.46
Breastfeeding experience	1.22	0.62	0.690	0.45, 3.23
Mother as main caregiver	5.65	3.25	0.003	1.82, 17.47
Single family	0.65	0.39	0.475	0.20, 2.10
Predominant breastfeeding at discharge	2.76	1.54	0.069	0.92, 8.23

SE: standard error; CI: confidence interval.

Logistic regression result: $\chi^2(8) = 17.77$, $p = 0.023$, $\text{pseudoR}^2 = 0.1497$, $\text{AuROC} = 0.7695$.

Table 4. Maternal perception scores regarding the benefits, barriers and efficacy of breastfeeding.

Maternal perception	Breastfeeding	Infant formula	p-value
Breastfeeding benefits	4.70 ± 0.29	4.52 ± 0.44	0.026
Barriers to breastfeeding	3.83 ± 0.64	3.52 ± 0.65	0.029
Self-efficacy	4.46 ± 0.40	4.29 ± 0.42	0.062

Data were described as mean (SD); Wilcoxon rank-sum test was used.

were still breastfeeding at 6 months had better perception scores regarding breastfeeding benefits and barriers ($p < 0.05$).

Discussion

In our small study, the prevalence of any form of breastfeeding at 6th month was 57% and of exclusive breastfeeding was 34%. This was better than what was reported in the Thailand Multiple Indicator Cluster Survey (MICS) 5 2015-2016: 21% of children under 6 months received exclusive breastfeeding, and 42.1% received primarily breastfeeding [12]. Of note, the proportion of infants having any type of breastfeeding is close to data from most developed countries [13, 14].

The main reasons for discontinuing breastfeeding in our study were maternal perceptions of insufficient milk supply and early return to work. In Thailand, female employees have 90 days of maternity leave, but they only receive full pay from employers for 45 days, with the social welfare fund making up the difference. As a result, some mothers with low incomes and no social welfare benefits are obliged to return to work before 90 days. This is consistent with our finding that women from households with incomes less than 30,000 Thai baht (the mean family income in Thailand) had lower breastfeeding rates at 6 months. Infants whose mothers were the main caregivers were also more likely to breastfeed at 6 months. Our results concur with previous studies that also demonstrated

a higher rate of discontinuance breastfeeding in lower-income families that do not receive social welfare support [15-17]. The World Bank has noted that Thailand has a relatively high rate of female workforce participation (45.6%) [18]; however, Thailand has no laws for encouraging or even permitting breastfeeding at work. Studies from different countries consistently found that the nature of work influenced breastfeeding duration [19-21]. Key factors for successful breastfeeding were identified, such as employment benefits, commute time, workplace environment, labor intensity, managerial and co-worker support [21, 22]. While strategies to improve breastfeeding compliance must necessarily target lower-income working women, all women would likely benefit from any legislation to support breastfeeding and/or pumping in the workplace.

A previous study had shown the benefit of prenatal consultation on the length of breastfeeding [23], but we did not find this association; rather, important factors were the mother's perceptions of benefits of and barriers to breastfeeding. Maternal perceptions of breastfeeding and its challenges varied between mothers. Therefore, healthcare providers should assess maternal understanding and perception of breastfeeding in sick babies to provide optimal counseling.

We did not find any other associated factors for breastfeeding practices. By contrast, earlier research stated the length of hospital stay and the age at which complementary feeding was started affected breastfeeding practices in post-NICU babies [14]. As our study was in a single-center situated in the conurbation of Bangkok, surrounded by many industrial estates, our results may not be applicable to other areas with different cultures and socioeconomic status.

Conclusion

We identified important factors to explain why mothers do not continue to breastfeed their previously sick infants for up to 6 months in Thailand, a middle-income Southeast Asian country. Although there was no consultation with a breastfeeding nurse/lactation specialist, 57% of women were breastfeeding at 6 months, exclusively or mixed with formula feeding; this was a surprisingly good outcome for our center. We found mothers being the main caregiver and their perception of breastfeeding plays an important role toward success. More research is still needed

to identify ways of sustaining breastfeeding up to 2 years and especially encourage more breastfeeding in low-income families. Nonetheless, longer durations of paid maternity leave and policies to support breastfeeding in the workplace are required if any long-term change is to result. Thailand's economy necessarily incorporates high levels of female workplace participation, and the short maternity leave remains in opposition to WHO guidelines on what is best for future generations. How this will be resolved is yet unknown but it is important with Thailand's new status as an aging nation.

Declaration of interest

The Authors declare that there are no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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