

Factors associated with early cessation of exclusive breast feeding among Saudi mothers: A prospective observational study

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ABSTRACT

Context: World Health Organization recommending initiation of breastfeeding within hour of birth, exclusive breastfeeding for the first 6 months. In Saudi Arabia, there is a paucity of studies on the factors associated with early cessation of exclusive breastfeeding. **Aims:** We aimed to assess the exclusive breastfeeding rates and to identify the risk factors for early breastfeeding cessation at maternal and institutional levels. **Settings and Design:** A prospective observational study carried out at King Abdullah bin Abdulaziz University Hospital, Riyadh, Saudi Arabia. **Methods and Materials:** It included all postpartum women who had given birth to full term, singleton, healthy newborns, and were breastfeeding before discharge. Data were collected before discharge, 2 weeks, and 8 weeks postpartum using an adapted instrument. **Statistical Analysis:** Using JMP14 software with appropriate statistical tests. **Results:** The study included 136 mothers, of whom 37.5% were exclusively breastfeeding in the first 2 weeks; this rate dropped to 19% with a statistically significant difference ($P < 0.0001$). Early breastfeeding cessation was significantly associated with maternal age, health status, mother's knowledge, and attitude, in addition to other modifiable factors that was encountered during hospital stay such as latching difficulties and introduction of formula feeding. **Conclusions:** This study reported low exclusive breastfeeding rates in the first 2 months postpartum among Saudi mothers. Multiple factors were associated with breastfeeding, and some are modifiable. Breastfeeding promotion and support for is a critical role required from healthcare workers in all settings, including primary health care. Healthcare professionals play a major role in promoting, protecting, and supporting exclusive breastfeeding.

Keywords: Breastfeeding, breastfeeding cessation, breastfeeding duration, exclusive breastfeeding, factors, postpartum

Introduction

Breastfeeding promotion is considered one of the essential elements of primary health care (PHC) as well as maternal and

child health. Given the recognized benefits of breastfeeding for both mother's and infant's health, it reduces all-cause and infection-related mortality among infants and children who are exclusively breastfed.^[1] While, on maternal side it improves birth spacing and decreases risk of type 2 diabetes mellitus, breast, and ovarian cancer. However, it is dose-dependent, with exclusivity and longer duration increasing those benefits.^[2] Thus, World Health Organization (WHO) recommends that breastfeeding is initiated within an hour of birth, exclusive breastfeeding (EBF)

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is performed for the first 6 months and breastfeeding is continued for at least 2 years.^[3] Despite global efforts being made to implement breastfeeding promotion programs and public policies, only 44% of infants aged less than 6 months were exclusively breastfed worldwide, according to UNICEF report on 2019.^[4]

Moreover, this low rate indicates that breastfeeding is a challenging and complex issue not only at individual's level,^[5] but it has multifactorial aspects that require measures at multiple levels in order to identify mothers at risk of breastfeeding cessation.^[6] Among the commonest maternal bio-psycho-social factors, it has been found that age, education level, socioeconomic status, primiparity, and maternal employment had a major role in breastfeeding pattern and duration.^[7,8] While other studies showed that providers/hospitals that were complied with 10 – steps baby-friendly hospital initiatives^[9] had improved breastfeeding outcomes^[6,10,11] and not to forget the cultural context that may encourage complementary feeding for infants younger than 6 months.^[12-14]

In Saudi Arabia, recommendations for optimal breastfeeding practices are based on the Holy Book (Quran), which encourages Muslim women to breastfeed their babies for 2 years, in addition to commitments to the global standards of (WHO) and (UNICEF).^[3,14] However, within the last 3–5 years multiple observational studies reported poor breastfeeding practices, such as delayed breastfeeding initiation,^[15] relatively high prevalence of mixed feeding,^[16] and introduction of complementary feeding^[17] before 6 months of age. Moreover, the most concerning finding among all recently published studies is the decline in duration/or lacking exclusivity of breastfeeding^[18,19] compared to old literature.^[20]

Data suggest that breastfeeding initiation and continuation are strongly associated with events that occurred in the first 2 weeks postpartum.^[21,22] Therefore, there is a substantial need to explore in depth these factors, which ultimately will help the healthcare providers in identifying mothers at risk of early breastfeeding cessation.

Objectives

To assess the breastfeeding cessation rate among Saudi mothers during the early postpartum period, i.e. 2 and 8 weeks, respectively. Moreover, to prospectively identify the risk factors for early exclusive breastfeeding cessation during hospitalization and after discharge on both maternal and institutional levels.

Subjects and Methods

Ethical consideration

All methods were carried out in accordance with relevant guidelines and regulations. The study protocol was approved by the Institutional Review Board at Princess Nourah bint Abdulrahman University, Riyadh, Saudi Arabia (IRB-PNU: 20-0118). Informed written consent was taken from all study participants.

Study design and setting

This prospective observational study was conducted at King Abdullah bin Abdulaziz University Hospital (KAAUH) at Princess Nourah bint Abdulrahman University (PNU) in Riyadh, Saudi Arabia. It is a newly established educational hospital equipped with a capacity of (300) beds. The hospital has applied for accreditation of the 10 – steps UNICEF baby-friendly hospital initiative.

Study subjects

It included all women who agreed to participate and eligible as per the following criteria: had given birth to full term (i.e. gestational age from 37 to 42 completed weeks), singleton, and healthy newborns (as determined by birth weight \geq 2500 g) and were breastfeeding (as per WHO definition, 2008),^[23] during hospital stay or before discharge during the period from Mar–Jun 2020. The enrolment was prematurely stopped due to the implementation of a COVID-19 protocol; breastfeeding initiation was delayed, and newborns were isolated from their mothers until additional COVID -19 screening and laboratory results were revealed.

Sample size

Sample size was calculated using an open epi calculator. Given that approximately 3000 pregnant women received antenatal care annually, and the international breastfeeding cessation rate ranges between 10 and 30%, the estimated sample size was between 133 and 292 participants, with a level of confidence of 95% ($\alpha = 0.05$).

The sample size was calculated as follows:

$$n = \frac{DEFF * Np(1-p)}{[(d2/Z21-\alpha/2*(N-1) + p*(1-p)]}$$

The population size (N) was calculated to be 3000, with a confidence interval of 5% (absolute \pm %) (d). The hypothesized % frequency of the outcome in the population (p) was calculated as follows: 10% \pm 5, 30% \pm 5. The design effect value (for cluster surveys-DEFF) was 1.

Data collection methods, instruments used, and measurements

Seven days a week, consecutive mother–infant dyad was assessed for eligibility and enrolled by the co-investigators in the maternity unit. Three data forms were developed for this study: the first one was administered before discharge, the second one was administered at 2 weeks postpartum, and the third one was administered at 6–8 weeks postpartum. Additionally, mother's contact information was recorded for follow-up phone calls at 2 and 8 weeks postpartum.

Before hospital discharge, the mothers were interviewed using a data collection instrument composed of three sections. The first section concerned sociodemographic variables: maternal age, level of education, parity, mother's employment status, employment sector, monthly income, and smoking status. In

addition, other information related to the current delivery, such as gestational age, mode of delivery, whether epidural anaesthesia was administered, the infant's birth weight. Some of these variables were recorded or verified by reviewing electronic medical records. The second section concerned breastfeeding-related practices with yes/no questions: counselling from a healthcare provider (doctor, health educationist, or nurse/midwife). Number of attended visits for antenatal care; number of attended antenatal breastfeeding classes.

Considering mother's knowledge, attitude and satisfaction toward breastfeeding, as important intrinsic factors we have designed 10-point Likert scale with 1 indicating the least agreement and 10 indicating the highest one. The third section concerned the six predictors that were adopted from breastfeeding assessment score (BAS) tool (latching difficulties, feeding interval, formula feeding during hospital stay, previous breastfeeding experience, previous breast surgery, and pregnancy-induced hypertension).^[24] This tool was selected based on the literature that they are commonest factors for breastfeeding cessation as early as 10 days postpartum.

Finally, all mothers were contacted by co-investigators at 2 weeks and at 6–8 weeks postpartum to report exclusive breastfeeding status (i.e. only breast milk given direct or expressed, may include ORS, drops, syrups (vitamins, minerals, medicines)^[23]; and if no exclusive breastfeeding, then mothers were furtherly asked to list the causes of early breastfeeding cessation. These causes were selected according to their prevalence in the recent literature, such as maternal fatigue, perceived insufficient milk, and maternal employment.^[25,26]

The instrument was discussed with all coinvestigators so that they asked/explained the questions to the participants in the same way. A pilot study was conducted in 20 subjects to test the face validity of the instrument and to estimate the time required for data collection, which lead to minor modifications on the data collection instrument.

Data management and analysis plan

Statistical analyses were performed using JMP14 software (SAS Institute, USA). The data were surmised and presented as numbers and percentages or Mean \pm Standard deviation (SD). A McNemar's test was used for the non-parametric data to find the proportion. The 10-point Likert scale was collected as categories then analysed as continues data using *t*-test and Mann-Whitney test with the higher score indicating the highest level of agreement. The correlation between the demographic, clinical, and organizational factors with the exclusive breastfeeding status was tested with Chi-square or Fisher's exact test with a *P* value < 0.05 to determine the significance.

Results

From 17 Mar to 6 Jun 2020, a total of 170 deliveries took place at KAAUH. Only 167 were eligible. However, 10 mothers refused to participate, and 21 pairs were lost to follow-up at 2 or 8 weeks.

Table 1 shows the demographic and clinical characteristics of the study cohort; the mean age of the participating mothers was 29.5 ± 5.07 years, and the majority had a bachelor's degree and were unemployed. A total of 90% of the mothers were healthy, 99% were nonsmokers, and 80.2% were overweight/obese with mean BMI 28.6 ± 4.9 kg/m². The mean parity was 1.7 ± 1.6 child.

Regarding obstetric variables, the mean gestational age of 39.3 ± 1.4 weeks, 95.5% had normal spontaneous vaginal delivery (NSVD), the mean birth weight was 3.08 ± 0.4 kg and only 24% of the sample utilized epidural anaesthesia. KAAUH eligible mothers visited the ANC clinic an average of 5.7 ± 3.4 times and the health educator clinics an average of 0.04 ± 0.1 times. However, only 15.7% of obstetricians provided breastfeeding counselling at least once in their pregnancy. During admission, only 25.7% of doctors have advised mothers about breastfeeding, while 67.6% of nurses/midwives have provided breastfeeding advice. Never less, due to COVID-19 pandemic a lot of educational activities were interrupted or cancelled, such as prenatal and breastfeeding classes. Thus, we did not include the responses in the final analysis as part of institutional factors.

A total of 37.5% of mothers were exclusively breastfeeding in the first 2 weeks postpartum; however, this rate dropped significantly to 19% at 6–8 weeks (*P* < 0.0001) as shown in Figure 1.

Table 1: Demographic and clinical characteristics of the study cohort (n=136)

Variable	Distribution
Maternal age (years)	
Younger than 24	39 (28.7%)
Older than 24	97 (71.3%)
Education level	
High school or less	36 (26.5%)
Bachelor's degree	88 (64.7%)
Postgraduate degree	12 (8.8%)
Employment status	
Employed	37 (27.2%)
Unemployed	99 (72.8%)
Employment sector	
Governmental	24 (64.9%)
Corporate and business	9 (24.3%)
Healthcare	4 (10.8%)
Average monthly income	
<10000 SR	57 (41.9%)
>10000 SR	79 (58.1%)
Chronic diseases	
No	123 (90.4%)
Yes	13 (9.6%)
Body mass index	
24 and less	27 (19.9%)
25 and more	109 (80.1%)
Smoking status	
No	135 (99.3%)
Yes	1 (0.7%)

Considering mother’s knowledge, attitude, and satisfaction toward breastfeeding, as shown in Table 2, there was a high agreement that breastmilk is the best source of nutrition for infants age below 6 months. It was statistically significantly associated with breastfeeding throughout study period. On the contrary, formula milk reported low level of agreement but still considered as associated factors with exclusive breastfeeding at 6–8 weeks. Considering attitude toward breastfeeding, interestingly mothers were having moderate agreement on planning for exclusive breastfeeding in the first 2 weeks with no statistical difference between two groups. However, concerning plan for 6 months exclusive breastfeeding, mothers showed more positive attitude with statistically significant *P* values. Finally, mothers were neutral when asked about their satisfaction with breastfeeding counselling and it appeared that this factor was not associated with exclusive breastfeeding.

Table 3 illustrates correlation between maternal demographic and clinical factors with exclusive breastfeeding status at 2 and 6–8 weeks, respectively, using Chi-squared test. It has been shown that introducing formula feeding (two or more bottles) during hospital stay was significantly associated with breastfeeding cessation during the first 2 weeks postpartum (*P* < 0.02). Meanwhile, none of other sociodemographic or clinical predictors associated with breastfeeding cessation. While in

6–8 weeks postpartum, breastfeeding cessation was statistically significantly associated with maternal age (above 24 years), maternal health status and presence of latching difficulties in more than half of the feedings regarding correlation between breastfeeding counselling practices and breastfeeding cessation. There was no association between number of visits or healthcare provider’s advice with breastfeeding cessation. However, we must be careful interpreting these results as we have few responses.

Regarding analysis of the causes of exclusive breastfeeding replacement/cessation at 2 and 8 weeks, respectively, we asked the mothers to list most common causes and allowed them to add others if applicable. In this study, the most common causes within the first 2 months postpartum included insufficient or a lack of breastmilk (37% and 51%, respectively), followed by maternal fatigue (12%) at both 2 weeks and 6–8 weeks postpartum. Other causes were less frequently reported, such as cracked nipples/painful breasts, the acclimation of infants to other foods and a lack of support. The other causes that were added by the mothers were sleep deprivation, the mothers’ medication intake (pain killers, antibiotics, oral contraceptive pills (OCPs), latching difficulty, a lack of experience, the mothers being busy performing other household duties, and infant satiety with formula milk.

Discussion

Although the decision to breastfeed is highly personal, However, initiation and duration are often influenced by multiple factors.^[27] Thus, studies that aim to identify and predict factors associated with EBF are of great public health significance, given the importance of this feeding method for the health of both the mother and child and the global low exclusive breastfeeding rates.^[4,28] This study investigated the breastfeeding cessation rate during the early postpartum period and exploring maternal and institutional factors on multiple levels that may contribute to early breastfeeding cessation. Although all mothers were discharged home and were able to initiate breastfeeding, the EBF rate was only 37.5% within the first 2 weeks and dropped to 19% in 6–8 weeks postpartum, which is considered low compared to international standards.^[3] and consistent with a recently published

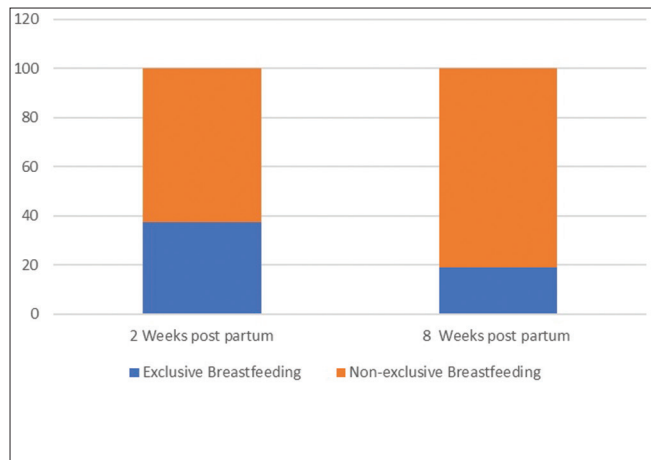


Figure 1: Breastfeeding status among study cohort during 2 and 8 weeks postpartum

Table 2: Mother’s knowledge, attitude, and satisfaction associated with exclusive breastfeeding

Variable	Exclusive breastfeeding at 2 weeks		<i>P</i>	Exclusive breastfeeding at 6-8 weeks		<i>P</i>
	No	Yes		No	Yes	
	Breast milk is the best source of nutrition for infants <6 months of age	9.2±1.3		9.6±0.8	<0.03	
Formula milk is the best source of nutrition for infants <6 months of age	4.2±2.9	3.4±2.9	<0.1	4.1±2.9	2.6±2.8	<0.02
Plan to exclusively breastfeed for 2 months	7.4±3.0	6.8±4.9	<0.3	7.4±3.2	6.4±4.4	<0.3
Plan to exclusively breastfeed for 6 months	6.4±3.2	8.5±2.3	<0.001	6.8±3.1	8.9±2.1	<0.001
Have a family that encourages and supports breastfeeding	8.1±2.1	8.0±2.6	<0.8	8.1±2.1	8±3	<0.8
Have a work environment that encourages and supports breastfeeding	5.2±3.7	5.9±3.5	<0.6	5.2±3.6	6.6±4.2	<0.5
Satisfied with breastfeeding counseling practices in the hospital	5.8±3.5	5.5±3.9	<0.7	5.6±3.6	6.3±3.7	<0.3
Willing to receive additional advice/attend follow-up visits on breastfeeding	6.4±3.5	7.4±3.6	<0.1	6.6±3.6	7.5±3.6	<0.2

Table 3: Socio-demographic and clinical factors associated with exclusive breastfeeding at 2- and 8-weeks postpartum

Factors	Exclusive breastfeeding at 2 weeks		P	Exclusive breastfeeding at 6-8 weeks		P
	No	Yes		No	Yes	
Maternal age (years)						
Younger than 24	25 (29.4%)	14 (27.5%)	<0.8	36 (32.7%)	3 (11.5%)	<0.02
Older than 24	60 (70.6%)	37 (72.6%)		74 (67.3%)	23 (88.5%)	
Education level						
High school or less	21 (24.7%)	15 (29.4%)	<0.5	32 (29.1%)	4 (15.4%)	<0.1
Bachelor's degree or above	64 (75.3%)	36 (70.6%)		78 (70.9%)	22 (84.6%)	
Employment status						
Employed	27 (31.2%)	10 (19.6%)	<0.1	32 (29.1%)	5 (19.2%)	<0.2
Unemployed	58 (68.2%)	41 (80.4%)		78 (70.9%)	21 (80.8%)	
Monthly income						
<10000 SR	32 (37.7%)	25 (49%)	<0.1	44 (40%)	13 (50%)	<0.3
>10000 SR	53 (62.4%)	26 (51%)		66 (60%)	13 (50%)	
Chronic diseases						
No	76 (89.4%)	47 (92.2%)	<0.5	97 (88.2%)	26 (100%)	<0.01
Yes	9 (10.6%)	4 (7.8%)		13 (11.8%)	0	
BMI						
24 and less	17 (20%)	10 (19.6%)	<0.9	23 (20.9%)	4 (15.4%)	<0.5
25 and more	68 (80%)	41 (80.4%)		87 (79.1%)	22 (84.6%)	
Epidural anesthesia						
No	69 (81.2%)	43 (84.3%)	<0.6	92 (83.6%)	20 (76.9%)	<0.4
Yes	16 (18.8%)	8 (15.7%)		18 (16.4%)	6 (23.1%)	
Previous breastfeeding experience						
No	30 (35.3%)	15 (29.4%)	<0.4	37 (33.6%)	8 (30.8%)	<0.7
Yes	55 (64.7%)	36 (70.6%)		73 (66.4%)	18 (69.2%)	
Latching difficulties during admission						
Less than half of feeding	50 (58.8%)	37 (72.6%)	<0.1	66 (60%)	21 (80.8%)	<0.03
half of feeding and more	35 (41.2%)	14 (27.5%)		44 (40%)	5 (19.2%)	
No. of formula feeding during admission						
Less than 2 bottles	17 (20%)	19 (37.3%)	<0.02	29 (26.4%)	7 (26.9%)	<0.9
2 bottles and more	68 (80%)	32 (62.8%)		81 (73.6%)	19 (73.1%)	
Breastfeeding interval during admission						
Less than 3 hours	71 (83.5%)	47 (92.2%)	<0.1	95 (86.4%)	23 (88.5%)	<0.7
3 hours and more	14 (16.5%)	4 (7.8%)		15 (13.6%)	3 (11.5%)	

local study that showed EBF rate was 16.9%, 21.5% at 1- and 2 months postpartum.^[29]

Moreover, the mothers' knowledge about breastfeeding and that breastmilk is the best source of infant nutrition as well as their intent to perform EBF during the first 2 months of the postpartum period were not reflected in the actual EBF rate. This finding is consistent with those of similar studies involving different cultures confirming that knowledge and intent alone are not sufficient to influence the actual EBF rate.^[30,31] This finding might be explained by different factors. One of the health practice-related factors was the lack of breastfeeding advice from both the doctors and nurses/midwives, which might be reflected in the low satisfaction score about breastfeeding promotion and counselling practices. Recent evidence showed that interventions to support breastfeeding appear to reduce the risk of breastfeeding cessation at up to 6 months.^[32] Thus, providing proper counselling, education, and support for breastfeeding is a critical role of healthcare providers in all settings, especially in PHC,^[33] because promotion for optimal child nutrition and disease prevention are core elements in maternal and child health.

Regarding maternal factors associated with breastfeeding cessation, this study showed that maternal age is statistically significantly associated with lack of exclusivity in during the first two months for mothers aged 24 years and above. On contrast, a review article published in 2014 showed that an older maternal age is a contributing factor for a higher breastfeeding rate among Saudi women.^[34] However, age per say might not be the only factor, 73% of mothers reported that their infants received two bottles or more of formula milk during their hospital stay and this was contributed to breastfeeding cessation in 2 weeks. This is consistent with other study had shown that infant formula feeding during the first 3 days after birth was associated with increased subsequent infant formula feeding and early breastfeeding cessation.^[35] In this cohort, the most common mode of delivery was a NSVD. However, it did not associate with exclusive breastfeeding as reported in the literature.^[36,37]

Moreover, this study reported several causes for early breastfeeding replacement/cessation; one of the most common causes in both the early postpartum period and after 2 months

was perceived insufficient or a lack of breastmilk. This finding is consistent with those of other studies.^[38,39] Regarding provider's related factors, this study reported low breastfeeding advice among doctors compared to nurses/midwives and this may affect mother's satisfaction about breastfeeding counselling practices in the hospital. However, not to forget that this study was conducted during the time of COVID-19 pandemic, in which some of outpatient's breastfeeding educational activities for both staff and pregnant women were interrupted or discontinued.

Conclusion

This study reported low exclusive breastfeeding rates in the first 2 months postpartum among Saudi mothers. Multiple factors were associated with breastfeeding cessation, and some were modifiable and occurred during the hospital stay, i.e. latching difficulties and introducing formula feeding. Moreover, healthcare providers have pivotal role in supporting nursing mothers. However, the current study reported suboptimal breastfeeding counselling practice observed among doctors in comparison to nurses and midwives.

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Key Messages

Studies that aim to identify and predict factors associated with exclusive breastfeeding are of great public health significance. Thus, more attention should be given to mothers who have a high risk for early breastfeeding cessation, such as employed mothers or those who have previous short breastfeeding period.

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Conflicts of interest

There are no conflicts of interest.

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