The Relationship between Breast Milk Sufficiency Perceptions and Breastfeeding Self-Efficacy of Mothers with Infants Hospitalized in the NICU: An Analytical Cross-Sectional Study

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ABSTRACT

Objective: The purpose of this study is to analyze the relationship between perceived breast milk supply and breastfeeding self-efficacy among mothers whose newborns were hospitalized in the neonatal intensive care unit (NICU).

Methods: Designed as an analytical and cross-sectional study, this study was performed from March 2021 to May 2022 with 237 mothers in Türkiye. A Mother–Infant Information Form, the Breastfeeding Self-Efficacy Scale (BSES), and the Perception of Insufficient Milk (PIM) Questionnaire were used in the collection of data. The Shapiro–Wilk test, kurtosis and skewness coefficients, *t*-tests, analysis of variance, post hoc tests, Pearson's correlation analysis, and linear regression analyses were used in statistical analyses.

Results: In our study, being older, having high levels of education, having a high-level income, having a planned pregnancy, and having a vaginal delivery influenced breastfeeding self-efficacy and perceptions of breast milk sufficiency. The breastfeeding self-efficacy levels and breast milk sufficiency perceptions of the participants were also positively affected by receiving breastfeeding training, breastfeeding the newborn in the first 24 hours after birth, having a long-term breastfeeding plan, and feeding the newborn exclusively with breast milk. The mean BSES and PIM scores of the participants were 58.97 ± 11.11 and 39.15 ± 10.39, respectively. It was also found that 66.7% of the participants believed they produced enough breast milk to feed their newborns. A statistically significant strong positive relationship was found between breastfeeding self-efficacy and perceptions of breast milk sufficiency ($r = 0.854$, $P = .000$). The independent variable of breastfeeding self-efficacy accounted for 72.8% of the total variance in the dependent variable of perceptions of sufficient milk ($R^2 = 0.728$).

Conclusion: In this study, mothers whose newborns were hospitalized in the NICU were found to have above-average breastfeeding self-efficacy levels and breast milk sufficiency perceptions. In addition, it was found that as the level of breastfeeding self-efficacy of the mothers and their perception of the sufficiency of breast milk increased.

Keywords: Breastfeeding, self efficacy, exclusive breastfeeding, neonatal intensive care unit, newborn

Introduction

For baby nutrition, exclusively breast milk is recommended for the first 6 months. Infants receive complementary foods after the first 6 months and continue to be breastfed until at least 2 years of age or longer to start them on a healthy life.[1] At the global level, the World Health Organization (WHO) aims to increase the rate of exclusive breastfeeding for the first 6 months to 70% by 2030. Despite these recommendations, the rate of exclusive breastfeeding for the first 6 months is only 48% worldwide.[2] The region with the highest rate of exclusive breastfeeding for the first 6 months (60%) is South Asia, while the region with the lowest rate (26%) is North America. In Türkiye, the rate of exclusive breastfeeding for the first 6 months is 40.7%.[3]

It was scientifically proven that breast milk had nutritional, immunological, social, and cultural benefits for the mother, newborn, and society. In a systematic review, it was reported that newborns who exclusively had breast milk had a higher survival rate than those who were not fed with breast milk or those who were partially fed with it.[4] There is strong evidence that breast milk protects newborns against diseases and

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infections such as diarrhea, respiratory infections, and necrotizing enterocolitis.[5] It is also emphasized that breast milk increases children's intelligence levels and protects children against diabetes and obesity. Breastfeeding for over 12 months reduces the risk of breast and ovarian cancer in women.[6]

Breastfeeding is a phenomenon influenced by socio-cultural structure. The mother's age, education level, employment status, and ethnic origin are among the sociodemographic factors that affect breastfeeding.[7] In a recent systematic review, it was stated that low sociodemographic and economic status was associated with the perception of insufficient milk (PIM).[8]

Perceptions of breastfeeding self-efficacy (BSE) determine the mother's breastfeeding thoughts, her breastfeeding preferences, the efforts to be made by her for breastfeeding, her power to cope with emerging obstacles, and her skills in continuing breastfeeding. The success of mothers in their previous breastfeeding experiences, their status of seeing others breastfeeding, the support of their families, friends, and breastfeeding consultants, and their psychological state affect their success in breastfeeding their newborn newborns.[9] In the relevant literature, it was shown that exclusive breastfeeding enhanced the mother's BSE.[10,11]

The PIM of mothers affects their decisions to continue or cease breastfeeding. The main reason mothers stop breastfeeding is the belief that they are not producing enough milk. Perception of insufficient milk is not generally associated with the actual sufficiency of women's breast milk supply. By exploring the topic of PIM, barriers to breastfeeding can be eliminated.[12,13] In a systematic review, it was put forward that strong BSE reduced the mother's PIM and extended her breastfeeding period.[14]

This study is different from other studies in the literature[10-14] in that it revealed PIM and BSE in mothers whose babies were hospitalized in the neonatal intensive care unit (NICU) during a period when coronavirus disease-19 (COVID-19) measures were restrictive. Due to COVID-19 policies, mothers were unable to bond with their babies, and breastfeeding was limited. With this feature, the results of the study will contribute to the literature by shedding light on the relationship between mothers' BSE and milk perceptions during the pandemic period.

The purpose of this study is to evaluate the relationship between PIM and BSE levels of mothers whose newborns were hospitalized in the NICU.

Research Questions
1. What are the BSE and PIM of mothers whose newborns are hospitalized in the NICU, and what are the factors associated with their BSE and PIM?
2. Is there a statistically significant relationship between the BSE and PIM?

Methods

Study Design
This is a descriptive, correlational, and cross-sectional study.

Sampling
The study's population included mothers whose newborns were hospitalized in the NICU of a Training and Research Hospital in Istanbul, Türkiye, between March 2021 and May 2022. The study participants were Turkish mothers who met the case selection criteria and volunteered. The G*Power (v3.1.9) program was utilized to determine the minimum sample size necessary for the study. According to the information obtained from the reference study and assuming a small-sized effect is observed (Cohen's $d = 0.19$), the calculation resulted in a required sample size of 237 participants, with an effect size of 0.19, power of 0.80, and an α value of 0.05.[19]

Mothers whose newborns had a gestational age above 37 weeks, were fed orally, and were hospitalized in the NICU for a minimum of 5 days, and who volunteered to participate in the study were included in the sample. Mothers of newborns who had a congenital anomaly and for whom breast milk was contraindicated, as well as mothers who suffered from hearing, speech, or cognitive barriers, were excluded from the sample.

Problems related to the immature neurodevelopmental and digestive systems of preterm infants (problems with sucking and swallowing, etc.), as well as preeclampsia, diabetes, and chronic and mental illnesses that may occur in mothers of preterm infants, can be additional barriers to breastfeeding.[15] In this study, the inclusion of term neonates was planned in order to more clearly determine the relationship between Breastfeeding Self-Efficacy Scale (BSES) and PIM and to reduce confounding factors.

In the NICU, mothers are admitted to the clinic 4 times a day to feed their babies. However, mothers were admitted to the clinic once a day for feeding due to COVID-19 precautions during the period of study data collection. Mothers were primarily encouraged to breastfeed and supplemented their babies with formula when necessary. The newborns in the sample group were fed breast milk 8 times a day, every 3 hours, and formula as needed.

Data Collection Tools
Data were collected using a Mother–Newborn Information Form, the BSES, and the Perception of Insufficient Milk Questionnaire.

Mother–Newborn Information Form
The form prepared in light of the relevant literature comprised 2 parts that were designed to collect information about the mother and the newborn.[10-12,14] The part about the mother had 15 questions, and the part about the newborn had 6 questions, constituting a total of 21 questions. The questions in the form collected information about the mother's descriptive, obstetric, and breastfeeding characteristics, as well as the newborn's age, sex, weight, and other characteristics.

Breastfeeding Self-Efficacy Scale
The BSES was developed by Dennis in 1999, and the short version was published in 2003.[16] In 2008, Aluş Tokat and colleagues conducted a study to evaluate the validity and reliability of the Turkish version. The scale consists of 5 points in a Likert-type format, with scores ranging from 14 to 70. A higher score indicates that the mother has a higher level of self-efficacy in breastfeeding. The Cronbach α coefficient for the Turkish validity and reliability study was 0.86.[17] In our study, it was 0.95.

Perception of Insufficient Milk Questionnaire
McCarter-Spaulding and Kearney[18] developed the PIM Questionnaire to determine how mothers perceive the sufficiency of the supply of their breast milk. Gökçeoğlu and Küçükoğlu performed a reliability and validity study in Turkish for the PIM Questionnaire, which has 6 items. The scale includes a question asking if the mother believes her breast milk supply is sufficient. This item is dichotomously answered as "yes" or "no." The first item is not included in the calculation of the total PIM score. The minimum and maximum PIM scores are 0 and 50. A high score shows that the mother perceives that the supply of her breast milk is sufficient. In the reliability and validity study of PIM

in Turkish, it was found to be 0.82.[19] In this study, this coefficient was calculated as 0.95.

Data Collection
Data were collected through face-to-face interviews. The purpose of the study was explained to mothers who met the inclusion criteria, and informed consent was obtained. Next, the Mother–Newborn Information Form, BSES, and PIM were administered to the participants. On average, it took each participant 20 minutes to fill out the data collection tools.

Ethical Considerations
The study was approved by the Ethics Committee of the University of Health Sciences (Approval no: 20/452, Date: November 20, 2020). Permission to include BSES and PIM was obtained from the authors who conducted reliability and validity studies of the scales in Turkish.

Statistical Analysis
The Statistical Package for Social Sciences version 25.0 software (IBM Corp.; Armonk, NY, USA) was used in the analysis of the collected data. Frequency and percentage analyses were utilized in the analysis of the descriptive characteristics of the participants, while mean and standard deviation statistics were used in the analysis of their BSES-SF and PIM scores. Whether the data had a normal distribution was checked with the Shapiro–Wilk test and kurtosis–skewness coefficients. It was found that the data were normally distributed. The BSES-SF and PIM scores of the participants were analyzed using the *t*-test, one-way analysis of variance (ANOVA), and post hoc tests (Tukey, LSD) methods. Relationships between BSES-SF and PIM scores were examined using Pearson's correlation analysis and linear regression analysis methods.

Results

The majority of the participants were aged 25-32 years (49.8%), had low levels of education (47.3%), were not working (83.1%), and defined their income levels as medium (72.6%). Significantly higher BSES-SF and PIM scores were found among the participants who were aged 25-32 years, those who were university graduates, those who were working, and those who had high levels of income (Table 1).

Similarly, the participants who had planned pregnancies, those who had vaginal deliveries, those whose newborns were admitted

Table 1. Descriptive Characteristics and Mean BSES-SF and PIM Scores of the Participants

Descriptive Characteristics	N	BSES-SF			PIM		
Age (Years)		**Mean ± SD**	**F**	**P**	**Mean ± SD**	**F**	**P**
18-25[1]	50	52.00 ± 12.04			33.34 ± 10.45		
25-32[2]	118	61.83 ± 9.04			41.64 ± 8.64		
33-39[3]	52	60.03 ± 11.26	10.881	.000	39.69 ± 11.379	8.404	.000
40 or older[4]	17	56.29 ± 12.32		2 > 3> 4 > 1	37.35 ± 12.04		2 > 3 > 4 > 1
Education level		Mean ± SD	F	P	Mean ± SD	F	P
Primary–secondary school[1]	112	54.92 ± 11.95			35.652 ± 11.450		
High school [2]	83	61.31 ± 9.94		.000	41.313 ± 9.084		.000
University [3]	42	65.14 ± 5.56	18.040	3 > 2 > 1*	44.238 ± 5.759	14.685	3 > 2 > 1*
Employment status		Mean ± SD	t	P	Mean ± SD	t	P
Working	40	62.300 ± 8.951			41.350 ± 9.264		
Not working	197	58.294 ± 11.403	2.093	.017	38.711 ± 10.581	1.467	.144
Income status		Mean ± SD	F	P	Mean ± SD	F	P
Income below expenses[1]	43	55.767 ± 12.987			35.861 ± 12.202		
Income equaling expenses[2]	172	58.919 ± 10.819		.003	39.285 ± 9.907		.005
Income above expenses[3]	22	65.636 ± 5.465	5.989	3 > 2 > 1*	44.591 ± 8.063	5.368	3 > 2 > 1*
Had a planned pregnancy		Mean ± SD	t	P	Mean ± SD	t	P
Yes	137	62.051 ± 9.144			41.920 ± 8.825		
No	100	54.750 ± 12.182	5.271	.000	35.370 ± 11.215	5.029	.000
Number of children		Mean ± SD	F	P	Mean ± SD	F	P
1	66	57.455 ± 11.391			38.394 ± 9.938		
2	102	60.814 ± 10.664			40.804 ± 10.124		
3	44	59.136 ± 9.483	2.368	.071	37.750 ± 10.280	1.638	.181
4 or more	25	55.160 ± 13.686			36.920 ± 12.383		
Mode of delivery		Mean ± SD	t	P	Mean ± SD	t	P
Vaginal delivery	101	61.327 ± 9.901			41.495 ± 9.382		
C-section	136	57.221 ± 11.664	2.855	.004	37.419 ± 10.804	3.035	.002
Cause of the newborn's hospitalization in the NICU		Mean ± SD	F	P	Mean ± SD	F	P
Hyperbilirubinemia[1]	66	61.742 ± 9.481			42.864 ± 8.539		
Endocrine problems[2]	18	55.333 ± 11.438			34.500 ± 10.815		
Problems arising from the perinatal period[3]	15	59.733 ± 8.464			41.333 ± 8.243		
Dehydration[4]	16	50.688 ± 14.041	2.178	.034	32.813 ± 12.713	2.832	.005
SGA[5]	26	58.269 ± 11.790			38.654 ± 9.169		
Respiratory problems[6]	71	58.817 ± 11.102			38.127 ± 11.217		
Infection[7]	25	59.720 ± 11.560			38.720 ± 11.458		
		1 > 3 > 5 > 7 > 6 > 2 > 4	*		1 > 3 > 6 > 7 > 5 > 2 > 4	*	

F = one-way ANOVA, *t* = *t*-test, *P* < .005, *post hoc (Tukey, LSD)

Table 2. Breastfeeding Characteristics and Mean BSES-SF and PIM Scores of the Participants

Breastfeeding Characteristics	N	BSES-SF			PIM		
Has breastfeeding experience		Mean ± SD	t	P	Mean ± SD	t	P
Yes	167	59.491 ± 11.072			39.587 ± 10.313		
No	70	57.729 ± 11.191	1.114	.266	38.129 ± 10.606	0.985	.326
Has received breastfeeding education		Mean ± SD	t	P	Mean ± SD	t	P
Yes	135	63.785 ± 7.571			43.096 ± 8.080		
No	102	52.598 ± 11.854	8.839	.000	33.941 ± 10.857	7.444	.000
Has received education about breast milk		Mean ± SD	t	P	Mean ± SD	t	P
Yes	152	62.204 ± 8.793			41.428 ± 9.118		
No	85	53.188 ± 12.459	6.491	.000	35.094 ± 11.330	4.693	.000
Breastfed the newborn		Mean ± SD	F	P	Mean ± SD	F	P
Immediately after birth[1]	67	65.851 ± 5.970			45.164 ± 5.192		
In the first 60 minutes[2]	39	59.359 ± 9.847			39.333 ± 9.683		
In the first 61 minutes or later[3]	55	51.964 ± 12.967	20.076	.000	34.818 ± 11.279	13.749	.000
After the first 24 hours[4]	76	57.776 ± 10.355			36.908 ± 11.238		
		1 > 2 > 4 > 3			1 > 2 > 4 > 3		
Plans to breastfeed for…		Mean ± SD	F	P	Mean ± SD	F	P
6 months[1]	39	51.564 ± 11.616			31.667 ± 11.536		
7-12 months[2]	46	48.630 ± 9.943			30.739 ± 7.298		
13-18 months[3]	11	58.455 ± 8.190	48.948	.000	37.909 ± 11.441	41.364	.000
18 months or longer[4]	141	64.433 ± 7.383		4 > 3 > 1 > 2	44.071 ± 7.508		4 > 3 > 1 > 2
Regularly brings breast milk to the NICU		Mean ± SD	t	P	Mean ± SD	t	P
Yes	215	60.154 ± 10.440			40.470 ± 9.589		
No	22	47.409 ± 11.083	5.423	.000	26.318 ± 9.388	6.606	.000
Thinking of feeding the newborn exclusively with breast milk		Mean ± SD	t	P	Mean ± SD	t	P
Yes	140	65.450 ± 5.764			45.329 ± 5.056		
No	97	49.619 ± 10.290	−15.109	.000	30.247 ± 9.649	15.658	.000

to the NICU for hyperbilirubinemia, and those who had received breastfeeding education had significantly greater BSES and PIM scores (Table 1). Moreover, significantly higher BSES and PIM scores were observed among the participants who started breastfeeding immediately after delivery, those who planned to breastfeed their newborns for 18 months or longer, those who brought breast milk to the NICU, and those who exclusively breastfed their newborns (Table 2).

On the other hand, the number of the participant's living, their breastfeeding experience, and their newborn's sex had no statistically significant relationship to their BSE or perceptions of sufficient milk (PSM) supply (P > .05, Tables 1 and 2).

The mean BSES and PIM scores of the participants were 58.97 ± 11.11 and 39.15 ± 10.39, respectively (Table 3). Thus, the participants had above-average BSE and PSM levels. It was also found that 66.7% of the participants answered yes to the first question of PIM, "Do you believe that you produce enough milk to feed your newborn?"

A statistically significant strong positive relationship was identified between the BSES and PIM scores of the participants (r = 0.854, P = .000; Table 3).

The independent variable of BSE accounted for 72.8% of the total variance in the dependent variable of PSM ($R^2 = 0.728$). Higher BSE

Table 3. Results of the Correlation Analysis Between the Mean BSES-SF and PIM Scores of the Participants

Mean ± SD; N = 237			
BSES-SF	58.97 ± 11.11	r	0.854*
PIM	39.15 ± 10.39	P	.000

*r = Pearson's correlation coefficient, P < .005

levels among the participants corresponded to higher levels of PSM (ß = 0.799, Table 4).

Discussion

The purpose of this study was to evaluate the relationship between the BSE and PSM of mothers whose newborns were hospitalized in the NICU. In our study, the mean BSE score (58.97 ± 11.11 points) and PSM score (39.15 ± 10.39 points) of the participants were above average.

Breastfeeding self-efficacy means in this study were similar to the literature. In a study conducted per week[20], BSE averages were 57.00 ± 12.1 points. In another study,[21] the mean BSE was 58.62 points. In an intervention study conducted in Sweden,[22] the mean BSE was 58.9 ± 7.9 points in the experimental group and 58.1 ± 10.4 points in the control group. In a study from Turkey, it was stated that the average BSE score was 46.98 ± 14.65 points.

A study[23] reported a PSM score of 31.67 ± 10.91. Another study by Yılmaz et al[24] investigated the effect of kangaroo care on PSM. The experimental group had a PSM score of 46.60 ± 3.40, while the control group had a score of 30.17 ± 11.37. In this study, the PSM score was 39.15 ± 10.39, slightly higher than the means reported in the literature.[25,26]

In the literature,[20-24] the sample was mostly taken from mothers who were with their babies. In this study, mothers were separated from their babies due to hospitalization in the NICU. Due to the pandemic, mothers were only able to contact their babies once a day. Despite this limited contact, the fact that mothers' BSE and PSM scores are similar to the literature suggests that mothers have good social support.

A strong correlation of 72.8% was found between BSE and PSM in our study. In a recent study,[23] the relationship was reported as 86.6%. Other

Table 4. Results of the Regression Analysis on the Effects of Breastfeeding Self-efficacy on Breast Milk Supply Sufficiency Perceptions

Dependent Variable	Independent Variable	ß	t	P	F	Model(p)	R^2
Breast milk supply sufficiency perceptions	Constant	−7.970	−4.182	.000	632.996	0.000	0.728
	Breastfeeding self-efficacy	0.799	25.159	.000			
R^2, linear regression analysis; $P < .005$.							

studies in the literature also indicate a significant relationship.[14,25] Mothers with high BSE perceive themselves as successful and believe that they produce sufficient milk for their baby.

Having low BSE and PSM are among the main causes of early breast-feeding cessation and starting to give the newborn supplementary food in the early period.[12,13,24,25] Although physiological, psychological, and social factors influence PSM, the most important factor is BSE. Mothers with high BSE levels believe that they will produce enough breast milk to satisfy their newborns.[12]

The majority of the participants in our study (67.5%) believed that they produced enough breast milk to feed their newborns. The participants with high BSE also perceived their breast milk supply to be more sufficient. Our results were consistent with the relevant literature. If mothers believe that they produce enough breast milk for their newborns, their BSE increases.[12,19,24] A mother's BSE and PSM can be changed and improved through practices such as educational activities and persuasion efforts.

Furthermore, in our study, BSE and PSM levels were relatively significantly higher among participants who were aged 25-32, those with university degrees, those who were employed, and those with high levels of income. It has been stated that mothers who have university education have higher rates of maintaining exclusive breast-feeding.[12,13] High levels of education are effective as they enable mothers to have higher levels of information on breastfeeding and breast milk production. These mothers also have easier access to information, and they acquire better skills in reaching supportive resources.[12,25]

Besides, in our study, the participants who were working had higher BSE and PSM than those who were not working. Similarly, the participants with high levels of income had higher BSE levels and PSM than those who had medium-level and low-level income. Contrary to the results of our study, it was suggested that breastfeeding rates are lower among working mothers.[12] Having no economic concerns and continuing to enjoy the social environment in working life may have had a positive psychological effect on the participants who were working and had high levels of income. Additionally, the results in our study may have been positively affected by Türkiye's policies regarding breastfeeding. Under these policies, new mothers are allowed 10 weeks of maternity leave, half-day breastfeeding breaks during the first six months, one-hour breastfeeding breaks during the second 6 months, with the possibility of a flexible work schedule.[26] Breastfeeding rooms, breastfeeding breaks, and workplace policies to raise and support breastfeeding awareness can enable mothers to continue breastfeeding.

Moreover, in our study, the participants whose pregnancies were planned and those who had vaginal deliveries had higher BSE and PSM. It was also found that the participants whose newborns were hospitalized in the NICU due to hyperbilirubinemia and those who received breastfeeding education had higher levels of BSE and PSM. These results suggested that these participants were prepared for breastfeeding in the prenatal period, were willing to breastfeed their newborns, and were likely to continue breastfeeding for a long period. Our results were consistent with those in the relevant literature.[27-30] Making an early decision about breastfeeding enables mothers to acquire information on breastfeeding in the early period and succeed in breastfeeding.[31]

Furthermore, in our study, we found that the participants who fed their newborns exclusively with breast milk, those who aspired to breastfeed their newborns for a long period, and those who regularly brought breast milk to the NICU had higher BSE levels. These mothers also had higher PSM levels. Similarly, a positive relationship was reported between supplementing breast milk with baby formula and PIM.[13]

We found that the participants who thought of feeding their newborns with breast milk for 18 months or longer and those who started to breastfeed their newborns early had higher mean BSES-SF and PIM scores. In parallel with our study, it was stated that planning to breast-feed for a long duration[24] and starting to breastfeed early[32] increased the feeling of breastfeeding success in mothers. Accordingly, this affected the BSE levels and PSM of mothers positively.

Surprisingly, we determined that having breastfeeding experience and having another child were not significantly associated with BSE or PSM. This result was contrary to the study conducted by De Roza et al[12], whereas it was in a similar vein to the result reported by Otsuka et al,[33] who found that multiparous mothers who fed their newborns with breast milk for less than 3 months had low BSE levels. As mentioned in the theory and studies on breastfeeding, unsuccessful breastfeeding experiences negatively affected BSE and PSM.[34] In such circumstances, health workers may think that multiparous mothers have previously received breastfeeding education. Therefore, they may be less inclined to provide sufficient breastfeeding education and support for multiparous mothers.[12] Breastfeeding education and support should be offered to all women regardless of their parity.

Study Limitations and Strenghts
The results of this study are limited to the data collected from 237 mothers whose newborns were hospitalized in the NICU of a research and training hospital in Türkiye. They are also limited to the items and questions in the data collection forms.

Researchers faced challenges collecting data during the COVID-19 pandemic due to prolonged data collection processes caused by safety precautions. Another limitation of this study was the lack of data on factors such as social support, newborn weight gain, and postnatal depressive symptoms, which may affect breastfeeding success.

The stay of their newborns in the NICU for a long period (a minimum of 5 days) may have increased the participants' self-confidence, as well as their confidence in the researchers. This may have eliminated a potential selection bias, leading to the more likely participation of mothers with higher BSE levels.

Conclusion

In this study, mothers whose newborns were hospitalized in the NICU were determined to have above-average BSE and PSM. We also observed that as BSE among the mothers increased, they were more likely to perceive their PSM. Efforts such as receiving breastfeeding education and starting to breastfeed early improve BSE, PSM, and raise breastfeeding rates. The findings of this study will serve as a basis for

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the improvement of breastfeeding interventions and identification of the breastfeeding characteristics of mothers.

References

1. Chipojola R, Chiu HY, Huda MH, Lin YM, Kuo SY. Effectiveness of theory-based educational interventions on breastfeeding self-efficacy and exclusive breastfeeding: a systematic review and meta-analysis. *Int J Nurs Stud*. 2020;109:103675. [CrossRef]
2. United Nations Children's Fund. Global breastfeeding scorecard | Global breastfeeding collective. Available at: https://www.globalbreastfeedingcollective.org/global-breastfeeding-scorecard.
3. United Nations Children's Fund. Too few children benefit from recommended breastfeeding practices; 2024. Available at: https://data.unicef.org/topic/nutrition/breastfeeding/Accessed.
4. Sankar MJ, Sinha B, Chowdhury R, et al. Optimal breastfeeding practices and infant and child mortality: a systematic review and meta-analysis. *Acta Paediatr*. 2015;104(467):3-13. [CrossRef]
5. Chowdhury R, Sinha B, Sankar MJ, et al. Breastfeeding and maternal health outcomes: a systematic review and meta-analysis. *Acta Paediatr*. 2015;104(467):96-113. [CrossRef]
6. Bartick MC, Schwarz EB, Green BD, et al. Suboptimal breastfeeding in the United States: maternal and pediatric health outcomes and costs. *Matern Child Nutr*. 2017;13(1):e12366. [CrossRef] [published correction appears in *Matern Child Nutr*. 2017;13(2):null].
7. Li J, Zhao C, Wang Y, et al. Factors associated with exclusive breastfeeding practice among mothers in nine community health centres in Nanning city, China: a cross-sectional study. *Int Breastfeed J*. 2021;16(1):71. [CrossRef]
8. Pérez-Escamilla R, Hromi-Fiedler A, Rhodes EC, et al. Impact of prelacteal feeds and neonatal introduction of breast milk substitutes on breastfeeding outcomes: a systematic review and meta-analysis. *Matern Child Nutr*. 2022;18(suppl 3):e13368. [CrossRef]
9. Kılınç G, Yildiz E, Harmanci P. Bandura's social learning and role model theory in nursing education. *Health Sci Res Globalizing World*. 2018;132.
10. Babakazo P, Donnen P, Akilimali P, Ali NMM, Okitolonda E. Predictors of discontinuing exclusive breastfeeding before six months among mothers in Kinshasa: a prospective study. *Int Breastfeed J*. 2015;10:19. [CrossRef]
11. Patil DS, Pundir P, Dhyani VS, et al. A mixed-methods systematic review on barriers to exclusive breastfeeding. *Nutr Health*. 2020;26(4):323-346. [CrossRef]
12. De Roza JG, Fong MK, Ang BL, Sadon RB, Koh EYL, Teo SSH. Exclusive breastfeeding, breastfeeding self-efficacy and perception of milk supply among mothers in Singapore: a longitudinal study. *Midwifery*. 2019;79:102532. [CrossRef]
13. Huang Y, Liu Y, Yu XY, Zeng TY. The rates and factors of perceived insufficient milk supply: a systematic review. *Matern Child Nutr*. 2022;18(1):e13255. [CrossRef]
14. Galipeau R, Baillot A, Trottier A, Lemire L. Effectiveness of interventions on breastfeeding self-efficacy and perceived insufficient milk supply: a systematic review and meta-analysis. *Matern Child Nutr*. 2018;14(3):e12607. [CrossRef]
15. Brockway M, Benzies KM, Carr E, Aziz K. Does breastfeeding self-efficacy theory apply to mothers of moderate and late preterm infants? a qualitative exploration. *J Clin Nurs*. 2020;29(15-16):2872-2885. [CrossRef]
16. Dennis CL. The breastfeeding self-efficacy scale: psychometric assessment of the short form. *J Obstet Gynecol Neonatal Nurs*. 2003;32(6):734-744. [CrossRef]
17. Aluş Tokat M, Okumuş H, Dennis CL. Translation and psychometric assessment of the breast-feeding self-efficacy scale-short form among pregnant and postnatal women in Turkey. *Midwifery*. 2010;26(1):101-108. [CrossRef]
18. McCarter-Spaulding DE, Kearney MH. Parenting self-efficacy and perception of insufficient breast milk. *J Obstet Gynecol Neonatal Nurs*. 2001;30(5):515-522. [CrossRef]
19. Gökçeoğlu E, Küçükoğlu S. The relationship between insufficient milk perception and breastfeeding self-efficacy among Turkish mothers. *Glob Health Promot*. 2017;24(4):53-61. [CrossRef]
20. Gümüşsoy S, Çelik NA, Güner Ö, Kıratlı D, Atan ŞÜ, Kavlak O. Investigation of the relationship between maternal attachment and breastfeeding self-efficacy and affecting factors in Turkish sample. *J Pediatr Nurs*. 2020;54:e53-e60. [CrossRef]
21. Monteiro JCDS, Guimarães CMS, Melo LCO, Bonelli MCP. Breastfeeding self-efficacy in adult women and its relationship with exclusive maternal breastfeeding. *Rev Lat-Am Enferm*. 2020;28:e3364. [CrossRef]
22. Oras P, Ljungberg T, Hellström-Westas L, Funkquist EL. A breastfeeding support program changed breastfeeding patterns but did not affect the mothers' self-efficacy in breastfeeding at two months. *Early Hum Dev*. 2020;151:105242. [CrossRef]
23. Yilmaz F, Küçükoglu S, Aytekin Özdemir AA, Oğul T, Aşki N. The effect of kangaroo mother care, provided in the early postpartum period, on the breastfeeding self-efficacy level of mothers and the perceived insufficient milk supply. *J Perinat Neonatal Nurs*. 2020;34(1):80-87. [CrossRef]
24. Küçükoğlu S, Çelebioğlu A, Emzirme Özyeterlilik HYA. Düzeyi ve Emzirme Başarılarının İncelenmesi. *ERÜ Sağlık Bilimleri Fak Derg*. 2014;2:1-11.
25. Küçük E, Yeşilçiçek Çalık K, Tayar N. The effect of perceived insufficient milk on transition to supplementary food and factors affecting it during the first six months postpartum in Turkey: a cross-sectional study. *Health Care Women Int*. 2023;44(3):295-313. [CrossRef]
26. Erener Yilmaz EE. Türk iş hukukunda süt İzni. *Marmara Univ Hukuk Fak Hukuk Araştırmaları Derg*. 2020;26(1):382-399. [CrossRef]
27. Çankaya S, Ataş A. The relationship of psychological well-being and cognitive emotions with breastfeeding self-efficacy in mothers in the postpartum period. *Dev Psychobiol*. 2023;65(3):e22371. [CrossRef]
28. Wong MS, Mou H, Chien WT. Effectiveness of educational and supportive intervention for primiparous women on breastfeeding related outcomes and breastfeeding self-efficacy: a systematic review and meta-analysis. *Int J Nurs Stud*. 2021;117:103874. [CrossRef]
29. Raihan MJ, Choudhury N, Haque MA, Farzana FD, Ali M, Ahmed T. Feeding during the first 3 days after birth other than breast milk is associated with early cessation of exclusive breastfeeding. *Matern Child Nutr*. 2020;16(3):e12971. [CrossRef]
30. Amaral LJX, Sales S, Carvalho DPSRP, Cruz GKP, Azevedo IC, Ferreira Júnior MA. Fatores que influenciam na interrupção do aleitamento materno exclusivo em nutrizes [Factors that influence the interruption of exclusive breastfeeding in nursing mothers]. *Rev Gaucha Enferm*. 2015;36(Spec No):127-134. [CrossRef]
31. Tsaras K, Sorokina T, Papathanasiou IV, Fradelos EC, Papagiannis D, Koulierakis G. Breastfeeding self-efficacy and related socio-demographic, perinatal and psychological factors: a cross-sectional study among postpartum Greek women. *Mater Sociomed*. 2021;33(3):206-212. [CrossRef]
32. Vieira TO, Vieira GO, Giugliani ERJ, Mendes CMC, Martins CC, Silva LR. Determinants of breastfeeding initiation within the first hour of life in a Brazilian population: cross-sectional study. *BMC Public Health*. 2010;10:760. [CrossRef]
33. Otsuka K, Dennis CL, Tatsuoka H, Jimba M. The relationship between breastfeeding self-efficacy and perceived insufficient milk among Japanese mothers. *J Obstet Gynecol Neonatal Nurs*. 2008;37(5):546-555. [CrossRef]
34. Shafaei FS, Mirghafourvand M, Havizari S. The effect of prenatal counseling on breastfeeding self-efficacy and frequency of breastfeeding problems in mothers with previous unsuccessful breastfeeding: a randomized controlled clinical trial. *BMC Womens Health*. 2020;20(1):94. [CrossRef]