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ORIGINAL PAPER

Evaluation of breastfeeding self-efficacy among postnatal women

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Abstract

Aim: The aim of this study was to evaluate mothers' breastfeeding self-efficacy (maternal confidence) in association with demographic and clinical characteristics. *Design:* An observational longitudinal study. *Methods:* Data were collected with the Breastfeeding Self-Efficacy Scale – Short Form (BSES-SF) questionnaire from 102 breastfeeding women three days after delivery in three hospitals, and at the third and sixth weeks at home. *Results:* Parity was a key finding in the overall assessment of breastfeeding self-efficacy, with multiparous women demonstrating higher breastfeeding self-efficacy than primiparous women at all three time points (day three: $p < 0.001$; week three: $p = 0.015$; week six: $p = 0.037$). Strong correlations were found between all paired time points ($p < 0.001$). Analysis of individual questions revealed differences primarily related to parity, while other demographic and clinical characteristics showed only occasional significant differences. In terms of time, it was found that women need most support in the first three weeks after birth. *Conclusion:* The results of this study provide evidence-based guidance for healthcare professionals on how to offer effective, individualized support to women in initiating and continuing breastfeeding, both in clinical settings and at home, as well as on how to ensure accurate communication between both parties to help achieve this goal.

Keywords: breastfeeding, BSES-SF questionnaire, self-efficacy (maternal confidence).

Introduction

Breastfeeding provides long-term benefits due to improved immune system function, reduced susceptibility to disease, and enhanced cognitive development. Breastfeeding women have a lower risk of developing type II diabetes, ovarian cancer, breast cancer, and cardiovascular disease compared to women who do not breastfeed (Kramuschke et al., 2025; Maurer et al., 2024).

The World Health Organization (WHO) recommend exclusive breastfeeding for the first six months without the introduction of any complementary foods and fluids and continued breastfeeding until the second year or beyond (WHO, 2024). This recommendation is also followed by the Czech Ministry of Health. Statistics data from 2023 showed that breastfeeding initiation rates were at 75% among postnatal women at the point of discharge from all hospitals in the Czech Republic (National Health Information Portal, 2024), meaning that three out of four newborns were exclusively breastfeed. Global Target 2025 has recommended that at least 50% of children be exclusively breastfed for the first six months (Economou et al., 2021; Kantorová et al., 2023; WHO, 2025).

To provide valuable insights for shaping and evaluating supportive interventions, one important modifiable psychological factor – self-efficacy, and several non-modifiable predictors have been identified, including demographic factors (e.g., maternal age, education, marital status, socioeconomic status), physical factors (e.g., maternal smoking, insufficient milk supply, sore nipples, parity), and social factors (e.g., maternal occupation, family support). These variables can be predictors of discontinuation of breastfeeding and transfer to supplementation (Kramuschke et al., 2025; Maurer at al., 2024). According to Furnham & Cheng (2023) demographic variables are associated with individual self-efficacy.

Breastfeeding self-efficacy was conceptualized by Cindy-Lee Dennis (2003), the author of the Breastfeeding Self-Efficacy Scale – Short Form (BSES-SF) 14-item questionnaire that measures breastfeeding self-efficacy based

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on Bandura's social cognitive theory (1977). Canadian psychologist Albert Bandura introduced the concept of self-efficacy in his theory to explain how individuals achieve success in actions that lead to specific goals (Furnham & Cheng, 2023). There are four key factors identified in Bandura's social cognitive theory (Bandura, 1977) that contribute to increased self-efficacy expectations. Dennis & Faux (1999) hypothesized four sources of information (self-efficacy theory) based on Bandura's theory: (1) their own breastfeeding experience (i.e., performance accomplishment – successful coping experiences in the past and / or building confidence through simulation of task practicing); (2) observing other women breastfeeding (i.e., vicarious experience – to have the opportunity to learn from others, including observation of their successful coping experiences); (3) support and encouragement from healthcare professionals, family, or friends (i.e., social or verbal persuasion – encouragement from somebody else who is influential and respected); (4) current physical and emotional state (i.e., physiological response) (Kramuschke et al., 2025; Maurer et al., 2024).

Aim

The aim of this study was to evaluate mothers' breastfeeding self-efficacy (maternal confidence) using the BSES-SF questionnaire, and to analyze individual questionnaire items in relation to demographic and clinical characteristics.

Methods

Design

An observational longitudinal study.

Sample

The sample consisted of 102 postpartum women who were evaluated on their breastfeeding self-efficacy. Participants were eligible to take part in the study if they were over 18 years old, were at least 37 weeks pregnant, had had a singleton pregnancy, and had been breastfeeding.

Data collection

Data were collected through the 14-item BSES-SF questionnaire (Dennis, 2003). Official permission was obtained from the author of the BSES-SF to use and translate this instrument into Czech. The translation process involved two independent forward and back translations and a review by a nurse expert. The questionnaire has not yet been validated in the Czech Republic. Respondents answer on a 5-point Likert scale (from 1 "not at all confident" to 5 "very confident"). Individual items scores (1–5) identify perceptions of low self-efficacy (item score ≤ 3) or high self-efficacy (item score ≥ 4). The BSES-SF questionnaire was supplemented with demographic and clinical characteristics, including maternal age, education level, marital status, delivery method, parity, gestational week, and attendance of a pregnancy course.

The research was conducted in three hospitals in the Central Bohemian Region. The same questionnaire was administered to participants at three time points. The first distribution took place on the third day after delivery, in the hospital's rooming-in setting, using a paper-and-pencil survey completed by 322 women. The second round was conducted in the third week postpartum via email, with 164 women responding (of those who had completed the first questionnaire). The final distribution occurred in the sixth week postpartum, again at home, and was completed by 114 of the women who had responded to the second measurement. The final group consisted of 102 women who submitted the questionnaire at all three phases.

Data analysis

The statistical analysis was conducted using R software version 4.4.1 and RStudio environment version 2024.09.0 Build 375. All statistical conclusions were based on a 5% significance level. For comparison between two groups, a two-sample t-test was used; if normality was not met, the Mann-Whitney U test was applied. Normality was verified using the Shapiro-Wilk test. In cases where we compared three dependent groups, we conducted Mauchly's test of sphericity to decide on the appropriate test. If sphericity was met, we used the Repeated Measures ANOVA, otherwise, we applied the Friedman test. The reliability of the translated BSES-SF scale was calculated using Cronbach's alpha for the first, second and third measurements.

Results

Demographic and clinical characteristics of the study population

A total sample of 102 women (mean age 32.3 ± 4.3 years) were recruited from those respondents who participated in all three measurements. The majority of participants were primiparous, had completed university education, were married, had given birth between 37–40 weeks of pregnancy, and delivered vaginally. The detailed demographic and clinical characteristics of the study population are presented in Table 1.

Table 1 Demographic and clinical characteristics of the study population (N = 102)

Characteristics		N (%)	Mean (SD)
Maternal age			32.3 ± 4.3
	younger (≤ 35 years)	80 (78.4%)	
	older (≥ 36 years)	22 (21.6%)	
Education level	secondary school	39 (38.2%)	
	university degree	63 (61.8%)	
Marital status	single	38 (37.3%)	
	married	64 (62.7%)	
Parity	primiparous	55 (53.9%)	
	multiparous	47 (46.1%)	
Gestational week	37–40 weeks	81 (79.4%)	
	41 weeks	21 (20.6%)	
Delivery method	vaginal	71 (69.6%)	
	caesarean section	31 (30.4%)	
Pregnancy course	yes	38 (37.3%)	
	no	64 (62.7%)	

SD – standard deviation

Between-group comparisons of maternal confidence

The women's maternal age, educational level, marital status, delivery method, parity, and attendance of a pregnancy course were assessed in relation to their breastfeeding self-efficacy. The analysis revealed significant differences only in mean breastfeeding self-efficacy scores based on parity status across all three time points. Multiparous mothers consistently demonstrated higher breastfeeding self-efficacy scores compared to primiparous mothers at day three (3.92 vs. 3.29, $p < 0.001$), at week three (4.11 vs. 3.82, $p = 0.015$), and at week six (4.27 vs. 4.04, $p = 0.037$). No other demographic or clinical characteristics showed significant differences in mean breastfeeding self-efficacy scores at any time point (Table 2).

Table 2 Comparison of mean breastfeeding self-efficacy scores between demographic and clinical characteristics groups across three time points

Characteristic	Day 3	Week 3	Week 6
Maternal age (≤ 35 / ≥ 36)	3.53 / 3.76 (0.220)	3.95 / 3.97 (0.732)	4.16 / 4.10 (0.293)
Education (secondary / university)	3.65 / 3.54 (0.381)	3.88 / 4.00 (0.866)	4.06 / 4.19 (0.394)
Marital status (single / married)	3.37 / 3.71 (0.065)	3.92 / 3.98 (0.768)	4.08 / 4.18 (0.758)
Delivery method (vaginal / caesarean)	3.63 / 3.46 (0.436)	3.98 / 3.91 (0.560)	4.21 / 3.99 (0.175)
Parity (primipara / multipara)	3.29 / 3.92 (< 0.001)*	3.82 / 4.11 (0.015)*	4.04 / 4.27 (0.037)*
Pregnancy course (yes / no)	3.44 / 3.67 (0.192)	3.88 / 4.00 (0.332)	4.18 / 4.12 (0.811)

*Values are presented as mean scores for each group (Group 1 / Group 2) with *p < 0.05; two-sample t-test / Mann-Whitney U test.*

Between-times comparisons of maternal confidence

The basic characteristics of mean breastfeeding self-efficacy scores on the third day, third week, and sixth week after delivery are presented in Table 3. First, significant differences in mean breastfeeding self-efficacy scores across all three time points were analyzed using the Friedman test, followed by post hoc analyses for 102 breastfeeding women ($p < 0.001$). The mean scores increased steadily over time, from day three to week six. Second, we explored the relationship between breastfeeding self-efficacy and the timing of the measurements. We found strong and significant correlations between all paired time points ($p < 0.001$ for all comparisons). The Spearman correlation coefficients demonstrated robust relationships ($r_s = 0.76$ for day three and week three; $r_s = 0.66$ for day three and week six; $r_s = 0.88$ for week three and week six).

From these results, we can observe that breastfeeding self-efficacy showed the greatest change between day three and week three, while between week three and week six, a stabilization in breastfeeding self-efficacy was observed.

Table 3 Basic characteristics of mean breastfeeding self-efficacy scores at individual time points

Time Point	Count	Mean	Median	Min	Max	SD
Day 3	102	3.58	3.71	1.43	5.00	0.83
Week 3	102	3.96	4.14	1.57	5.00	0.80
Week 6	102	4.14	4.36	1.43	5.00	0.82

SD – standard deviation

Detailed analysis of individual question comparisons

Analysis of individual questions revealed several significant differences across various demographic and clinical characteristics. The most notable differences were observed in parity status. Multiparous women demonstrated significantly higher breastfeeding self-efficacy scores compared to primiparous women across the three time periods. For other characteristics – maternal age, education level, marital status, and attendance of a pregnancy course – significant differences were found only exceptionally. However, no significant differences were found in the BSES-SF scale item that asked whether breastfeeding women were always satisfied with their breastfeeding experience. At day three we observed in all items of BSES-SF scale significant differences in mean breastfeeding self-efficacy scores for multiparous women, who demonstrated constantly higher breastfeeding self-efficacy scores than primiparous women. Compared to primiparous women, multiparous women could: always determine that the baby was getting enough milk (3.38 / 2.67, $p < 0.001$), successfully cope with breastfeeding as with her other challenging tasks (3.51 / 2.98, $p = 0.011$), breastfeed the baby without using formula as a supplement (3.89 / 3.07, $p = 0.004$), ensure that the baby was properly latched on for the whole feeding (3.77 / 3.18, $p = 0.003$), manage the breastfeeding situation to their satisfaction (3.91 / 3.11, $p < 0.001$), manage to breastfeed even if the baby was crying (3.57 / 3.13, $p = 0.026$), comfortably breastfeed with family members present (4.38 / 3.51, $p < 0.001$), deal with the fact that breastfeeding could be time consuming (3.77 / 3.15, $p = 0.004$), finish feeding the baby on one breast before switching to the other breast (4.47 / 3.93, $p = 0.003$), continue to breastfeed the baby for every feeding (4.19 / 3.69, $p = 0.010$), mange to keep up with the baby's breastfeeding demands (4.04 / 3.24, $p < 0.001$), and tell when the baby had finished breastfeeding (3.72 / 3.07, $p < 0.001$). During this time, we also observed statistically significant differences in mean breastfeeding self-efficacy scores based on maternal age, marital status, and attendance of a pregnancy course. Women aged 36 and above demonstrated higher breastfeeding self-efficacy than younger women particularly in their ability to deal with the fact that breastfeeding could be time consuming (3.86 vs 3.31, $p = 0.025$). Married women were more confident than unmarried women, especially in their ability to determine that their baby was getting enough milk (3.23 vs 2.61, $p = 0.003$), to breastfeed the baby without using formula as a supplement (3.67 vs 3.08, $p = 0.043$), and to breastfeed even if the baby was crying (3.53 vs 3.00, $p = 0.025$). Interestingly, women who did not attend a pregnancy course indicated more frequently that they could always comfortably breastfeed with family members present than those who had attended a pregnancy course (4.11 vs 3.58, $p = 0.014$). At week three, we observed significant differences in mean breastfeeding self-efficacy scores for these items on the BSES-SF scale between primiparous and multiparous women – who demonstrated constantly higher breastfeeding self-efficacy. In comparison to primiparous women, multiparous women could: always successfully cope with breastfeeding, as with her other challenging tasks (3.94 vs 3.64, $p = 0.046$), ensure that the child was properly latched on for the whole feeding (4.06 vs 3.49, $p < 0.001$), manage the breastfeeding situation to their satisfaction (3.98 vs 3.55, $p = 0.021$), comfortably breastfeed with family members present (4.49 vs 4.07, $p = 0.032$), deal with the fact that breastfeeding could be time consuming (4.06 vs 3.49, $p = 0.003$), and breastfeed the baby at every feeding (4.26 vs 3.89, $p = 0.034$). Notably, we found significant differences in mean breastfeeding self-efficacy scores among women with a university degree – who demonstrated higher self-efficacy scores by continuing breastfeeding without introducing formula as a supplement, compared to women with secondary education (4.48 vs 4.05, $p = 0.050$). At week six, we observed

significant differences in mean breastfeeding self-efficacy scores for items of the BSES-SF scale, with multiparous women consistently demonstrating higher breastfeeding self-efficacy than primiparous women. Compared to primiparous women, multiparous women could: always determine that the baby was getting enough milk (4.00 / 3.73, p = 0.038), continue wanting to breastfeed (4.51 / 4.18, p = 0.030), breastfeed the baby at every feeding (4.34 / 3.96, p = 0.019), and tell when the baby had finished breastfeeding (4.04 / 3.73, p = 0.025). Notably, we found significant differences in mean breastfeeding self-efficacy scores between women who had attended a pregnancy course and could always manage to breastfeed even if their baby was crying, and those who had not attended a pregnancy course (4.47 vs 3.97, p = 0.027).

Reliability of BSES-SF scale

The Cronbach's alpha coefficients demonstrate excellent internal consistency of the 14-item scale across all three time points. The values (day three: $\alpha = 0.94$; week three: $\alpha = 0.95$; week six: $\alpha = 0.96$) are well above the conventional threshold of 0.70, indicating strong inter-item correlations.

Discussion

Our first study goal was to evaluate which demographic and clinical characteristics contributed to the level of breastfeeding self-efficacy across three time periods. Our results showed significant associations between breastfeeding self-efficacy and parity. Multiparous women demonstrated higher breastfeeding self-efficacy scores than primiparous women across the three time periods. Similar results were found in the longitudinal study by Alves dos Santos et al. (2022) and in the study by Hasri et al. (2023). Although in a study by Mazúchová et al. (2024), multiparous women reported higher breastfeeding self-efficacy than primiparous women, a study by Kramuschke et al. (2025) found no significant differences between these groups at the three-month mark, reporting that breastfeeding self-efficacy was equal for both groups at that time. Among other demographic and clinical characteristics, no significant differences in breastfeeding self-efficacy were found in relation to maternal age (Basu et al., 2020; Kramuschke et al., 2025), education level (Basu et al., 2020; Kramuschke et al., 2025; Mercan & Tari Selcuk, 2021), marital status (Economou et al., 2021; Mercan & Tari Selcuk, 2021), or delivery method (Maurer et al., 2024; Mazúchová et al., 2024) in our study across the three time periods among the full sample of 102 participants. However, it is important to note that the absence of significant associations between demographic and clinical factors and breastfeeding self-efficacy in our study might be due to attrition bias.

Our second goal was to compare breastfeeding self-efficacy between times. The study by Kramuschke et al. (2025) reported a high mean breastfeeding self-efficacy score. In our study we have found mean breastfeeding self-efficacy scores above three at day three, close to four at week three, and high at week six. A study by Mercan & Tari Selcuk (2021) revealed that women with low breastfeeding self-efficacy had difficulty in starting breastfeeding or stopped sooner, while women with a high level of breastfeeding self-efficacy continued with breastfeeding. Furthermore, we found that women's breastfeeding self-efficacy scores changed mainly between day three and week three, with a stabilization observed between week three and week six. A study by Economou et al. (2021) similarly showed that the mean breastfeeding self-efficacy score increased from above three on day two to a higher level by the end of the first month. A study by Maurer et al. (2024) reported a high breastfeeding self-efficacy score.

Our third goal was to analyze the individual BSES-SF items in relation to demographic and clinical characteristics, which revealed particularly noteworthy findings for maternal age, education level, marital status, and attendance of a pregnancy course. Regarding maternal age, Maternal age has also been identified as a significant predictor of self-efficacy in a study by Furnham & Cheng (2023). Regarding education level, Bengough et al. (2022) found that breastfeeding rates were higher among women in high-income countries and among better educated women compared to those from lower-income groups (it should be noted that our study was conducted in a single region of the Czech Republic and in three maternity hospitals, where such differences may not have been detected between groups). Education level has also been identified as a significant predictor of self-efficacy in a study by Furnham & Cheng (2023). From the perspective of marital status, Davidson & Ollerton (2020) reported that in many cultures, a woman's partner plays a highly influential role in the initiation, exclusivity, and duration of breastfeeding. Partner support may play an important role, especially in the context of marriage. When the partner considers breastfeeding important, this has been shown to positively influence women's breastfeeding self-efficacy, as shown in a study by Maurer

et al. (2024). Support from other family members, nurses or midwives, and the woman's own mother can also have a positive effect, as reported by Mercan & Tari Selcuk (2021). From an educational perspective, a systematic review by Oggero et al. (2024) found that prenatal breastfeeding education provides an opportunity to improve self-efficacy among pregnant individuals and to help them develop coping skills in case future breastfeeding problems arise. A study by Halm et al. (2024) concluded that prenatal education is essential in various forms (e.g., videos, in-person or online prenatal classes, nurse educators) and suggested that it is important to note that pregnant women cannot be fully educated. Interestingly, satisfaction with breastfeeding was not assessed in our study. In the literature, a study by De Senna et al. (2020) reported that women's satisfaction with breastfeeding was positively associated with breastfeeding duration.

Finally, we wanted to establish the internal consistency of the BSES-SF questionnaire for all three measurements. The original BSES-SF reported a Cronbach's alpha of 0.94, indicating that the translated and modified version are comparable. Studies validating non-English versions had a wider range of Cronbach's alpha values than studies analyzing the English version (Dennis et al., 2024). Hence, our currently translated BSES-SF questionnaire revealed a Cronbach's alpha of 0.94 on day three after delivery, 0.95 at week three, and 0.96 at week six, similar to the translated BSES-SF questionnaire in the study by Economou et al. (2021). However, the Cronbach's alpha in these studies was lower than our findings, as reported by Kramuschke et al. (2025), Maurer et al. (2024), and Mazúchová et al. (2024).

Limitation of study

A limitation of our study is that data collection took place only in one region of the Czech Republic and in only three maternity hospitals. The Breastfeeding Self-Efficacy Scale – Short Form (BSES-SF) questionnaire was evaluated only by women who reported that they were breastfeeding.

Conclusion

This study examined associations between demographic and clinical characteristics and breastfeeding self-efficacy, with parity emerging as the most significant factor. Multiparous women consistently demonstrated higher breastfeeding self-efficacy than primiparous women across all time points. The three time periods allowed us to apply interventions in a timely manner, according to the women's needs based on their scores and demographic / clinical characteristics. The timing suggests that the first three weeks after delivery are crucial based on our results, but we still need to consider each individual woman when evaluating her breastfeeding self-efficacy. A detailed analysis of individual BSES-SF items also provided insights into specific aspects of breastfeeding confidence affected by maternal characteristics, allowing interventions to be tailored to the woman's situation (demographic and clinical characteristics) and her BSES-SF item scores. The reliability of our BSES-SF questionnaire was confirmed and these results and conclusions may be useful for introducing the questionnaire into nursing practice in the Czech Republic. More attention should be given to the mother's self-efficacy in the assessment of breastfeeding effectiveness by midwives, as this helps prevent breastfeeding difficulties and supports continued breastfeeding. The validity of using this instrument is supported by the strong reliability results of Cronbach's alpha for all three measurements. Further validation studies, following the original methodology (Dennis et al., 2024), would be valuable.

Ethical aspects and conflict of interest

The study was approved by the ethics committee of the three hospitals (No. 60/2013, No. 23/2013, No. 68/2013). All respondents provided written informed consent. The authors declare that they are not aware of any conflict of interest.

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Author contributions

Conception and design (JV, BD), data analysis and interpretation (PM, JV), manuscript draft (JV), critical revision of the manuscript (BD, KG), final approval of the manuscript (JV, KG, BD, PM).

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