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The Prevalence and Determinants of Exclusive Breastfeeding during First Three Months of Infant's Life in Bushehr, Iran: A Cross-sectional Community-based Study

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ABSTRACT

Background & aim: Breastfeeding is one of the most effective strategies to reduce infant and child mortality around the world. Due to the low rate of exclusive breastfeeding in Bushehr, Iran, it seems necessary to examine its related factors. Therefore, this study aimed to investigate the prevalence and factors associated with exclusive breastfeeding in Bushehr, Iran.

Methods: This study was conducted based on a cross-sectional descriptive design. The data were collected using an adopted and validated structured questionnaire from 288 mothers who attended 10 public health centers through stratified random sampling in Bushehr, Iran, during 2019. The obtained data were analyzed in SPSS software (version 24) through descriptive statistics, Chi-square test, t-test, and binary logistic regression.

Results: The mean age of the respondents was 28.48±5.50 years, and the prevalence of exclusive breastfeeding during the first three months of the infant's life was obtained at 75%. Lower household income was associated with higher exclusive breastfeeding practice (OR: 2.21, 95% CI: 1.01-4.69.95; P= 0.04). The odds of exclusive breastfeeding practice was 2.15 times higher in mothers who were satisfied with their newborn's sleep habits (OR: 2.15, 95% CI: 1.14-4.04; P =0.01); moreover, the corresponding value was 9.82 times higher in mothers with singleton pregnancy (OR: 9.82, 95% CI: 1.78-24.12; P=0.009). Mothers who had a sick infant were 0.45 times less likely to practice exclusive breastfeeding, compared to those who had a healthy infant (OR: 0.45, 95% CI: 0.212-0.950; P=0.03).

Conclusion: Household income, mother's satisfaction with newborns sleep habits, singleton pregnancy and infant disease were associated with exclusive breastfeeding practice. It is recommended to identify mothers who are in high-risk groups and consider their needs to promote exclusive breastfeeding.

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Introduction

Breast milk is reported to be the best nutrition for babies. Evidence shows that exclusive breastfeeding (EBF) is the optimal way of feeding infants for the first six months of life (1). The word "exclusive breastfeeding" refers to a baby that only receives breast milk. No other liquids or solids are offered, including water (except for oral rehydration solution), vitamin, mineral, or medicine drops, and syrups (2).

Since exclusive breastfeeding offers important nutrition for a child's growth and development, it is a cornerstone of child survival and health (3). Breastfeeding reduces the risk of infection in infants, such as diarrhea and common childhood illnesses, including

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pneumonia. Moreover, it can have longer-term health benefits for both the mother and the infant, such as decreasing the risk of childhood and adolescent overweight and obesity (1). Exclusive breastfeeding in mothers delays returns to fertility, as well as decreases weight, contraction of the uterus, and its affordability, compared to infant formula (4). Although EBF is vital to promote infants' growth, development and health, globally only 38% of infants aged 0 to 6 months are exclusively breastfed (5, 6). About 50% of infants under one month of age and 30% of infants aged between 1 and 5 months are exclusively breastfed (5). According to recent studies, suboptimal breastfeeding behaviors, such as non-exclusive breastfeeding, were responsible for 11.6% of mortality in children under the age of five. In 2011, this amounted to around 804, 000 child deaths (5). The lowest rates of EBF were found in West/Central Africa (20%), and the highest rates of EBF were reported in East Asia/Pacific (43%) (7).

According to studies, there are a variety of factors that influence EBF practice between countries and even within the same country. Several factors have been linked to EBF, including educational level, breastfeeding knowledge, occupation, breastfeeding counseling during antenatal and postnatal services, intent to exclusively breastfeed before delivery, attitudes towards EBF, mothers with chronic diseases, mother death, unwanted pregnancy, children with congenital or acquired diseases, low birth weight, twin babies, infant's gender, timely initiation of breastfeeding, infant's birth weight, socioeconomic position, monthly household income, type of delivery, place of delivery, residence, parity, discarding, mothers' smoking status, community beliefs, health system practices, and mothers' HIV status (4, 8-11). According to a systematic review and meta-analysis in 2019, the overall prevalence of EBF was obtained at 53% in Iran (12).

Duration of breastfeeding infants in Bushehr province is lower than the national average which can put babies at risk for disease and infection (13). There is limited information regarding determinants of EBF in Bushehr. Due to cultural, economic, and social differences in different parts of Iran, this study is necessary to determine factors affecting EBF practice in Bushehr, Iran. Therefore, this study aimed to determine the prevalence of EBF practice and its associated factors among mothers attending the public health centers in Bushehr, southwest of Iran. The findings would provide necessary information to the public health providers and health policy-makers in evidence-based policymaking, which may help reduce mortality and morbidity associated with non-exclusive breastfeeding.

Materials and Methods

A cross-sectional-descriptive analytic study was carried out on 288 eligible women recruited from 10 public health centers in Bushehr, Iran, from April to October 2019. The public health centers provide routine antenatal care, obstetric services, and postnatal care for mothers and children.

The inclusion criteria were minimum level of literacy and willingness of the mothers to participate in research. On the other hand, the mothers with a serious physical disease (mastectomy) that interfered with breastfeeding, as well as mental illness, and those whose infants had abnormalities, such as cleft lip or palate, and the mothers who had adopted the infants were excluded from the study.

The sample size was determined using a single proportion formula. Based on a previous study, the proportion of mothers who practiced EBF for their infants was estimated at 82% (14). Moreover, considering the precision of 0.05 with a 95% confidence interval (CI), the minimum sample size was calculated at 227 individuals. Eventually, regarding the non-response rate of 20%, the final sample size was estimated at 273 cases.

This study was conducted on mothers who presented to the public health centers for routine maternal and child health care within three month of delivery. The study population was selected using a stratified random sampling method from 10 public health centers in Bushehr. In the first step, the total number of women in all the health centers was identified in Bushehr. As the numbers of women were unequal in different health centers, a list of mothers with an infant less than three months was obtained from the Integrated Health Record

System of each health center and used as the sampling frame. Subsequently, the number of mothers of each stratum (health center) was divided by the total number of the mothers to get the percentage. Afterward, the percentage of each stratum was multiplied by the desired sample size to get the required sample for each health center. Finally, from each stratum, the subjects were randomly selected on the sample frame. Considering the inclusion criteria, telephone calls were made to ask eligible women to participate in the study. The research assistant attended the health centers to explain the objectives of the study to the mothers who were referred to health centers for routine postpartum care. After obtaining the informed consent from those who were willing to participate in the study, mothers were asked to complete the questionnaire and then deliver it to the research assistant.

The study protocol was approved by the Ethics Committee of Bushehr University of Medical Sciences, Bushehr, Iran (IR.BPUMS.REC.1398.022). The participants were then assured of the confidentiality of their responses through the anonymity of the questionnaire. All the collected data were kept confidential and used only for study purposes.

In this study, the outcome variable was exclusive breastfeeding during the first three months of an infant's life. The data were collected through an adopted questionnaire from studies conducted by Ghanbarnejad and Almasi in Bandar Abbas and Kashan, respectively, which examined the pattern of exclusive breastfeeding and related factors. In the study performed by Ghanbarnejad, the validity of the researcher-made questionnaire was performed by a panel of experts consisting of epidemiologists, obstetricians, and midwives (15, 16). The inter-rater reliability analysis Kappa was obtained at 0.79. As a rule of thumb, the values of Kappa from 0.61 to 0.80 were considered substantial agreement (17).

The questionnaire includes two sections to cover such sociodemographic variables as age, occupation, education level, husband's age, education level, and occupation, as well as household income (first section). The second part evaluates maternal and child-related variables and psychiatric histories, such as the method of delivery, last pregnancy intention, infant disease, birth weight, singleton/twin birth, baby's gender, mother's history of depression, and mother's satisfaction with the baby's sleep habits. Content validity of the combined questionnaires was examined qualitatively and quantitatively. In the qualitative content validity assessment, three experts in midwifery and community health were asked to comment on the items regarding the grammatical accuracy of the items, choice of vocabulary, and placement of items. After applying the views of experts, the required revisions were made. Furthermore, the content validity ratio was assessed by eight experts. The participants were then asked to rate the items based on a 3-point Likert scale of essential, useful but not essential, and not essential. Regarding the opinion of the experts (n=8), a content validity ratio (CVR) greater than 0.75 suggests that the item is needed at a statistically significant level (P=0.05). Additionally, the content validity index (CVI) was evaluated by the same eight experts, who used a 4-point Likert scale to rate items on their "clarity", "simplicity", and "relevance (scores 0 to 3 for "not at all" to "completely") (18). In this study, the results of CVI and CVR were obtained at 0.93 and 0.90, respectively.

The obtained data were analyzed in SPSS software (version 24.0) through descriptive statistics (frequencies and percentages, as well as means±SD). Both univariate and multivariate techniques were used to identify the factors associated with EBF practice among women. An independent sample t-test was applied to compare the means of the two groups of quantitative variables. Moreover, the Chi-square test was used to determine the association among categorical variables. Binary logistic regression was also utilized to identify the influencing factors for EBF practice after controlling other variables. A p-value less than 0.05 was considered statistically significant.

Results

Participants Characteristics

The mean ages of the respondents and their husbands were obtained at 28.48±5.50 and 32.59±5.57 years, respectively.

Table 1. Socio-demographic factors associated with exclusive breastfeeding

Characteristics	EBF	NEBF	Total	p-value
	N (%)	N (%)		
Age (Year)	217 (75)	71 (25)	288	0.413
Mean±SD	28.56± 5.52	28.11±5.46		
Husband's Age	216 (75)	71 (25)	287	0.402
Mean±SD	32.40 ± 5.62	33.11±5.48		
Occupational Status				
Housewife	176(86.41)	53 (75.71)	229	0.863
Employed	32(15.4)	17 (24.3)	49	
Husband's Occupational Status				
Unemployed	5 (2.3)	1 (1.4)	6	
Government job	108 (50)	38 (53.5)	146	0.274
Non-government job	103 (47.7)	32 (45.1)	136	
Education Level				
Under diploma	45 (20.8)	10 (14.1)	55	
Diploma	75 (34.7)	23 (32.4)	98	0.612
University	96 (44.5)	38 (53.5)	134	
Husbands' Education Level				
Under diploma	30 (14)	6 (8.6)	36	
Diploma	51 (23.7)	24 (34.3)	75	0.159
University	134 (62.3)	40 (57.1)	174	
Household Income				
≤ 30,000,000 IRR	187 (89)	52 (76.5)	239	0.009*
> 30,000,000 IRR	23 (11)	16 (23.5)	39	

*Significant level at P<0.05; EBF: Exclusive Breastfeeding; NEBF: Non-Exclusive Breastfeeding

A majority of the women were housewives (80.1%) with academic degrees (47.2%). Furthermore, almost all husbands (97.9%) were employed in this study, and most of the households (86%) had a monthly income of ≤30.000.000 Iranian Rials (IRR). In this study, 75% of the infants were exclusively breastfed. Table 1 tabulates the distribution of EBF practicing among women according to socio-demographic characteristics. According to the results, there was a significant association between household income and breastfeeding practice. Women with lower household income practiced EBF more, compared to their counterparts with higher household income (89% vs. 11%, P=0.009).

Table 2 demonstrates maternal and child-related factors between the EBF and non-exclusive breastfeeding (NEBF) groups.

Those who had singleton pregnancy practiced EBF more, compared to women with twin pregnancy (99% vs. 1%, P=0.001). Moreover, there was a lower rate of EBF practice among mothers who had a sick infant, compared to women with healthy infants (11% vs. 88.9%, P=0.001). Additionally, there was a higher proportion of mothers who were satisfied with their baby's sleep habits in the EBF group, compared to those who were unsatisfied (76.5% vs. 23.5%, P<0.001).

The results of the binary logistic regression analysis of the EBF predictors among the women were presented in Table 3. The Hosmer-Lameshow Chi-square test yielded a p-value of 0.633, indicating that the model adequately fitted the data.The whole model explained 16% (Nagelkerke R squared) of the variance of EBF and appropriately categorized 76% of cases. As can be observed in Table.3, the odds of EBF practice among mothers who had monthly income ≤ 30,000,000 IRR was 2.21 times higher than their counterparts with household income > 30,000,000 IRR (OR: 2.21, 95% CI: 1.01-4.69.95; P=0.04).

Table 2. Maternal and child-related factors associated with exclusive breastfeeding

Characteristics	EBF	NEBF	Total	P-value
	N (%)	N (%)		
Mode of delivery				
Normal vaginal delivery	82 (37.8)	22 (31)	104	0.732
Cesarean section	135 (62.2)	49 (69)	184	
Pregnancy Desire				
Desired	188(87.4)	61(85.9)	249	0.740
Unwanted	27 (12.6)	10 (14.1)	37	
Type of Pregnancy				
Single	212 (99)	65 (91.5)	277	0.001*
Twin	3(1)	6 (8.5)	9	
History of Depression				
Yes	18(8.3)	12(16.9)	30	0.041*
No	198(91.7)	59(83.1)	257	
Birth Weight				
< 2500 gr	12 (5.6)	10 (14.1)	22	0.02*
≥ 2500 gr	202 (94.4)	61(85.9)	263	
Infant Disease				
Yes	24(11.1)	19(26.8)	43	0.001*
No	192(88.9)	52(73.2)	244	
Baby's Gender				
Yes	109 (50.2)	34 (47.9)	143	0.785
No	108 (49.8)	37 (52.1)	145	
Mother's Satisfaction with the Baby's Sleep Habits				
Yes	166(76.5)	39(54.9)	205	< 0.001*
No	51(23.5)	32(45.1)	83	

*Significant level at P<0.05; EBF: Exclusive Breastfeeding; NEBF: Non-Exclusive Breastfeeding

Table 3. Factors associated with exclusive breastfeeding among women

Variables	P-value	OR	95% C.I. for EXP(B)	
			Lower	Upper
Household Income				
≤ 30,000,000 IRR	0.04	2.207	1.009	4.699
> 30,000,000 IRR (Ref)		1.00		
History of Depression				
Yes	0.142	0.512	0.209	1.251
No(Ref)		1.00		
Type of Pregnancy				
Single	0.009	9.822	1.782	24.125
Twin (Ref)		1.00		
Birth Weight				
≥ 2500 gr	0.541	1.389	0.484	3.989
< 2500 gr (Ref)		1.00		
Disease of Infant				
Yes	0.036	0.449	0.212	.950
No (Ref)		1.00		
Mother's Satisfaction with the Baby's Sleep Habits				
Yes	0.017	2.151	1.144	4.045
No (Ref)		1.00		

* Significant level at P<0.05, **Ref= reference, CI= confidence interval, OR=odds ratio

Furthermore, the odds of EBF was 2.15 times higher in mothers who were satisfied with their baby's sleep habits (OR: 2.15, 95% CI: 1.14-4.04; P=0.01); in addition, the corresponding value

was 9.82 times higher in mothers with singleton pregnancy (OR: 9.82, 95% CI: 1.78-24.12; P=0.009). It should be noted that the mothers who had a sick infant (OR: 0.45, 95% CI: 0.212-0.950; P=0.03) were less likely to practice EBF, compared to mothers who had a healthy infant.

Discussion

This study aimed to determine prevalence and factors associated with EBF practicing among women in Bushehr, Iran. The overall prevalence of EBF practice was obtained at 75%, whereas 25% of infants were NEBF at three months of birth. A prospective descriptive study among Thai women under the Breastfeeding Promotion Program estimated the rate of NEBF at 26.4% at 12 weeks postpartum, which was consistent with the results of our study (19). Furthermore, a study was conducted by Panaviene among primigravid mothers in a large Irish tertiary maternity hospital. The results demonstrated that 73% of babies were receiving any human milk on discharge from hospital, and 48% were breastfed exclusively (20). The prevalence of EBF in this study was higher than that reported in some other countries, such as Bangladesh (35.9%) (21), Saudi Arabia (24.4%) (22), Egypt (9.7%) (23), the USA (16.8%) (24), Malaysia (43%) (8), India (34%) (25), and the Goba district of South-East Ethiopia (71.3%) (26).

The possible explanation for these variations in EBF rate in different regions worldwide might be due to socio-economic and cultural differences regarding the newborns feeding across areas. In addition, all the countries might not focus on promoting the EBF rate with the same intensity which may also contribute to the discrepancy (10, 21).

Exclusive breastfeeding was more prevalent in the present study, compared to that in the studies carried out by Ghanbarnejad in Bandar Abbas (55.4%) (15) and the Almasi in Kashan (33%) (16) on six-month-old infants. This may be due to the older age of the infants in these studies since as the infant ages, the mother's desire to continue exclusive breastfeeding decreases. In a study conducted by Ghanbarnejad, the absence of a specific disease of the mother during pregnancy, breastfeeding experience, insufficient breast milk, wanted pregnancy, singleton birth, initiation of breastfeeding in the first two hours after delivery, birth of a baby in the hospital, and no use of a pacifier were related to exclusive breastfeeding (15).

On the other hand, Almasi showed that factors, such as type of delivery, exclusive breastfeeding education, father's job, growth curve status, and birth weight were associated with exclusive breastfeeding (16). It is worth mentioning that the prevalence of exclusive breastfeeding in Sanandaj, Iran, was almost the same as that in the present study (71.5%). Moreover, factors, such as unwanted pregnancy, the mother's perception of sufficient milk, hospitalization of the baby, skin-to-skin contact, and breastfeeding in the first hour after delivery were associated with exclusive breastfeeding (11).

This study demonstrated that higher household income was significantly associated with lower EBF practice among mothers, which was consistent with the study conducted by Tan in Malaysia (27); however, the results were inconsistent with the findings of a study performed by Onah in Nigeria (28). In other studies, there was no relationship between EBF and the mother's income (11, 29). According to this report, the rate of exclusive breastfeeding decreased when a mother's income was high. This result may be clarified by the fact that cow milk and baby formula are not affordable unless the family has a higher income. Another explanation is that higher-income women are less likely to stay at home during the day, which could jeopardize the tradition of exclusive breastfeeding (30).

In the present study, the relationship between other socio-demographic variables and breastfeeding was not significant. In contrast, Hossein et al. (2018) conducted a study in Bangladesh and showed that younger mothers were less likely to adhere to the EBF practice. Moreover, the housewife mothers were 1.2 times more likely to practice EBF than their counterparts, and EBF was significantly reduced with an increase in mothers' educational level (21). These findings are in agreement with the results of the studies carried out by El-Gilany in Saudi Arabia (22) and Radhakrishnan in Tamil Nadu, India (25). The differences in the results may be related to participants' characteristics,

as the majority of them were educated and housewives. The possession of a healthy baby at birth has a positive effect on continued breastfeeding. Neonatal illnesses, including jaundice, respiratory distress, and infection, put the infant at risk for inadequate breastfeeding (31). Our study found that a lower rate of EBF was among mothers who had a sick infant. Similarly, in a study conducted in Ireland, there was a higher rate of hypoglycaemia in NEBF newborns, explaining the reason for formula supplementation as a method of treatment for hypoglycemic conditions (20).

According to the results of a study in Sanandaj, west of Iran, the prevalence of exclusive breastfeeding was obtained at 71.5%. Moreover, exclusive breastfeeding was significantly correlated with an unwanted pregnancy, maternal perception of insufficient milk, hospitalization of the baby after birth, skin-to-skin contact, and breastfeeding in the first hour after delivery (11).

Studies have reported that twins and multiple births were less likely to be exclusively breastfed for six months, compared to their singleton counterparts (32, 33). Our study indicated that the mothers of singleton infants were more likely to practice EBF, compared to mothers of twins. In the same line, Odei documented a 44 % exclusively breastfeeding rate for six months among singleton babies, compared to 14% of twins who were EBF for six months in Accra, which was consistent with our findings (34). Moreover, evaluation of the Polish breastfeeding program showed lower levels of EBF among twins and triplets (4.9%), while the corresponding value was obtained at 73.2% among singletons (32).

This discrepancy may be related to many issues concerning exclusively breastfeeding twins, such as weakness or lack of sucking reflex, repeated link of prematurity with multiple pregnancies, separation due to stay in the intensive care, and neurodevelopmental failure (35).

Mothers who gave birth vaginally were more likely than those who had a cesarean section to exclusively breastfeed their babies (30, 36). This may be due to the mother's pain, leading her to postpone giving the baby breast milk and instead turn to formula or cow milk in the first few days. In this study, although the ratio of exclusive breastfeeding in mothers with normal delivery was higher than cesarean section, this difference was not statistically significant. This finding was consistent with the results of the studies conducted in Ireland (17) and Sanandaj (west of Iran) (11); however, they were not in line with the findings of a study carried out in Ethiopia (30).

In this study, those mothers who were satisfied with the baby's sleep habits were more likely to practice EBF. According to a review of 37 published studies, infants have particular sleep habits, which can be difficult for new parents to adapt. Sleep is influenced by biopsychosocial factors, and the parent-child relationship has a significant effect on the infant's sleeping and feeding habits. Once health care professionals understand these aspects and the particular characteristics of infant sleep, they will provide information that will help to direct and reassure the growing family (37).

Regarding the limitations of this study, one can refer to the cross-sectional nature of the research that hindered establishing a causal relationship between the determinant factors and EBF. Furthermore, some factors which had potential influences on breastfeeding, such as EBF education, mother's perception, awareness, and self-efficacy about EBF have not been examined in this study. It is recommended that these factors be considered in future studies. Moreover, the present study was carried out on three-months old infants. In future studies, it is recommended to consider the continuation of exclusive breastfeeding up to six months.

Conclusion

According to the results of the study, higher household income, infant disease, twin birth, and maternal satisfaction with the infant's sleeping habits were factors associated with EBF during the first three months of the infant's life. Furthermore, the identification of high-risk groups and educational interventions, especially for mothers with twins or sick infants, is recommended to promote exclusive breastfeeding.

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Conflicts of interest

Authors declared no conflicts of interest.

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