

## Predictors of Exclusive Breastfeeding in the First Six Months: A Cross-sectional Study in Ardabil, Northwest of Iran

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### Abstract

**Background:** Breast milk provides essential and irreplaceable nutrients for an infant's growth and development. Consequently, exclusive breastfeeding for the first 6 months of an infant's life is important for their health and survival. This study aimed to determine predictors of exclusive breastfeeding in the first 6 months among infants in Iran.

**Methods:** A cross-sectional study was conducted on 379 lactating women with infants >6 months. Participants attended health care centers in Ardabil city, Iran during 2020. Information about mothers and infants was collected via a questionnaire. Differences in characteristics of women that engaged in exclusive breastfeeding for the first 6 months (EBF-6) compared to no exclusive breastfeeding for the first 6 months (NEBF-6) was analyzed via T-tests. Predictors of exclusive breastfeeding among the infants were examined via logistic regression analyses.

**Results:** There were 196 respondents (51.7%) categorized into EBF-6 compared to 183 respondents (48.3%) categorized into NEBF-6. A greater number of women in EBF-6 compared to NEBF-6 were housewives ( $p=0.034$ ). Additionally, the time of the first breastfeeding after birth was earlier for EBF-6 compared to NEBF-6 ( $p<0.001$ ). Among the variables related to exclusive breastfeeding, only the predictive power of breastfeeding in the first half hour after birth was confirmed ( $p=0.002$ ). This finding suggested that breastfeeding soon after birth led to an increase of almost 6 times in the probability of engaging in exclusive breastfeeding for 6 months.

**Conclusions:** Breastfeeding soon after birth appears to strongly influence the likelihood of exclusive breastfeeding for 6 months. Considering the important role of this practice in maintaining and ensuring maternal and child health, early initiation of breastfeeding after birth should be prioritized.

**Key Words:** Ardabil, Exclusive Breastfeeding, Infant Health, Maternal Health, Predictors.

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## 1- INTRODUCTION

Optimizing nutrition during the infancy period is of great importance due to this period being one of the most vulnerable stages of a child's growth and development. During the first few months of life, breast milk is considered as the most complete meal for infants (1). The importance of this issue is demonstrated by the numerous scientific studies focused on breastfeeding in recent years (2). Furthermore, UNICEF and the World Health Organization (WHO) continue to promote the importance of breastfeeding for health and psychological benefits to the mother and child, as well as the economic savings. Such organizations have tried to promote breastfeeding by providing counseling and holding various meetings (3).

Breast milk is a complex, dynamic liquid that supplies the newborn with the nutrients and bioactive elements necessary for their growth and development. The nutritional content of human milk is constantly changing; therefore, variations may occur during the nursing period, during a single day, during a single feeding, and from one woman to another (4). According to existing literature, breastfeeding boosts IQ, protects against childhood and opportunistic diseases, and may reduce the future risk of obesity and diabetes (5). Additionally, breastfeeding protects lactating women from breast cancer, promotes healthy spacing between pregnancies, and may also lower their risk of ovarian cancer and type 2 diabetes (6).

It is critical to realize that human milk has distinctive qualities (4, 7). In this respect, UNICEF and the WHO advise 6 months of exclusive breastfeeding. Accordingly, infants should only be given breast milk for the first 6 months of their lives and should not be given any other liquids (apart from medications and vitamins) (8). However, the existing body of literature has documented that only 37% of infants

generally, high-income countries have shorter breastfeeding durations than low-income ones (9). The literature is in general agreement that breastfeeding could globally prevent 20,000 breast cancer deaths and 823,000 deaths of children under the age of 5 years. Over the past ten years, epidemiological and biological findings confirmed the benefits of breastfeeding for women and children, regardless of socioeconomic status (10).

Existing literature on breastfeeding prevalence in Iran suggests that the range is from 40% to 74% (11, 12). However, there is evidence of a reduction in this practice when compared to previous decades. Therefore, it is crucial to explore factors that may influence mothers' breastfeeding practices to help develop programs that would encourage and support mothers to breastfeed (13). A previous study reported that Iranian women mostly stop breastfeeding before or after 6 months due to inadequate breast milk, doctor's advice, illness, drug use, child's illness, and employment (14).

Proper and frequent milk sucking in the right position during the first days can play a critical role in continuing breastfeeding. Some other associated factors include calmness and mothers' relaxed status, prior birth experience, success with breastfeeding, support from spouse and family, and assurance of financial and job security. It has been suggested that the proper breastfeeding process may be interrupted when the mother and baby are not in the same room, breastfeeding is delayed, and complementary feeding is not started on time. Additionally, when the mother and baby are not released from hospital at the same time, type of birth is cesarean section and when all the aforementioned factors are absent (13, 15, 16).

Other studies have investigated the effect of a mothers' race, age, occupation, literacy and socioeconomic status, a lack

of sufficient mother's milk, a child's illness, multiple pregnancy, the delivery method, and the mother's willingness on exclusive breastfeeding. However, the findings from these studies have revealed a wide range of results (1, 17). Given the important role of breastfeeding and the variations in social, cultural, and economic conditions across the world, the aim of the present study was to examine predictors of exclusive breastfeeding in the first six months in Iran.

## **2- MATERIALS AND METHODS**

### **2-1. Design and Sampling**

This cross-sectional study was undertaken among breastfeeding mothers in Ardabil who were registered with health centers and had children older >6 months. Three hundred and seventy-nine qualified breastfeeding mothers were enrolled in the study using the convenient sampling approach, and two health centers were chosen from each of the city's five districts using a stratified cluster sampling method. A significance threshold of 0.5%,  $d=0.05$ , and ( $p=0.5$ ) from the pilot study were used to calculate the sample size. Of the 384 participants, five individuals were excluded from the study because they refused to continue cooperating, and 379 samples were ultimately examined.

#### **2-1-1. Inclusion and exclusion criteria**

The inclusion criteria of the study consisted of having one child, giving birth at term, and living in Ardabil, northwest of Iran. The exclusion criteria included refusing to participate in the study or ceasing cooperation, suffering from any cancer or chronic disease, or taking drugs that impair the immune system, the use of tobacco, alcohol, or narcotics, as well as infants suffering from congenital issues like cleft palate or cleft lip.

#### **2-2. Procedure and Data analysis**

The Participants gave written consent before the study began, and it was made

clear to them that all data would be kept private. The participants were required to complete a questionnaire that was allowed for collecting information about the mother and their infant. The Statistical Package for the Social Sciences (SPSS version 23.0, Chicago, IL, USA) was used for data analysis. Quantitative data was presented in terms of mean and standard deviation, and qualitative data were presented in terms of frequency and percentage. T-test was implemented to compare the differences in characteristics of women that engaged in exclusive breastfeeding for the first 6 months (EBF-6) with those of the mothers without exclusive breastfeeding for the first 6 months (NEBF-6). Predictors of exclusive breastfeeding in the first 6 months among infants were examined via logistic regression analyses. The statistical significance was considered at  $p < 0.05$ .

## **3- RESULTS**

The characteristics of the respondents are presented in Table 1. The age of respondents ranged from 19 to 45 years, with an average age of  $31.0 \pm 5.8$  years. The infants were the family's first-born child for approximately half of the respondents (49.0%). The type of birth for the majority (85.2%) of babies was vaginal, and 98% of the times, the first feeding occurred within the first half hour of birth. Mothers were primarily housewives (87.2%) and had diplomas (39.8%) in terms of educational level. There were 196 respondents (51.7%) categorized into EBF-6 compared to 183 respondents (48.3%) categorized into NEBF-6. A greater number of women in EBF-6 compared to NEBF-6 were housewives ( $p=0.034$ ). Additionally, the time of the first breastfeeding after birth was earlier for EBF-6 compared to NEBF-6 ( $p < 0.001$ ).

**Table-1:** Mothers' and infants' demographic profiles

Variable		EBF-6 (n = 196)	NEBF-6 (n = 183)	P-value
Mothers' age (in years)	19-25	42 (21.4)	37 (20.2)	0.688
	26-35	103 (52.6)	104 (56.8)	
	36-45	51 (26)	42 (23)	
Mothers educational level	Primary level	38 (19.4)	19 (10.4)	0.069
	Elementary level	53 (27)	47 (25.7)	
	Diploma	78 (39.8)	84 (45.9)	
	Pre University	27 (13.8)	33 (18)	
Mothers job	Housewife	171 (87.2)	146 (79.8)	0.034
	Employed	25 (12.8)	37 (20.2)	
Family' income	Low	25 (12.8)	20 (10.9)	0.497
	Moderate	142 (72.4)	128 (69.9)	
	High	29 (14.8)	35 (19.1)	
Infants birth rank	1	92 (46.9)	94 51(4)	0.513
	2	65 (33.2)	61 (33.3)	
	3	35 (17.9)	23 (12.6)	
	4	4 (2)	5 (2.7)	
Distance from previous birth giving	2-3	58 (29.6)	48 (26.2)	0.143
	3-4	73 (37.2)	59 (32.2)	
	4-5	50 (25.5)	49 (26.8)	
	5-6	15 (7.7)	27 (14.8)	
Infant's gender	Male	111 (56.6)	90 (49.2)	0.513
	Female	85 (43.4)	93 (50.8)	
Type of birth	Vaginal	167 (85.2)	145 (79.2)	0.143
	Cesarean section	29 (14.8)	38 (20.8)	
Type of recent birth	Vaginal	167 (85.2)	145 (79.2)	0.089
	Cesarean section	29 (14.8)	38 (20.8)	
Time of the first breastfeeding	In the first half hour	192 (98)	162 (88.5)	0.001
	Delayed	4(2)	21 (11.5)	
Average duration of exclusive breastfeeding		0±6	1.63±3.37	0.000

EBF-6: Exclusive breastfeeding for the first 6 months; NEBF-6: No exclusive breastfeeding for the first 6 months. Data reported as number (percentage).

**Table-2:** Frequency distribution of exclusive breastfeeding duration

Duration of breastfeeding (in months)	Number	Percent
1>	6	1/6
1	14	3.7
2	28	7.4
3	43	11.3
4	42	11.1
5	50	13.2
6	196	51.7
Sum	379	100
Mean and standard deviation	1.63 ± 4.73	P = 0.000

Comparison test with standard value (6 months)

According to the findings of all respondents, the average duration of exclusive breastfeeding is less than 6 months, and this difference is statistically

significant ( $p = 0.000$ ), according to a comparison between the average duration and the standard value of 6 months (Table 2).

**Table-3:** Logistic regression analysis of some variables in relation to exclusive breastfeeding for up to 6 months

Predictor variables	Wald	df	OR	P-Value	CI 95%
Type of birth	0.312	1	1.175	0.576	0.668 – 2.066
Mother's job	3.129	1	1.675	0.077	0.946 – 2.965
Breastfeeding soon after birth	10.073	1	5.948	0.002	1.978 – 17.891

The predictive value of breastfeeding as soon as possible after birth was found to be true among the factors that had a significant link with exclusive breastfeeding (Table 3). In other words, compared to delayed breastfeeding, early breastfeeding offered about six times the chance of exclusive breastfeeding for the first 6 months. The Wald statistic shows the effect of each variable in predicting exclusive breastfeeding; considering the Wald coefficient, the variable of breastfeeding soon after delivery has the greatest impact on predicting exclusive breastfeeding up to six months. The mother's job and type of birth were found to have no statistically significant impact on exclusive breastfeeding up to 6 months ( $p > 0.05$ ).

#### 4- DISCUSSION

The findings from the present study highlighted that approximately half of the infants cared for by health centers in Ardabil were breastfed exclusively for six months. However, the typical amount of time was less than six months ( $4.73 \pm 1.63$ ) and the variable of breastfeeding soon after birth had a strong predictive power in the first 6 months of exclusive breastfeeding. The prevalence of exclusive breastfeeding in the first 6 months for the Iranian women in the present study differs from the rates reported in other countries.

For instance, the majority of Arab nations, including Kuwait 2% (18), Egypt 9.7% (19), Syria 12.9% (20), the United Arab Emirates 13.3% (21), and Saudi Arabia 13.7% (22), had lower rates of exclusive breastfeeding than those observed in the current study. Additionally, Vietnam (32%), Japan (37.4%), America (24.7%), and Australia (30.5%) (23-25), as well as in European nations including France (10%), Germany (12%), and England (17%) (26) had lower rates than those found in the present study. In contrast, higher percentages of infants exclusively breastfed up to 6 months have been reported in Cambodia (73.5%) (27) and Bangladesh (63.4%) (28) in South Asia, as well as in Colombia (73.9%), Bolivia (89.9%), and Peru (92.8%) in South America (29). There have been similar rates of exclusive breastfeeding in the first 6 months reported in Turkey (45.7%) (30) and Romania (46.7%) (31).

With respect to previous studies conducted in Iran, significant regional variations in the prevalence of exclusive breastfeeding during the first 6 months of life have been reported. This includes prevalence rates of 72.4% in Qom (32), 70.7% in Shazand, and 56.4% in Mashhad (33), which is higher than that observed in this study. However, the rates reported in cities such as Shahrekord (44.5%) (34), Arak (41.5%) (35), Tehran (31.2%) (36), and Ardakan (6.1%) (37) were all lower than that

reported in our findings. Like our findings, 53% of women in Bandar Abbas (38) and 50.7% of women in Fars province (39) reported exclusively breastfeeding their infants for the first 6 months.

The WHO and UNICEF state that by 2030, at least 70% of infants should be exclusively breastfed for the first 6 months of life (40). Although the prevalence of exclusive breastfeeding in this study is higher than many other countries or regions of the world, the rate found (51.7%) is still unsatisfactory and falls short of the target set by the WHO and UNICEF.

While EBF-6 cases compared to NEBF-6 cases were more likely to be housewives, only this variable approached significance for predicting exclusive breastfeeding for up to 6 months ( $p = 0.077$ ). However, the difference between EBF-6 and NEBF-6 based on employment status is in agreement with the findings from numerous domestic and international studies (28, 13, 41). Specifically, it appears that being employed is one of the causes of breastfeeding discontinuation. The negative impact of mothers' employment on exclusive breastfeeding may be explained by several causes, including exhaustion, lack of mother's time, bottle feeding, and a lack of employer attention to the issue of assistance for breastfeeding mothers.

Although the type of delivery did not have a statistically significant effect, numerous studies have shown that exclusive breastfeeding for the first 6 months is longer in mothers who had vaginal delivery compared to cesarean section (28, 42-44). Albeit, some other investigations, in line with the findings of the present study, have not found any relationship between the delivery method and exclusive breastfeeding (30- 31, 39). It is well established that mothers who have a caesarean section experience several complications due to this procedure,

including pain and wound at the surgical site, fatigue, difficulty in moving, a decreased ability to breastfeed, etc. These complications are intense particularly in the first few hours after the baby is born, which may be detrimental to starting or continuing breastfeeding.

A main finding of the present study was that mothers who breastfed their babies for the first time within the first half hour of delivery experienced longer periods of exclusive breastfeeding compared to mothers who began breastfeeding later. More specifically, mothers who breastfed their babies for the first time within the first half hour of delivery were nearly six times more likely to continue exclusive breastfeeding up to 6 months. This finding is corroborated by the results of a study conducted in Kashan, which demonstrated a direct correlation between newborn feeding beginning less than two hours after birth with exclusive breastfeeding (45). Furthermore, another study concluded that breastfeeding soon after birth had a significant predictive power of providing an eight-time increase in the chance of exclusive breastfeeding for 6 months (46). In contrast, studies in Turkey (30) and Romania (31) do not support our findings that exclusive feeding and the start of breastfeeding soon after birth are significantly correlated. It seems highly plausible that early breastfeeding may help with the initiation and maintenance of exclusive breastfeeding due to the various advantages it provides for the mother and child, including fortifying the early relationship between the two (47, 48).

This difference in breastfeeding duration and the factors influencing it among studies sheds light on the fact that breastfeeding is influenced by a variety of individual, social, cultural, and medical factors (49). As such, further investigation is needed to collaborate the findings from

the present study and to generalize the findings to other cities.

## 5- CONCLUSION

The findings showed that approximately half of the respondent's breastfed their infants' exclusively for at least 6 months. However, the only variable that had a predictive effect on exclusive breastfeeding for the first 6 months was breastfeeding soon after birth. Given the importance of exclusive breastfeeding in maintaining and ensuring the health of the mother and child, early initiation of breastfeeding after birth should be prioritized.

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## 7- ETHICAL APPROVAL

Informed consent was obtained from all participants of the study. They were guaranteed that their information would be kept confidential and anonymous. This study was approved by the ethics committee of Ardabil University of Medical Sciences under the code of IR.ARUMS.REC.1399.447. All experiments were performed in accordance with relevant guidelines and regulations (such as the Declaration of Helsinki). Exception: Research gathered via questionnaires.

## 8- COMPETING INTERESTS

The authors declare that they have no competing interests.

## 9- AUTHORS' CONTRIBUTIONS

A.M. and H.G. designed the initial proposal and manuscript. All authors cooperated in data collection and analysis. A.M., M.M. and A.S. wrote the main manuscript text and all authors reviewed the manuscript.

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## 11- AVAILABILITY OF DATA AND MATERIALS

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

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