



# Research Title: Factors Associated with Cessation of Exclusive Breastfeeding

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**Purpose:** The study aimed to determine the prevalence of exclusive breastfeeding (EBF), measure the association between EBF and sociodemographic and obstetric characteristics of lactating mothers, and determine challenges of EBF.

**Methods:** The study was cross-sectional and was conducted in four primary health care centres (PHCCs) at Alehsa region in Saudi Arabia (SA). Lactating mothers coming to vaccinate their babies (0–6 months) were recruited. Sample size totalled 372, where 93 were randomly selected from each centre. Sociodemographic and obstetric characteristics of participants, breastfeeding (BF) status, and challenges of EBF were collected. Basic univariate descriptive statistics were conducted to explore the sociodemographic and obstetric characteristics, BF status and challenges of BF. Bivariate analyses were done to explore the association between the dependent and independent variables. Binary logistic regression models were then executed. A 2-tailed p-value < 0.05 was considered significant.

**Results:** EBF rate was nearly 60%. Cessation of EBF was associated with younger age, inconvenience/fatigue due to BF, sore breasts or nipples/too painful, perceived low milk quantity, BF skills were not effective, maternal choice, and baby-centred factors.

**Conclusion and Recommendations:** EBF was associated with problems/difficulties in BF technique. It is recommended that health care professionals like doctors, nurses, and midwives should train mothers during and after pregnancy regarding BF technique or pumping breast milk in case of BF difficulties, improve mothers' confidence about the ability to breastfeed and enhance mothers' knowledge on the normal process of lactation. Secondly, it is the role of policymakers to ensure implementation of Baby-Friendly Hospital Initiative (BFHI) guidelines in hospitals to meet the WHO's global target of infants being exclusively breastfed until six months of age.

**Keywords:** exclusive breastfeeding; EBF, cross-sectional study, risk factors

## Introduction

BF is viewed as the optimal method of infant feeding that provides many benefits to both infant and mother.<sup>1</sup> Meta-analyses indicated protection against child infections and malocclusion, increases in intelligence, and probable reductions in overweight and diabetes.<sup>2</sup> Therefore, studying the potential factors that affect BF practices and duration is of significance.<sup>1</sup> Extensive research has demonstrated that the long duration of BF also contributes to the good health and well-being of mothers and babies.<sup>3</sup> Consequently, World Health Organization (WHO) and an international body like United International Children Emergency Fund (UNICEF) implemented a number of guidelines that recommend mothers to breastfeed their babies for the first 6 months.<sup>4,5</sup>

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WHO defined EBF as “[when] infant is allowed to receive breast milk only without any food, drinks, even water, except drops of syrups, vitamins, minerals or medicines”.<sup>4</sup> Although the benefits of EBF have spread worldwide, BF is still unpopular in most parts of the world.<sup>5</sup>

As a part of the global efforts to promote BF, the government of SA has put a tremendous effort through adopting the Baby-Friendly Hospital Initiative (BFHI) Program to promote, protect, and support BF. Still, the outcomes are below expectation.<sup>6</sup> Today, the rate of EBF initiation, EBF, and continued BF to 24 months are not high as expected.<sup>7</sup> National cross-sectional studies in SA showed that BF rate declined from 93% in the first month to 89% in the second month, and then to 78% in the 6th month.<sup>8</sup>

The main challenges impeding the success of BF were: formal work schedule; informal work; family influence due to community culture from grandmothers, cousins, and aunties; insufficient breast milk; and swollen breast or sore nipples.<sup>9–11</sup> On the other hand, in the Gulf Cooperation Council (GCC) countries {United Arab Emirates, Bahrain, Oman, SA, Qatar, and Kuwait}, the challenges of BF were; inadequate training of health care staff, increased marketing of infant milk formula, lack of education and policy support, presence of only 3 out of 11 non-governmental hospitals adopting BFHI practice, short maternity leave, insufficient milk production, sickness of a lactating mother, and lactating mothers getting pregnant.<sup>12</sup>

The literature revealed that the initiation rate of BF is high in SA. However, the rate declined over six months.<sup>1</sup> To the best of the researcher’s knowledge, no studies have been conducted to explore the challenges facing EBF in Alehsa region in SA. Accordingly, the study aimed to determine the prevalence of mothers who adopted EBF for 1, 2 and 6 months after delivery at Alehsa region in SA, measure the association between EBF vs the socio-demographic and obstetric characteristics of lactating mothers and identify the challenges of EBF.

## Materials and Methods

### Study Design, Data Source and Population

Cross-sectional study conducted at four PHCCs in Alehsa district in SA. One PHCC was chosen from each of the four regions in Alehsa. These centres were chosen as they

have the highest frequency of visits (encounters) of lactating women to vaccinate their babies (0–6 months). Similarly, the four regions of Alehsa district were represented. Study participants were lactating women visiting the centres to vaccinate their babies (0–6 months). Mothers who have single birth, 17 years and older, and gave birth after 24 gestational weeks were included. However, mothers with medical contraindications for BF, such as HIV/AIDS and babies who received intensive care monitoring and/or with malformations that interfered with their BF, were excluded.

### Data Collection

Data collection sheet was designed ([Appendix 1](#)) and validated by faculty members in the family and community medicine department as well as paediatricians. The questionnaire comprised of BF status as the dependant variable {Mothers who exclusively breast fed their babies at 1, 2 and 6 months were considered as EBF and mothers who did not breastfeed their babies since birth (only formula feeding) or who used partial BF (formula + BF) from the start were considered as non-EBF} and maternal socio-demographic characteristics, e.g., age, mothers’ education and occupation, family income, etc., obstetric characteristics, e.g., gestational age, parity, and mode of birth, and reasons for cessation of EBF, e.g., Perceived low milk quantity, Sore breasts or nipples/Too painful, etc. as independent variables.<sup>9–13</sup> Self-administered questionnaire was used to collect data from participants. A pilot study was conducted among fifteen women attending the dental clinic of one of the PHCCs under study. It was done to estimate the time needed to complete the data collection and check for any difficulty or misunderstanding of the questionnaire.

### Sample Size and Sampling Technique

The sample size was determined by applying a one-sample proportion formula. The researcher used 55% as an average of the proportions of the previous studies.<sup>14</sup> The precision of estimation was determined as 5%. Then, the initial sample size was 423 women, and after correction for finite population, which is approximately 2880 women visiting the four centres semi-annually to vaccinate their babies, the final sample size was 372 mothers. They were distributed uniformly among the four centres; 93 women were randomly selected from each centre using systematic random sampling technique after the application of inclusion and exclusion criteria.

## Statistical Analysis

Basic univariate descriptive statistics were executed (for example; frequency counts, percentages, means, and standard deviations) to explore the socio-demographic characteristics, obstetric history, BF status, and barriers impeding mothers during their BF practice. Bivariate analyses were done to explore the association between the dependent and the independent variables. Dependent variables were the BF status, and independent variables were the socio-demographic characteristics, obstetric history, and reasons for the cessation of EBF. Then, statistically significant variables were considered as candidate variables in the binary logistic regression analysis models.  $P$ -value  $< 0.05$  was considered statistically significant. Statistical analysis was completed using the SPSS 24.0 computer software package for Windows (SPSS, Inc., Chicago, IL). Ethical approval from Imam Abdulrahman Bin Faisal University's research ethical review board (IRB-PGS-2019-03-288) and written informed consent from participants were obtained. Study complies with the Declaration of Helsinki. Data obtained from the participants were kept confidential.

## Results

Study findings revealed that the mean age of mothers was 30.6 years  $\pm$  6.53, a majority had at least a bachelor's degree (52.7%), were not working (75%), and had family income below 10,000 Saudi Riyal/month (58.3%). The prevalence of mothers who adopted EBF for 1, 2 and 6 months postpartum was 16.9%, 21.5%, and 22.0% respectively. However, those mothers that adopted non-EBF was approximately 40%. The most frequent reasons for cessation of EBF were perceived as low milk quantity, baby-centred factors, maternal choice, and inconvenience/fatigue due to BF.

Table 1 demonstrated many variables that showed a statistically significant difference between mothers adopted EBF for 1, 2 and 6 months after birth versus non-EBF regarding some factors.

Table 2 illustrated adjusted OR for EBF with respect to various independent variables. Inconvenience/fatigue due to BF was a risk factor associated with cessation of EBF at 1, 2 and 6 months after birth. Sore breasts or nipples being too painful was a risk factor associated with cessation of EBF at 2 and 6 months after birth. In addition, claims of lack of skills in BF, perceived low milk quantity, maternal choice, and baby-centred factors were risk factors

associated with discontinuation of EBF at 6 months after delivery.

## Discussion

The current study demonstrated that the prevalence of mothers who adopted EBF for 1, 2 and 6 months postpartum at Alehsa was 16.9%, 21.5%, and 22.0% respectively. Findings of a review study conducted in SA and reviewed 17 cross-sectional studies revealed that EBF rates range from 0.8% to 43.9%.<sup>1</sup> At Riyadh, SA, 51% ( $n=53$ ) of BFHI participants experienced EBF, however 29.6% ( $n=29$ ) of non-BFHI participants experienced EBF.<sup>6</sup>

Low prevalence of practising EBF could be due to lack of training of mothers during and after pregnancy regarding BF technique and or lack of mothers' awareness of the significance of BF. A systemic review was done in Iran among 32 studies, and the overall rate of EBF was 53%. The study revealed that the relatively high prevalence of EBF was attributed to the training of mothers regarding the BF technique during and after pregnancy. Additionally, apart from most Iranian mothers being housewives, Iran's maternity leave as per its labour law is 6 months.<sup>15</sup>

In this study, mothers who cited "inconvenience/fatigue due to BF" had more chance to stop EBF. This could be inferred to the fact that BF was tiring or demanding for the mother in addition to the lack of a mother's time to breastfeed while caring for other children. A study done in Canada reported that the most frequent reason mentioned for a cessation of EBF was inconvenience or fatigue and it was correlated with BF by 22.6% of mothers; about 22.8% mothers ceased BF in less than 1 week, 24.5% discontinued BF from 1–6 weeks, while 18.9% stopped BF in more than 6 weeks.<sup>16</sup>

"Sore breast or nipples" was another risk factor related to the cessation of EBF. Mothers complained of painful nipples, general or unspecified BF pain, sore breasts, engorgement, breast pain, and biting. This concurs with a study conducted in two different regions in Ghana in 2019 where mothers reported that the swollen breast or sore nipples were major challenges that hindered efforts to optimum BF.<sup>9</sup>

Moreover, another study conducted at the breastfeeding centre of Western Australia also had its findings showing that nipple pain was one of the reasons for early weaning. The study recommended that effective early lactation management for prevention of nipple pain and early diagnosis and effective treatment are crucial to avoid early weaning.<sup>17</sup> Moreover, "perceived minimal milk quantity"

**Table I** Association of Cessation of EBF with Socio-Demographic Characteristics, Obstetric History, and Reasons of EBF Cessation in Alehsa, 2020

Variables	For 1 Month					For 2 Months					For 6 Months				
	EBF (n= 63)		Non EBF (n= 147)		P value	EBF (n= 80)		Non EBF (n= 147)		P value	EBF (n= 82)		Non EBF (n= 147)		P value
	N	%	N	%		N	%	N	%		N	%	N	%	
<b>Socio-demographic characteristics</b>															
<b>Age</b>															
17-27-37-49	5	8.6	53	91.4	0.000	30	36.1	53	63.9	0.879	20	27.4	53	72.6	0.176
	33	31.7	71	68.3		36	33.6	71	66.4		45	38.8	71	61.2	
	25	52.1	23	47.9		14	37.8	23	62.2		17	42.5	23	57.5	
<b>Mothers' education</b>															
Illiterate - Elementary school	11	50.0	11	50.0	0.008	6	35.3	11	64.7	0.394	5	31.3	11	68.8	0.057
Intermediate school- High school	21	25.6	61	74.4		26	29.9	61	70.1		35	36.5	61	63.5	
Undergraduate school- Postgraduate	31	29.2	75	70.8		48	39.0	75	61.0		42	35.9	75	64.1	
<b>Husbands' education</b>															
Illiterate - Elementary school	5	71.4	2	28.6	0.051	3	60.0	2	40.0	0.359	4	66.7	2	33.3	0.258
Intermediate school- High school	25	29.1	61	70.9		28	31.5	61	68.5		35	36.5	61	63.5	
Undergraduate school- Postgraduate	33	28.2	84	71.8		49	36.8	84	63.2		43	33.9	84	66.1	
<b>Mothers' occupation</b>															
Non-working	42	25.5	123	74.5	0.006	54	30.5	123	69.5	0.005	60	32.8	123	67.2	0.922
Working	21	46.7	24	53.3		26	52.0	24	48.0		22	47.8	24	52.2	
<b>Husbands' occupation</b>															
Non-working	0	0.0	3	100.0	0.253	0	0.0	3	100.0	0.198	0	0.0	3	100.0	0.193
Working	63	30.4	144	69.6		80	35.7	144	64.3		82	36.3	144	63.7	
<b>Income of family</b>															
less than 10.000 SR "less than 2.667 \$"	26	23.9	83	76.1	0.04	48	36.6	83	63.4	0.606	60	42.0	83	58.0	0.012
More than 10.000 SR "More than 2.667 \$"	37	36.6	64	63.4		32	33.3	64	66.7		22	25.6	64	74.4	
<b>Residency</b>															
Urban	27	25.5	78	74.3	0.175	42	35.0	78	65.0	0.936	39	33.3	78	66.7	0.425
Rural	36	34.3	69	65.7		38	35.5	69	64.5		43	38.4	69	61.6	
<b>Type of family</b>															
Direct	37	25.9	106	74.1	0.057	42	28.4	106	71.6	0.003	61	36.5	106	63.5	0.710
Extended family	26	38.8	41	61.2		38	48.1	41	51.9		21	33.9	41	66.1	
<b>Obstetric history</b>															
<b>Gestational age</b>															
9 months	52	30.1	121	69.9	0.968	65	34.9	121	65.1	0.842	70	36.6	121	63.4	0.552
< 9 months	11	29.7	26	70.3		15	36.6	26	63.4		12	31.6	26	68.4	
<b>Parity:</b>															

(Continued)

Table I (Continued).

Variables	For 1 Month					For 2 Months					For 6 Months				
	EBF (n= 63)		Non EBF (n= 147)		P value	EBF (n= 80)		Non EBF (n= 147)		P value	EBF (n= 82)		Non EBF (n= 147)		P value
	N	%	N	%		N	%	N	%		N	%	N	%	
Primiparity	6	15.4	33	84.6	0.027	19	36.5	33	63.5	0.824	9	21.4	33	78.6	0.031
Multiparity	57	33.3	114	66.7		61	34.9	114	65.1		73	39.0	114	61.0	
<b>Mode of birth</b>															
Cesarean	18	31.0	40	69.0	0.840	24	37.5	40	62.5	0.655	24	37.5	40	62.5	0.739
Vaginal	45	29.6	107	70.4		56	34.4	107	65.6		58	35.2	107	64.8	
<b>Reasons of EBF cessation</b>															
Perceived low milk quantity	27	29.0	66	71.0	0.754	35	34.7	66	65.3	0.833	4	5.7	66	94.3	0.000
Sore breasts or nipples/Too painful	14	29.8	66	70.2	0.971	5	13.2	33	86.8	0.002	2	5.7	33	94.3	0.000
Mother/infant separation	4	12.9	27	87.1	0.024	26	49.1	27	50.9	0.016	0	0.0	27	100.0	0.000
Maternal choice	9	18.0	41	82.0	0.034	23	35.9	41	64.1	0.891	1	2.4	41	97.6	0.000
Breastfeeding skills were not effective	10	32.3	21	67.7	0.766	4	16.0	21	84.0	0.033	1	4.5	21	59.6	0.001
Mother's medical condition	13	33.3	26	66.7	0.615	12	31.6	26	68.4	0.604	0	0.0	26	100.0	0.000
Inconvenience/fatigue due to breastfeeding	10	18.2	45	81.8	0.026	13	22.4	45	77.6	0.018	3	6.3	45	93.8	0.000
Mother Return to work or school	5	50.0	5	50.0	0.157	15	75.0	5	25.0	0.000	0	0.0	5	100.0	0.091
Baby-centred factors	17	28.8	42	71.2	0.815	15	26.3	42	73.7	0.103	1	2.3	42	97.7	0.000
Baby's medical condition	4	36.4	7	63.6	0.636	3	30.0	7	70.0	0.723	0	0.0	7	100.0	0.045

was a risk factor associated with cessation of EBF. Mothers perceived that the infant was not getting enough milk (28.5%) and was showing signs of hunger (11.8%). Another study presented similar result where the most popular barrier for a cessation of EBF at the early postpartum period was the perception of mothers of inadequate milk supply in the first few days; therefore, they introduced formula for their babies after pushing from hospital's staff.<sup>18</sup> On the other hand, perceived insufficient milk comes from lack of mothers' knowledge about lactation physiology. One study addressed maternal concerns in relation to perceived insufficient milk, especially regarding the role of maternal interpretation of crying as a sign of hunger and its role as the initiator of the perceived insufficient milk cycle. The study recommended making the connection between incomplete or infrequent removal of milk from the breast and breast milk production clearer to women may play an important role in reducing the prevalence of perceived insufficient milk and its impact on EBF rates. Additionally, the study recommended manual breast milk extraction if the mother and baby were apart.<sup>19</sup>

Woman's conception of insufficient milk quantity was attributed to lack of knowledge regarding the normal process of lactation, or technical difficulties in feeding, rather

than an actual inability to produce enough milk.<sup>20</sup> Additionally, mothers who cited "BF skills were not effective" had a higher probability of stopping EBF. The findings demonstrated that 6.5% of mothers faced problems with BF technique, and 2.7% stopped EBF at 6 months because the baby was uncomfortable with the act or connotations of BF. Either others stopped EBF as their babies suffered from colic, or the mothers had trouble in BF. This also affirms results of a study done in the United States where about 28% of mothers had difficulty with BF and uncertainty in their ability in BF.<sup>21</sup>

Similarly, "maternal choice" is another reason to stop EBF among lactating mothers. This could be due to psychosocial distress of mothers. This is in accordance with a secondary analysis of data collected from 7,942 participants who were enrolled in a peer counselling BF support program done by Michigan State University. Mothers discontinued BF because of psychosocial distress.<sup>22</sup> Moreover, a cross-sectional survey of women who discharged from five hospitals in Ontario, Canada revealed that mothers' intention to breastfeed for a short duration (<4 months) was a key risk factor for early cessation of BF.<sup>23</sup>

The final risk factor to stop EBF is referred to as "baby's centred factor". Mothers demonstrated problems

**Table 2** Factors Associated with Cessation of Exclusive Breastfeeding After 1, 2 and 6 Months of Birth in Alehsa, 2020

Variables	For 1 Month		For 2 Months		For 6 Months	
	P value	OR	P value	OR	P value	OR
<b>Age category</b>	0.014					
17-	0.006	8.107	-	-	-	-
27-	0.465	1.394	-	-	-	-
37-49		1.000	-	-	-	-
<b>Mothers' education</b>	0.110				0.111	
Elementary school or less	0.042	0.261	-	-	0.086	3.703
Intermediate school or more	0.157	0.472	-	-	0.442	0.681
Bachelor's degree or more		1.000	-	-		1.000
<b>Husbands' education</b>	0.026					
Elementary school or less	0.041	0.097	-	-	-	-
Intermediate school or more	0.269	1.690	-	-	-	-
Bachelor degree or more		1.000	-	-	-	-
<b>Mothers' occupation</b>						
Working	0.009	0.305	0.412	0.702	-	-
Not working		1.000		1.000	-	-
<b>Income of family</b>						
Less than 10.000 SR "less than 2.667 \$"	0.064	2.160	-	-	0.033	0.369
More than 10.000 SR "More than 2.667 \$"		1.000	-	-		1.000
<b>Type of family</b>						
Direct family	0.053	0.442	0.001	0.343	-	-
Extended family		1.000		1.000	-	-
<b>Parity</b>						
Primiparity	0.933	1.052	-	-	0.021	0.248
Multiparity		1.000	-	-		1.000
<b>Reasons of cessation of EBF</b>						
<b>Maternal choice</b>						
Yes	0.180	1.962	-	-	0.001	44.027
No		1.000	-	-		1.000
<b>Inconvenience/fatigue due to breastfeeding</b>						
Yes	0.010	3.432	0.003	3.265	0.011	7.648
No		1.000		1.000		1.000
<b>Sore breasts or nipples/too painful</b>						
Yes	-	-	0.010	3.885	0.000	32.298
No	-	-		1.000		1.000
<b>Breastfeeding skills were not effective</b>						
Yes	-	-	0.102	2.647	0.001	39.755
No	-	-		1.000		1.000
<b>Mother return to work or school</b>						
Yes	-	-	0.025	0.205	-	-
No	-	-		1.000	-	-

(Continued)



Table 2 (Continued).

Variables	For 1 Month		For 2 Months		For 6 Months	
	P value	OR	P value	OR	P value	OR
<b>Perceived low milk quantity</b>						
Yes	-	-	-	-	0.000	12.219
No	-	-	-	-		1.000
<b>Baby's-centred factors</b>						
Yes	-	-	-	-	0.002	35.531
No	-	-	-	-		1.000

with latching (3%), infant refusal of BF (9.9%), preterm baby (1.3%), and infant's colic (0.3%). This agrees with a systematic review study that confirmed that infants might also reject breast and prefer the bottle because either they are having a problem with BF or they may be experiencing nipple confusion.<sup>24</sup>

Comparing our study findings with other studies in SA, a review study showed the most common reason for BF cessation was insufficient breast milk, sickness, new pregnancy, and BF problems.<sup>1</sup>

Limitations of this study are recall bias, inability to generalize the study results across SA and study participants are only Saudi nationals.

## Conclusion and Recommendations

It is recommended that health care professionals like doctors, nurses, and midwives should train mothers during and after pregnancy regarding BF technique or pumping breast milk in case of BF difficulties, improve mothers' confidence about the ability to breastfeed and enhance mothers' knowledge on the normal process of lactation. Secondly, it is the role of policymakers to ensure implementation of BFHI guidelines in hospitals to meet the WHO's global target of infants being exclusively breastfed until 6 months of age. Thirdly, policymakers have a fundamental role in directing resources in favor of public health. Thus, it is their role to mobilize health professionals and mothers regarding the importance of EBF for society.

## Disclosure

The authors report no conflicts of interest in this work.

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