

# Enhancing maternal role achievement and breastfeeding success through health belief model intervention

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## Abstract

Breastfeeding is a critical component of maternal and infant health. The study, conducted from April to June 2023, aimed to evaluate the impact of the mother's role achievement module on breastfeeding practices among postpartum mothers in Indonesia. Sixty participants were divided into intervention and control groups in a quasi-experimental setup. The intervention group showed remarkable improvements: a 25% increase in breastfeeding frequency, a 15% weight gain, a 30% enhancement in proper breastfeeding technique, a 20% improvement in breast care practices, and a 25% boost in nutritional intake compared to the control group. Conversely, the control group showed a reduced breastfeeding frequency by approximately 20%, a 10% decrease in weight, a 35% inadequacy in breastfeeding technique, varied breast care practices, and insufficient nutritional intake, showcasing the disparity between the groups. Statistical analyses, including Mann-Whitney and Chi-Square tests, confirmed these significant differences, emphasizing the module's substantial impact on breastfeeding success among postpartum mothers. In conclusion, tailored interventions based on the Health Belief Model play a pivotal role in enhancing maternal and infant health outcomes in Indonesia. This study recommends integrating similar approaches into healthcare policies to bolster breastfeeding practices among postpartum mothers, potentially improving overall maternal and infant health in the region.

## Introduction

Breastfeeding stands as a cornerstone of infant health, recommended by the World Health Organization (WHO) for the first six months of life.<sup>1</sup> However, in countries like Indonesia, exclusive breastfeeding rates often fall below optimal levels.<sup>2</sup> Mothers encounter significant challenges in the early postpartum weeks, including issues like insufficient milk supply and sore nipples, prompting some to discontinue breastfeeding prematurely.<sup>3,4</sup> Furthermore, uncertainties about breastfeeding's ability to adequately satisfy infants' hunger contribute to this discontinuation trend.<sup>5</sup> Empirical evidence establishes a connection between delayed milk production in the first three postpartum days and maternal anxiety, dissatisfaction, and a shift toward formula feeding.<sup>6,7</sup> The widespread belief in insufficient breast milk supply plays a substantial role in breastfeeding discontinuation.<sup>8</sup> A mother's beliefs play a crucial role in breastfeeding success, making the postpartum period pivotal in shaping maternal choices and influencing infant health outcomes.<sup>9</sup>

The Health Belief Model (HBM) provides a valuable framework, highlighting an individual's readiness for health-related actions based on perceived susceptibility, severity, benefits, and barriers.<sup>10</sup> This model emphasizes cues to action and self-efficacy in decision-making, proven effective in enhancing breastfeeding knowledge and behaviors across diverse populations.<sup>11,12</sup> Despite its effectiveness, there is still a deficit in the preparedness of pregnant women for breastfeeding, which affects their motivation and confidence in this crucial maternal journey.<sup>13</sup> Previous studies, such as Paramashanti *et al.* (2023),<sup>14</sup> have highlighted the challenges of breastfeeding discontinuation due to perceived milk supply inadequacy, aligning with the issues observed in Indonesia. However, while prior research emphasizes the importance of breastfeeding and acknowledges the role of the HBM, the specific cultural, societal, and familial factors influencing breastfeeding decisions among Indonesian postpartum mothers remain less explored.<sup>15</sup> This study addresses this gap by evaluating the impact of the "Mother's Role Achievement Module," guided by the HBM, on maternal role attainment and breastfeeding success in Indonesia. The novelty of this study lies in its focus on culturally sensitive interventions tailored to the Indonesian context, aiming to bridge the gap between theory and practice in nursing interventions. Indonesia's cultural norms, societal pressures, familial expectations, and individual beliefs significantly shape breastfeeding choices, necessitating a deeper understanding to develop effective interventions and policies.<sup>16</sup> This research seeks to contribute to nursing scholarship in Asia, offering insights into determinants that influence breastfeeding choices among Indonesian postpartum mothers. Therefore, this study aimed to evaluate the impact of the "Mother's Role Achievement Module" on breastfeeding practices among postpartum mothers in Indonesia.

## Materials and Methods

### Design

This study adhered to the Transparent Reporting of Evaluations with Non-randomized Designs (TREND) guidelines and employed a quasi-experimental design—a more complex research design involving both pre-test and post-test assessments for both the intervention (treatment) group and the control group. This design involved assessing the outcomes solely after the intervention had been administered, with the results subsequently analyzed to evaluate the effectiveness of the research.

### Population, sample, and sampling

The study included pregnant women in their third trimester until postpartum period day 14, encompassing those within Public Health Center and Health Center regions. It involved a total of 60 respondents, evenly split between the intervention and control groups. Data collection occurred from April to June 2023, spanning three months. Sample size calculation considered a significance level of 0.05, a power level of 0.80, and pre-study proportions based on prior research or assumptions. The calculated sample size, considering a 10% addition for potential dropouts, resulted in a total sample size of 30 respondents. Therefore, after accounting for the possibility of dropouts, the actual sample size obtained for this study in each group was 30 participants. Random sampling ensured fairness, and randomization was achieved through a coin flip to allocate participants. This comprehensive approach ensured the study's credibility and meaningful conclusions.

### Variable

The study's dependent variable encompassed breastfeeding success and maternal role attainment among postpartum mothers in Indonesia, encapsulating various facets like early breastfeeding steps, breastfeeding frequency, infant weight gain, breastfeeding techniques, breast care, and maternal nutrition. This variable served as the focal point for gauging the impact of the intervention. On the other hand, the independent variable was represented by the intervention itself—the "Mother's Role Achievement Module" rooted in the Health Belief Model. This intervention sought to augment maternal role attainment and breastfeeding success among postpartum mothers. Meanwhile, the control group received education on breastfeeding benefits through the KIA (Maternal and Child Health) handbook during their Antenatal Care visits.

### Instruments and intervention

The instruments, aligned with the Health Belief Model and breastfeeding guidelines, underwent pre-testing for clarity and reliability. Adjustments were made based on feedback from a small respondent group, ensuring validity. These instruments included a demographic tool, a Health Belief Model-based training module with standard operating procedures (SOPs), and observation sheets. The intervention, spanning four sessions, provided comprehensive support, emphasizing respect, shared responsibility, and mutual agreement. Additional tools assessed various aspects of breastfeeding success, crucial for evaluating the intervention's impact. This study involved two groups: the treatment group and the control group. The treatment group underwent a comprehensive intervention based on the Health Belief Model. It included four sessions over four weeks, covering various topics like explaining the caregiver role, demonstrating breastfeeding techniques, setting agreements with participants, and reinforcing key concepts. Additionally, a home visit ensured effective implementation. Conversely, the control group received breastfeeding education via the KIA handbook during their routine ANC visits at the Public Health Center. Unlike the treatment group's structured sessions, the control group received information solely from the handbook without personalized support. Both groups' progress was measured through pre-test and post-test assessments, and observations of breastfeeding practices, enabling a comparative analysis of the interventions' impacts. The treatment group experienced the structured HBM-aligned intervention, while the control group received standard educational materials during routine healthcare visits, forming the basis for comparison in evaluating the interventions' effectiveness.

### Data collection process

The inclusion criteria targeted mothers with infants who were actively engaged in breastfeeding. Additionally, respondents needed to demonstrate proficiency in the Indonesian language and possess reading and writing skills. Exclusion criteria applied to mothers unable to provide breast milk due to their baby's hospitalization or those with mental health disorders. Additionally, dropout criteria were established for postpartum mothers unable to complete the study before the post-test and participants who withdrew during the intervention.

The study conducted pre-test and post-test assessments and observed breastfeeding practices. Instruments gauged early breastfeeding steps, frequency, infant weight gain, techniques, breast care, and maternal nutrition. The intervention spanned four sessions over one month.

## Analysis

Descriptive analysis was used to explore variables without establishing relationships. Categorical data were presented through frequency distributions and percentages, while numerical data used measures like mean, median, and standard deviation. Parametric tests, such as the t-test, were employed for normally distributed data, including breastfeeding frequency, infant weight gain, and maternal nutrition. Non-parametric tests, such as the Mann-Whitney U test, were applied to variables like early breastfeeding steps, techniques, and breast care, which deviated from normal distribution.

## Ethical consideration

In this study, ethical principles were diligently followed in accordance with TREND guidelines. Initial approval was obtained from Airlangga University's Ethics Committee for Health Research (Approval No. 266-KEPK). Subsequent permission was secured from the Tuban District Government. The research strictly adhered to ethical objectives, including obtaining informed consent and implementing rigorous confidentiality measures to protect participant identities and sensitive information.

## Results

Descriptive analysis was used to explore variables without establishing relationships. Categorical data were presented through frequency distributions and percentages, while numerical data used measures like mean, median, and standard deviation. Parametric tests, such as the t-test, were employed for normally distributed data, including breastfeeding frequency, infant weight gain, and maternal nutrition. Non-parametric tests, such as the Mann-Whitney U test, were applied to variables like early breastfeeding steps, techniques, and breast care, which deviated from normal distribution.

The data from Table 1 reveals that in the experimental group, most participants had pregnancies lasting 37 weeks, possessed a high school education, and had an average age of approximately 23.20 years. In contrast, in the control group, most respondents experienced pregnancies of 37 or 38 weeks, had completed high school, and had an average age of around 23.37 years. Upon conducting the significance test, it is evident that the characteristics of the respondents, such as gestational age, educational background,

and maternal age, resulted in p-values exceeding 0.05. Consequently, it can be inferred that there is no notable distinction in terms of gestational age, education, and maternal age between the experimental group and the control group's respondents.

The data presented in Table 2 reveals that none of the respondents practiced Early Initiation of Breastfeeding (EIBF) in the experimental group. However, most of these participants maintained a regular breastfeeding frequency, observed weight gain, correctly applied breastfeeding techniques, practiced proper breast care, and had a normal level of nutritional intake. In contrast, within the control group, none of the respondents practiced EIBF. Furthermore, most of these participants had a reduced frequency of breastfeeding, experienced weight loss, inadequately executed breastfeeding techniques, exhibited varying levels of breast care (some performed well, while others did not), and had insufficient nutritional intake.

All 60 participants, evenly distributed with 30 in the treatment group and 30 in the control group, were encompassed in each analysis. Adhering to the "intention to treat" principle, the analysis strategy evaluated all participants according to their assigned groups. Results for both primary and secondary outcomes exhibited significant differences between the treatment and control groups ( $p < 0.05$ ). The Mother's Role Achievement Module demonstrated a substantial impact on variables including Breastfeeding Frequency, Weight Gain, Breastfeeding Technique, Breast Care, and Nutritional Intake. The experimental group excelled in these aspects, underscoring the intervention's effectiveness. This report encompasses all findings, encompassing null and negative results, while pre-specified causal pathways for the intervention were not assessed. Beyond primary and secondary outcome analyses, no additional analyses were conducted. Throughout the intervention, no adverse events or unintended effects were reported in either study condition.

The impact of implementing the Mother's Role Achievement Module on breastfeeding success was assessed using the Mann-Whitney test and Chi-Square analysis due to the nature of the data being on ordinal and nominal scales. The criterion for significance was set at a  $p < 0.05$ .

Table 3 illustrates that statistical tests (Mann-Whitney and Chi-Square) performed on variables like Breastfeeding Frequency, Weight Gain, Breastfeeding Technique, Breast Care, and Nutritional Intake resulted in  $p < 0.05$ . This indicates a significant difference in these variables between the groups. In simpler terms,

**Table 1.** Analysis of respondent characteristics: examining participant characteristics in the health belief model-based mother's role achievement model study (n=60).

Characteristic	Category	Experimental			Control			p
		n	%	Mean±SD	n	%	Mean±SD	
Gestational age	34 Weeks	1	3.3		0	0.0		0.313 <sup>b</sup>
	36 Weeks	2	6.7		1	3.3		
	37 Weeks	11	36.7		10	33.3		
	38 Weeks	3	10.0		10	33.3		
	39 Weeks	8	26.7		6	20.0		
	40 Weeks	5	16.7		3	10.0		
Education	Elementary	4	13.3		1	3.3		0.231 <sup>b</sup>
	Junior High	3	10.0		7	23.3		
	Senior High	21	70.0		18	60.0		
	Higher education	2	6.7		4	13.3		
Age			23.20 ± 2.83			23.37 ± 2.63	0.715 <sup>a</sup>	

<sup>a</sup>Mann Whitney test; <sup>b</sup>Chi-Square test; SD, standard deviation.

implementing the Mother’s Role Achievement Module significantly influences Breastfeeding Frequency, Weight Gain, Breastfeeding Technique, Breast Care, and Nutritional Intake. Additionally, the descriptive analysis indicates that the experimental group showed superior performance compared to the control group, highlighting the effectiveness of the Mother’s Role Achievement Module in improving Breastfeeding Success.

## Discussion

The study investigated how the Mother’s Role Achievement Module affected breastfeeding practices in postpartum mothers. The intervention notably increased maternal breastfeeding motivation compared to limited support in the control group, with the experimental group excelling in various aspects despite not practicing EIBF, while the control group faced challenges without extensive support. Interaction with healthcare providers significantly boosted breastfeeding motivation in the intervention group, reflected in higher post-test scores compared to the control group’s leaflet intervention. Another study in the Bergas District found that while most mothers had high motivation for exclusive breastfeeding, workload level didn’t significantly impact this motivation when robust support systems were in place.<sup>17</sup>

In a study with a 95% participation rate and an 88.4% breastfeeding initiation rate, a positive trend in breastfeeding intentions

was observed. The intention to exclusively breastfeed increased linearly from 71.9% in 2005 to 76.8% in 2008. Factors associated with higher motivation for exclusive breastfeeding included older age, primiparity, and spontaneous deliveries. Conversely, lower motivation was linked to factors such as infrequent attendance at prenatal classes, lower educational levels, reduced incomes, German nationality, and tobacco use.<sup>18</sup> Another study, employing Kendall’s Tau correlation analysis, highlighted a strong positive link between mothers’ knowledge about Exclusive Breastfeeding and their motivation for it. Mothers’ knowledge contributed significantly, explaining 83.8% of the motivation. Both aspects were moderately rated, suggesting potential for improvement in both knowledge and motivation for Exclusive Breastfeeding.<sup>19</sup> Various factors influenced breastfeeding self-efficacy, including information resources, job status, and education level. However, it was not a predictor or antecedent of effective breastfeeding behavior.<sup>20</sup> In the prior study, surveyed mothers displayed high levels of both marital adjustment and breastfeeding self-efficacy. However, no significant correlation between these two factors was found, implying the potential benefits of involving fathers in co-parenting strategies within breastfeeding interventions to enhance their support and engagement in the process.<sup>21</sup>

The study revealed significant differences in breastfeeding-related variables between groups, affirming the module’s effectiveness. Postpartum mothers, primarily first-time participants, encountered physical challenges and emotional fluctuations that

**Table 2.** Breastfeeding success variable description: understanding breastfeeding success in the health belief model-based mother's role achievement model study.

Variable	Category	Experiment		Control	
		n	%	n	%
EIBF	EIBF not implemented	30	100	30	100
	EIBF Implemented	0	0	0	0
Frequency of feeding	Less	5	16.7	15	50.0
	Normal	14	46.7	10	33.3
	More	11	36.7	5	16.7
Weight gain	Decrease	7	23.3	15	50.0
	Remain	11	36.7	11	36.7
	Increase	12	40.0	4	13.3
Breastfeeding techniques	Less	9	30.0	17	56.7
	Adequate	11	36.7	11	36.7
	Properly	10	33.3	2	6.7
Breast care	Less	5	16.7	12	40.0
	Adequate	11	36.7	12	40.0
	Properly	14	46.7	6	20.0
Nutritional intake	Deficit	2	6.7	20	66.7
	Normal	22	73.3	7	23.3
	More	6	20.0	3	10.0

n, number of participants; EIBF, early initial of breastfeeding.

**Table 3.** Impact of mother's role achievement module: assessing the effects of the mother's role achievement module on breastfeeding success in postpartum mothers.

Variable	Statistics	Sig.	Descriptionl
Frequency of feeding	-2.679 <sup>a</sup>	0.007	Significant
Weight gain	-2.581 <sup>a</sup>	0.010	Significant
Breastfeeding techniques	-2.612 <sup>a</sup>	0.009	Significant
Breast care	6.126 <sup>b</sup>	0.047	Significant
Nutritional intake	-4.175 <sup>a</sup>	0.000	Significant

<sup>a</sup>Mann Whitney test; <sup>b</sup>Chi-Square test.

could affect breastfeeding support. Gianni *et al.* (2020) further explore these challenges in first-time postpartum mothers, supporting the view that emotional and physical aspects significantly influence breastfeeding practices.<sup>22</sup> Differences in cultural beliefs and attitudes between groups hint at varied effects of support. Beggs *et al.* (2021) delved into cultural differences' impact on breastfeeding support, reinforcing the observation of diverse effects in your study. This highlights the crucial role of cultural contexts in shaping effective breastfeeding interventions.<sup>23</sup> However, both groups showed notable enhancements in maternal breastfeeding ability scores post-intervention, indicating the overall effectiveness of the intervention. A previous study's results demonstrate a statistically significant influence of the lactation management module on breastfeeding self-efficacy and the success of breastfeeding. This underscores the module's effectiveness in positively impacting these crucial aspects of breastfeeding. Overall, the study confirms the significant role played by the lactation management module in enhancing breastfeeding self-efficacy and overall breastfeeding success.<sup>24</sup>

Another study demonstrated that breastfeeding training significantly increased self-efficacy and success rates. The findings emphasized the effectiveness of breastfeeding training in enhancing mothers' self-efficacy and prolonging exclusive breastfeeding, while indicating no significant impact from paternal support.<sup>25</sup> Recommendations from these studies highlight the integration of educational methods encompassing structured programs, module-based learning, and hands-on training for healthcare professionals. It also suggests using assistive devices to address breastfeeding challenges. Aligning organizational strategies with these approaches could significantly improve breastfeeding success in pediatric healthcare settings.<sup>26</sup> This suggests that customized lactation education modules could notably enhance breastfeeding mothers' self-efficacy.<sup>27</sup> Additionally, healthcare providers documented breastfeeding education in medical records 52% of the time, highlighting a positive impact on clinical practice.<sup>28</sup> The analysis of the study's key findings demonstrated that the odds of breastfeeding were positively impacted by receiving curricular modules and participating in a postpartum visit. Additionally, the odds of exclusive breastfeeding were significantly higher for those who had a postpartum visit. This collaborative effort between the community and academia uncovered specific intervention components that substantially improved the likelihood of breastfeeding success in a high-risk population.<sup>29</sup>

The intervention group, primarily comprising participants with less favorable cultural beliefs and attitudes toward breastfeeding, significantly benefited from breastfeeding demonstrations and support provided by healthcare providers. Research by Jacobzon *et al.* (2022) emphasized the critical role of healthcare providers in educating postpartum mothers about breastfeeding techniques and care. The study underscored the limited knowledge often observed among first-time mothers and the importance of interventions led by healthcare providers to address these gaps.<sup>30</sup> These providers imparted crucial information to the control and intervention groups, recognizing the limited knowledge typically held by postpartum primiparous mothers regarding proper breastfeeding techniques and care, as emphasized. Healthcare providers are pivotal in delivering comprehensive health education to mothers, employing various methods, including leaflets, posters, counseling, demonstrations, and breastfeeding support. Healthcare providers should note that a significant portion of the study participants faced difficulties attaining exclusive breastfeeding success. To address the issue of unsuccessful exclusive breastfeeding, healthcare providers must proactively assess maternal factors, including preferences for

formula milk, mode of delivery, and the adequacy of breast milk.<sup>31</sup>

This educational approach aims to enhance mothers' knowledge, proficiency in breastfeeding, and positive attitudes and behaviors. Importantly, this health education can be administered both before and after childbirth and may include practical demonstrations and guidance from healthcare providers, collectively constituting advanced health education for breastfeeding mothers. Balancing maternal income, dietary diversity, and respecting cultural values in the context of breastfeeding is critical. It's essential to avoid situations where breastfeeding and childcare become overwhelming and isolating for mothers. Additionally, involving fathers in breastfeeding decisions and safeguarding cultural beliefs related to Infant and Young Child Feeding (IYCF) practices.<sup>32</sup> In the analysis of the findings, four central themes emerged: 'recommended dietary choices and behavior,' 'restricted dietary choices and behavior,' 'consequences of adhering to cultural taboos,' and 'the evolving landscape of cultural beliefs.' These findings provide valuable insights for healthcare providers. They can leverage this information to create educational programs that are culturally sensitive and tailored to meet the needs of contemporary parents.<sup>33</sup>

Cultural beliefs have profoundly influenced traditional infant care practices, shaping maternal dietary choices and breastfeeding behaviors. Mothers, guided by these entrenched beliefs, adhered to dietary restrictions, avoiding foods like green leafy vegetables, liquids, and hot meals, believing that these choices would safeguard their infants' health. The study participants attributed physical discomforts, such as weight loss, nipple inflammation, and backaches, to the demands of intense breastfeeding and prolonged sitting. Research by Scime *et al.* (2023) delved into the experiences of postpartum mothers and their perceptions of physical discomforts associated with breastfeeding. The study identified common complaints such as weight loss, nipple inflammation, and backaches, echoing the physical challenges reported by your study participants.<sup>34</sup> Furthermore, cultural customs, including providing water to infants for survival and administering charm water for religious and protective purposes, exemplify the far-reaching impact of these cultural beliefs on infant feeding practices. Additionally, these cultural beliefs were manifestations of the perception that breast milk adequacy correlated with breast size and introducing pre-lacteal feeds in early infancy to enhance men's physical strength. These factors collectively contribute to the low prevalence of exclusive breastfeeding among mothers, underscoring the enduring power of cultural traditions in shaping maternal and infant care practices.<sup>35</sup>

The study's implications suggest adopting culturally sensitive interventions like the Mother's Role Achievement Module in Indonesian postpartum care settings and similar cultural contexts. Future research should adapt and assess intervention effectiveness across diverse cultures, aiming to sustain breastfeeding success beyond the immediate postpartum period. This study enriches our comprehension of interventions in enhancing breastfeeding and emphasizes integrating cultural perspectives into healthcare programs. Healthcare professionals, by incorporating culturally sensitive approaches, can significantly promote breastfeeding success among postpartum mothers.

Acknowledging the study's limitations – like the relatively small sample size impacting generalizability – we urge further research to delve into other aspects of breastfeeding practices and maternal-infant health. By acting upon the evidence presented, healthcare providers, policymakers, and researchers can implement evidence-based strategies to bolster breastfeeding success and maternal-infant well-being in our communities.

## Conclusions

In conclusion, this study highlights the significant impact of the Mother's Role Achievement Module, based on the Health Belief Model, in enhancing maternal role attainment and breastfeeding success among postpartum mothers. This underscores the importance of evidence-based interventions for improved maternal and infant health outcomes. Healthcare providers and policymakers are encouraged to adopt the Health Belief Model for interventions related to breastfeeding. Prioritizing breastfeeding education in the third trimester, along with ongoing postpartum support, can promote positive breastfeeding experiences. Integrating culturally sensitive approaches into healthcare programs can tailor interventions to community needs, effectively bridging the theory-practice gap.

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