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Predictors of breastfeeding self-efficacy during the covid-19 pandemic

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ABSTRACT

Background: Breastfeeding self-efficacy (BSE) is a strong predictor of the duration of breastfeeding. The aim of this study is to determine the predictors of BSE in breastfeeding mothers during the Covid-19 pandemic.
Methods: A cross-sectional study was conducted with 300 breastfeeding mothers who breastfed during the Covid-19 pandemic. Convenience sampling was used to recruit participants. A battery of online questionnaires measured sociodemographic and obstetric characteristics, breastfeeding self-efficacy, spouse postpartum social support, perceived social support, anxiety and depression, and fear of Covid-19. Data were analyzed using Pearson correlation coefficients, one-way ANOVA, and multivariable linear regression via stepwise method. The significance level in this study was $\alpha = 0.05$.
Results: The mean BSE score among participants was 58.19 ± 10.48 (out of 70). Spouse postpartum social support ($\beta = 0.732$, $p = 0.04$), intention to breastfeed ($\beta = 0.17$, $p = 0.001$), use of formula while breastfeeding ($\beta = -0.09$, $p < 0.001$), and depression ($\beta = -0.11$, $p < 0.001$) were significant predictors of BSE. However, fear of Covid-19 was not significantly correlated with BSE ($p = 0.514$).
Conclusion: The results of the present study showed that fear of Covid-19 was not a significant predictor of BSE, while spouse postpartum social support and having the intention of breastfeeding were positively associated with BSE. Depression and simultaneous use of formula in feeding the infant was negatively associated with BSE during Covid-19. Overall, breastfeeding can be encouraged through counseling to improve receiving spousal support, increasing breastfeeding intent, and reducing depression.

1. Introduction

The World Health Organization (WHO) recommends breastfeeding initiation in the first hour after birth, exclusive breastfeeding for up to 6 months, and continuation of breastfeeding until the child is 2 years old (WHO, 2003). Health organizations, including the Centers for Disease Control and Prevention (CDC), WHO, and the American Academy of Pediatrics (AAP), recommend exclusive breastfeeding for the first 4–6 months after birth (Kornides and Kitsantas, 2013). Breastfeeding has both short- and long-term benefits for mothers and infants (Jaafar et al., 2016). The Lancet Breastfeeding Series (2016) reported that breastfeeding could prevent approximately 823,000 child deaths annually (Victora et al., 2016). Breastfeeding reduces of morbidity and mortality due to diarrhea by 64% and the severity of respiratory infections and its hospitalization by 70% (Eidelman and Schanler, 2012). This demonstrates the protective benefits of breastfeeding and the repercussions when it is not undertaken (Lubbe et al., 2020). Although a large percentage of women start exclusive breastfeeding after childbirth, this rate decreases as the infant grows older (Woldeamanuel, 2020). The exclusive breastfeeding rate in Iran has been reported as 56.8% four months after childbirth and 27.7% after six months. One of the goals of global nutrition policies is to increase exclusive breastfeeding in the first 6 months after childbirth by at least 50% by 2025 (WHO, 2014).

An approach to achieve this goal is to focus on the factors that affect mothers' breastfeeding. Many factors, such as age, marital status, income, smoking, type of delivery, previous breastfeeding experience, social support, and domestic violence, are related to exclusive breastfeeding (Barona-Vilar et al., 2009; Yılmaz et al., 2017). An important

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factor in the continuation of breastfeeding is a sense of self-efficacy in breastfeeding mothers (Baud et al., 2020). Breastfeeding self-efficacy (BSE) is defined as the mother's confidence in her own capability to breastfeed her infant (C.-L. Dennis, 1999) and is one of the primary factors affecting the continuation of breastfeeding during the first 6 months after delivery (Sinsuksai et al., 2017). Self-efficacy is one of the constructs of Bandura's social cognitive theory (1997), which includes belief and confidence in one's ability to perform healthy behaviors, including exclusive and successful breastfeeding. Increasing BSE in mothers can result in increasing the duration of exclusive breastfeeding (Wong et al., 2021).

Physical, mental, and social conditions are among the factors that affect the self-efficacy of breastfeeding mothers (Baud et al., 2020). However, these findings have not been confirmed in all studies. For example, a few studies have not found a relationship between a mother's age and occupation with BSE (Hasanpoor et al., 2010; Varaei et al., 2009). Other studies have shown that the mother's educational level, employment status, and previous breastfeeding experience are not related to exclusive breastfeeding (O'Brien et al., 2008). In another study, age, alcohol consumption, family history of asthma, allergies and eczema, place of delivery, and place of postnatal ward, were not related to exclusive breastfeeding in the third month after delivery (Kools et al., 2006). However, certain psychological factors, such as depression, anxiety, stress, and self-esteem, have been found to be related to exclusive breastfeeding (O'Brien et al., 2008).

At the time of writing this article, the Covid-19 pandemic is still an ongoing concern in Iran (WHO, 2020). Worldwide anxiety and worry grew as the virus spread and increased infection rates were reported (Hu et al., 2020). A sense of fear in relation to virus transition, health complications, and mortality rate can lead to other social and psychosocial challenges such as stigma, discrimination, and misguidance (Huang et al., 2020; Li et al., 2020; Pappas et al., 2009). Following the HIV epidemic in Ethiopia, a study found that HIV-positive mothers developed a widespread fear of breastfeeding, resulting in avoidance of breastfeeding and feelings of guilt (Koricho et al., 2010). Similarly, fear of breastfeeding during Covid pandemic seems to have arisen following the outbreak among counselors and mothers, might challenge a well-established breastfeeding culture.

One of the most important concerns of mothers is to maintain their children's health. In uncertain times, such as the Covid-19 pandemic, breastfeeding may be disrupted and may even lead to a mother ceasing to breastfeed (Gribble et al., 2020; Rollins et al., 2021). Pregnant and lactating mothers are a vulnerable group and need evidence-based advice to protect the health of themselves and their child (Rocca-Ihenacho and Alonso, 2020). Adequate practical, psychological, and social assistance should be provided to breastfeeding mothers throughout the breastfeeding process. Research has suggested that infants born to mothers infected with Covid-19 can and should be breastfed if they are able to (Orvos, 2020),.

Given that exclusive breastfeeding has important benefits and BSE has a significant impact on actual rates of breastfeeding, the present study aims to identify the factors that can affect the self-efficacy of breastfeeding mothers, specifically in the context of the Covid-19 pandemic. The results from this study may inform health care workers of the pandemics' impact on BSE in order to provide informed advice to breastfeeding mothers. So, the present study aimed to investigate the predictors of BSE during Covid pandemic.

2. Methods

2.1. Design and participants

The present research is a cross-sectional study that was conducted between June and November 2020. Participants were breastfeeding women who had breastfed their babies during the Covid-19 pandemic in the city of Qazvin, Iran.

2.2. Sample size estimation

The Green's (Green, 1991) rule of thumb was used to determine the sample for a linear multi-variable analysis. Considering 35 predictor variables (K), the required sample size was calculated to be 330 participants.

2.3. Sampling procedure

In this study, five urban comprehensive health centers (CHCs) were randomly selected as study settings. In each center, the list of breastfeeding mothers was provided and 66 participants were randomly selected from each CHC. Selected breastfeeding mothers were contacted and invited to participate in the study. If they agreed to participate, the link for the online questionnaire was sent to them via a social media platform. Mothers who only fed their children with formula from birth, as well as those who did not answer the questionnaire completely (6 out of 330 persons) were excluded from the study.

2.4. Measures & variables

In the present study, BSE was the dependent variable. The independent variables included: spouse postpartum social support, perceived social support, anxiety and depression, and fear of the Covid-19 virus. Demographic and reproductive characteristics and coronavirus infection status were studied as covariates. The tools used for this study, which were translated into Persian and psychometrically verified as valid and reliable, consisted of the following items:

Checklist of sociodemographic and obstetric characteristics: This questionnaire includes questions such as age, level of education and occupation of the woman and her spouse, mother's understanding of the family's socio-economic status, number of pregnancies and number of live children, birth order, desire for the current pregnancy (from the perspective of the woman and her spouse), type of delivery, infant's gender, skin-to-skin contact, previous breastfeeding experience, time of starting first breastfeeding, history of hospitalization of the baby and its cause, infant's age, and the birth status of the baby (pre-term, term, or post-term). This sociodemographic and obstetric checklist was developed by researchers and professors.

Spouse Postpartum Social Support *Questionnaire*: This 20-item scale uses a 4-point Likert scale with responses ranging from 1 (*Strongly Disagree*) to 4 (*Strongly Agree*). Total scores range from 20 to 80, with a higher score indicating more spousal social support. Psychometric evaluation, including internal stability analysis, exploratory factor analysis (EFA), and concurrent and predictive validity and reliability (Cronbach's alpha for this scale was 0.96) showed that the psychometric properties of the English version are acceptable (C.-L. Dennis, Brown and Brennenstuhl, 2017). Confirmatory factor analysis, and analysis based on Rasch linear model and concurrent validity, confirmed the acceptable validity of the Persian version of the scale. In addition, Cronbach's alpha coefficient of the Persian scale was 0.94 (Eslahi et al., 2019).

Multidimensional Perceived Social Support *Scale (MDPSS) Questionnaire:* The MDPSS was developed by and is used to measure perceived social support from family, friends, and other important people in ones' life. This 12-item measure uses a Likert scale from 1 *(Highly Disagree*) to 7 *(Highly Agree*), with total scores ranging from 12 to 84; higher scores indicate greater social support. Cronbach's alphas of the total scale and subscales ranged from 0.85 to 0.91 and its reliability was reported through retesting as ranging from 0.72 to 0.85 (Bruwer et al., 2008). The psychometric properties of the translated version were examined by. Cronbach's alpha coefficients of the three dimensions of social support received from family, friends, and important people in ones' life were 0.89, 0.86, and 0.82, respectively, which confirmed the reasonable reliability of the Persian version.

Hospital anxiety and depression scale (HADS): In the present study, the

HADS questionnaire was used to assess anxiety and depression in patients in non-psychiatric clinics (Zigmond and Snaith, 1983). This 14-item scale consists of two subscales (anxiety and depression), and each item is rated based on a 4-point Likert scale. Scores range from 0 to 21 within each subscale, with scores greater than 11 indicating significant depression or anxiety, scores from 8 to 10 indicating borderline cases, and scores from 0 to 7 are considered normal (Zigmond and Snaith, 1983). Bjelland et al. (2002) examined the psychometric properties of HADS in a systematic review, and concluded it is an appropriate tool for assessing anxiety and depression disorders for different groups, including somatic patients, psychotherapy patients, primary care unit clients, and the general population (Bjelland et al., 2002). Psychometric properties of the Persian version were reviewed and confirmed by.

Fear of Covid-19 Questionnaire: This questionnaire was designed by and assesses fear of the Covid-19 virus. Participants express their level of agreement with 7 questions using a 5-point Likert scale, with answers ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Total scores range from 7 to 35, with a higher score indicating a greater fear of the Covid-19 virus. Psychometric properties of the Persian-translated questionnaire have been approved for the Iranian population (Ahorsu et al., 2020).

Breastfeeding Self-Efficacy (BSE) Questionnaire: The 14-item BSE questionnaire is rated based on a 5-point Likert scale from 1 (*Never* or *I am not completely sure*) to 5 (*Always* or *I am completely sure*). Scores range from 14 to 70 with higher scores indicating greater BSE (C.-L. Dennis, Hodnett, Gallop and Chalmers, 2002; C. L. Dennis, 2003). The validity of this questionnaire has been reviewed and confirmed (Varaei et al., 2009), and the reliability was confirmed in one study with a Cronbach's alpha of 0.87 (Bastani et al., 2008).

2.5. Ethical considerations

This research has been approved by Qazvin University of Medical Sciences (ethics code IR.QUMS.REC.1399.079). Initially, breastfeeding women who met the research inclusion criteria were contacted via telephone and the study objectives and working methods were explained. If they wished to participate in the research, the link to the online questionnaire was sent to them. To observe ethical principles of the research, potential participants were informed that their information would remain confidential and questionnaires would be collected anonymously. The contents of the informed consent were listed on the first page of the online questionnaire and the continuation of the questionnaire completion process was considered as consent to participate in the study.

2.6. Statistical analysis

A total of 324 breastfeeding women participated in the study. Data were analyzed using SPSS software, version 24. Means and standard deviations were reported to describe continuous quantitative variables, and frequencies and percentages were reported to describe qualitative variables. First, the normality of the distribution of BSE scores was evaluated and confirmed using central distribution and dispersion indices, a histogram graph, and the Shapiro-Wilk test.

In the first step, a one-way analysis of variance (ANOVA) and Pearson correlation coefficients were used to examine the associations between BSE (dependent variable) and spouse postpartum social support, perceived social support, anxiety and depression, fear of Covid-19, Covid-19 infection status, and the demographic and obstetric characteristics (independent variables). Considering a significance level of 0.05, the variables that had a significant correlation with BSE were selected to be included in the multivariable linear regression model. These variables included breastfeeding intention, type of infant feeding (among obstetric characteristics), spouse postpartum social support, perceived social support (subscale of the family), and depression.

Next, the multivariable linear regression model was developed by considering the total score of BSE as the dependent variable, and the above-mentioned variables as independent variables. The multivariable regression model was based on the stepwise method. Assumptions of using the linear regression method included normal distribution of BSE scores and lack of outlier data. In the initial model, given Variance Inflation Factor (VIF) >10 to examine the collinearity between independent variables, the family social support variable (VIF = 25.9) was removed from the model. After removing this variable, the problem of collinearity between the independent variables in the model was resolved.

3. Results

In this study, 324 women with a mean age of 29.68 (SD = 5.66) years participated. The mean and standard deviation score of BSE was 58.19 (SD = 10.48), 21.24 (5.69) for fear of coronavirus, 61.17 (10.78) for spouse postpartum social support, 21.36 (4.36) for perceived social support by family, 17.14 (5.16) for friends, 20.70 (4.63) for others, 8.03 (3.98) for anxiety, and 7.49 (4.09) for depression (Table 1).

Independent t-tests, ANOVA, and Pearson's correlation coefficient were used to examine the relationships between the variables. Results demonstrated that the variables of education level ($p = 0.05$), time of first postpartum breastfeeding ($p = 0.02$), type of infant feeding ($p < 0.001$), tendency to breastfeed ($p < 0.001$), fear of Covid-19 ($p = 0.05$), age of newborn ($p < 0.002$), anxiety ($p < 0.01$), depression ($p < 0.001$), spousal social support ($p < 0.04$), and social support received from the family ($p < 0.05$) were all significantly correlated with women's BSE (see Table 1).

These variables were included as independent variables in the multivariable linear regression model based on the stepwise method. The multivariable regression model showed that the independent variables of spouse postpartum social support (β: 0.77), tendency to breastfeed (β: 0.171), depression (β: 0.09), and formula feeding along with breastfeeding (β: 0.11), were significant predictors of breastfeeding self-efficacy. Results are presented in Table 2.

4. Discussion

The aim of this study was to determine predictors of BSE during the Covid-19 pandemic. In this study, the variables of spouse postpartum social support and breastfeeding intention were positively correlated with BSE, and depression and using formula along with breastfeeding (non-exclusive breastfeeding) were negatively correlated with BSE. Fear of Covid-19 was not significantly correlated with BSE. In several studies on breastfeeding self-efficacy, the mean score of BSE was approximately similar to the present study (58.19). For example, one study found a mean BSE score of 57.28 (Moafi et al., 2019), another found a score of 47.10 (Karbandi et al., 2014). The similarity of the results in this study with previous studies shows that the BSE in the time of the Covid-19 pandemic was not significantly different from previous studies.

The results of the present study showed that spouse postpartum social support was significantly correlated with BSE in lactating women. In line with the present results, showed that the emotional and functional support of the spouse increased the mother's BSE. In a study by Eslahi et al. (2019), there was an inverse relationship between spousal support and postpartum depression. Maternal depression in the postpartum period is one of the factors that can negatively affect BSE. Also, couple's counseling has been shown to increase spousal support and consequently increase the attachment between mother and baby (Khanzadeh and Mogaddam Tabrizi, 2020). Similarly, Zhu et al. (2014) demonstrated that social support from a mother's spouse, their own mother, and friends, as well as having previous breastfeeding experience increased BSE in Chinese women (Zhu et al., 2014).

BSE has been found to be the most effective factor in predicting exclusive breastfeeding among mothers (Moafi et al., 2019). The present findings corroborate this finding, confirming that exclusive

Table 1
Distribution of socio-demographic variables and results of univariable analysis to determine associations with Breastfeeding Self Efficacy (BSE) as independent variable.

Variables		Range	Mean (SD)	Pearson correlation	
				r	p value
Age (year)		16–45	29.68 (5.66)	−0.04	0.48
Spouse Age (year)		21–55	34.27 (5.47)	−0.001	0.99
Birth weight (gram)		1320–5515	3284 (512.49)	−0.02	0.76
Neonate Age (month)		1–22	5.02 (4.67)	0.17	**0.002**
Birth Gestational Age (weeks)		33–42	38.03 (1.71)	0.05	0.36
Spiritual Beliefs		0–10	9.02 (1.85)	0.003	0.95
FOC		9–35	21.24 (5.69)	−0.036	0.514
HADS	Anxiety	0–21	8.03 (3.98)	−0.14	**0.01**
	Depression	0–21	7.49 (4.09)	−0.19	**0.001**
Spouse Postpartum Support		24–80	61.17 (10.78)	0.114	**0.04**
Multidimensional Perceived Social Support Scale	Family	4–28	21.36 (4.36)	0.11	**0.05**
	Friends	4–28	17.14 (5.16)	−0.02	0.75
	others	4–28	20.70 (4.63)	0.06	0.26
Breastfeeding Self Efficacy		17–70	58.19 (10.48)		
			No (%)	statistics	p value
Education	Below Diploma		52 (16)	F: 3.12	**0.05**
	Diploma		117 (36.1)		
	Academic		155 (47.8)		
Spouse Education	Below Diploma		81 (25)	F: 0.09	0.92
	Diploma		106 (32.7)		
	Academic		137 42.3 ()		
Job	Housewife		280 (86.4)	t: 0.54	0.59
	Employed		44 (13.6)		
Spouse Job	Unemployed		26 (8)	t: 1.55	0.12
	Employed		298 (92)		
Economic Status	Week		52 (16)	F: 2.61	0.08
	Fair		218 (67.3)		
	Good		54 (16.7)		
Infant Gender	Girl		153 (47.2)	t: 0.86	0.393
	Boy		171 (52.8)		
Type of Delivery	NVD		148 (45.7)	t: 0.18	0.86
	CS		176 (54.3)		
First Breastfeeding after delivery	less than 1 h		210 (64.8)	t: 2.30	**0.02**
	More than 1 h		114 (35.2)		
Skin Contact after delivery	No		95 (29.3)	t: 0.08	0.94
	Yes		229 (70.7)		
Neonate Hospitalization	No		260 (80.2)	t; 1.52	0.13
	Yes		64 (19.8)		
Neonate Feeding	Exclusive breastfeeding		173 (53.4)	F:58.37	**<0.001**
	Formula		12 (3.7)		
	Breastfeed + Formula		60 (18.5)		
	Breastfeed + Complementary feeding		79 (24.4)		
Previous experience of Breast Feeding	No		176 (54.3)	t: 1.05	0.30
	Yes		148 (45.7)		
Intent to Breastfeed	No		18 (5.6)	29.36	**<0.001**
	Yes		259 (79.9)		
	Undetermined		47 (14.5)		
Gravid (Number of pregnancies)	1		157 (48.5)	r: 0.06	0.28
	2		102 (31.5)		
	≥3		65 (20.1)		
Child No.	1		174 (53.7)	r: 0.06	0.33
	2		108 (33.3)		
	≥3		42 (13)		
Contraception	WD		208 (64.2)	F: 0.32	0.81
	IUD		12 (3.7)		
	Condom		79 (24.4)		
	Hormonal		25 (7.7)		
Covid Status	Not infected		295 (91)	F: 3.06	**0.05**
	Infected & treated		23 (7.1)		
	Suspicious		6 (1.9)		

breastfeeding increases BSE. Because today's health care system focuses on postpartum care - including exclusive breastfeeding - it is expected that BSE will increase over time.

Intention to breastfeed was another variable that predicted BSE in this study, which means that BSE was higher in mothers who already intended to breastfeed. Moafi et al. (2019; 2019) demonstrated that there is a significant relationship between making a decision on breastfeeding duration and BSE, and mothers who chose exclusive breastfeeding before pregnancy were more likely to continue exclusive breastfeeding in the third month after delivery. Reported that exclusive breastfeeding would increase if more than 6 months had passed since the time that women had decided to breastfeed. These findings suggest that when a mother is has a desire to breastfeed, she is more motivated to achieve this goal and feels more confident in her ability to breastfeed.

Giving supplements (i.e., formula) along with mother's breastmilk can also affect BSE. In the present study, BSE was lower in mothers who used formula feeding along with breastfeeding. In a study conducted by in Brazil, mothers who used combined breastfeeding (breast milk plus

Table 2
Results of multivariable linear regression model considering BSE as dependent variable.

	Unstandardized Coefficients		Standardized Coefficients	Sig.
	B (95% CI)	Std. Error	Beta	
Spouse Post-Partum Support	0.73 (0.68; 0.79)	00.03	0.77	.000
Intent To Breastfeed	8.60 (5.88; 11.32)	1.38	0.17	.000
Neonate Feeding = Breastfeed + Formula (vs. EBF)	−10.75 (−13.75; −7.75)	1.53	-.09	.000
Depression	0.74 (0.47; 1.01)	.14	0.11	.000
Model Summary	R: 0.98 R2: 0.96 Adjusted R2: 0.96 Durbin-Watson: 1.79			

a. Dependent Variable: BSE.
b. Linear Regression through the Origin.

formula) showed higher scores on the postpartum depression scale (PDSS) than those who exclusively breastfed. Also, BSE scores for mothers who exclusively breastfed were higher and these scores were inversely related to depression.

The results of the present study also showed that depression in breastfeeding mothers was negatively related to BSE. Coo et al. (2020) found high levels of depression symptoms during pregnancy were associated with non-exclusive breastfeeding in the first three months after delivery. Also, in the first three months after delivery, high levels of anxiety and depression have a negative effect on breastfeeding (Coo et al., 2020). Similarly, another study found that prenatal depression at week 36 of pregnancy was associated with a delayed initiation of breastfeeding; and postpartum depression was associated with a shorter duration of exclusive breastfeeding or any type of breastfeeding (Abdul Raheem et al., 2019). In a study by, women with prenatal depression were less likely to start breastfeeding and less likely to continue breastfeeding after 6 weeks of delivery. In a study by, 30.4% of non-breastfeeding mothers had symptoms of depression, demonstrating the importance of screening for depression during breastfeeding. These findings suggest that mothers who suffer from depressive symptoms may have less confidence in their ability to breastfeed, and that prenatal depression is a significant factor in the early cessation of breastfeeding. Early detection of maternal mental health problems during pregnancy is essential as a proactive measure to prevent breastfeeding problems. As a result, further interventions to improve breastfeeding should include assessing maternal mental health, and responding to pre- and post-partum depression in mothers to encourage them to start breastfeeding early, and breastfeed for a longer period.

Although the findings of previous studies are similar to the findings of the present research in terms of mean BSE and its predictors, it is noteworthy that the present study was carried out during the Covid-19 pandemic. According to the results, although the scores obtained from the fear of Covid-19 scale were relatively high in breastfeeding women, no correlation was found between BSE and fear of Covid-19. A study in Ethiopia following the HIV epidemic found that HIV-positive mothers had a strong fear of breastfeeding that was disproportionate to documented evidence of transmission risk (Koricho et al., 2010). Although infectious diseases have emerged at different times in history, globalization in recent years has facilitated the spread of pathogens such as HIV, Ebola, Zika, and H1N1, resulting in global epidemics (Tucci et al., 2017). This has further complicated the control of infections, which has led to significant political, economic, and psychological outcomes and immediate public health challenges (Ferguson et al., 2020).

Fear is an adaptive reaction to danger. However, when the threat is uncertain and persistent, such as the coronavirus pandemic, fear can become chronic and severe (Mertens et al., 2020). Patients with, or suspected of having a Covid-19 infection, may experience severe emotional and behavioral reactions such as fear, impatience, loneliness, anxiety, insomnia, or anger (Shigemura et al., 2020). Such conditions can lead to disorders such as depression, anxiety (including panic attacks and post-traumatic stress disorder), psychosis, or paranoia, and can even lead to suicide (Xiang et al., 2020). In some cases, uncertainty about infection and death, or the infection of family and friends, can exacerbate irritability (Shigemura et al., 2020). In the present study, there was no statistically significant relationship between fear of Covid-19 and BSE. Although fear of Covid was not directly related to BSE, an association was observed between depression and BSE. Although it seems that fear of Covid did not directly affect BSE, it may influence a person's mental health (e.g., the correlation between fear of Covid and depression in this study as an exploratory finding; $r = 0.3$, $p<.001$; Was examined and a positive and significant correlation was observed between them). In other studies, a positive and significant correlation between fear of Covid-19 and depression have been found (Bakioğlu et al., 2020; Mahmud et al., 2021).

4.1. Strengths and weaknesses of the research

A strength of the present research is the study of breastfeeding status and BSE during the Covid-19 pandemic crisis. By making use of an appropriate sample size and statistical methods, the present study has strived to simultaneously evaluate some predictors of BSE during the Covid-19 pandemic. However, the cross-sectional nature of the research and use of self-report questionnaires represent some of the limitations of the present study. Although fear of Covid was not associated with BSE in the present study, it might have had an indirect effect through the mental health of participants; which further research is needed.

5. Conclusion

The findings in this study have shown that spousal postpartum social support and having the intention to breastfeed were positively associated with BSE. Mothers who had depression and those who used formula in infant feeding alongside breastfeeding were negatively associated with BSE during the Covid-19 pandemic. These findings may have implications for improving breastfeeding conditions for mothers through counseling, public health campaigns, or by aiming to improve spousal support. Preventing, identifying, and responding to mental health problems in mothers will also have a vital role in supporting BSE.

6. Ethics approval and consent to participate

The research is approved by the Research Review Board at Qazvin Faculty of Nursing and Midwifery (IR.QUMS.REC.1399.079 at the Human Ethics Committee at Qazvin University of Medical Sciences). The permissions to access the health and medical centers have been obtained from the authorities in Qazvin University of Medical Sciences. Then, the researcher will introduce herself to the participants. After introducing the research objectives, the confidentiality of data maintenance and the freedom to withdraw from the study, the informed consent form was signed by the participants who were willing to participate in this study.

Consent for publication

Not applicable.

Availability of data and material

Data will be provided through email to the corresponding author.

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Authors' contributions

All authors contributed to the conception and design of the study. MAB and NB drafted the manuscript. ZA, MAB, KA, KL, and NB provided contributions to the literature review and substantially edited the primary manuscript and prepared the final version of the manuscript. All authors revised the manuscript, agreed to be fully accountable for ensuring the integrity and accuracy of the study, and read and approved the final version of the manuscript to be published. All the authors met the criteria for authorship, and they are listed as co-authors on the title page.

Declaration of competing interest

None to declare.

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