Original Article

The Relationship between Perceived Stress and Breastfeeding Pattern among Primiparous Mothers: A Cross-sectional Study in the West of Iran

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Abstract

Background: The breastfeeding pattern of mothers in different societies has its roots in different social and cultural issues. Recognizing the significance of this issue and the absence of similar research in the western region of Iran, this study explored the relationship between perceived stress and breastfeeding patterns among primiparous mothers. **Materials and Methods:** This cross-sectional study was conducted on 269 mothers from January to May 2023 in the city of Hamadan, Iran. The demographic and midwifery information questionnaire and the perceived stress scale (PSS) were used. Data analysis was performed using Stata software, with the significance level set at 0.05. **Results:** In the present study, only 24.16% of breastfeeding mothers breastfed exclusively. The findings showed that with each unit increase in the perceived stress score, the chance of not exclusively breastfeeding increased by 54%. Moreover, with each year of increase in the mother's age, the chance of not exclusively breastfeeding decreased by 15%. **Conclusions:** The results showed a negative association between stress and exclusive breastfeeding. Therefore, it is recommended that mental health promotion be incorporated into policy-making and planning for maternal and neonate healthcare to ensure the continuation of exclusive breastfeeding.

Keywords: *Breastfeeding, cross-sectional studies, Iran, perceived stress scale*

Introduction

Breastfeeding is widely recognized for its positive impact on physical, mental, and social health, both in childhood and adulthood.[1,2] Breast milk, tailored to meet the specific needs of newborns, is rich in immunoglobulins and nutrients that promote growth, development, and protection against infections.[3,4] In many countries, the rate of exclusive breastfeeding and the continuation of breastfeeding have decreased.[5] According to statistics, in the United States in 2018, only 46.3% of children were exclusively breastfed up to 3 months of age, which decreased to 25.8% at 6 months of age.[6] Moreover, recent studies in Iran show that the rate of exclusive breastfeeding in the first 6 months after birth varies between 47% and 60%.[7] Unfortunately, despite the emphasis of the national committee on the promotion of breastfeeding, the available statistics on the exclusive breastfeeding of mothers in Iran are worrying.[8]

The cessation of breastfeeding has a detrimental effect on the health of the child as well as the health of women.[9] Therefore, promoting breastfeeding is one of the strategies for the food security of children under 2 years of age,[10] and it causes savings by reducing the import of artificial milk and the problems caused by its consumption.[11] The psychological problems of mothers, especially primiparous mothers, due to lack of experience, can affect many of the biological processes, including breastfeeding.[12] Acute physical and mental stress can disrupt the let-down reflex by reducing the secretion of oxytocin during breastfeeding.[13] If this happens repeatedly, it can reduce milk production due to the lack of complete emptying of the breasts in each breastfeeding session.[14] Ziomkiewicz *et al*.[13] reported that psychosocial stress has a negative effect on the density of calories, fat, and medium-chain and long-chain saturated fatty acids in milk.

The breastfeeding pattern of mothers in different societies has its roots in different social and cultural issues. Given the

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importance of this issue and the lack of similar studies in the western region of Iran, the present study examined the relationship between perceived stress and breastfeeding patterns among primiparous mothers.

Materials and Methods

This cross-sectional study was conducted on 269 mothers from January to May 2023 in comprehensive health service centers in the city of Hamadan, located in western Iran. The sampling method was as follows: the city of Hamadan was divided into four geographical areas, four comprehensive health service centers were randomly selected from each area, and sampling was done through availability sampling. The researchers introduced themselves and explained the research objectives, then registered the initial enrollment of individuals interested in participating in the study. Written informed consent was obtained from the participants, and the study questionnaires, including a demographic and midwifery information questionnaire and perceived stress scale (PSS; Cohen *et al*., 1983),[15] were completed through interviews by the researcher.

The study inclusion criteria included the mother's willingness to participate in the study, a singleton pregnancy with a healthy and low-risk fetus, neonate birth age of 37 weeks or later, healthy neonates without severe physical abnormalities, neonate not undergoing surgery, not undergoing phototherapy, neonates having the conditions for discharge from the incubator and warmer according to the specialist physician's opinion, neonates capable of breastfeeding, healthy mothers without physical or mental illnesses according to their health record, being a primiparous mother and 18–45 years of age, absence of abnormal conditions after delivery (such as bleeding or uterine atony), absence of contraindications for breastfeeding after delivery (such as untreated tuberculosis, HIV, and severe depression), and lack of use of medications that prevent breastfeeding. The study exclusion criteria included delivery before 37 weeks of pregnancy and the presence of known abnormalities in the neonate or mother's breast that prevent breastfeeding.

The sample size was calculated based on the study by Didarloo *et al*.,[16] which investigated the relationship between perceived stress and breastfeeding self-efficacy. In this study, the correlation coefficient between the scores of the two variables ranged from −0.17 to −0.19, and a value of −0.17 was used to estimate the sample size. Considering a type I error rate of 0.05 and a power of 80%, the sample size was estimated to be 269 individuals.

This researcher-developed questionnaire included questions about maternal and demographic information such as age, education level, occupation, spouse's age and occupation, spouse's education level, type of delivery, average monthly family income, satisfaction with neonate gender, neonate hospitalization after discharge, planned or unplanned pregnancy, spousal support in breastfeeding, and breastfeeding patterns. The content validity method was used to determine the validity of the demographic and midwifery information questionnaire. The questionnaire was prepared after reviewing various research articles and validation and correction by the supervisor. It was then provided to 10 experienced individuals, and the final tool for data collection was determined based on their corrective and suggestive comments. The validity of this tool was confirmed, and a Cronbach's alpha of 0.89 was obtained.

The PSS assesses the experience of stress in the past month and consists of 10 items scored on a Likert scale of 0–5, ranging from "never" to "very often."[17] The stress score is obtained by summing up the item scores, ranging from 0 to 40, with higher scores indicating higher levels of perceived stress. Scores of 13 or lower indicate normal stress, scores of 14–19 indicate occasional stress, and scores of 20 or higher indicate high stress. This questionnaire was validated in Iran by Khalili *et al*.[18] and has a reported reliability of 72%.

To describe the perceived stress score, mean (standard deviation) was used based on the breastfeeding pattern and other qualitative variables under investigation. Univariate and multivariate linear regression analyses were also performed with a stepwise approach to assess the predictors of exclusive breastfeeding. All analyses were conducted using Stata software (version 14; StataCorp LLC, College Station, TX, USA). A significance level of 0.05 was considered for the tests' p values.

Ethical considerations

The protocol of this study has been approved by the Ethics Committee of Hamadan University of Medical Sciences, Iran, with the ethical code of IR.UMSHA.REC.1401.404. A written informed consent form was obtained from all participants before entering the study.

Results

In total, 269 women participated in the study, with a mean age of 26.34 (4.65) years (range: 18–42 years). The mean gestational age was 39.43 (0.97) weeks, and the average birth weight was 3069.70 (409.57) grams. Table 1 presents the demographic and breastfeeding characteristics of the study population. More than 54% of the participants had a high school diploma or university education, and 244 of them were homemakers (90.71%). In addition, over 85% of the participants had a moderate economic status. Among the cases, 64.31% had boy newborns, and 68.77% had vaginal deliveries. Breastfeeding initiation occurred within half an hour after delivery in over 51.3% of cases. However, only 24.16% of breastfeeding mothers exclusively breastfed their neonates. Approximately 60.97% breastfed less than eight times a day, and around 45% had breastfeeding sessions lasting between 5 and 10 minutes. The mean (SD) perceived stress score was 4.12 (21.0), with a range of

Table 1: Demographic characteristics and factors related to breastfeeding in the study population

Variable		*n* (%)
Education	Primary	35 (13.01)
	High school	87 (32.34)
	Diploma	89 (33.09)
	University	58 (21.56)
Occupation	Housekeeper	244 (90.71)
	Employee	25 (9.29)
Economic situation	Poor	40 (14.87)
	Moderate	229 (85.13)
Child's age (months)	<1	28 (10.41)
	1–3	53 (19.70)
	4–6	79 (29.37)
	7–12	50 (18.59)
	13–18	36 (13.38)
	19–24	23 (8.55)
Gender	Boy	173 (64.31)
	Girl	96 (35.69)
Delivery type	Vaginal	185 (68.77)
	Cesarean section	84 (31.23)
Time of breastfeeding after birth	Immediately	29 (10.78)
	Half an hour	138 (51.30)
	1–3 hours	78 (29.00)
	4–6 hours	24 (8.92)
Prenatal care	Yes	213 (79.18)
	No	56 (20.82)
Breastfeeding pattern	Exclusive	65 (24.16)
	Predominant	36 (13.38)
	Partial	60 (22.30)
	Token	61 (30.11)
	Bottle	27
Frequency of breastfeeding (number of times daily)	<8	164
	8–12	61
	>12	44
Breastfeeding in each time (minutes)	5–10	121
	10–15	45
	15–20	80
	20–25	21
	>25	2

12–29. Among the participants, nine women (3.35%) had a low stress score, 90 (33.46%) had a moderate score, and 170 (63.2%) had a high score.

The predictors of the breastfeeding pattern are presented in Table 2. The adjusted regression model revealed that with each unit increase in the perceived stress score, the chance of not exclusively breastfeeding increased by 54% (OR: 1.54; $p = 0.001$). With a 1-year increase in the mother's age, the chance of not exclusively breastfeeding decreased by 15% (OR: 0.85; $p = 0.005$). Moreover, women who breastfed for less than 15 minutes per session had 3.12 times higher odds of not exclusively breastfeeding ($p = 0.001$). Variables such as neonate gender, employment status, mode of delivery, prenatal care, and education level of the breastfeeding mother had no significant association with the pattern of exclusive breastfeeding ($p > 0.05$).

Table 3 presents the predictors of breastfeeding duration using the logistic regression model. The analysis revealed that with a 1-year increase in the mother's age, the chance of breastfeeding for less than 15 minutes per session decreased by 27% ($p = 0.003$). Conversely, with each unit increase in the perceived stress score, the chance of breastfeeding for less than 15 minutes per session increased by 3.07 times ($p < 0.001$). Other variables did not demonstrate a significant association with breastfeeding duration ($p > 0.05$).

Table 4 displays the predictors of breastfeeding frequency using the logistic regression model. The results indicated that with a 1-year increase in the mother's age, the chance of breastfeeding less than eight times a day decreased by 12% ($p = 0.047$). Conversely, with each unit increase in the perceived stress score, the chance of breastfeeding less than eight times a day increased by 2.03 times ($p < 0.001$). Similar to previous findings, other variables did not exhibit a significant association with breastfeeding frequency ($p > 0.05$).

Discussion

In the present study, only 24.16% of breastfeeding mothers exclusively breastfed their neonates. The findings showed that with each unit increase in the perceived stress score, the chance of not exclusively breastfeeding increased by 54%. Conversely, with a 1-year increase in the mother's age, the chance of not exclusively breastfeeding decreased by 15%. Women who breastfed for less than 15 minutes per session had 3.12 times higher odds of not exclusively breastfeeding. Conversely, with a 1-year increase in the mother's age, the chance of breastfeeding for less than 15 minutes per session decreased by 27%. With each unit increase in the perceived stress score, the chance of breastfeeding for less than 15 minutes per session increased by 3.07 times, and with a 1-year increase in the mother's age, the chance of breastfeeding less than eight times a day decreased by 12%. Conversely, with each unit increase in the perceived stress score, the chance of breastfeeding less than eight times a day increased by 2.03 times.

Suárez-Cotelo *et al*.[19] reported a prevalence of 28.2% for exclusive breastfeeding, which is consistent with the findings of the present study. Similarly, a cross-sectional study in India found that 27.6% of mothers practiced exclusive breastfeeding until 6 months of age.[20] Another systematic review focusing on East African women revealed that 55.9% of them exclusively breastfed for at least 6 months.[21] In a study involving 428 mothers with children aged 0–5 months, the prevalence of exclusive breastfeeding was reported at 42.8%.[3] However, in contrast to these findings, a study conducted in Iran reported a higher prevalence of exclusive

Table 2: Predictors of exclusive breastfeeding pattern using logistic regression model

Variable		Crude model		Adjusted model	
		OR (95% CI)	*p*	OR (95% CI)	*p*
Perceived stress score		1.65 (1.46, 1.86)	<0.001	1.54 (1.31, 1.81)	0.001
Age (year)		0.8 (0.74, 0.86)	<0.001	0.85 (0.75, 0.95)	0.005
Breastfeeding in each time (minutes)	>15	1			
	<15	3.38 (2.44, 4.69)	<0.001	3.12 (2.68, 3.56)	0.001
Frequency of breastfeeding	>8	1			
	<8	2 (1.72, 2.32)	<0.001	1.96 (1.75, 2.37)	<0.001
Education	Less than diploma	1			
	Diploma or higher	0.22 (0.11, 0.42)	<0.001	0.64 (0.21, 1.93)	0.43
Occupation	Housekeeper	1			
	Employee	0.3 (0.13, 0.7)	0.005	-	-
Neonate gender	Girl	1			
	Boy	0.85 (0.48, 1.52)	0.59	-	-
Delivery type	Vaginal	1			
	Cesarean section	1.24 (0.67, 2.32)	0.48	-	-
Prenatal care	Yes	1			
	No	1.39 (0.67, 2.88)	0.38	-	-

Table 3: Predictors of breastfeeding duration using logistic regression model

Variable		Crude model		Adjusted model	
		OR (95% CI)	*p*	OR (95% CI)	*p*
Age (year)		0.77 (0.71, 0.83)	<0.001	0.73 (0.6, 0.9)	0.003
Perceived stress score		3.12 (2.18, 4.68)	<0.001	3.07 (2.08, 4.54)	<0.001
Education	Less than diploma	1			
	Diploma or higher	0.13 (0.07, 0.23)	<0.001	0.49 (0.08, 2.96)	0.44
Occupation	Housekeeper	1			
	Employee	0.07 (0.0, 0.23)	<0.001	0.13 (0.008, 2.2)	0.16
Neonate gender	Girl	1			
	Boy	1.21 (0.72, 2.03)	0.47	-	-
Delivery type	Vaginal	1			
	Cesarean section	1.17 (0.69, 2)	0.56	-	-
Prenatal care	Yes	1			
	No	1.04 (0.57, 1.91)	0.89	-	-

Table 4: Predictors of breastfeeding frequency using logistic regression model

Variable		Crude model		Adjusted model	
		OR (95% CI)	*p*	OR (95% CI)	*p*
Age (year)		0.8 (0.75, 0.86)	<0.001	0.88 (0.78, 1)	0.047
Perceived stress score		2.18 (1.73, 2.68)	<0.001	2.03 (1.62, 2.54)	<0.001
Education	Less than diploma	1			
	Diploma or higher	0.23 (0.13, 0.4)	<0.001	1.2 (0.33, 4.36)	0.78
Occupation	Housekeeper	1			
	Employee	0.1 (0.03, 0.3)	<0.001	0.38 (0.05, 2.79)	0.34
Neonate gender	Girl	1			
	Boy	1.03 (0.62, 1.72)	0.90	-	-
Delivery type	Vaginal	1			
	Cesarean section	1.14 (0.67, 1.94)	0.63	-	-
Prenatal care	Yes	1			
	No	0.82 (0.45, 1.49)	0.51	-	-

breastfeeding of 71.5%.[22] Cultural, social, and economic factors likely contribute to these differences and can influence the continuation of breastfeeding.

The present study demonstrated that with each unit increase in the perceived stress score, the likelihood of not exclusively breastfeeding increased by 54%.

Numerous studies have associated maternal psychological distress with suboptimal breastfeeding outcomes, including reduced proportion and duration of exclusive breastfeeding. Longitudinal research has shown that mothers experiencing higher perceived stress are less likely to continue exclusive breastfeeding for 6 months.[14] An international online study involving participants from various countries highlighted the significant role of psychosocial factors in maintaining exclusive breastfeeding up to 6 months after birth.[23] A review by Nagel *et al*.[12] further supported the negative impact of maternal psychological distress on breastfeeding outcomes. Although different studies have employed diverse methods to assess maternal stress, evidence consistently indicates that stress is associated with delayed initiation of breastfeeding and shortened duration of exclusive breastfeeding.

The mother's age was found to be significantly associated with exclusive breastfeeding in a study by Jones *et al*.,[24] which is in line with the findings of the present study. In the current study, variables such as the baby's gender, employment status, delivery type, prenatal care, and education level of the nursing mother had no significant relationship with the pattern of exclusive breastfeeding.

However, Esmaeili *et al*.[10] reported the positive effect of the neonate's gender and the mother's occupation on exclusive breastfeeding, with a higher rate observed in girl neonates and the non-employment of mothers being a contributing factor for maintaining exclusive breastfeeding.[11] These results are inconsistent with the results of the present study. However, Asare *et al*.[25] conducted a study in Ghana and found no relationship between the neonate's gender and exclusive breastfeeding, which is consistent with the present study.

Considering Iran's policy of increasing the birth rate and the importance of nutrition in ensuring the highest standard of health for children, it is crucial to prioritize the promotion of breastfeeding. Mothers should be encouraged to attend prenatal care, where they can learn about the benefits of exclusive breastfeeding for infants under 6 months of age. Given the significant negative relationship between perceived stress and breastfeeding observed in this study, it is essential to implement strategies to manage maternal stress effectively. Interventions that support breastfeeding goals in women experiencing high levels of psychological distress are beneficial for both maternal and infant health. It is worth noting that the data collection method relied on self-reporting, which introduces the possibility of biases associated with this type of data; thus, this is a limitation of the present study.

Conclusion

The findings indicate a negative association between stress and exclusive breastfeeding. Therefore, it is recommended that mental health promotion be prioritized in policy-making and planning for the health of mothers and infants to support continued exclusive breastfeeding. Longitudinal studies are warranted to further explore the impact of perceived stress on breastfeeding patterns.

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Conflicts of interest

Nothing to declare.

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