IJN
Iranian Journal of Neonatology
http://ijn.mums.ac.ir

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Original Article

Breastfeeding Self-efficacy and Determinants among Mothers with and without COVID-19 during Childbirth: An Ambidirectional Cohort Study

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ABSTRACT

Background: Breastfeeding self-efficacy (BSE) refers to a mother's confidence in her ability to breastfeed her baby and it is a key factor during breastfeeding. The current study aimed to investigate the relationship between BSE and its related factors with the history of COVID-19 during childbirth in breastfeeding mothers.

Methods: The present ambidirectional cohort study was conducted on 60 breastfeeding mothers who were divided into two study and control groups. Participants were selected randomly from referrals to Shahid Sadoughi Hospital, Yazd, Iran. To collect data, a BSE questionnaire a checklist consisting of midwifery-demographic and baseline characteristics were completed through interviews. Chi-square test, t-test, univariate binary, and multivariable logistic regression were applied for analysis. P value less than 0.05 was considered statistically significant.

Results: Although the study and control groups were homogeneous in terms of baseline characteristics, they differed significantly in terms of delivery type of, NICU admission, and skin contact as midwifery-demographic factors (P<0.01). Breastfeeding self-efficacy mean score (BSES) in the control and study groups were 52.33 and 39.56, respectively, showing a significant difference between the two groups (P<0.01). According to univariate binary logistic regression analysis, type of delivery, NICU admission, and COVID-19 were significantly related to poor BSE (P<0.05). Based on multivariable logistic regression analysis, a positive test result for COVID-19 during childbirth was the only statistically significant predictor of BSES (P=0.02).

Conclusion: In the present study, the positive test result for COVID-19 was the only significant predictor of BSE during childbirth.

Keywords: Breastfeeding, Childbirth, COVID-19, Pregnancy, Self-efficacy

Introduction

The primary cases of SARS-CoV-2 contamination were detected in December 2019, leading to a widespread outbreak of COVID-19. In response to the large-scale outbreak of COVID-19 contamination, the World Health Organization (WHO) declared the COVID-19 outbreak a worldwide pandemic in March 2020 (1-3). Just like other populations, breastfeeding women were at risk of encountering SARS-CoV-2 and potentially contracting COVID-19 (4-6).

There are numerous questions and worries about COVID-19, including its implications for breastfeeding. The present observation draws on an announcement and recommendations currently issued by the local office for Europe of the World Health Organization (WHO) with the contribution of the European Pediatric Association-Union of National European Pediatric Societies and Associations (EPA/UNEPSA) and other main European pediatric organizations (7).

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Please cite this paper as:
Dehshiri M, Chaleshi D, Nafei Z. Breastfeeding Self-efficacy and Determinants among Mothers with and without COVID-19 during Childbirth: An Ambidirectional Cohort Study. Iranian Journal of Neonatology. 2023 Jul: 14(3). DOI: 10.22038/IJN.2023.70247.2367

Emergencies are identified in the United Nations Children's Fund (UNICEF)/WHO international Strategy on Infant and Young Child Feeding as one of the "exceptionally hard circumstances" (UNICEF and WHO, 2003, p. 11). Based on this strategy, special attention should be paid to breastfeeding (8). The protection, promotion, and support of breastfeeding are priorities for public health, and WHO has been constantly compiling proof addressing the effect of COVID-19 on mothers and children (7).

Breast milk is like an elixir of life. Breast milk is a complex fluid of nutrients, cellular components, and bioactive molecules with considerable nutritional value for infants (9). Short-term benefits of breastfeeding are a reduced risk of diarrhea and respiratory infections, while the long-term effects include protection against overweight and obesity, as well as a positive effect on intelligence. For mothers, breastfeeding increases child spacing and reduces the risk of mastitis, postpartum hemorrhage, depression, and ovarian and breast cancer (10). Although breastfeeding has noteworthy benefits, a significant proportion of women breastfeed for less than 6 months. In Iran, the growth of exclusive breastfeeding until 6 months of age is reported as 23.1% (11). Currently, no compelling evidence suggests the transmission of SARS-CoV-2 from mother to baby via vertical route or breast milk (12-14). In particular, there is probably an association between the presence of specific IgA against SARS-CoV-2 in mothers with a history of COVID-19 infection. Providing breast milk by mothers with COVID-19 can potentially offer infant-specific protection against the virus, provided that appropriate hygiene practices are followed (9). Some factors, such as BSE, play a role in starting or maintaining exclusive breastfeeding. Breastfeeding self-efficacy refers to a mother's perceived ability to breastfeed her new infant and is a salient variable in breastfeeding duration (15). One of the identified predictors of breastfeeding duration and exclusivity is BSE. Therefore, evaluating mothers' BSE helps identify women who need more support for breastfeeding during the postpartum period (10).

A study in the United States showed that limited milk supply could result in feelings of worry and guilty, ultimately increasing stress levels among women who gave birth during the COVID-19 pandemic. Additionally, social distancing restrictions associated with the pandemic can negatively affect women's pregnancy experiences and emotions after childbirth, potentially increasing the risk of postpartum mental health problems and decreasing BSE (16-18).

Due to the importance of breastfeeding during the COVID-19 pandemic and the impact of BSE on breastfeeding actual rates, the obtained results may inform health providers about the impact of the pandemic on BSE to offer tailored advice and support to breastfeeding mothers. Therefore, the aim of this study was to investigate predictors of BSE during the COVID pandemic.

Methods

Study design and participants

The present ambidirectional cohort study was conducted between November 6, 2021 and 2021 December 6 (prospective phase). All breastfeeding mothers admitted for childbirth in Shahid Sadoughi Hospital, Yazd, Iran between 2021 May 22, and 2021 June 5, were assessed for participation eligibility (retrospective phase). Breastfeeding women with a singleton pregnancy and those who desire to breastfeed the infant were included in the study. Molecular test (PCR) for COVID-19 was available during childbirth for participants. Exclusion criteria were patients who died before the prospective phase or were unwilling to participate in the study due to breast anomaly, drug and alcohol abuse, having galactosemic baby, under treatment mothers for breast cancer, mothers with HIV, untreated active tuberculosis, and breast Herpes.

The patient list was obtained from the hospital information system (HIS). According to HIS list, it was identified that 35 patients with COVID-19 were admitted for delivery during the retrospective phase. After exclusion and attrition of 14.2% of participants (two mothers died due to COVID-19, and three mothers did not respond to calls), 30 breastfeeding mothers with a positive PCR test were included as the study group. To select the control group, a random allocation sample list was generated using Random Allocation 1 software within the timeframe of the retrospective phase, and 30 breastfeeding mothers with a negative PCR test were randomly chosen. Once the study subjects were identified in the prospective phase, a pre-planning checklist and an exclusive breastfeeding questionnaire were administered through phone calls to both the study and control groups.

Considering $\alpha = 0.05$ and $\beta = 0.01$ and using G power software version (3.1.9.4), the effect size between study groups was calculated to be 1.44.

Data collection

In this study, a pre-planning checklist

consisting of midwifery-demographic and baseline characteristics was used. Midwifery-demographic characteristics were gravidity, parity, alive child, breastfeeding experience, type of delivery, infant gender, skin contact after delivery, neonatal intensive care unit (NICU) admission, and history of COVID-19 infection. Baseline characteristics included age, academic degree, and occupation. Additionally, a shortened version of breastfeeding self-efficacy scale (BSES) was utilized. This version, developed by Araban et al., comprises 13 items and employs a 5-point Likert scale for scoring. The total score ranges from 13 to 65, with interpretations as 13-44 for poor BSE and 45-65 for proper BSE. The validity and reliability of this version were evaluated and confirmed by a previous study conducted in Iran, where the internal consistency, using Cronbach's alpha coefficient, internal consistency was 0.91 (11).

Statistical analysis

The Statistical Package for the Social Sciences Software (SPSS, version 16.0) was used to perform all statistical analyses. Categorical variables quantitative data were expressed as frequency and mean ± standard deviation, respectively.

The prevalence of poor BSE was determined and then stratified by sociodemographic data. Then, differences in BSES (mean ± SD) and prevalence of poor breastfeeding self-efficacy (categorized) between groups were assessed using the Chi-square and t-test. Univariate binary logistic regression analysis was applied, then significant variables were included in subsequent multivariable logistic regression analysis. The associations were presented using odds ratios (OR) and their 95% confidence interval (95% CI). P-value for statistical significance was considered as 0.05.

Ethical approval

The study was approved by the ethics committee of Shahid Sadoughi University of Medical Sciences, Yazd, Iran (Code: IR.SSU.REC.1400.149). Ethical principles related to the confidentiality of participants' information were also considered.

Results

The present study evaluated 60 participants, including 30 breastfeeding mothers infected with COVID-19 and 30 non-infected mothers, of whom 38 (63.4%) participants were younger than 30 years. As can be seen in Table 1, there were

Table 1. Comparison of study variables contributing to breastfeeding self-efficacy

Variables	Categories	Groups, N (%)		P value[1]
		Control	study	
Age (mean, SD)	Less than 30	22 (57.9%)	16 (42.1%)	0.15
	30 & more	8 (36.4%)	14 (63.6%)	
Education	Under diploma and diploma	22 (55%)	18 (45%)	0.20
	Bachelor, master, & PhD	8 (40%)	12 (60%)	
Occupation	Housewife	28 (51.9%)	26 (58.1%)	0.38
	Employed	2 (33.3%)	4 (66.7%)	
Gravidity	G1	11 (52.4%)	10 (47.6%)	0.13
	G2	3 (25%)	9 (75%)	
	G3 and more	16 (59.3%)	11 (40.7%)	
Parity	P1	11 (50%)	11 (50%)	1.0
	P2 and more	19 (50%)	19 (50%)	
Alive child	one	11 (50%)	11 (50%)	0.94
	two	9 (47.4%)	10 (52.6%)	
	three and more	10 (52.6%)	9 (47.4%)	
Type of delivery	Natural	18 (78.3%)	5 (21.7%)	<0.01
	Cesarean	12 (32.4%)	25 (67.6%)	
Infant gender	Male	15 (48.4%)	16 (51.6%)	0.79
	Female	15 (51.7%)	14 (48.3%)	
NICU admission	Yes	4 (21.1%)	15 (78.9%)	<0.01
	No	26 (63.4%)	15 (36.6%)	
Breastfeeding experience	Yes	19 (48.7%)	20 (51.3%)	0.78
	No	11 (52.4%)	10 (47.6%)	
Skin Contact after delivery	Yes	23 (67.6%)	11 (32.4%)	<0.01
	No	7 (26.9%)	19 (73.1%)	

[1] chi square or fisher exact test

Table 2. Difference in breastfeeding self-efficacy between groups

	Groups		P-value
	Control	Study	
Breastfeeding self-efficacy mean ± SD	52.33 ± 7.84	39.56 ± 9.74	<0.01[1]
Categorized, N (%)			<0.01[2]
Poor	7 (23.3%)	21 (70%)	
Good	23 (76.7%)	9 (30%)	

[1]T test, [2]chi square test

significant differences between the groups in terms of the type of delivery (X^2: 11.9, $p < 0.01$), NICU admission (X^2: 9.3, $p < 0.01$), and skin-to-skin contact after delivery (Table 1X^2: 9.7, $p < 0.01$).

Regarding the dependent factor, BSE was compared between the study and control groups both as a quantitative measure and as a categorized factor. The BSES was significantly lower in the study group than in the control ($p < 0.01$). Notably, 70% of the study group participants had poor BSE, whereas 23.3% of the control had poor BSE (Table 2).

Logistic regression analysis was performed to identify factors affecting BSE in participants. In the univariate binary logistic regression (Model 1), type of delivery (for cesarean; OR: 0.24, 95% CI: 0.07-0.75), NICU admission (OR: 0.26, 95%CI: 0.08-0.84), and COVID-19 (OR: 0.13, 95% CI: 0.04-0.41) were significantly related to poor BSE. Multivariable logistic regression analysis (model 2) was performed regarding the type of delivery, history of NICU admission, and COVID-19, which were significant as independent variables in univariate binary logistic regression analysis. The findings revealed that the associations strengthened, but type of delivery and NICU admission were not significant predictors of BSE anymore. A positive test for COVID-19 was a significant predictor of BSE, meaning that participants with COVID-19 were nearly four times more likely to have poor BSE (Table 3).

Table 3. Results of univariate binary and multivariable logistic regression analysis for good breastfeeding self-efficacy

Variables	Model 1		Model 2	
	OR	P value	OR	P value
Age (mean, SD)				
Less than 30	1		1	
More than 30	1.08 (0.37 – 3.09)	0.88	2.93 (0.70 – 12.16)	0.13
Education				
Under diploma and diploma	1		1	
Bachelor, Master, & PhD	0.60 (0.20 – 1.78)	0.36	0.76 (0.23 – 2.46)	0.65
Occupation				
Housewife	1		1	
Employed	0.40 (0.06 – 2.37)	0.31	0.51 (0.06 – 4.03)	0.52
Gravidity (number of pregnancies)				
G 1	1		1	
G 2	1.10 (0.26 – 4.54)	0.89	2.06 (0.38 – 11.25)	0.40
G 3 and more	1.60 (0.50 – 5.05)	0.42	1.68 (0.43 – 6.51)	0.45
Parity				
P1	1		1	
P2 and more	1.65 (0.57 – 4.75)	0.35	2.03 (0.58 – 7.06)	0.26
Alive child				
1	1		1	
2	2.05 (0.58 – 7.21)	0.26	3.09 (0.69 – 13.79)	0.14
3 and more	1.33 (0.38 – 4.56)	0.64	1.34 (0.31 – 5.79)	0.68
Type of delivery				
NVD	1		1	
Cesarean	0.24 (0.07 – 0.75)	0.01	0.45 (0.12 – 1.70)	0.24
Infant gender				
Male	1		1	
Female	1.13 (0.41 – 3.12)	0.80	1.26 (0.38 – 4.11)	0.69

Table 3. Continued

NICU admission				
No	1		1	
Yes	0.26 (0.08 – 0.84)	0.02	0.48 (0.13 – 1.81)	0.28
Breastfeeding experience No				
Yes	1		1	
	1.91 (0.65 – 5.61)	0.23	2.93 (0.79 – 10.80)	0.10
Skin contact after delivery No				
Yes	1		1	
	2.20 (0.77 – 6.23)	0.13	0.59 (0.14 – 2.54)	0.48
COVID-19				
No	1		1	
Yes	0.13 (0.04 – 0.41)	<0.01	0.21 (0.06 – 0.79)	0.02

Model 1: pure univariate binary logistic regression, model 2: adjusted for type of delivery, NICU admission, and group

Discussion

The study was conducted to investigate the relationship between BSE and its related factors in mothers with and without a history of COVID-19 during childbirth. The obtained results indicated that mothers with a history of COVID-19 during childbirth had significantly lower BSE scores compared to mothers without such a history. Previous studies showed that the mean score of BSE and exclusive breastfeeding rates were similar during the COVID-19 pandemic and before the pandemic (19, 20). This is unexpected, as it was anticipated that the mean score of BSE and exclusive breastfeeding rates would have declined during the pandemic. this result could be attributed to the fact that a high number of respondents in the studies conducted were healthy and asymptomatic, in contrast to those with suspected or confirmed COVID-19 infection.

Both study and control groups were homogeneous, and they had no statistically significant differences in terms of variables of age, education level, occupation, number of pregnancies and deliveries, number of children, breastfeeding experience, and infant gender.

The results of univariate binary logistic regression analysis indicated that the type of delivery, NICU admission, and COVID-19 were significantly related to poor BSE. However, based on multivariable logistic regression analysis, maternal history of COVID-19 during childbirth was the only statistically significant predictor of BSES.

In Iran, a study by Ahmad Zadeh Beheshti et al. (2021) showed that COVID-19 status was significantly correlated with BSE in women (P=0.05). However, this variable was not considered independent in the multivariable linear regression model (20).

In the current study, the type of delivery did not affect mothers' mean BSES. Consistent with the present results, several studies found no statistically significant difference between cesarean section and vaginal delivery with respect to BSE (21-23). In contrast to the current findings, some studies found that the type of delivery affected BSE (24, 25), and mother-child interaction appeared to be a major factor (22). The obtained results of the current study showed that NICU admission was not significantly related to BSE. In Iran, a study by Farhadieh et al. (2019) revealed that the NICU admission was not significantly correlated with women's BSE, which was in line with the findings of the present study (26).

The present results indicated that COVID-19 was a significant predictor of BSES. One of the influencing factors on BSE is emotional arousal, such as illness, fatigue, stress, and anxiety (11). Infectious diseases that emerged in recent years have facilitated the spread of pathogens resulting in global epidemics (27). This has made infection management more difficult, leading to serious political, economic, and psychological effects as well as urgent public health issues (28). Therefore, it is possible to use BSE to identify mothers who need additional support or are at risk. It is also possible to implement strategies in the fields of education, research, and clinical in order to maintain and promote breastfeeding. Implementing appropriate educational interventions and addressing other factors that influence BSE can help reduce maternal emotional distress and enhance levels of BSE and empowerment.

Strengths and weaknesses of the research

The present research possesses several strengths, including the comparison of BSE status during the COVID-19 pandemic in mothers with

and without a history of COVID-19 during childbirth. The present study tries to simultaneously evaluated some predictors of BSE during the COVID-19 pandemic using appropriate statistical methods. Using a standard scale for measuring BSE was another strength of this study. However, the observational, nonrandomized design of the study represented some of the limitations of the present study. The available sampling was used due to the limited number of research units. Lower BSES was found in COVID-19-positive women, but they probably had higher anxiety and other negative feeling after these experiences.

Conclusion

In conclusion, the current study revealed that infection with COVID-19 was the only significant predictor for BSE during childbirth and could play a significant role in breastfeeding selection and continuation. Therefore, one of the important responsibilities of health providers is to boost their knowledge on breastfeeding during the COVID-19 pandemic and provide psychological support to breastfeeding mothers with COVID-19 because they deal with more breastfeeding problems.

Acknowledgments

Authors consider it necessary to thank and appreciate the participants, staff of Shahid Sadoughi Hospital Information System, and all those who cooperated.

Conflicts of interest

The authors declare that they have no competing interests.

Funding

This study was financially supported by Shahid Sadoughi University of Medical Sciences, Yazd, Iran.

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