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The spiritual health and breastfeeding behavior: a cross-sectional correlational study

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Abstract

Background Breastfeeding is the optimal choice for infant health, and spiritual health may assist mothers in adapting to maternal roles, including breastfeeding. This study aimed to evaluate the relationship between spiritual health and breastfeeding behavior among lactating mothers.

Method This cross-sectional study included 400 lactating women who were selected using a multi-stage sampling method. Data collection tools included a socio-demographic and reproductive questionnaire, a spiritual health questionnaire, and a breastfeeding behavior assessment questionnaire. Data analysis was conducted using SPSS V23, incorporating independent t-tests, Pearson and Spearman correlation tests, and multiple linear regression analysis.

Results The study included 400 women aged 29.36 ± 5.67 years. The mean scores for spiritual health and breastfeeding behavior were 91.66 ± 6.80% and 80.07 ± 9.94%, respectively. Regression analysis revealed that spiritual health (Beta = 0.287, $p < 0.01$), infant age (Beta = −0.19, $p < 0.01$), breastfeeding initiation time (Beta = 0.12, $p = 0.009$), and nipple care (B = 0.09, $p = 0.04$) were significant predictors of breastfeeding behavior.

Conclusions The study found a positive relationship between spiritual health and breastfeeding behavior among women. Therefore, promoting spiritual health could be considered a strategy to improve breastfeeding behavior in lactating women.

Keywords Spiritual health, Breastfeeding, Maternal health

Background

Breastfeeding offers numerous benefits for both maternal and neonatal health. The World Health Organization (WHO) emphasizes breast milk as the most effective way to ensure child health and survival, recommending exclusive breastfeeding for the first six months of life [1]. However, despite promotional efforts, the rate of exclusive breastfeeding has declined in recent years. Globally, the rate of exclusive breastfeeding is estimated at only 36%, and in Iran, it stands at 49.1% [2, 3].

The WHO recommends initiating exclusive breastfeeding within the first hour of life and continuing it for six months [4]. Various guidelines for breastfeeding behavior have been established [5, 6], which have formed the basis for developing indexes and tools to assess breastfeeding behavior of mothers [7, 8]. The duration of breastfeeding

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is a crucial indicator of successful breastfeeding behavior [7]. Shortening the duration of breastfeeding, particularly in developing countries, poses a significant challenge. Therefore, promoting exclusive breastfeeding is vital in both developed and developing countries due to its protective effects against infections like gastrointestinal infections and non-communicable diseases such as breast cancer, diabetes, overweight, and obesity, ultimately improving maternal and infant health [2].

Several factors contribute to the discontinuation of exclusive breastfeeding. These include mothers' employment [9], maternal misconceptions and negative attitudes toward breastfeeding, which can be influenced by personal experiences and information from non-professional sources like family and friends, as well as professional sources such as doctors and nurses,, and midwives [10, 11]. Mothers' perceptions of inadequate milk supply [12] and maternal mental status, particularly maternal stress, also play a role. Maternal stress can increase levels of epinephrine and adrenocorticotrophin, affecting the neural network and raising blood pressure and heart rate [13]. Consequently, women experiencing higher stress levels tend to discontinue exclusive breastfeeding [10]. Maternal anxiety is linked to poor breastfeeding behaviors and outcomes [14]. Other factors influencing breastfeeding include child gender, family support, and sore nipples [15].

There is a positive relationship between spiritual health and coping strategies that can help women manage perinatal stress [16]. Enhancing the spiritual health of lactating women appears to improve their ability to cope with stress, which may in turn improve their breastfeeding behavior [17]. Additionally, a positive correlation has been found between spiritual health and self-efficacy in breastfeeding behaviors [11]. A recent review study also highlighted the positive impact of religious beliefs, as an aspect of spiritual health, on breastfeeding behaviors [18].

Spiritual health is recognized as the fourth dimension of health, essential in daily life and influential in bio-psycho-social well-being [19]. He core components of spiritual health include a sense of connection with others, seeking meaning and purpose in life, maintaining a healthy lifestyle, and having a relationship with a transcendent force [20]. Currently, spiritual health is viewed as an integral part of the other three dimensions of health: physical, mental, and social.

In 1946, WHO defined health as: "A state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity." The special group of the WHO Executive Board (1998) proposed that the Preamble of the Constitution should be amended as follows: "Health is a dynamic state of complete physical, mental, spiritual and social wellbeing and not merely the absence of disease or infirmity" [21].

The importance of spiritual health for health promotion was emphasized in the Bangkok Charter in 2005 [22]. Since then, the concept and dimensions of spiritual health have been studied extensively, and various tools have been developed to measure spiritual health and its relationship with health behaviors [21].

Previous studies have demonstrated a positive relationship between spiritual health and the promotion of healthy behaviors [23, 24], such as the connection between spiritual health and adolescent health [25, 26]. Recently, the concept and dimensions of spiritual care have been considered in developing nursing care plans, including adaptation to diseases [27, 28], for instance for adaptation to diseases [28]. However, there is limited research on the relationship between spiritual health and maternal-child health behaviors [29].

Given that spiritual health is associated with improved mental status [30], and it may also enhance breastfeeding behavior, *this study aimed* to evaluate the relationship between spiritual health and breastfeeding behavior using validated tools to assess both spiritual health [19] and breastfeeding behavior [20] among lactating women.

Methods

Study design

This study was designed as a cross-sectional correlational study.

Participants

The study involved 400 lactating women who were referred to the 28 health centers affiliated with Alborz Medical Science University. The inclusion criteria for participation in the study were as follows: lactating women with no known medical or mental diseases; Women with a healthy single infant, without any contraindications for breastfeeding; Women living with their husbands; No history of neonatal hospitalization; No death of a family member in the past three months; Not taking medications that interfere with breastfeeding; Not feeding the neonate with any milk other than maternal milk; Not using a pacifier. The exclusion criteria included participants who did not complete the questionnaires fully.

Sampling method

The study utilized a multi-stage sampling method to select participants. Initially, randomized cluster sampling was conducted to choose 28 health centers affiliated with Alborz University of Medical Sciences from four geographic regions of Karaj city in Iran: north, south, east, and west. Randomization was performed using Excel.

Subsequently, a quota sampling method was applied based on the population visiting each health center. Finally, eligible participants were recruited using a convenience consecutive sampling method.

Sample size

The sample size was calculated as 320 participants using the following formula for correlational studies:

1-β = 0.90, α = 0.05, Zα/2 = 1.96, β = 0.10, Zβ = 1.28

$$n \equiv \frac{\left(Z_\alpha + Z_\beta\right)^2}{\left(\frac{1}{2} ln\left(\frac{1+r}{1-r}\right)\right)^2} + 3$$

r = 0.18 (based on a study by Didarloo et al. [40], which examined the relationship between spiritual health and breastfeeding self-efficacy). To account for a potential 20% dropout rate, the final sample size was increased to 400 participants.

Tool for data collection

Data collection was conducted using three questionnaires: (1) a demographic and reproductive information questionnaire, (2) the breastfeeding behavior assessment questionnaire, and (3) the spiritual health assessment questionnaire.

Socio-Demographic and reproductive information questionnaire

This questionnaire was researcher-developed and consisted *of 28 questions created based on the research objectives and a review of the literature*. The questions covered topics such as the women's age, education level, employment status, spouse's employment status, economic status, number of pregnancies, history of pregnancy and childbirth, neonate's sex, desired neonate sex, whether the pregnancy was wanted or unwanted, birth weight, type of delivery, number of deliveries, breastfeeding frequency, breastfeeding initiation time, family support during breastfeeding, and so on. We included sociodemographic and reproductive characteristics, as well as potential confounding variables such as undesired infant gender, because these factors may influence the mother's breastfeeding behavior. The content validity of the questionnaire was evaluated by 10 reproductive health experts.

The breastfeeding behavior assessment questionnaire

This questionnaire consisted of 40 items designed to assess breastfeeding behavior. The items were scored on a scale of 1 to 5, corresponding to "never" to "always" responses, respectively, resulting in a total possible score range of 40–200. Higher scores indicate healthier breastfeeding practices. All items described behaviors related to breastfeeding practice, such as: "To have enough milk, I eat on time and use all food groups," "I breastfeed the infant any time she/he requests," "I take enough rest to breastfeed properly," and "I care about the correct breastfeeding position of the infant." The total score was converted to a percentage.

The items of the questionnaire were primarily developed using the updated national guideline of breastfeeding education for pregnant mothers [31] as well as a few other valid guidelines and resources [5, 6, 32]. Therefore, the "breastfeeding behavior" variable in our study encompasses all the correct practices for mothers mentioned in the aforementioned valid guidelines for successful breastfeeding and were used to develop the questionnaire (Appendix 1).

The content validity of the questionnaire was assessed by 10 experts in midwifery, nursing, public health, and reproductive health. To assess the content validity ratio (CVR), the experts indicated their opinions by assigning each item scores of 1 to 3, corresponding to "not necessary," "useful but not essential," and "essential," respectively. The scores were then calculated using the formula: CVR = (Ne—N/2) / (N/2), where Ne is the number of experts indicating an item as "essential" and N is the total number of experts. The accepted value was determined based on Lawshe's table, with 0.62 regarded as acceptable for 10 experts [33]. Content Validity Index (CVI) was calculated based on Waltz and Bausell's criteria to ensure that the items of the questionnaire are appropriately designed to measure content. The expert evaluation was focused on relevance, clarity, and simplicity and was expressed using a four-point Likert scale (scores 1–4, respectively).

The CVI score for each statement was computed as the number of experts giving a rating of 3 or 4 to the relevance of each item, divided by the total number of experts. Based on this index, each statement was initially measured in terms of relevance, and then its acceptability was determined according to the following criteria: CVI > 0.79, the item is relevant; between 0.70 and 0.79, the item needs revisions; and if the value is below 0.70, the item is eliminated [34]. The content validity was confirmed by an S-CVI of 0.85 and an S-CVR of 0.80.

The reliability of the questionnaire was confirmed using the test–retest stability assessment method on 15 mothers, yielding r = 0.91, which confirmed the questionnaire's stability. Internal consistency assessment showed a Cronbach's α = 0.85 for the questionnaire.

The spiritual health assessment questionnaire

The Spiritual Health Assessment Questionnaire consisted of 48 questions scored on a 5-point Likert Scale,

with responses ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). The total possible score ranged from 48 to 240, with higher scores indicating a healthier spiritual status. This questionnaire included two dimensions: cognitive/emotional (28 questions) and behavioral (20 questions). It was designed based on the theoretical framework presented by Fisher [35]. The CVR, CVI values, stability, and internal consistency of this questionnaire were 0.80, 0.85, > 0.7, and Cronbach's $\alpha = 0.8$, respectively. Exploratory Factor Analysis was performed for the questionnaire, yielding a Kaiser–Meyer–Olkin (KMO) value of 0.79. The factors extracted from the questionnaire explained 47.9% of the observed variance. This questionnaire was developed using a mixed-methods study by Amiri et al. [36].

The procedure of the study

Following a preliminary evaluation of the inclusion criteria and selection of study subjects, the research purpose was explained to the participants. They were assured that the study results would remain confidential. Participants were then enrolled in the study after providing written consent. Subsequently, the demographic, spiritual health, and breastfeeding behavior questionnaires were completed by the participants. The sample comprised 400 lactating mothers with infants aged 1 day to 6 months, > 6 to 12-, > 12 to18, and > 18 to 24 months with 100 participants in each group.

Statistical analyses

Data were analyzed using SPSS Version 23, employing independent t-tests, Pearson's and Spearman's correlation, and multiple linear regression tests. A *p*-value less than 0.05 was considered statistically significant in all tests. The Kolmogorov–Smirnov Test was used to assess data normality. Based on the results indicating normal distribution, parametric tests were applied. Multiple regression analysis was used to examine the relationship between spiritual health and breastfeeding behavior while controlling for other significant independent confounding variables.

Ethics

The purpose and procedure of the study were thoroughly explained to all participants. Additionally, they were assured that the results of the study would remain confidential. Written informed consent was obtained from all participants. All methods were conducted in accordance with the relevant guidelines and regulations of the Deputy of Research, and the study was approved by the Ethics Committee of Shahid Beheshti University of Medical Sciences under the ethics code IR.SBMU.PHARMACY.REC.1399.264.

Results

The study was performed on 400 lactating women aged 29.36 ± 5.67 (Mean ± SD) years. The response rate was 100 percent and the statistical analysis was performed on all 400 subjects of the study. Two hundred fourteen women (53.4%) obtained their breastfeeding information—such as benefits, duration, initiation time, proper positioning, rest, and nutrition for nursing mothers—from healthcare providers. Meanwhile, 186 women (47.6%) obtained this information from other sources. Additional socio-demographic and reproductive characteristics, as well as the breastfeeding status of the participants, are detailed in Table 1.

An assessment of spiritual health and breastfeeding behavior revealed mean scores of 91.66 ± 6.80% and 80.07 ± 9.94%, respectively. The results of the Spearman correlation test indicated a significant positive correlation between breastfeeding behavior and the spiritual health of lactating mothers ($r = 0.334$; $p < 0.001$) (Table 2). We evaluated the potential relationship between breastfeeding behavior and 23 dependent variables, and the results showed a significant relationship between the breastfeeding behavior of participants and seven independent variables: infant's age, wanted or unwanted pregnancies, breastfeeding initiation time, nipple care, family support for childcare, family support during breastfeeding, and mothers' spiritual health ($p < 0.05$) (Table 2).

Next, with breastfeeding behavior *assumed* as the dependent variable, these seven significant independent variables were entered into multiple linear regression analysis models to identify the potential significant predictors of breastfeeding behavior. The regression analysis revealed that all factors, except for 'family's support for breastfeeding' and 'family support for infant care,' significantly predicted breastfeeding behavior.

Two regression models presented in Table 3 indicate that spiritual health, infant age, breastfeeding initiation time, and nipple care are predictors of breastfeeding behavior. However, Model 2 reveals that spiritual health alone can be a significant potential predictor of breastfeeding behavior, with a Beta coefficient of 0.287 ($p < 0.001$). This means that for every one-unit increase in spiritual health, the breastfeeding behavior score improves by 0.287 units.

As shown in Table 3, Model 1 has an adjusted R^2 of 0.097, while Model 2 has an adjusted R^2 of 0.175. This indicates that Model 1 explains 9.7% of the variance, whereas Model 2 explains 17.5% of the variance in breastfeeding behavior. Therefore, Model 2, which includes spiritual health along with other predictors, exhibits higher fitness and is more effective at explaining the variation in breastfeeding behavior without overfitting. It is

Table 1 The personal, reproductive and breastfeeding characteristics of breastfeeding mothers who participated in the study (n = 400)

Variable		Mean ± SD
Age (year)		29.36 ± 5.67
Gravida		1.99 ± 0.96
Abortions		0.27 ± 0.07
Number of children		1.68 ± 0.75
Birth weight (kg)		3.32 ± 0.38
Frequency of breastfeeding* in 24 h		12.04 ± 6.41
Frequency of breastfeeding* at night		3.42 ± 2.15
		N (%)
Mothers' age groups	**< 21**	22 (5.5)
	21–30	217 (54.25)
	> 30	161 (40.25)
Infants' age groups	**0–6**	100 (25)
	> 6–12	100 (25)
	> 12–18	100 (25)
	> 18–24	100 (25)
Educational level**	High school	125 (31.3)
	Diploma	168 (42)
	Graduate diploma	34 (8.5)
	Bachelor	64 (16)
	Postgraduate	9 (2.3)
Occupation	Housewife	373 (93.2)
	Employed	27 (6.8)
Husband's occupation	Unemployed	13 (3.2)
	Employed	387 (85.8)
Family's income level	Inadequate	59 (14.8)
	Adequate	291 (72.7)
	Adequate and saving	50 (125)
Additional children	Yes	228 (57)
	No	172 (43)
Type of pregnancy	Wanted	324 (81)
	Unwanted	76 (19)
Mode of delivery	Vaginal	195 (48.8)
	Cesarean section	205 (51.2)
Infant's gender	Female	192 (48)
	Male	208 (52)
Wanted sex of the infant	Yes	366 (91.5)
	No	34 (8.5)
Gestational age***		
	Term	379 (94.7)
	Preterm	21 (5.3)
Breastfeeding Initiation time	During the first Hour	297 (74.3)
	After the first hour	103 (25.8)
Nipple care		
	Yes	217 (54.2)
	No	183 (45.8)
Family support for child care[¥]	Yes	346 (86.5)
	No	54 (13.5)
Family support during breastfeeding[¥¥]		
	Yes	289 (72.2)
	No	111 (27.8)

*Number of breastfeeding times

**The completed level of Education

***The gestation age definition: Preterm neonates born alive before 37 weeks of pregnancy are completed. Term neonates born after 37 (38–42 weeks)

[¥] The meaning of the family's support for breastfeeding in this study was mother's encouragement for breastfeeding, and helping her in facilitating the conditions for breastfeeding. The family also refers to participants' husband, parents and siblings

[¥¥] The meaning of family support in child-care in this study was helping the mother in child-care or facilitating the conditions for her for child-caring

worth noting that R^2 values range from 0 to 1, where 1 represents a perfect fit (Table 3).

Discussion

The present study revealed a substantial positive relationship between breastfeeding behavior and spiritual health. In our study, breastfeeding behavior encompassed a group of all correct practices by nursing mothers, which were measured using a valid breastfeeding behavior questionnaire. In Iranian and Islamic cultures, breastfeeding is regarded as an important maternal responsibility [37]. Breastfeeding is also usually encouraged and supported by the spouse and other family members as well as the health providers and society [38]. According to a UNICEF report, the prevalence of exclusive breastfeeding in Iran is higher than in other Islamic countries such as Pakistan, Iraq, and Saudi Arabia [3]. This can also be attributed to breastfeeding promotion programs, including increased public awareness about exclusive breastfeeding and breastfeeding education in maternal health services in Iran [39].

Several studies demonstrated the significant relationships between spiritual health, stress and breastfeeding behavior, and self-efficacy [18, 40, 41]. Considering the models of health behaviors, self-efficacy is the most powerful element for performing a behavior [10]. Therefore, these studies used self-efficacy as the best predictor of behavior. The conclusions from these studies suggest that spiritual health enhances health-related behaviors by influencing self-efficacy and behavior. Additionally, it has been shown that spirituality has a significant indirect positive effect on promoting health behaviors through its effects on reducing anxiety and coping with stress [16].

The results of the study revealed a high level of spiritual health among the participants. Most previous studies have also reported a high level of spiritual health

Table 2 The relationship between breastfeeding behaviors with the personal and reproductive and breastfeeding characteristics of participants (n = 400)

Variable			r	P
Spiritual health			**0.334**	**0.001**
Cognitive/emotional domain of spiritual health			**0.288**	**0.001**
Behavioral domain of spiritual health			**0.354**	**0.001**
Age (year)[a]			−0.080	0.112
Educational level[b]			0.020	0.692
Family's Income level[b]			0.056	0.267
Number of children[a]			−0.078	0.121
Gravida[a]			−0.025	0.618
Abortions[a]			0.018	0.722
Infant's age			**−0.236**	**0.001**
Neonate weight at birth (kg)[a]			0.086	0.086
Frequency of breastfeeding in 24 h[a]			0.088	0.080
Frequency of feeding in night[a]			0.028	0.68
		Mean ± SD	T[c]	P
Occupation	Housewife	79.90 ± 10.04	−1.27	0.20
	Employed	82.43 ± 8.23		
Husband's occupation	Unemployed	85.22 ± 7.09	1.90	0.058
	Employed	79.90 ± 9.8		
Have another child	Yes	80.04 ± 9.48	−0.08	0.932
	No	80.12 ± 10.54		
Type of pregnancy	**Wanted**	**80.63 ± 9.78**	**2.32**	**0.02**
	Unwanted	77.70 ± 10.31		
Mode of delivery	Normal	80.52 ± 10.23	0.82	0.38
	Cesarean section	79.65 ± 9.65		
Infant's gender	Female	80.45 ± 9.50	0.72	0.46
	Male	79.73 ± 10.34		
Wanted sex of the infant	Yes	80.15 ± 9.87	0.53	0.59
	No	79.21 ± 10.27		
Labor time	Term	80.18 ± 10.01	0.87	0.38
	Preterm	78.23 ± 8.71		
Breastfeeding initiation time	**During the first Hour**	**80.74 ± .84**	**2.28**	**0.02**
	After the first hour	**78.16 ± 10.01**		
Nipple care	**Yes**	**81.64 ± 10.04**	**3.46**	**0.01**
	No	**78.22 ± 9.51**		
Family's support for child care	**Yes**	**80.50 ± 10.10**	**2.16**	**0.031**
	No	**77.37 ± 8.41**		
Family's support during breastfeeding	**Yes**	**80.96 ± 10.16**	**2.89**	**0.004**
	No	77.77 ± 8.96		

[a] Pearson's correlation test

[b] Spearman's correlation test

[c] Independent student t-test

P < 0.05 values are shown in bold

among Iranian women [42, 43], which can be attributed to the Iranian cultural background and Islamic lifestyle [13]. For instance, Besharat and colleagues introduced a new intervention model based on the Islamic lifestyle, demonstrating its significant impact on enhancing mental and spiritual health while reducing the risk of cardiovascular disease among high-risk individuals [44]. A key aspect of the Islamic lifestyle is strengthening spirituality, which can positively influence the quality of life [45].

Table 3 The linear regression model analysis of the relationship between spiritual health and breastfeeding behavior considering other potential predictors (n = 400)

Model	Unstandardized		Standardized	t	P	95.0% CI for B	
Model 1 (constant)	**B**	**SE**	**Beta**			**Lower**	**Upper**
Infant's age	−1.824	0.438	−.205	−4.164	0.000	−2.685	−0.963
Breastfeeding initiation time[b]	−2.929	1.083	−0.129	−2.704	0.007	−5.058	−0.799
Nipple care[c]	2.488	0.983	0.125	2.531	0.012	0.555	4.420
Type of pregnancy[d]	2.680	1.214	0.106	2.208	0.028	0.293	5.067
Family support for breastfeeding[e]	1.005	1.293	0.045	0.777	0.438	−1.537	3.547
Family support for infant's care[f]	1.974	1.659	0.068	1.190	.235	−1.288	5.235
Model 2	**B**	**SE**	**Beta**	**t**	**P**	**Lower**	**Upper**
(constant)	38.453	6.989		5.502	0.000	24.711	52.194
Spiritual health	**0.420**	**0.068**	**0.287**	**6.198**	**0.000**	**0.287**	**0.553**
Infant's age	−1.696	0.419	−0.191	−4.047	0.000	−2.519	−0.872
Breastfeeding initiation time[b]	−2.736	1.035	−0.120	−2.642	0.009	−4.772	−0.700
Nipple care[c]	1.872	0.945	0.094	1.982	0.048	0.015	3.729
Type of pregnancy[d]	2.172	1.163	0.086	1.868	0.063	−0.114	4.459
Family support for Breastfeeding[e]	0.430	1.239	0.019	0.347	0.729	−2.006	2.866
Family support for infant's care[f]	1.751	1.586	0.060	1.104	0.270	−1.366	4.869
Model	**Beta In**	**t**	**Sig**	**Partial Correlation**		**Collinearity Statistics**	
Spiritual health (excluded)	0.287	6.198	0.000	0.299		0 .961	
Model	**R**	**R^2**	**Adjusted R^2**	**SE of the estimate**			
1	0.333	0.11	0.097	9.44			
2	0.436	0.19	0.175	9.02			

[a] Dependent Variable: Breastfeeding Practice

[b] Breastfeeding initiation Time; in the first hour = 1, More than 1 Hour = 2

[c] Nipple Care; No = 1, Yes = 2

[d] Type of Pregnancy; Unwanted = 1, Wanted = 2

[e] Support for Breastfeeding; No = 1, Yes = 2

[f] Support for Infant's Care; No = 1, Yes = 2

P < 0.05 values are shown in bold

The findings showed a high score for the participants' breastfeeding behavior, whereas a study in Malaysia reported moderate scores for mothers' awareness and breastfeeding behavior [46]. The differences in the results may be attributed to variations in breastfeeding programs aimed at enhancing mothers' knowledge and attitudes in these countries. Additionally, since breastfeeding behavior improves with increased women's awareness, educating female students about the benefits of breastfeeding in schools is also recommended to promote this behavior [47].

The other causes for the inconsistency in mothers' breastfeeding behavior across different studies can be attributed to the age of the infants, as breastfeeding frequency tends to decrease with increasing infant age [48, 49]. Therefore, it is essential to consider the age of breastfed infants in studies related to breastfeeding behavior. The present study investigated mothers of infants aged 1 to 24 months, divided into four groups with equal sample sizes.

The results showed significantly higher scores for breastfeeding behavior of women with wanted pregnancies compared with women with an unwanted pregnancy. Mothers with wanted pregnancies are better prepared for infant care and are more likely to exhibit appropriate breastfeeding behavior [50]. On the other hand, mothers with unwanted pregnancies may experience impaired milk ejection reflex due to stress and decreased oxytocin secretion during [51]. Additionally, there was a significant relationship between early breastfeeding initiation and breastfeeding behavior. Early nipple sucking and stimulation by the infant in the first hour after birth enhance oxytocin and prolactin secretion, which are crucial for milk production [52].

The results also showed a higher score for breastfeeding behavior among women who practiced nipple care

compared to those who did not. This is because nipple care helps prevent nipple fissures, which can make breastfeeding painful and disrupt infant sucking and proper feeding [53].

There was also a significant relationship between family support for infant care and breastfeeding behavior. It appears that mothers' breastfeeding behaviors improve when they receive support from their husbands and other family members. Several studies have shown that fathers' participation in perinatal care and breastfeeding support enhances maternal health [54, 55]. A randomized experimental study by Panahi et al. demonstrated the effectiveness of educating fathers in improving exclusive breastfeeding practices [56]. The education of fathers about perinatal care is a critical need [55] and can also aid in their adaptation to paternal roles [57]. However, the regression analysis revealed that 'family's support for breastfeeding' and 'family's support for infant care' are not predictors of breastfeeding behavior. It appears that fathers' support is more crucial than other family members' support for breastfeeding and infant care.

The multiple linear regression model identified spiritual health, infants' age, breastfeeding initiation time, and nipple care as predictors of breastfeeding behavior, listed from highest to lowest predictivity. As mentioned in the introduction, numerous background and confounding variables have been linked to breastfeeding behavior. In this study, confounding variables were controlled through inclusion criteria, such as mothers with singleton infants and the absence of maternal or infant diseases, and other confounding variables, as shown in Table 2, were controlled through statistical regression analysis. A comparison of the predicted variance of breastfeeding behavior in the two regression models presented in Table 3 reveals that Model 2, which includes spiritual health alongside other predictors, exhibits higher fitness and is more effective at explaining the variation in breastfeeding. Furthermore, Model 2 indicates that spiritual health, as an independent variable, can be a significant potential predictor of breastfeeding behavior, with a Beta coefficient of 0.287. Actually, we evaluated the relationship between spiritual health and breastfeeding while controlling for other confounding variables in Model 2, which increases the validity of the results. A study by Narenji and colleagues found that mothers who focus on their spiritual health during pregnancy are more likely to strive for improving the health of themselves, their babies, and their families [58]. It seems that educational interventions targeting spiritual health are necessary to enhance maternal-child health, particularly breastfeeding behaviors.

Limitation

Spirituality and religious beliefs are often private aspects of people's lives, and inquiring about these beliefs may be a limitation of the study. This limitation was addressed by reassuring participants about the confidentiality of the information. Additionally, this study was cross-sectional, which means it could not establish a cause-and-effect relationship between spiritual health and breastfeeding behavior. Therefore, longitudinal studies are necessary to explore the causal roles of these variables. We did not analyze the relationship between the dimensions of spiritual health and breastfeeding behaviors, which could be a focus for future studies. Furthermore, research on the effectiveness of spiritual health educational interventions on breastfeeding behavior is recommended.

We conducted the study among Iranian mothers, who hold specific Iranian and Islamic traditional beliefs that place importance on spirituality, and demonstrated a relationship between spiritual health and breastfeeding behavior. However, the findings may vary in other societies with different beliefs and perspectives on spirituality. Therefore, we suggest that the study be replicated in other cultures to explore these differences.

Conclusion

Spiritual health, infants' age, breastfeeding initiation time, and nipple care are the predictors of breastfeeding behavior. Spiritual health is the predictor of breastfeeding behavior among nursing women. Spiritual health can enhance women's breastfeeding behaviors by helping them cope with stress related to physiological and psychological changes during the postpartum period. Therefore, promoting spiritual health can be considered as a strategy for improving breastfeeding behaviors.

Appendix 1 Breastfeeding behavior assessment questionnaire

Statement	Never	Seldom	Sometimes	Often	Always
1. In order to have enough milk, I eat on time and use all food groups in my meal					
2. I take enough rest to breastfeed properly					

Statement	Never	Seldom	Sometimes	Often	Always
3. I try to maintain my mental health and peace for proper breastfeeding					
4. I look at and touch the baby while breastfeeding					
5. I started breastfeeding the baby for the first time within the first hour after delivery					
6. I breastfeed the baby whenever I wake up during the night					
7. I give milk to the infant according to his wishes and requests					
8. I feed the infant from both breasts at every meal					
9. I care about the correct breastfeeding position of the infant					
10. I pay attention to the correct position of the infant's body during breastfeeding					
11. While breastfeeding, the baby's face is facing my breast and the infant's body is straight and in one direction					
12. I pay attention to the correct position of the baby's lips and mouth during breastfeeding					
13. When the infant sucks my breast, I hear the sound of regular sucking and swallowing					
14. I only feed the baby with my own milk					
15. I am completely with the baby within 24 h					
16. I am ready to breastfeed my baby at any time					
17. My own milk is enough for the infant and I do not use milk powder, water, or complementary food before 6 months					
18. During breastfeeding, I put the most brown halo in the baby's mouth					
19. During breastfeeding, I prevent the baby's nose from being blocked with the breast with my finger					
20. I don't have pain or discomfort in my breast during breastfeeding and the skin of my nipples is healthy					
21. I give milk according to the child's needs					
22. I recognize the signs of satiety in my baby					
23. After the end of breastfeeding, the baby is calm and sleeps					
24. After the end of breastfeeding, my breast becomes empty and soft					
25. I breastfeed the baby every 2–3 h					
26. I breastfeed the baby 8–12 times a day					
27. Each breastfeeding takes 15–20 min					
28. I notice the time of breastfeeding, I feel fullness, tickling or milk coming out in my breast					
29. I stop breastfeeding only after the baby is satisfied					
30. If necessary, to remove the breast from the baby's mouth, I put my finger in the corner of his mouth and slowly remove the breast from his mouth					
31. I care about baby burping after breastfeeding					
32. I wash and dry my breasts once a day					
33. I use cream or milk to prevent breast cracking					

Statement	Never	Seldom	Sometimes	Often	Always
34. My baby is growing well and sufficiently					
35. I check that my nursing baby has wet his diaper at least 6 times in 24 h					
36. I check that my breastfed baby has at least 4 stools more than spots and in granular form					
37. I seek help from a midwife, gynecologist or pediatrician to obtain information, skills and training necessary for breastfeeding alone					
38. I am encouraged by my family to breastfeed					
39. I was in the same room with my baby during the first 24 h of delivery					
40. I have had the support of hospital personnel during childbirth and transition to breastfeeding					

Abbreviations

WHO	World Health Organization
BF	Breast feeding
KMO	The Kaiser–Meyer–Olkin test
CVI	Content validity index
CVR	Content validity ratio
SPSS	Statistical package for the social sciences

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Author contributions
MP, MS, and MAD developed the project and designed the concept and study. MS, ZK, and SMT contributed to the study design and managed data analysis. MP, MS, MAD, ZK prepared the first and revised drafts of the manuscript and edited critically the manuscript. SMT contributed to the preparation of the questionnaire and data collection. All authors have read and approved the manuscript as well as agreed on the final manuscript and all tables.

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Declarations

Ethics approval and consent to participate
The purpose and procedure of the study were explained to all participants. They have also ensured the results of the study would be confidential. Written informed consent was obtained from all participants. All methods were performed under the relevant guidelines and regulations of the deputy of research and the ethical committee of Shahid Beheshti University of Medical Sciences approved the study by the ethics code IR.SBMU.PHARMACY.REC.1399.264.

Consent for publication
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Competing interests
The authors declare no competing interests.

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