

Maternal self-efficacy: perspectives on formula milk and insufficient breast milk in Koja District Health Center, Indonesia

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Abstract

Breastfeeding self-efficacy substantially impacts mothers' perceptions of formula milk and their beliefs regarding breast milk inadequacy, thereby directly influencing breastfeeding behaviors. Despite the considerable health advantages of breastfeeding for both infants and mothers, diminishing breastfeeding rates and a growing dependence on formula milk underscore the necessity for interventions aimed at enhancing mothers' confidence in breastfeeding. This study's objective is to determine the relationship among breastfeeding self-efficacy, perception of formula milk,

and perceived breast milk insufficiency among breastfeeding mothers. A quantitative analytical approach using a cross-sectional design was employed, involving 103 breastfeeding mothers with infants under six months. Data were collected using a self-developed questionnaire on formula milk perceptions, an adapted Perceived Insufficient Milk (PIM) questionnaire, and the Breastfeeding Self-Efficacy Scale-Short Form (BSES-SF). A significant relationship was identified between perceptions of breast milk inadequacy and breastfeeding self-efficacy ($p=0.001$). Factors such as exclusive breastfeeding experience and current infant nutrition positively correlated with self-efficacy. Addressing the perceptions of breast milk inadequacy is essential for promoting breastfeeding self-efficacy and improving breastfeeding practices. Future research should explore how these factors evolve over time and how they affect breastfeeding success.

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Introduction

Breastfeeding is universally recognized for its substantial health benefits to infants and mothers. The World Health Organization (WHO) recommends exclusive breastfeeding for the first six months of life to ensure optimal growth and development. Despite these recommendations, breastfeeding practices have remained suboptimal in several regions. According to the 2023 Indonesian Health Survey, exclusive breastfeeding rates in Jakarta Province increased from 52% in 2017 to 68% by 2023.¹ However, only 27% of newborns received breast milk within the first hour of birth, and approximately 79.32% of infants aged 0-5 months were fed formula milk, as reported in the 2018 Jakarta Provincial Health Survey.² One of the critical factors influencing breastfeeding practices is mothers' perception of breast milk insufficiency. For instance, 81% of mothers reported dissatisfaction with their milk supply, which was often associated with physical challenges, such as nipple abrasion.³ A previous study noted that the perception of insufficient breast milk is the primary reason for the global failure of exclusive breastfeeding.^{4,5} Additionally, marketing strategies for formula milk contribute to a decline in breastfeeding rates by promoting products that are nutritionally equivalent to breast milk.⁶

Despite these insights, few studies have examined the impact of breastfeeding self-efficacy on mothers' perceptions of formula and breast milk adequacy in Indonesia. Studies have shown that mothers with higher breastfeeding self-efficacy are more likely to initiate and maintain exclusive breastfeeding.⁷⁻⁹ This study focuses on how mothers' confidence in breastfeeding interacts with their attitudes toward formula milk and perceived milk insufficiency in a specific population. It aimed to fill this research gap by exploring the relationship between breastfeeding self-efficacy, perceptions of formula milk, and perceived breast milk inadequacy

among mothers attending public health centers. Understanding these dynamics is crucial for developing targeted interventions to enhance breastfeeding practices and to support maternal confidence in breastfeeding.

Materials and Methods

Study design

This study employed a quantitative analytical design with a cross-sectional approach to assess the relationship between breastfeeding self-efficacy and mothers' perceptions of formula milk and breast milk adequacy.

Study participants

The research was conducted from February to May 2024, targeting mothers with infants under six months old within the working area of the Koja Health Center, Indonesia. Purposive sampling was used to select 103 breastfeeding mothers for the study. Inclusion criteria consisted of breastfeeding mothers with infants under six months of age, and exclusion criteria were mothers with infants older than six months or those with comorbidities (such as HIV/AIDS).

Variable, instrument, and data collection

The independent variables included demographic factors (age, education, occupation, and number of children), perceptions of formula milk consumption, and perceptions of breast milk insufficiency. The dependent variable was breastfeeding self-efficacy. Data were collected using three validated instruments: a self-developed questionnaire for assessing perceptions of formula milk, the Perceived Insufficient Milk (PIM) Questionnaire¹⁰ modified for this study, and the Breastfeeding Self-Efficacy Scale-Short Form (BSES-SF).¹¹ All instruments were validated for reliability using a 4-point Likert scale (1=strongly disagree to 4=strongly agree). Respondents completed questionnaires during their visits to the health center. Trained enumerators delivered instructions to guarantee comprehension and accurate execution of the instruments.

Data analysis

The data analysis included univariate analysis to describe the respondents' characteristics and to provide a detailed overview of the sample demographics and study variables. Bivariate analysis was conducted using the chi-square test to examine the relationships between the independent and dependent variables and to identify significant associations within the data.

Ethical clearance

Ethical approval was obtained from the Jakarta Ministry of Health Polytechnic III Research Ethics Committee (no. LB.02.02/F.XIX.21/3828/2024). The study followed ethical principles such as informed consent, respect for human rights, beneficence, and nonmaleficence.

Results

This study aimed to investigate the impact of breastfeeding self-efficacy on mothers' perceptions of formula and breast milk adequacy. The results provide valuable insights into these relationships and how they may influence breastfeeding practice.

As shown in Table 1, among the 103 participants, most

(78.6%) were within the reproductive age range of 20-35 years. A significant proportion of the sample (79.6%) had a higher level of education, whereas 81.6% identified themselves as housewives. Additionally, 61.2% had more than one child. Notably, 40.8% had exclusive breastfeeding experience, and 61.2% relied exclusively on breast milk for their infants' nutrition.

Table 2 shows that 59.1% of mothers of non-reproductive age had low breastfeeding self-efficacy, whereas 60.5% of reproductive-age mothers had high self-efficacy. The p-value for the association between maternal age and breastfeeding self-efficacy was 0.162, indicating no significant relationship.

Regarding education, 61.9% of mothers with low educational levels displayed high breastfeeding self-efficacy, compared to 54.9% of those with higher education. The p-value for education was 0.739, suggesting no significant correlation between the mother's level of education and confidence in breastfeeding. Among the working mothers surveyed, 12 (63.2%) expressed low breastfeeding self-efficacy, whereas 51 (60.7%) reported high self-efficacy ($p=0.101$), indicating no meaningful relationship between work status and self-efficacy.

Mothers with only one child demonstrated a high level of breastfeeding self-efficacy, with 21 (52.5%) reporting this, whereas those with more than one child exhibited a similar level, with 37 (58.7%) reporting high self-efficacy. Statistical analysis yielded a p-value of 0.676, indicating no significant correlation between the number of children (parity) and breastfeeding self-efficacy.

Tables 3 and 4 demonstrate maternal self-efficacy in relation to perceptions of formula milk and breast milk insufficiency at the Public Health Center. Mothers with a positive perception of formula milk had a higher proportion of low breastfeeding self-efficacy (53.2%) than those with a negative perception of formula milk (35.7%). However, this association was not statistically significant ($p=0.114$, OR=2.045, 95% CI: 0.927-4.515). In contrast, the perception of breast milk inadequacy was significantly linked to breastfeeding self-efficacy ($p=0.001$). Among mothers who believed they had insufficient breast milk, 88.5% exhibited low breastfeeding self-efficacy, compared to just 28.6% in the low-insufficiency group. The odds ratio (OR=19.167, 95% CI: 5.220-70.381) sugge-

Table 1. Characteristics of respondents based on general data.

Characteristics	Frequency	Percentage
Age		
Non-reproductive	22	21.40
Reproductive	81	78.60
Education		
Low education	21	20.40
Higher education	82	79.60
Job		
Working	19	18.40
Housewife	84	81.60
Number of children (parity)		
1 child	40	38.80
>1 child	63	61.20
Exclusive breastfeeding experience		
Not breastfeeding	40	38.80
Not exclusive	21	20.40
Exclusive	42	40.80
Current baby nutrition		
Breastmilk with formula/formula only	40	38.80
Breastmilk only	63	61.20
Total each variable	103	100

sted that mothers who perceived a high level of breast milk insufficiency were significantly more likely to have low breastfeeding self-efficacy. These findings indicate that while maternal perception of formula milk may not strongly impact breastfeeding self-efficacy, concerns about breast milk insufficiency play a critical role in underscoring the need for targeted interventions to enhance maternal confidence in breastfeeding practices.

Discussion

This study aimed to examine the impact of mothers' self-efficacy in breastfeeding on their perceptions of formula and breast milk inadequacy among mothers attending public health centers. The key findings indicated a significant relationship between the perception of breast milk inadequacy and breastfeeding self-efficacy; however, the perception of formula milk did not significantly influence self-efficacy levels. Specifically, 88.5% of the mothers who perceived breast milk as inadequate exhibited low breastfeeding self-efficacy, whereas 71.4% of those with a low perception of breast milk inadequacy demonstrated high self-efficacy. In contrast, only 46.8% of the mothers with a positive perception of formula milk reported high self-efficacy, suggesting that breastfeeding confidence is more strongly associated with perceptions of milk adequacy than external feeding options. These findings underscore the importance of addressing maternal perceptions of milk sufficiency to enhance breastfeeding self-efficacy.

The findings highlight that mothers' perceptions of breast milk inadequacy are positively correlated with breastfeeding self-efficacy. These results align with previous studies indicating that perceptions of breast milk adequacy significantly influence breastfeeding practices.¹² For example, Gusriani *et al.* emphasized that maternal psychological factors, including confidence and perceived milk production, play a crucial role in successful breastfeeding.¹³ Additionally, several studies have identified a significant association between the perception of insufficient breast milk and exclusive breastfeeding, reinforcing the notion that mothers' beliefs about their milk supply can substantially impact breastfeeding outcomes.^{4,14} Furthermore, breastfeeding experience is a key determinant of breastfeeding self-efficacy, as supported by this study,

which found that past experience with exclusive breastfeeding was positively associated with higher self-efficacy.^{15,16} These findings highlight the importance of addressing maternal perceptions of milk adequacy through targeted education and support programs to enhance breastfeeding self-efficacy and to promote exclusive breastfeeding.

Interestingly, this study found no significant relationship between mothers' perception of formula milk and breastfeeding self-efficacy. This suggests that attitudes toward formula milk may not directly influence confidence in breastfeeding, while other factors can impact it, including individual perspectives, family, education, and knowledge.¹⁷⁻²⁰ This result was unexpected, as previous studies have suggested that negative perceptions of formula milk may contribute to increased confidence in breastfeeding.²¹ Instead, our study's findings indicate that breastfeeding confidence is more strongly associated with perceptions of milk adequacy than with attitudes toward formula feeding.^{14,22} Moreover, this study suggests that mothers exhibit varying levels of self-efficacy regardless of their opinions about formula milk. These nuances may reflect the complexity of maternal attitudes, where personal experiences and social support systems play a more significant role than external perceptions of formula feeding.^{23,24} These findings suggest a clear relationship between mothers' perceptions of both formula milk and breast milk adequacy and their confidence in breastfeeding. This aligns with existing literature, which indicates that perceptions of milk sufficiency significantly influence breastfeeding practices.^{10,11} Understanding these dynamics is essential for developing interventions aimed at improving breastfeeding rates and enhancing maternal confidence. For further insights into the influence of maternal perceptions on breastfeeding, refer to relevant studies.²⁵

Several limitations of this study should be acknowledged when interpreting the results. The cross-sectional design limits the ability to establish causal relationships, as data are collected at a single point in time. Additionally, the sample size of 103 participants, although sufficient for preliminary insights, may restrict the generalizability of the findings to broader populations and diverse settings. The reliance on self-reported measures may also introduce bias, as participants may provide socially desirable responses. Furthermore, key factors, such as maternal mental health, social

Table 2. Relationship between respondent characteristics and breastfeeding self-efficacy (n=103).

Variables	Breastfeeding self-efficacy				Total	P value	OR (95% CI)	
	Low		High					n
	n	%	n	%	n	%		
Age							0.162	2,212
Non-reproductive	13	59.1	9	40.9	22	100		0.847-5.774
Repro-ductive	32	39.5	49	60.5	81	100		
Total	45	43.7	58	56.3	103	100		
Education							0.739	0.748
Low education	8	38.1	13	61.9	21	100		0.280-1.999
Higher education	37	45.1	45	54.9	82	100		
Total	45	43.7	58	56.3	103	100		
Job							0.101	2,649
Wor-king	12	63.2	7	36.8	19	100		0.946-7.420
Hou-sewife	33	39.3	51	60.7	84	100		
Total	45	43.7	58	56.3	103	100		
Number of children							0.676	1.288
1 child	19	47.5	21	52.5	40	100		0,580-2,860
>1 child	26	41.3	37	58.7	63	100		
Total	45	43.7	58	56.3	103	100		

Table 3. Relationship of Mothers' perception with Breastfeeding Self-Efficacy (n=103).

Mothers' perception	Breastfeeding self-efficacy				Total	P value	OR (95% CI)
	Low		High				
	n	%	n	%			
Perception of formula milk							
Positive	25	53.2	22	46.8	47	100	0.114 2.045 0.927-4.515
Negative	20	35.7	36	64.3	56	100	
Total	45	43.7	58	56.3	103	100	
Perception of breast milk inadequacy							
Perception of high breast milk insufficiency	23	88.5	3	11.5	26	100	0.001 19.167 5.220-70.381
Perception of low breast milk insufficiency	22	28.6	55	71.4	77	100	
Total	45	43.7	58	56.3	103	100	

support, and socioeconomic status, which could influence breastfeeding self-efficacy, have not been comprehensively examined. The subjective nature of the measures related to perceptions and self-efficacy may affect the reliability of the data, and the study's focus on breastfeeding mothers may have excluded the perspectives of those who rely on formula feeding.

Given these considerations, future research should explore the dynamics of breastfeeding self-efficacy in larger and more diverse populations. Investigating the impact of social support networks and mental health on breastfeeding confidence could provide deeper insights into factors that facilitate successful breastfeeding. Longitudinal studies could also be valuable for establishing causal relationships between maternal perceptions and breastfeeding practices over time.

Conclusions

Mothers who perceived their breast milk as inadequate were more likely to have low self-efficacy regarding breastfeeding. These findings highlight the need for interventions that enhance mothers' confidence in their breastfeeding capabilities, such as educational programs that dispel myths about breast milk insufficiency and provide evidence-based breastfeeding information. Future interventions should prioritize educational outreach, community support networks, and resources that empower mothers, thereby contributing to improved breastfeeding practices and better health outcomes for families in the district and beyond.

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