The Open Nursing Journal
DOI: 10.2174/0118744346459619260325045305, 2026, 20, e18744346459619
ISSN: 1874-4346

RESEARCH ARTICLE OPEN ACCESS

Breastfeeding Knowledge, Perceived Stress, and Barriers among Breastfeeding Mothers: A Cross-Sectional Study

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Abstract:

Introduction: Exclusive breastfeeding rates among children from birth to five months are declining in Jordan. Little is known about the challenges Jordanian mothers face in implementing breastfeeding. This study examines mothers' breastfeeding knowledge, perceived barriers, and stress levels, and analyzes their relationships with one another and with demographic factors.

Methods: A cross-sectional, descriptive correlational study utilizing an online survey was conducted to gather data from mothers attending a healthcare center in Jordan. The Arabic Breastfeeding Knowledge Questionnaire, the Breastfeeding Perceived Barriers scale, and Cohen's Perceived Stress Scale were used to collect data. Pearson *r*, independent t-test, and one-way ANOVA were used for analysis.

Results: Three hundred and fifty mothers (mean age 29.8±5.8 years) participated in the study. The mean score of BFK-A was 11.1±2.5 out of 16. Almost half of the mothers (n=185) reported poor to fair knowledge. The mean score on the BFPB scale was 57.3±10.1 out of 110, and 42.6% (n=149) of mothers scored above the mean. The mean score of PSS-10 was 19.9±2.8 out of 40, with 97.7% of mothers (n=342) reporting moderate levels of perceived stress. Perceived stress did not correlate with breastfeeding knowledge nor with barriers.

Discussion: The findings revealed significant knowledge gaps and a positive association between level of education and breastfeeding knowledge. Breastfeeding barriers concerned with body image, self-efficacy, and inadequate professional support were prominent.

Conclusion: Community and healthcare-based counseling programs are needed to enhance knowledge, address barriers, and reduce stress among breastfeeding mothers.

Keywords: Breastfeeding knowledge, Perceived stress, Maternal barriers, Infant barriers, Socio-environmental barriers, Health education, SDG-3.

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Cite as: Al Nsour M, Bani Khaled M, Alfasfos N, Al Momani H. Breastfeeding Knowledge, Perceived Stress, and Barriers among Breastfeeding Mothers: A Cross-Sectional Study. Open Nurs J, 2026; 20: e18744346459619.
http://dx.doi.org/10.2174/0118744346459619260325045305

Received: October 27, 2025
Revised: February 04, 2026
Accepted: February 26, 2026
Published: March 27, 2026

1. INTRODUCTION

Breastfeeding is considered one of the most important methods of feeding infants and improving the health of mothers [1, 2]. The World Health Organization (WHO) recommends exclusive breastfeeding of children up to six months of age and emphasizes its benefits in reducing infant morbidity and mortality. In Jordan, the rate of early breastfeeding is 34%, while exclusive breastfeeding within six months is 24% [3]. Additionally, exclusive breastfeeding among children from birth to five months has shown a declining trend from 39% in 1990 to 24% in 2023. Breastfeeding is associated with improved health outcomes in infancy and throughout adulthood, as breast milk contains diverse immune-active factors that influence the development of the infant's immune system [4]. Sustainable Development Goal 3 (SDG 3) aims to ensure health and well-being for all individuals of all ages, and breastfeeding is directly associated with reducing child mortality (Target 3.2) and enhancing maternal health (Target 3.1) [5]. The World Bank asserts that failure to breastfeed leads to high health costs and low productivity [6]. Declining breastfeeding rates in Jordan could lead to increased health care costs, more cases of child illnesses, and possibly other health problems in the future for both mothers and children.

Several interventions to encourage breastfeeding in Jordan, such as the introduction of the Baby-Friendly Hospital Initiative and the International Code of Marketing of Breast-milk Substitutes, have been implemented. Additionally, the Jordanian government, with support from the United States Agency for International Development [7], has put in place educational initiatives and policy reforms. However, these interventions have yet to provide tangible benefits in increasing breastfeeding rates, possibly as they are relatively new or due to insufficient consideration of sociocultural and contextual barriers, which remain inadequately studied in Jordan [8]. For instance, Jordanian pharmacists prioritize breastfeeding support through staff training, prenatal education on breastfeeding benefits, and the implementation of WHO-compliant infant feeding policies; however, these initiatives lag behind current practice [9].

Possible maternal challenges are related to perceived stress, lack of knowledge about the process of breastfeeding, and potential barriers that may prevent mothers from initiating and sustaining breastfeeding. Much of the existing literature describes the interactions among multiple variables that affect the relationship between maternal stress and breastfeeding [10]. High levels of stress have been associated with decreased breastfeeding duration and exclusivity [11, 12]. In addition, a link between increased perceived stress levels and decreased attitudes towards breastfeeding has been established [13].

Mothers' decisions and confidence in breastfeeding are largely influenced by their knowledge of breastfeeding practices [14]. Multiple barriers to breastfeeding, such as negative cultural attitudes toward breastfeeding, aggressive corporate marketing of formula, inadequate labor policies for working mothers, and urbanization pressures, have been reported internationally [15]. In addition, healthcare systems that do not properly support breastfeeding practices due to the medicalization of birthing and infant care also contribute to these barriers [15]. A recent study noted that increasing maternal age was associated with increasing negative attitudes towards breastfeeding within the Arab culture [16]. Cesarean delivery, infant hospitalization, and maternal employment are also among the main barriers reported in Jordan [17]. Whereas barriers specific to exclusive breastfeeding in Jordan were mainly infants feeling hungry after breastfeeding, a short period between pregnancies, and breast problems [18].

Although several studies have been conducted to date, there is still a lack of research that seeks to explore the connections between perceived stress, breastfeeding knowledge, and barriers among women who are breastfeeding or have breastfed their children, with little research being conducted in the Arab speaking countries. It is important to fill this gap to identify areas for intervention so that breastfeeding can be better supported. Various interrelated factors may affect the breastfeeding practices: these factors range from the individual level to the societal level. This study aims to understand how individual factors, such as knowledge, stress, and barriers, influence the practice of breastfeeding in the Jordanian context, thereby filling a gap in the current literature on breastfeeding in Arab countries.

The aims of this study are to assess mothers' knowledge of breastfeeding, perceived barriers to breastfeeding, and perceived stress, and then to determine the relationships among them and with demographic variables. Through the identification of the particular relationships between these variables in Jordan, the research can help in the creation of appropriate culturally specific interventions and support programs, ultimately aiding in the sustainable development goals of global public health.

2. MATERIAL AND METHODS

2.1. Research Design

A cross-sectional, descriptive correlational research design was employed to assess breastfeeding knowledge, perceived barriers, and perceived stress and to explore the relationships between these variables among mothers in Jordan. Approval was obtained from the Ethics and Scientific Research Committees of the Faculty of Nursing at Al-Ahliyya Amman University (Date: 12/05/2024, #MM 1/5-2024). Informed consent was secured through a checkbox in the survey after participants were informed of their rights. Participation was voluntary, with no impact on the care received, and participants could withdraw at any point before completing the survey. Researchers' contact details were provided for questions or concerns. Confidentiality was ensured by coding data with numbers accessible only to the researcher. No risks or harm were anticipated. Potential benefits included a sense of well-being from contributing to scientific research. Approvals for using the study instruments were obtained.

2.2. Setting and Relevant Context

The study was undertaken at the largest comprehensive health care center in the Balqa governorate, situated in the central region of Jordan. This center offers services to the relatively low-income segment of society with a total population of approximately 74,000 individuals [19].

2.3. Sample

Breastfeeding mothers in Jordan were the target population of this study. The study's accessible population comprised all mothers who participated in a breastfeeding awareness campaign at a comprehensive health center. This campaign was organized by the university's Women's Health Center, which is dedicated to serving the community primarily through awareness campaigns. The campaign included a series of educational sessions and interactive discussions aimed at promoting breastfeeding. The workshop was advertised *via* the clinic's website, leaflets placed in the waiting room, and nurses working at the pediatric and obstetric/gynaecology clinics. Sessions were held on mid-days in the seminar room every other Wednesday, and interested mothers attended.

The sample size was calculated using G*Power 3.1.10 software based on F-statistics (ANOVA: One-way), medium effect size (0.25), $\alpha < 0.05$, and power of 0.80 [20]. Accordingly, the minimum required sample size was 200 mothers. Independent-samples t-test, one-way ANOVA, and Pearson's r correlation were used. Inclusion criteria included: Breastfeeding mothers, aged 18 years or older, from early postpartum onwards, able to read and write in Arabic, and access to the internet/smartphone for completing the online survey. Exclusion criteria included: Mothers with medical conditions contraindicating breastfeeding and mothers with severely ill infants. The QR code of the online survey was scanned by 486 mothers, 350 filled out the survey (response rate=72%)

2.4. Measurement

Data were collected using an online survey consisting of two parts. The first part collected demographic data, including age, education, employment status, number of children, breastfeeding experience, and childcare arrangements. These variables were chosen following a review of relevant studies [21, 22]. The second part included three validated instruments:

2.4.1. Arabic Breastfeeding Knowledge Questionnaire (BFK-A)

A 16-item tool measuring breastfeeding knowledge across multiple domains. Scores range from 0–16, categorized into four knowledge levels. According to Tamim *et al*. [23], the cut-off points for BFK-A knowledge categories were determined as following: v*ery good breastfeeding knowledge*: more than 1 Standard Deviation (SD) above the mean, *good breastfeeding knowledge*: between mean and 1 SD above the mean; *fair knowledge*: between mean and 1 SD below the mean, and *poor breastfeeding knowledge*: 1 SD or more below the mean. The Cronbach's alpha (α) of the BFK-A scale in this study was 0.6, which is similar to the α reported in the original study (α=0.65) (Tamim *et al*., 2016).

2.4.2. Breastfeeding Perceived Barriers (BFPB) Scale

A 22-item scale assessing maternal, infant, and socio-environmental barriers on a five-point Likert scale (1-5), with scores ranging from 22–110 [21]. Higher scores indicate greater perceived barriers. The Cronbach's α of the BFPB scale in this study was 0.8.

2.4.3. Arabic Cohen's Perceived Stress Scale (PSS-10)

A 10-item scale measuring stress over the past month on a five-point Likert scale (0-4), with scores ranging from 0–40 [24]. The Cronbach's α of the PSS-10 scale in this study was 0.77.

2.5. Data Collection

Data collection took place from May to November 2024 following ethical approval. At the end of the breastfeeding educational sessions, the study was introduced by the research team (the principal investigator and the educator), who were not involved in the mothers' care. A QR code was provided on the screen for those interested in participating in the study. No compensation for participation was provided.

2.6. Data Analysis

Descriptive statistics (mean and standard deviation) were used to describe participants' continuous variables. Frequencies and percentages were used for the categorical variables. A Pearson r correlation was conducted to examine the relationships among participants' age, breastfeeding knowledge, barriers to breastfeeding, and perceived stress. An independent sample t-test was conducted to explore differences in relation to the previous experience of breastfeeding and work status. In addition, one-way analysis of variance (ANOVA) was used to explore the differences in relation to childcare arrangement, level of education, and number of previous deliveries. All statistical analyses were conducted using SPSS (version 21). Results were considered significant when the *p*-value is less than 0.05 (two-tailed).

3. RESULTS

A total of 350 mothers responded to the online survey. The mean (M) age was 29.8, with an SD of 5.8 years and an age range between 18 and 48 years. A substantial proportion of mothers had completed higher education (n=233, 66.6%), particularly at the bachelor's level (n=129, 36.9%). The majority were unemployed (n=242, 69.1%). Notably, most mothers relied on family members for childcare when employed. The great majority of the participants had multiple previous deliveries (n=238, 68%). Additionally, a considerable proportion had previously breastfed their children (n=287, 82%) (Table **1**).

Table 1. Descriptive statistics of demographics variables (N=350).

Demographic Characteristics	-	n	%	M(SD)
Age	-	-	-	29.8(5.8)
Marital status	Married	332	94.9	-
	Widowed	6	1.7	-
	Divorced	12	3.4	-
Level of education	< 6 years	41	11.7	-
	≥ 6 yrs - < 12 yrs	76	21.7	-
	Diploma	90	25.7	-
	Bachelor's Degree	129	36.9	-
	Higher Degree	14	4.0	-
Work status	Full or Part-time	108	30.9	-
	Unemployed/ Home maker	242	69.1	-
In case of work or being busy, where do you put your child?	Family Member	204	58.3	-
	Nursery	104	29.7	-
	No specific place	42	12	-
Number of previous deliveries	0	33	9.4	-
	1	79	22.6	-
	2	113	32.3	-
	3	77	22.0	-
	4 and more	48	13.7	-
Did you breast feed your child/ren previously	Yes	287	82.0	-
	No	63	18.0	-

3.1. Breastfeeding Knowledge

The mean score of BFK-A was 11.1±2.5, with scores ranging from three to 16. The results revealed that 52.9% of women (n=185) scored below the mean. The total BFK-A score was categorized into four groups: Poor (n=56, 16%), Fair (n=129, 36.9%), Good (n=111, 31.7%), and Very Good (n=54, 15.4%) based on the mean (SD). Women displayed varying levels of breastfeeding knowledge, ranging from poor to very good, with over half (n=185, 52.8%) reporting poor to fair knowledge.

The mothers' knowledge about breastfeeding revealed both areas of strength and misconceptions. About 91% (n=316) of mothers understood that breastfeeding reduces post-delivery bleeding, 88.9% (n=311) recognized that breast milk is the best food for newborns, 86.9% (n=304) realized that breastfeeding reduces the risk of infection in babies compared to formula, and 84.6% (n=296) reduced the risk of allergy in babies. Whereas considerable misconceptions included lack of knowledge about the impact of breastfeeding on breast size and shape (n=104, 29.7%), ability to produce enough milk for their infants (n=158, 45.1%), the perception that smaller breast size limits milk supply, and the feasibility of returning to work while breastfeeding (n=170, 48.6%) (Table **2**).

3.2. Breastfeeding Perceived Barriers (BFPB)

The mean score of *BFPB* was 57.3±10.1, with scores ranging from 25 to 110. The results revealed that 42.6% (n=149) of women scored above the mean. The M±SD for the maternal, infant, and socio-environmental barriers scales were 27.8±5.8, 15.2±3.2, and 14.4±3.7, respectively (Table **3**).

The analysis of maternal barriers to breastfeeding reveals a variety of concerns that affect the decision and ability to breastfeed. The two most significant barriers with the highest mean scores are 'Breastfeeding can distort body image' (3.1±1.1) and 'Overall, I am not good at breastfeeding' (3.1±1.2). Other notable concerns include 'Having previous bad experience with breastfeeding reduces my ability to do that' (3.0±1.1), 'I could not practice breastfeeding because of insufficient or no milk' (3.0±1.2), and 'I don't have enough skills to practice breastfeeding' (3.0±1.1), which contribute to the overall perception of difficulty in breastfeeding. In contrast, 'Breastfeeding interferes with the mother's sleep pattern' was perceived as the least significant barrier (2.3±1.0) (Table **3**).

The primary infant barrier to breastfeeding was the perception that 'Breastfeeding doesn't provide the infant with enough nutrition', which received the highest mean score (3.1±1.3). In contrast, the least perceived barriers were 'Inability of the infant to latch on properly' (2.3±1.0) and the 'Infant's refusal of breast milk' (2.3±0.9) (Table **3**).

The main socioenvironmental barrier to breastfeeding was the 'Lack of encouragement from the nurse or midwife', which received the highest mean score (2.6±1.1) in this category. 'Breastfeeding in public places being uncomfortable' was perceived as the least significant barrier (2.2±1.0) (Table **3**).

Table 2. Correct responses of mothers regarding breastfeeding knowledge questionnaire (N=350).

Items	n	%
1. Breastfeeding cuts down on the mother's bleeding after delivery.	317	90.6
2. The best food for a newborn is	311	88.9
a. Breast milk	-	-
b. Formula	-	-
c. Breast milk and water	-	-
3. Babies who are breastfed tend to get fewer infections than babies who get formula	304	86.9
4. Babies who are breastfed tend to have fewer allergies than babies who get formula	296	84.6
5. The more often you breastfeed, the more milk you will have for your baby	294	84.0
6. Breastfed babies need:	285	81.4
a. Only breast milk for the first 4 to 6 months	-	-
b. A bottle of formula every day or so	-	-
c. Extra water daily	-	-
7. You shouldn't try to breastfeed if you	282	80.6
a. Have twins	-	-
b. Have a cesarean section	-	-
c. Drink a lot of alcoholic beverages	-	-
8. When the mother is sick with the flu or a bad cold, she can usually continue to breastfeed her baby	264	75.4
9. Breastfeeding mothers' nipples get sore if:	257	73.4
a. The baby's feeding position is not right	-	-
b. The mother has light-colored ski	-	-
c. This is the first baby she has breastfed	-	-
10. When you breastfeed your child...	248	70.9
a. You may get your figure back easier	-	-
b. You nearly always gain weight	-	-
c. You may feel weak when you feed your baby	-	-
11. If you breastfeed:	212	60.6
a. No one else can help you with the baby since you have to feed him or her	-	-
b. More of your time will be taken up by the baby than if you bottle feed	-	-
c. It will be very difficult to feed the baby in public places	-	-
d. None of the above are correct	-	-
12. When you breastfeed, the best way to tell if the baby is getting enough milk is that:	196	56.0
a. Baby does not suck on fist after done nursing	-	-
b. Baby does not cry	-	-
c. Baby has 6 or more wet diapers in 24 hours	-	-
13. If your breasts are small, you might not have enough milk to feed the baby	170	48.6
14. You shouldn't try to breastfeed if you are planning to go back to work or school since you won't be able to be with your baby for feedings	170	48.6
15. Many women are not able to make enough milk to feed their baby	158	45.1
16. Breastfeeding will probably make:	104	29.7
a. Your breasts sag	-	-
b. Your breasts larger after you stop breastfeeding your baby	-	-
c. No difference in the size or shape of your breasts	-	-

Table 3. Descriptive statistics of the *BFPB* scale items (N=350).

Maternal Barriers to Breastfeeding	Mean (SD)
Breastfeeding interferes with the mother's sleeping pattern	2.3 (1.0)
Breastfeeding is an exhausting process	2.4 (1.1)
Lack of knowledge about breastfeeding results in unsuccessful practice	2.4 (1.0)
Experiencing a physical breast problem (cracked nipple) obstructs the breastfeeding process	2.7 (0.8)
Breastfeeding is an embarrassing process	2.8 (1.2)
I don't have enough skills to practice breastfeeding	3.0 (1.1)
I couldn't practice breastfeeding because of insufficient or no milk	3.0 (1.2)
Having a previous bad experience with breastfeeding reduces my ability to do that	3.0 (1.1)
Breastfeeding can distort body image	3.1 (1.1)
Overall, I am not good at breastfeeding	3.1 (1.2)
Infant Barriers to Breastfeeding	**Mean (SD)**
An infant's refusing of breast milk obstructs the breastfeeding practice	2.3 (0.9)
The inability of an infant to latch on properly makes breastfeeding more difficult	2.3 (1.0)
Infant's difficult temperament makes the breastfeeding harder	2.4 (1.0)
Infant's physical problem makes breastfeeding very hard	2.5 (1.0)
Feeling anxious about not having enough milk hinders the practice of breastfeeding	2.5 (1.0)
Breastfeeding doesn't provide the infant with enough nutrition.	3.1 (1.3)
Socio-environmental Barriers to Breastfeeding	**Mean (SD)**
Breastfeeding in public places is uncomfortable	2.2 (1.0)
Lack of husband's encouragement makes breastfeeding practice more difficult	2.3 (0.9)
Return to work affects breastfeeding adversely	2.4 (1.0)
Long working hours result in diminished milk production	2.4 (1.0)
Breastfeeding limits social activities with others	2.5 (1.0)
Lack of encouragement from the nurse or midwife hinders the practice of breastfeeding	2.6 (1.1)

3.3. Perceived Stress

Nearly all women (97.7%, n=342) reported a moderate level of stress. The mean score of the perceived stress was 19.9±2.8 out of 40. The most significant stressors among women included feeling things were not going their way (2.5 ±1.0), being unable to control life's irritations (2.3 ±1.0), concerns about being on top of things (2.2±1.0), and difficulties in coping with tasks (2.2±1.1). Conversely, the least significant stressors were related to frequency of being upset by something that happened unexpectedly (1.5±1.1), inability to control important things in life (1.6±1.0), and frequency of being angry because of situations out of control (1.7±1.0) (Table **4**).

3.4. Correlation among Study Variables

Pearson r correlation showed a significant positive correlation between the age and the *BFPB* score (r=0.23, $p<0.001$) and between BFK-A and barriers score, though both relationships were very weak. Moreover, there were no statistically significant correlations between BFK-A and stress scores (r=0.033, $p=0.534$), and between the perceived stress and barriers scores (r=-0.070, $p=0.190$) (Table **5**).

3.5. Comparison of Study Variables based on Demographics

Independent t test revealed a statistically significant difference in BFK-A between employed women and unemployed women/housewives (t (348)=2.950, $p=.003$). Employed women had significantly higher BFK-A ($M=11.63$, $SD=2.7$) compared to unemployed women/housewives ($M=10.79$, $SD=2.4$).

The ANOVA showed statistically significant differences in women's BFK-A based on their level of education (F (3, 346) =7.72, $p < 0.000$). Post-hoc Tukey test revealed that women with bachelor' degree ($M=11.67$, SD=2.5) had significantly higher knowledge about breastfeeding compared to those with diploma degree ($M=10.87$, SD=2.2) and those with less than six years of education ($M=9.73$, SD=2.9).

A one-way ANOVA showed a statistically significant difference in BFPB based on the number of previous deliveries ($F(4,345)=6.009$, $p=.000$). The post-hoc Tukey test revealed that women with four or more previous deliveries ($M=63.41$, SD=13.59) reported significantly higher barriers to breastfeeding compared to women with no previous delivery ($M=56.67$, SD=9.6), one delivery ($M=57.46$, SD=8.6), two deliveries ($M=55.15$, SD=8.9), and three deliveries ($M=56.89$, SD=9.5).

Regarding the childcare arrangement when women were busy or at work, ANOVA revealed a significant difference in BFPB scores ($F(2,349)=.3.556$, $p=0.030$). The post-hoc Fisher's LSD test revealed that women who reported family member-based childcare arrangement ($M=57.94$, SD=9.8) had significantly higher BFPB than those who used nursery-based childcare arrangement ($M=55.29$, SD=8.7). In addition, women who reported "no specific place" childcare ($M=59.77$, SD=14.1) perceived higher BFPB than those who used nursery-based childcare arrangement ($M=55.29$, SD=8.7) (Table **6**).

4. DISCUSSION

This study assessed the breastfeeding knowledge, perceived barriers, and stress, and explored the relationships between these variables among Jordanian mothers. The findings offer a richer appreciation of how different levels of analysis-individual, interpersonal, and societal-work together to shape breastfeeding behaviors in the specific context of Jordan. Our sample was highly representative of the lower-income segment of Jordanian society [19], as it consisted of relatively well-educated, mainly unemployed, family-oriented women with significant experience in raising children and a frequent reliance on family for childcare arrangements.

Table 4. Descriptive statistics of the perceived stress scale (PSS-10) items (N=350).

Items of the PSS-10	Minimum	Maximum	Mean (SD)
In the last month, how often have you been upset because of something that happened unexpectedly?	0	4	1.5 (1.1)
In the last month, how often have you felt that you were unable to control the important things in your life?	0	4	1.6 (1.0)
In the last month, how often have you been angered because of things that were outside of your control?	0	4	1.7 (1.0)
In the last month, how often have you felt that difficulties were piling up so high that you could not overcome them?	0	4	1.8 (1.1)
In the last month, how often have you felt nervous and "stressed"	0	4	1.9 (1.1)
In the last month, how often have you felt confident about your ability to handle your personal problems?	0	4	2.1 (1.1)
In the last month, how often have you found that you could not cope with all the things that you had to do?	0	4	2.2 (1.1)
In the last month, how often have you been able to control irritations in your life?	0	4	2.3 (1.0)
In the last month, how often have you felt that you were on top of things?	0	4	2.3 (1.0)
In the last month, how often have you felt that things were going your way?	1	4	2.5 (1.0)

Table 5. Correlation among study variables (N=350).

Variables	Knowledge	Barriers	Perceived Stress
Knowledge	1	-	-
Barriers	0.117*	1	-
Perceived stress	0.33	- 0.070	1
Age	0.046	0.23**	-0.15

Note: * Significant at 0.05 level (2-tailed) * * Significant at 0.01 level (2-tailed).

Table 6. Comparison of study variables based on demographics (N= 350).

Variables	n	Knowledge M (SD)	Barriers M (SD)	Perceived Stress M (SD)
Did you breastfeed your child/children previously?	-	-	-	-
Yes	287	11.09 (2.4)	57.75 (10.0)	19.91(2.7)
No	63	10.87 (2.7)	55.36 (10.2)	19.68 (3.0)
Childcare arrangement when being busy or at work	-	-	-	-
Family member	212	10.92 (2.5)	57.94 (9.8)*	19.81 (2.7)
No specific place	34	10.97 (2.5)	59.77 (14.1)*	20.18 (2.9)
Nursery	104	11.34 (2.4)	55.29 (8.7)	19.89 (2.8)
Level of education	-	-	-	-
6 years or less	41	9.73 (2.9)*	56.59 (7.8)	20.81 (2.9)
6-12 years	76	10.90 (2.3)	59.12 (11.4)	19.80 (3.1)
Diploma	90	10.78 (2.2)*	57.36 (9.8)	19.62 (2.6)
Bachelor or higher	143	11.67(2.5)	56.58 (10.1)	19.79 (2.6)
Work status	-	-	-	-
Employed	108	11.63 (2.7)*	56.82 (11.0)	19.58 (2.6)
Housewife/unemployed	242	10.79 (2.4)	57.57 (9.7)	20.00 (2.8)
Number of previous deliveries	-	-	-	-
0	33	11.15 (2.6)	56.67 (9.6)*	19.76 (3.0)
1	79	10.81 (2.6)	57.46 (8.6)*	19.86 (2.6)
2	113	10.74 (2.4)	55.15 (8.9)*	19.60 (2.6)
3	77	11.30 (2.1)	56.89 (9.5)*	19.94 (2.7)
≥ 4	48	11.73 (2.7)	63.42 (13.6)	20.48 (3.3)

Note: Last category of each variables was used as a reference for comparison.
* Significant at 0.05 level (2-tailed) * * Significant at 0.01 level (2-tailed).

The findings regarding breastfeeding knowledge were similar to those obtained in a Lebanese study using the BFK-A [23] indicating the alikeness of the two populations being studied. This possibly reflects shared cultural values, educational systems, and healthcare context across the Middle East. However, it is important to note that this similarity in knowledge does not necessarily translate to similar breastfeeding practices, as practice is influenced by additional factors like workplace support, family dynamics, and healthcare accessibility that may differ between countries. This highlights that knowledge alone is insufficient for achieving optimal breastfeeding outcomes without supportive systems.

Overall, the breastfeeding knowledge assessment showed varying levels of knowledge, with more than half of the mothers having poor to fair knowledge about breastfeeding, indicating the presence of knowledge gaps that can benefit from targeted education. While the results show that most of the women knew the advantages of breastfeeding, there is a need to eliminate misconceptions, especially on milk supply and body changes after giving birth. For example, many new mothers were aware of the benefits of breastfeeding, yet only a few understood that breastfeeding does not affect breast size or shape. Similarly, other misconceptions concerning the adequacy of breast milk and the need for complementary foods were also observed. These findings are in line with those reported in a recent study from southern Jordan, where the belief that breast milk is insufficient was identified as a maternal-related barrier, and mixed feeding (combining breastfeeding with formula feeding) was the most common practice [25]. It is likely that these behaviors and thoughts arise from sociocultural factors, misunderstanding of physiological infant behaviors such as crying, and strong formula marketing.

Education level emerged as a key determinant of breastfeeding knowledge, with mothers who were educated at the bachelor's level having significantly higher knowledge. This finding aligns with previous Saudi [26] and Ethiopian [27] studies, which found that higher maternal education levels were associated with improved breastfeeding knowledge. Higher education is likely to correlate with greater critical thinking skills, better access to information resources, and potentially greater engagement with healthcare providers. Additionally, educated mothers may have greater confidence in questioning traditional beliefs and seeking evidence-based information. The importance of education in improving knowledge of breastfeeding among primiparas and in delivering focused educational interventions for less educated mothers is highlighted in the literature [28].

Several maternal, infant, and socio-environmental barriers were identified in this study. The most significant reported maternal barriers were 'Breastfeeding can distort body image', 'Overall, I am not good at breastfeeding', 'Having previous bad experience with breastfeeding reduces my ability to do that', 'I could not practice

breastfeeding because of insufficient or no milk', and 'I do not have enough skills to practice breastfeeding'. These barriers indicate concerns with either body image or self-efficacy, inherently contributing to the general perception of difficulty in breastfeeding. Furthermore, mothers reported significantly more barriers with increasing parity, which could reflect accumulated negative experiences, greater body awareness after multiple pregnancies, or changing societal expectations about maternal appearance with age. Considering recent evidence indicating that positive body image directly increases breastfeeding self-efficacy [29], it will be important to implement supportive interventions that target body image to improve breastfeeding self-efficacy among mothers.

Infant-related barriers, such as the perception that 'Breastfeeding doesn't provide enough nutrition,' were also common. This finding aligns with earlier findings, which reported that many Jordanian mothers discontinued exclusive breastfeeding due to concerns about infant hunger and inadequate milk production [18]. Similarly, in a recent phenomenological study of mothers' breastfeeding experiences during the pre- and post-COVID-19 periods, many women agreed that vaccination affected their milk and breastfeeding experiences and reported concerns regarding the adequacy of their milk supply [30]. Globally, studies observed misconceptions in which the marketing of formula often played into parents' anxieties about whether breast milk is enough to meet their babies' needs [31], which, in turn, affected their confidence in breastfeeding. Therefore, the common perception that breastfeeding does not provide enough nutrition should be interpreted in light of these broader global trends.

The 'Lack of encouragement from the nurse or midwife' to breastfeed was identified as the most significant socio-environmental barrier in this study, emphasizing the fact that few mothers receive sufficient help from healthcare professionals. This aligns with previous studies, which found that a minority of Jordanian women received advice on breastfeeding from obstetric providers [32, 33]. This may be due to limited interaction between healthcare providers and patients, heavy workloads, and a limited focus on breastfeeding health education. However, healthcare professionals play an important role in encouraging breastfeeding and addressing maternal worries [34]. These repeated findings highlight serious gaps in professional breastfeeding support in Jordan that need to be addressed.

Interestingly, in this study women did not report discomfort with public breastfeeding to be an important barrier, unlike previous studies, which found that embarrassment about breastfeeding in public was a significant barrier in Jordan [21, 35]. This finding could be related to differences in the demographic or sociocultural characteristics of the study population and environmental factors. Our study participants included a higher proportion of unemployed women who had greater opportunities to breastfeed at home and therefore did not perceive breastfeeding in public as a significant barrier, as they did not need to do so. In contrast, the previous studies focused on working mothers, who are more likely to spend time in urban or professional environments where public breastfeeding may be less socially accepted or practical. Additionally, the availability of breastfeeding-friendly spaces in public areas, such as malls or workplaces, has improved over the last decade, making public breastfeeding less of a concern for mothers. In fact, a recent study reported that workplace breastfeeding support in Jordan was perceived as moderate, which indicates improvements in policies, managerial and co-worker awareness, flexibility for breastfeeding/pumping, and the availability of appropriate physical spaces to facilitate breastfeeding for employed mothers [36].

Almost all women in our sample reported being moderately stressed. Evidence to date suggests that maternal stress may impair lactation and breastfeeding outcomes, but stronger study designs and rigorous assessment methods have been called for [11]. Additionally, the exclusive breastfeeding rates have been shown to be negatively influenced by perceived maternal stress because it affects the hormonal balance of the body and, in consequence, the ability to produce milk [37]. Prenatal anxiety and stress were also shown to be predictors of shorter breastfeeding timelines [10], suggesting the importance of mental health care during the perinatal period.

Stress among breastfeeding mothers can increase oxytocin and cortisol levels, which may affect breast milk supply and quality and, consequently, breastfeeding outcomes [11]. However, this was not perceived as a barrier to breastfeeding in this study. A possible explanation lies in societal and cultural coping mechanisms, which may buffer elevated stress levels in this cohort. Breastfeeding mothers in Jordan tend to perceive high family support, especially from their husbands [32]. Additionally, in Jordanian culture, breastfeeding mothers usually receive guidance and support from their mothers and mothers-in-law [7]. This may act as a buffer against increased stress levels during breastfeeding.

The results show that there is a need for strong breastfeeding support programs to help in dealing with knowledge deficits, barriers, and stress in mothers. Breastfeeding support provided by lactation consultants has been shown to be an effective strategy for improving breastfeeding rates [38]. Educational interventions should be directed towards the misconceptions regarding breast milk sufficiency and body image concerns, especially among less educated women, and should be made relevant to the cultural and socio-economic situation of the population being targeted. Healthcare providers play a crucial role in encouraging breastfeeding, but this study showed that professional support is insufficient. Schools of nursing should integrate comprehensive breastfeeding education into their training modules, equipping future healthcare professionals with the skills and knowledge to effectively support mothers in overcoming breastfeeding challenges. Training in breastfeeding, counselling, and maternal stress management for practicing nurses,

midwives, and obstetricians should be improved. Implementing breastfeeding support into routine antenatal and postnatal care can lead to better results. To this end, stress can only be managed through measures such as mental health care, workplace interventions, and community-based breastfeeding support groups. On the other hand, community-based initiatives can also enhance positive breastfeeding environments. Removing obstacles, such as insufficient breastfeeding education and misconceptions, is crucial to improving health outcomes and achieving the targets for the Sustainable Development Goal of Good Health and Well-being (SDG 3) in Jordan and other countries.

5. LIMITATIONS

This study has several limitations. First, breastfeeding practices and barriers, which were based on self-reported data, may have been subject to recall bias. Additionally, the cross-sectional design of the study cannot be used to establish causal relationships between the variables, namely, knowledge of breastfeeding, barriers, stress, and outcomes. The participants were Jordanian mothers from a low-income area, which limits the generalizability of the findings. Due to the nature of online surveys and the lack of information about nonrespondents, there is a potential for nonresponse bias that may affect the representativeness of the findings. Lastly, while the study identified gaps in professional breastfeeding support, a review of its quality and consistency could have provided further insight. Future work should employ longitudinal designs to examine causal processes, expand the sample to include more diverse participants, and assess the efficacy of specific interventions to remove identified barriers.

CONCLUSION

The study shows that Jordanian mothers possess fair to good breastfeeding knowledge, yet they continue to hold misconceptions and face barriers such as perceived milk insufficiency and inadequate professional support, which prevent them from achieving optimal breastfeeding practices. To address this, multilevel interventions (integrating education, professional support, and stress management) are recommended, using a socioecological approach, with future work focused on evaluating culturally tailored programs, workplace policies, and community initiatives to establish supportive environments that advance maternal-child health and global sustainability goals.

AUTHORS' CONTRIBUTIONS

The authors confirm their contributions to the paper as follows: M.N. and M.K.: Contributed to the study conception and design; M.N. and H.M.: Carried out data collection; N.A.: Performed the analysis and interpretation of the results; and M.N. and M.K.: Prepared the draft manuscript. All authors reviewed the results and approved the final version of the manuscript.

LIST OF ABBREVIATIONS

ANOVA	=	Analysis Of Variance
BFPB	=	Breastfeeding Perceived Barriers Scale
BFK-A	=	The Arabic Breastfeeding Knowledge Questionnaire
M	=	Mean
PSS-10	=	Cohen's Perceived Stress Scale
SDG 3	=	Sustainable Development Goal 3
SD	=	Standard Deviation
WHO	=	World Health Organization

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

The Scientific Research Ethical Committee-Faculty of Nursing/Al-Ahliyya Amman University, Jordan granted ethical approval for this study under approval number #MM 1/5-2024, Date 12/05/2024.

HUMAN AND ANIMAL RIGHTS

All procedures performed in the study involving human participants were in accordance with institutional ethical standards and the 1975 Declaration of Helsinki, as revised in 2013.

CONSENT FOR PUBLICATION

Informed consent was obtained from all participants involved in the study.

STANDARDS OF REPORTING

STROBE guidelines were followed.

AVAILABILITY OF DATA AND MATERIALS

All data supporting the findings of our study can be provided upon reasonable request from the corresponding [M.N] author.

FUNDING

None.

CONFLICT OF INTEREST

The authors declare no conflict of interest, financial or otherwise.

ACKNOWLEDGEMENTS

The authors would like to thank all the mothers who took the time to participate in the study.

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