Factors Predicting Early Discontinuation of Exclusive Breastfeeding among Women in Kelantan, Malaysia

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ABSTRACT: This study aimed to identify factors predicting discontinuation of exclusive breastfeeding in the first month of lactation among women in Kelantan, Malaysia. A prospective cohort study was conducted in two districts in Kelantan. A two-stage sampling was applied and data were collected through interviewer-guided questionnaire. Intended duration of exclusive breastfeeding, past behaviour and socio-demographic data were assessed prenatally. During follow-up at one-month post-partum, their delivery experiences, post-partum social support, breastfeeding difficulty and exclusive breastfeeding behaviour were determined. Multiple logistic regression analysis was conducted to investigate factors associated with discontinuation of exclusive breastfeeding at one month. A total of 210 women participated at baseline, with 97.1% response rate at one month post-partum. The prevalence of exclusive breastfeeding at one month was 54.4%. The logistic regression model showed that discontinuation of exclusive breastfeeding was associated with late initiation of breastfeeding, breastfeeding difficulties, prenatal intended duration and breast milk expression. Women who initiated breastfeeding more than one hour after delivery and those with more breastfeeding difficulties were more likely to discontinue exclusive breastfeeding. A longer prenatal intended duration and those who did not express their breast milk were less likely to discontinue exclusive breastfeeding. Strengthening of baby-friendly hospital initiative by encouraging early initiation of breastfeeding and providing skill to handle breastfeeding difficulties are needed. A correct breast milk expression technique and storage might prevent women from discarding the expressed milk. All these strategies should be emphasized during antenatal classes to improve the women's intention and actual breastfeeding behaviour later.

Keywords: Breastfeeding difficulties, breast milk expression, exclusive breastfeeding, intention

Introduction

Exclusive breastfeeding refers to feeding an infant with breast milk from his or her mother or a wet nurse, or expressed breast milk, without any additional solid or liquid, except for oral rehydration salt, drops, syrups of vitamins, and minerals or medicines (World Health Organization, 2008). Infants should be given exclusive breastfeeding from birth until six months and continues up to two years, with introduction of complementary food at the age of six months (World Health Organization, 2003; National Coordinating Committee on Food and Nutrition, 2010). The benefits of breastfeeding to infants and mothers are well established, including lower risks of pneumonia, diarrheal diseases, otitis media, asthma, obesity and other chronic diseases in later childhood and adolescence, as well as protecting

mothers from breast cancer (Duffy *et al*., 1997; Chang-Claude *et al.,* 2000; Arifeen *et al.*, 2001; Dell and To, 2001; Harder *et al.*, 2005). These benefits are dose-dependent, with infants who breastfeed longer and more exclusive demonstrate greater reductions in diseases, especially gastrointestinal infection, pneumonia and recurrent otitis media (Raisler *et al*., 1999; Chantry *et al*., 2006).

In the first six months of life, breast milk is the only source of energy and nutrients that an infant needs. It fulfills the daily fluid requirement for a healthy infant provided that breastfeeding is exclusive and unrestricted. It is possible because breast milk contains 88.0% water, and is low in solutes (Lawrence and Lawrence, 2005). In addition, a review of two randomised controlled trials found that giving additional water or glucose water had no benefits to newborn infants, and it was associated with increased risk of early cessation of breastfeeding (Becker *et al*., 2011). However, many women worldwide add water to their breastfeeding infants due to various reasons. In Malaysia, the National Health and Morbidity Survey conducted in 2006 found 19.7% of infants between the ages of two to three months were given breast milk together with the addition of water (Institute for Public Health, 2008).

The addition of water, infant formula, other food or fluid to the infant feeding lead to discontinuation of exclusive breastfeeding. Studies have found various socio-demographic and obstetrical variables influencing exclusive breastfeeding practice and its discontinuation. Those factors included ethnicity, parental education, employment status, living places, place of delivery and type of delivery (Duong *et al*., 2004; Aidam *et al*., 2005; Agampodi *et al*., 2007; Chandrashekhar *et al*., 2007). More modifiable factors influencing exclusive breastfeeding included planning to practise exclusive breastfeeding and attitudes (Aidam *et al*., 2005), friends' feeding practices and infant's first feed (Chandrashekhar *et al*., 2007), and preferences of the husband and maternal grandmother (Duong *et al*., 2004). In Klang, Malaysia, husband's support on breastfeeding was a significant factor for exclusive breastfeeding (Tan, 2011). Identifying these factors was important to facilitate strategies in preventing early discontinuation of exclusive breastfeeding. Thus, more women could be facilitated to exclusively breastfeed their infants, preferably for six months. This study aimed to determine the percentage of exclusive breastfeeding at one month after delivery and the factors predicting early discontinuation of exclusive breastfeeding among women in Kelantan, Malaysia.

Materials and Methods

A prospective cohort study was conducted from September 2011 to June 2012 in the district of Kota Bharu and Pasir Mas,Kelantan, Malaysia. The majority of Kelantan population resided in the two districts, in which 30.4% and 12.6% of the population stayed in Kota Bharu and Pasir Mas districts, respectively (Kelantan State Economic Planning Unit, 2007). These two districts recorded the lowest percentage of exclusive breastfeeding among infants aged six months (Jabatan Kesihatan Negeri Kelantan, 2010). The study protocol was approved by the Research and Ethics Committee of Universiti Sains Malaysia and Ministry of Health. The study included pregnant women at 32 weeks of gestation or above, with no serious medical or obstetrical conditions, and attending antenatal follow-up at governmental health clinics in the two districts. Those who were medically contraindicated to breastfeeding were excluded from the study. Sample size was calculated using Power and Sample Size (PS) Software for two proportions. The calculated sample size of 95 was multiplied with the design effect of 2, and after 10% non-response consideration, the required sample size was 210.

A two-stage sampling was applied in this study. The first stage involved a simple random sampling to choose five health clinics from each district. Women who fulfilled the inclusion and exclusion criteria during every data collection day in each health clinic were approached to participate in the study. A total of 21 respondents per health clinic were needed in order to get a sample size of 210 from ten health clinics. The women who agreed and gave written informed consent were given interviewer-guided questionnaire in a room without the presence of any staff from the particular health clinic. Their responses were written in the questionnaire form. Some obstetric information was counter-checked by reviewing their antenatal cards. After the interview, the respondent's contact number and detail address were obtained. They were reminded that the researcher would contact them again at one month after their delivery dates.

The researcher regularly kept record on the respondents' dates of delivery by contacting the corresponding health clinics. Based on the record, the researcher proceeded with the follow-up interviews of every respondent at one month after delivery. The follow-ups were done through direct interviewing at the health clinics when they brought their infants for immunisation. If the researcher was not able to meet the respondents on their immunisation appointment dates, mainly because she was doing data collection at other health clinics, a home visit or telephone interview were conducted.

The interviewer-guided questionnaire given to the respondents at baseline covered the information on their socio-demographic characteristics, past behaviour and intention. Past behaviour referred to history of practising exclusive breastfeeding for six months to any of the previous infants. Intention was obtained through an open-ended question asking the respondent's intended duration of exclusive breastfeeding, in months. The WHO definition of exclusive breastfeeding as giving breast milk only, without additional food or drink, was used in this study.

During follow-up at one month after delivery, another interviewer-guided questionnaire was given to obtain information on their delivery, early post-partum experiences and infant feeding behaviour. Among the experiences inquired were post-partum social support and breastfeeding difficulty. Post-partum social support was defined as the physical, emotional and informational support received within the first one month after delivery. The score was obtained as the sum of 10 items with four-point Likert type scale for each item, ranging from 1 (no support), 2 (some support), 3 (many support), and 4 (full support). Breastfeeding difficulty score reflected whether the respondents experienced the difficulties, and the amount of perceived severity of each difficulty. The score was a sum of seven items with five-point Likert type scale, from 1 (no difficulty), 2 (mild), 3 (moderate), 4 (severe), and 5 (unbearable). Cronbach's alpha values obtained from a pilot study were 0.85 for post-partum social support and 0.78 for breastfeeding difficulty.

Data entry and analysis were conducted using IBM SPSS Statistics Version 19.0. Descriptive statistics, simple and multiple logistic regression analyses were performed. The outcome variable was early discontinuation of exclusive breastfeeding, classified as either discontinued exclusive breastfeeding at one month after delivery or still practising exclusive breastfeeding. Predictor variables with p-value of less than 0.25 in simple logistic regression analysis were included in the multiple logistic regression analysis. Using forward LR method of regression, variables significantly predicting early discontinuation of exclusive breastfeeding were identified. The significance level was set at 0.05. The logistic regression model was also

checked for interaction and multicollinearity between predictor variables. Variance inflation factor of more than 10 indicated the presence of multicollinearity problem. Fitness of the model was identified from Hosmer and Lemeshow Test and area under the Receiver Operating Characteristics (ROC) curve. Hosmer and Lemeshow test with p-value > 0.05 and area under ROC curve of > 0.70 suggested that the model was fit.

Results

A total of 222 eligible women were invited to participate in the study, and 210 agreed at baseline, with 94.6% participation rate. Of the 210 respondents, 204 completed the follow-up at one month post-partum, with 97.1% response rate. Three respondents had moved out from the study area and were not contactable through telephone, two respondents had early neonatal death due to congenital abnormality of the infants, and one respondent refused to participate in the follow-up study. The analysis was conducted on 204 respondents who completed the follow-up. There were no significant differences in socio-demographic and obstetrical characteristics between women who completed their follow-up and those failed to follow-up.

Majority of the respondents were Malay, with only four of them were Chinese. **Table 1** shows their socio-demographic characteristics at baseline. Their mean gestational age at inclusion into the study was 35.5 (± 2.49) weeks.

Table 1: Socio-demographic characteristics at baseline (n=204)

Variable	Frequency (%)	Mean (±)
Women's age (year)		29.3 (±6.56)
Women's education (year)		11.7 (±2.56)
Occupation		
Not working	121 (59.3)	
Working	83 (40.7)	
Age of husband (year)		33.5 (±7.84)
Number of live birth		1[a] (2)[b]
Past behaviour of exclusive breastfeeding for six months		
Yes	14 (6.9)	
No	190 (93.1)	

[a]median, [b]interquartile range

The mean intended duration of exclusive breastfeeding assessed prenatally was 3.5 ± 2.57 months. Upon follow-up at one month after delivery, information on their obstetric and post-partum experiences were obtained and presented in **Table 2**. Most of them (96.1%) delivered their infants at governmental hospitals accredited as baby-friendly hospitals, but less than half of them (46.1%) had initiated breastfeeding within one hour after delivery. Many of them did not include vegetables and fruits in their daily dietary intake (77.9% and 81.9%, respectively).

Table 2: Obstetric and early post-partum experiences within one month after delivery (n=204)

Variable	Frequency (%)	Mean (±)
Place of delivery		
Baby-friendly hospital	196 (96.1)	

Non-baby friendly hospital	8 (3.9)	
Type of delivery		
Vaginal delivery	174 (85.3)	
Caesarian section	30 (14.7)	
Use of pain-relieving medication during labour		
Yes	85 (41.7)	
No	119 (58.3)	
Early initiation of breastfeeding		
Yes	94 (46.1)	
No	110 (53.9)	
Rooming-in after delivery		
Yes	159 (77.9)	
No	45 (22.1)	
Breast milk expression		
Yes	98 (48.0)	
No	106 (52.0)	
Daily vegetables intake		
Yes	45 (22.1)	
No	159 (77.9)	
Daily fruits intake		
Yes	37 (18.1)	
No	167 (81.9)	
Post-partum social support score		28.6 (±6.09)
Breastfeeding difficulty score		7[a] (4)[b]

[a]median, [b]interquartile range

Figure 1 depicts the respondents' infant feeding behaviour at one month after delivery. One-hundred and eleven respondents (54.4%) practised exclusive breastfeeding from birth until one month. Twenty-two respondents (10.8%) did not practise exclusive breastfeeding because they gave water in addition to breast milk. Infant formula was commonly given (34.8%), either in combination with breast milk alone, or together with water and/or other food or fluid.

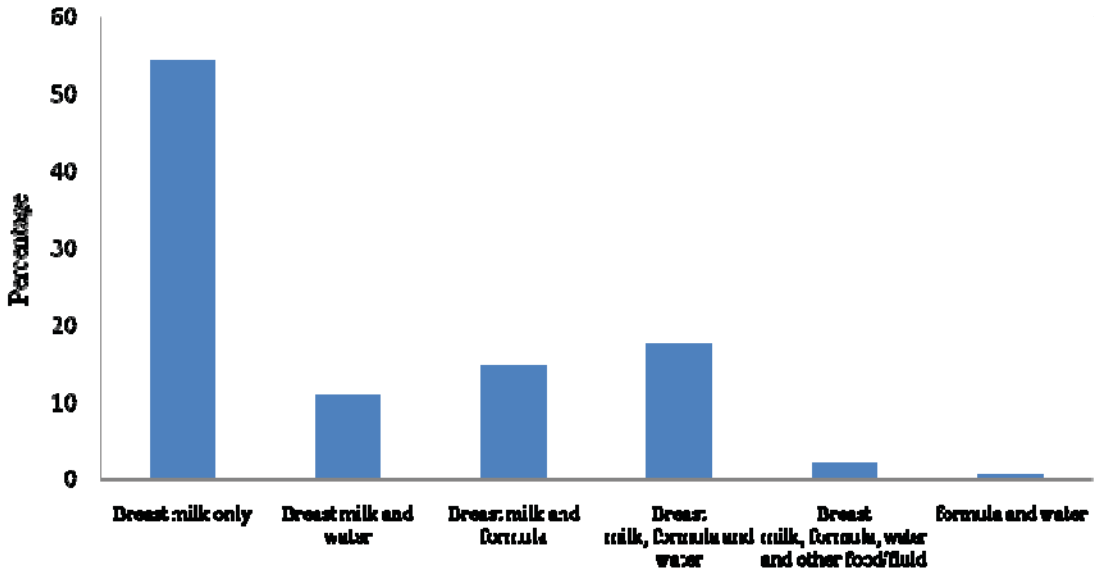

Figure 1: Infant feeding behaviour at one month after delivery

Table 3 shows the reasons for giving infant formula and water. The percentages were calculated based on the number of respondents who gave their reasons in the open-ended section of the questionnaire.

Table 3: Reasons for giving infant formula and water

Reasons for giving infant formula	Frequency (%)	Reasons for giving water	Frequency (%)
No breast milk	17 (33.3)	Following nurses' advice	2 (25.0)
Not enough breast milk	13 (25.5)	To avoid/treat jaundice	2 (25.0)
Caesarian section	5 (9.8)	Hot weather	1 (12.5)
Will return to work	5 (9.8)	To remove secretion	1 (12.5)
Inverted nipple	3 (5.9)	No breast milk	1 (12.5)
Infant not contented after feeding	2 (3.9)	To treat constipation	1 (12.5)
Infant refuse breastfeeding	2 (3.9)		
Mother admitted in hospital	2 (3.9)		

Cereal and wheat porridge were the foods given by two respondents to their infants in the first month of life. One respondent (0.5%) had never breastfed her infant because she was admitted in intensive care unit and ventilated for two weeks after delivery due to hypertensive crisis. Her infant was discharged home after two days and was fed with infant formula. After discharged from the hospital, she never initiated breastfeeding and denied having any difficulties such as breast engorgement.

Simple logistic regression analysis predicting early discontinuation of exclusive breastfeeding identified nine variables with $p < 0.25$. These variables were included in the multiple logistic regression analysis, and four variables were found to be significantly predicting early discontinuation of exclusive breastfeeding at multivariable level (**Table 4**). The combination of late breastfeeding initiation, breastfeeding difficulty, intention and breast milk expression

significantly explained 30.0% of the variance in early discontinuation of exclusive breastfeeding (chi-square = 51.56, $p < 0.001$, Nagelkerke $R^2 = 0.30$).

Table 4: Factors predicting early discontinuation of exclusive breastfeeding by multiple logistic regressions

Variable	Adjusted OR[a]	95% CI[b] for OR	Wald	*p*-value
Early initiation of breastfeeding				
Yes	1.00			
No	2.40	1.26, 4.57	7.09	0.008
Breastfeeding difficulty	1.15	1.07, 1.24	13.94	<0.0011
Intention	0.80	0.71, 0.91	11.72	0.001
Breast milk expression				
Yes	1.00			
No	0.38	0.20, 0.72	8.95	0.003

[a]OR = Odds ratio
[b]CI = Confidence interval
Hosmer and Lemeshow Test *p*-value = 0.066
Receiver Operating Characteristics (ROC) curve = 0.76
Nagelkerke $R^2 = 0.30$
Chi-square = 51.56, $p < 0.001$
No interaction or multicollinearity problem

The logistic regression model revealed the following: Women who initiated breastfeeding more than one hour after delivery had 2.40 times odds of early discontinuation of exclusive breastfeeding compared to those who initiated breastfeeding within one hour after delivery ($OR = 2.40$, $p = 0.008$). Women had 1.15 times odds of early discontinuation of exclusive breastfeeding with every one unit increase in breastfeeding difficulty score ($OR = 1.15$, $p < 0.001$). Women were less likely to have early discontinuation of exclusive breastfeeding with every one month increase in intended exclusive breastfeeding duration ($OR = 0.80$, $p = 0.001$). Women who did not express their breast milk were less likely to have early discontinuation of exclusive breastfeeding compared to those who expressed their breast milk ($OR = 0.38$, $p = 0.003$).

Discussion

This study demonstrates that almost half of the respondents (45.6%) had discontinued exclusive breastfeeding at one month after delivery. The percentage of exclusive breastfeeding at one month was 54.4%, and it was low compared to 63.3% of infants aged one month attending two health clinics in Klang, Malaysia who were exclusively breastfed (Tan, 2011). However, it was almost similar with 55.1% prevalence of exclusive breastfeeding for one month noted from a study conducted in the whole district of Klang (Tan, 2007). Discontinuing exclusive breastfeeding at one month after delivery was far below the recommended exclusive breastfeeding for six months. A nationwide survey in Malaysia noted the prevalence of exclusive breastfeeding was the highest among infants younger than two months, but dropped rapidly between two to three months, with further decline by almost half between the ages of four to five months (Institute for Public Health, 2008). Thus, with almost half of respondents in this study had discontinued exclusive breastfeeding at one month, a bigger percentage would be expected at six months.

It is important to understand why women discontinued exclusive breastfeeding as early as in the first month of lactation. Giving water to infants in addition to breast milk prevented the women from fulfilling the criteria of exclusive breastfeeding. Around 11.0% of the respondents in this study gave breast milk with no infant formula, but water was also given to their infants. Another 20.0% gave water in addition to infant formula and other food or fluid. Among reasons why they did so were because of the nurses' advices and to avoid or treat jaundice. In other settings, water was also commonly given to infants in their early lives. A study in Brazil found almost 6.0% and 58% of infants were given water on the first day after hospital discharge, and at four months old, respectively (Venancio *et al*., 2008). Almost one-third of mothers in Ghana gave water to their infants soon after delivery and within one month of life (Singh, 2010).

Intention was noted to be one of the significant predictors of early discontinuation of exclusive breastfeeding. Women with longer prenatal intended exclusive breastfeeding duration were less likely to discontinue exclusive breastfeeding at one month after delivery. Similar findings were noted in other studies, in which intention was a significant predictor of exclusive breastfeeding for six months (Bai *et al*., 2010), any breastfeeding at one week and four months post-partum (Blyth *et al*., 2004), any breastfeeding at birth, discharge from hospital and 10 days after discharge from the hospital (McMillan *et al*., 2008), and any breastfeeding for six months (Wilhelm *et al.*, 2008). However, many respondents in this study did not intend to give exclusive breastfeeding for as long as the recommended duration. Their mean intended duration was 3.5 months, with only 44.1% intended to give exclusive breastfeeding for six months. The low intention was also noted among first-time mothers in Sydney (Wen *et al*., 2009).

Breastfeeding difficulty was another significant predictor; with those who had more breastfeeding difficulties were more likely to discontinue exclusive breastfeeding at one month. The difficulties assessed were sore nipple, cracked nipple, difficulty latching on to the breast, perception of inadequate milk, perception of hungry infant, breast engorgement and emotional upset. Similarly, women who had pathological problems such as engorgement and cracked nipples were less likely to exclusively breastfed their infants for six months (Nkala and Msuya, 2011). Perception of having no breast milk or inadequate milk was strongly held, and was the most common reasons for the respondents to give infant formula. Other studies noted the same perceptions as having a big influence for mothers to discontinue breastfeeding or starting supplementation (Arora *et al*., 2000; Siah and Yadav, 2002; Xu *et al*., 2007; Fjeld *et al*., 2008). A qualitative study using in-depth interviews found a deep concern among women regarding inadequate breast milk (Tengku Alina *et al*., 2012). However, many women who held those beliefs did not know how to assess for adequacy of milk supply, including listening for audible swallow during feeding, noting the infant's urine production and weight gain (Arora *et al*., 2000).

Women who initiated breastfeeding more than one hour after delivery were more likely to discontinue exclusive breastfeeding at one month. In Japan, the proportion of women who continued full breastfeeding at four months was significantly higher in those who initiated breastfeeding within 120 minutes compared with those who initiated more than 120 minutes (Nakao *et al*., 2008). Early initiation of breastfeeding was one of the Ten Steps to Successful Breastfeeding, and one of the key recommendations to improve the practice of exclusive breastfeeding (National Coordinating Committee on Food and Nutrition, 2010). Implementation of the ten steps was one of the criteria for a hospital to be designated as baby-friendly. A majority of the respondents (96.1%) had delivered their infants at the government

hospitals accredited as baby-friendly hospitals but early initiation of breastfeeding was not routinely practised. Since majority of the infants (77.9%) were admitted to the same ward with their mothers, they might not have specific medical conditions preventing them from being put to their mothers' breasts within the first one hour of their lives.

A study in Perth found that women who expressed their breast milk were less likely to discontinue any breastfeeding before six months than those who had never expressed (Win *et al*., 2006). This is contradictory to our finding where women who did not express their breast milk were less likely to discontinue exclusive breastfeeding at one month compared to those who expressed. One possible explanation was that not every woman who expressed their breast milk fed it to their infants. Among 98 respondents who expressed their breast milk, 11 (11.2%) of them discarded it instead of storing and giving it to their infants. Safety and hygiene of the expressed breast milk was doubted by some women in Kelantan (Ismail *et al*., 2012).

Our study provides a useful understanding on the exclusive breastfeeding behaviour at one month after delivery. It is very relevant in our setting, where studies of its kind, with a prospective in nature and focusing on exclusive rather than any breastfeeding, were still not commonly conducted. It gave an insight on ways to prevent early discontinuation and further decline of exclusive breastfeeding. One important focus is to disseminate the knowledge that water should only be given to infants after six months of age, and that adding water is not the treatment or preventive measures for neonatal jaundice. Encouraging and supporting women to initiate breastfeeding within one hour after delivery is also essential.

One of the limitations in this study was the lack of comparison between Malay and other ethnic groups. The majority of our respondents were Malays, reflecting the actual population in Kelantan. Other ethnic groups might have different predictors of exclusive breastfeeding discontinuation. Studies have shown that Malay women more commonly practised breastfeeding compared to other ethnic groups, thus focusing on discontinuation of their behaviour would be important (Radzniwan *et al*., 2009; Amin *et al*., 2011; Tan, 2011). However, replication of this study with other ethnic groups would provide a better understanding of the behaviour, and help reduce the disparity in the behaviour among women of different ethnicity.

Conclusion

The promotion strategies for exclusive breastfeeding should start with clarifying what it really means, especially to inform and convince women that addition of water to a breastfeeding infant is not needed. They also need to be convinced that their breast milk is adequate, and a more objective tool to assess adequacy of their milk supply should be explained properly. In addition, measures to maintain and increase breast milk production still need to be emphasized. Among others, correct breast milk expression techniques and storage should be made a priority to avoid women from discarding it and discontinue exclusive breastfeeding. A well-balanced diet is important to increase milk production, but many respondents in this study did not take vegetables and fruits. Women should also be taught to anticipate and handle breastfeeding difficulties. All these strategies should target the women during pregnancy before they actually faced the real breastfeeding experiences. Thus, strengthening of antenatal classes on breastfeeding and the implementation of baby-friendly hospital

initiative would help to improve the women's intention and actual breastfeeding behaviour later.

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