Health System and Medical Journal

E-ISSN: 3090-3998
P-ISSN: 3090-4013

Resreach Article

The Effect of Health Education on Mothers' Knowledge and Attitudes Toward Exclusive Breastfeeding

Firsta Ninenty Fife Bertha[1], Retno Dewi Prisusanti[2*]

[1-2]Study Program Kebidanan, ITSK Soepraoen, Indonesia
*Coresponding Author: retnodewi@itsk-soepraoen.ac.id

Abstract. Background : Exclusive breastfeeding during the first six months of life is a proven intervention to improve infant health, reduce morbidity and mortality, and support optimal growth and development. Nevertheless, the rate of exclusive breastfeeding remains below national and global targets. Inadequate maternal knowledge and unfavorable attitudes are recognized as important barriers to successful breastfeeding practices. Health education is considered an effective health promotion strategy to enhance maternal knowledge and foster positive attitudes toward exclusive breastfeeding. This study aimed to determine the effect of health education on mothers' knowledge and attitudes regarding exclusive breastfeeding. Methods : A quantitative study employing a quasi-experimental pretest–posttest control group design was conducted among 60 mothers selected using consecutive sampling. Participants were assigned to an intervention group (n = 30) and a control group (n = 30). The intervention group received structured health education through interactive lectures, group discussions, breastfeeding demonstrations, educational videos, and printed leaflets, whereas the control group received routine health education. Data were collected using validated and reliable questionnaires measuring knowledge and attitudes toward exclusive breastfeeding. Statistical analyses included descriptive statistics, paired t-test, independent t-test, and multiple linear regression with a significance level of $p < 0.05$. Results : The mean knowledge score in the intervention group increased from 61.8 ± 8.4 to 87.6 ± 6.3, while the mean attitude score improved from 65.4 ± 7.1 to 88.2 ± 5.8. Improvements in the control group were comparatively lower.

Keywords : Attitude; Exclusive Breastfeeding; Health Education; Knowledge; Mothers.

Received: November 15, 2024
Revised: January 29 , 2025
Accepted: March 13 , 2025
Online Available: May 30 , 2025
Curr. Ver.:May 30, 2025

1. Introduction

Exclusive breastfeeding is widely recognized as one of the most effective public health interventions for improving infant health outcomes. Providing only breast milk during the first six months of life supplies all essential nutrients required for optimal growth and development, strengthens the infant's immune system, and reduces the risk of infectious diseases. In addition to its benefits for infants, exclusive breastfeeding contributes significantly to maternal health by lowering the risk of postpartum hemorrhage, breast cancer, and ovarian cancer. Consequently, increasing the coverage of exclusive breastfeeding has become an important indicator in efforts to reduce infant morbidity and mortality while improving maternal and child health outcomes (World Health Organization [WHO], 2023; United Nations Children's Fund [UNICEF], 2023).

Despite the well-documented advantages of exclusive breastfeeding, its implementation remains below the recommended target in many regions. Numerous factors contribute to the low prevalence of exclusive breastfeeding practices, including insufficient maternal knowledge, unfavorable attitudes toward breastfeeding, cultural beliefs, limited family support, maternal employment, aggressive marketing of infant formula, and inadequate access to accurate health information. These findings indicate that the success of exclusive breastfeeding programs depends not only on biological factors but also on behavioral and social determinants that influence mothers' decisions regarding infant feeding (WHO, 2023; Ministry of Health of the Republic of Indonesia, 2023).

Knowledge is considered one of the primary predisposing factors influencing health-related behavior. Mothers who possess adequate knowledge about the benefits of breastfeeding, appropriate breastfeeding techniques, and the importance of maintaining exclusive breastfeeding are generally more confident and motivated to breastfeed their infants successfully. Conversely, inadequate information often leads to misconceptions regarding breast milk sufficiency, the appropriate timing for complementary feeding, and the necessity of infant formula, thereby hindering the successful practice of exclusive breastfeeding (Notoatmodjo, 2018).

In addition to knowledge, maternal attitude plays a crucial role in determining breastfeeding behavior. Positive attitudes toward exclusive breastfeeding encourage mothers to continue breastfeeding despite various challenges, such as physical fatigue, work-related responsibilities, and insufficient social support. On the other hand, negative attitudes may weaken mothers' commitment to sustaining exclusive breastfeeding for the recommended six-month period. Therefore, efforts to improve maternal knowledge should be accompanied by strategies that foster positive attitudes to ensure sustainable behavioral change (Ajzen, 2020; WHO, 2023).

Health education represents an essential health promotion strategy designed to enhance individuals' ability to acquire, understand, and apply health-related information. Through structured educational interventions, mothers can gain comprehensive knowledge regarding the benefits of exclusive breastfeeding, appropriate breastfeeding techniques, management of lactation-related problems, and the importance of family support throughout the breastfeeding period. Beyond improving cognitive understanding, health education also strengthens beliefs and attitudes, thereby facilitating healthier behavioral practices (Notoatmodjo, 2018; Green & Kreuter, 2015).

Currently, health education is delivered through a variety of educational approaches, including face-to-face counseling, printed educational materials, instructional videos, social media platforms, digital applications, and individualized counseling sessions. These diverse methods offer opportunities to improve the effectiveness of information dissemination among breastfeeding mothers. Nevertheless, the success of health education programs depends on several factors, including the educational approach employed, participants' characteristics, educational background, and the communication skills of healthcare professionals responsible for delivering the educational content (Ministry of Health of the Republic of Indonesia, 2023).

Previous studies have consistently demonstrated that health education significantly improves mothers' knowledge regarding exclusive breastfeeding. Several investigations have also reported positive changes in maternal attitudes following educational interventions. However, the magnitude of these improvements varies considerably across studies due to differences in educational methods, instructional media, evaluation periods, and participant characteristics. These inconsistencies highlight the need for additional empirical evidence examining the effectiveness of health education across different healthcare settings.

Research conducted by Retno Dewi Prisusanti revealed that the effectiveness of health education is influenced by multiple factors, including the combination of educational methods, participant engagement, continuous support from healthcare professionals, and the sustainability of educational activities. Interactive educational approaches have been shown to produce greater improvements in knowledge and more positive attitudes than conventional one-way information delivery. These findings suggest that the quality of educational implementation is a key determinant of successful behavioral change within communities.

A review of the existing literature also reveals a research gap concerning the influence of health education on maternal knowledge and attitudes toward exclusive breastfeeding, particularly within primary healthcare settings. Most previous studies have focused primarily on knowledge improvement without simultaneously assessing changes in maternal attitudes. Furthermore, quasi-experimental studies integrating both variables remain relatively limited. Variations in sociocultural characteristics, educational attainment, and access to health information across different communities may also contribute to inconsistent findings, emphasizing the importance of conducting research within specific local contexts.

Based on these considerations, the present study aims to examine the effect of health education on mothers' knowledge and attitudes regarding exclusive breastfeeding. The findings are expected to provide scientific evidence concerning the effectiveness of health education in improving maternal understanding and fostering positive attitudes toward exclusive breastfeeding. Furthermore, the results are anticipated to serve as an evidence-based reference for healthcare professionals and policymakers in designing more effective health promotion programs to increase exclusive breastfeeding coverage and support the achievement of maternal and child health development goals (WHO, 2023; UNICEF, 2023).

2. Literature Review

Exclusive breastfeeding is defined as the practice of feeding infants exclusively with breast milk from birth until six months of age without providing any additional food or beverages, except for medications, vitamins, or mineral supplements prescribed by healthcare professionals. Breast milk contains a complete composition of macronutrients and micronutrients, together with antibodies, enzymes, hormones, and growth factors that are essential for supporting physical growth, neurological development, and immune system

maturation. Extensive evidence has demonstrated that exclusive breastfeeding reduces the incidence of respiratory tract infections, diarrhea, malnutrition, and infant mortality while also providing substantial long-term health benefits for both mothers and their children (World Health Organization [WHO], 2023).

Knowledge is generally understood as the outcome of an individual's sensory experience and cognitive processing, through which information is interpreted and transformed into understanding that guides decision-making. Within the field of health promotion, adequate knowledge enhances an individual's ability to recognize the importance of preventive and promotive health behaviors, including exclusive breastfeeding practices. According to Notoatmodjo's Health Behavior Theory, knowledge functions as a predisposing factor that shapes health behavior through learning experiences and information acquisition. Mothers who possess comprehensive knowledge regarding the benefits of breastfeeding, appropriate breastfeeding techniques, and exclusive breastfeeding management are more likely to practice breastfeeding in accordance with recommended guidelines (Notoatmodjo, 2018).

Attitude represents an individual's tendency to respond favorably or unfavorably toward a particular object or behavior and is influenced by previous experiences, beliefs, values, and acquired information. In the context of exclusive breastfeeding, a positive maternal attitude is reflected in confidence regarding the benefits of breast milk, willingness to breastfeed exclusively, and commitment to maintaining breastfeeding despite potential obstacles. The Theory of Planned Behavior proposes that positive attitudes strengthen behavioral intentions, particularly when they are supported by favorable social norms and a strong perception of behavioral control (Ajzen, 2020).

Health education is a systematic learning process designed to improve the ability of individuals or communities to obtain, comprehend, and apply health information, thereby enabling them to make informed decisions concerning their health. Beyond enhancing knowledge, health education seeks to cultivate positive attitudes, increase motivation, and promote sustainable behavioral change. In the present study, health education serves as the primary intervention expected to improve maternal knowledge and foster favorable attitudes toward exclusive breastfeeding (Green & Kreuter, 2015).

This study is further supported by the PRECEDE–PROCEED Model developed by Lawrence W. Green and Marshall W. Kreuter. The model explains that health behavior is influenced by three categories of determinants: predisposing, enabling, and reinforcing factors. Maternal knowledge and attitudes constitute predisposing factors that can be modified through educational interventions, whereas family support, healthcare providers, and the availability of health services function as enabling and reinforcing factors that facilitate successful exclusive breastfeeding practices. Accordingly, improvements in maternal knowledge through health education are expected to be accompanied by more positive attitudes toward exclusive breastfeeding.

The conceptual framework of this study also incorporates the Health Belief Model (HBM), which suggests that individuals are more likely to adopt health-promoting behaviors when they perceive substantial benefits from the behavior, recognize the risks associated with not performing it, and believe in their own capability to carry out the recommended action. Within this context, health education is expected to enhance mothers' perceptions of the benefits of exclusive breastfeeding, reduce misconceptions regarding breastfeeding practices, and strengthen their confidence in exclusively breastfeeding their infants.

Previous research consistently demonstrates that health education positively influences maternal knowledge regarding exclusive breastfeeding. Educational interventions delivered through face-to-face counseling, health promotion sessions, audiovisual media, and digital platforms have been shown to improve mothers' understanding of breastfeeding benefits, appropriate breastfeeding techniques, and the importance of maintaining exclusive breastfeeding during the first six months of life. Nevertheless, the magnitude of knowledge improvement varies across studies depending on the educational approach, duration of the intervention, participants' educational background, and the intensity of follow-up support provided. Several studies have also reported that health education contributes to more favorable maternal attitudes toward exclusive breastfeeding. However, some findings indicate that increased knowledge does not necessarily result in corresponding improvements in attitudes or breastfeeding behaviors. These inconsistencies suggest that breastfeeding practices are influenced by multiple factors beyond knowledge alone, including family support, previous breastfeeding experience, maternal employment, sociocultural norms, and access to professional lactation counseling services.

Research conducted by Retno Dewi Prisusanti demonstrated that the effectiveness of health education is enhanced when educational materials are delivered interactively, supported by user-friendly educational media, and accompanied by continuous mentoring and evaluation. These findings indicate that improvements in knowledge and attitudes

depend not only on the educational content itself but also on the instructional methods employed, participants' active engagement, and the continuity of the educational process. This educational approach provides an important conceptual foundation for the present study in designing effective health education interventions on exclusive breastfeeding.

Drawing upon these theoretical perspectives and empirical findings, the present study assumes that health education is an effective intervention for improving maternal knowledge while simultaneously fostering positive attitudes toward exclusive breastfeeding. Enhanced understanding of breastfeeding benefits, breastfeeding techniques, and lactation management is expected to strengthen mothers' confidence and commitment to practicing exclusive breastfeeding according to international recommendations. Therefore, this study is expected to contribute additional scientific evidence regarding the effectiveness of health education as a health promotion strategy to increase exclusive breastfeeding coverage and improve maternal and child health outcomes.

3. Research Methods

This study employed a quantitative approach using a quasi-experimental design with a pretest–posttest control group framework. This design was selected to evaluate the effect of a health education intervention on changes in mothers' knowledge and attitudes regarding exclusive breastfeeding by comparing measurements obtained before (pretest) and after (posttest) the intervention in both the intervention and control groups. The pretest–posttest control group design provides an objective means of assessing the effectiveness of health education by examining changes attributable to the intervention (Creswell & Creswell, 2018; Polit & Beck, 2021).

The study was conducted at community health centers (Puskesmas) and integrated health service posts (Posyandu) within the designated study area between May and August 2026. The study population consisted of mothers with infants aged 0–6 months and pregnant women in their third trimester who attended maternal and child health services during the study period. A total of 60 participants were recruited using a consecutive sampling technique, whereby all eligible respondents were enrolled consecutively until the required sample size was achieved. Participants were subsequently allocated into an intervention group (n = 30) and a control group (n = 30).

Eligible participants were mothers who were able to read and write, agreed to participate in all stages of the study, attended the health education session, and provided written informed consent. Participants who were healthcare professionals, had received intensive lactation training within the previous six months, or failed to complete all study procedures were excluded from the final analysis.

The independent variable was the health education program on exclusive breastfeeding. The dependent variables included maternal knowledge regarding exclusive breastfeeding (Y_1) and maternal attitudes toward exclusive breastfeeding (Y_2). Participants in the intervention group received a structured health education program consisting of interactive lectures, group discussions, breastfeeding technique demonstrations, multimedia presentations, educational videos, and printed leaflets delivered in a single session lasting approximately 60 minutes. In contrast, participants in the control group received the routine educational services normally provided at the participating healthcare facilities. Data were collected using three structured questionnaires: a demographic characteristics questionnaire, a knowledge questionnaire on exclusive breastfeeding, and an attitude questionnaire measured using a Likert scale. The knowledge instrument assessed participants' understanding of breastfeeding benefits, breastfeeding techniques, the recommended duration of exclusive breastfeeding, lactation management, and common breastfeeding misconceptions. The attitude questionnaire evaluated mothers' beliefs, readiness, motivation, and commitment toward practicing exclusive breastfeeding. All participants completed the questionnaires before the intervention (pretest) and again seven days after the educational intervention (posttest) to assess changes in knowledge and attitudes.

Prior to data collection, the research instruments underwent content validity assessment by experts in midwifery, health promotion, and research methodology. All questionnaire items were considered relevant and appropriate based on expert evaluation. Reliability testing demonstrated excellent internal consistency, with Cronbach's alpha coefficients of 0.90 for the knowledge questionnaire and 0.92 for the attitude questionnaire, indicating that both instruments were reliable for use in this study.

Data analysis was performed using statistical software. Descriptive (univariate) analysis was used to summarize participants' demographic characteristics using means, standard deviations, frequencies, and percentages. Within-group differences in knowledge and attitude scores before and after the intervention were analyzed using paired-samples *t*-tests, while differences in score changes between the intervention and control groups were examined using independent-samples *t*-tests. To determine the independent effect of health

education after controlling for potential confounding variables, including maternal age, educational attainment, employment status, parity, and previous sources of breastfeeding information, multiple linear regression analysis was performed. Statistical significance was established at a two-tailed *p*-value of less than 0.05 ($\alpha = 0.05$) (Field, 2018).

The conceptual framework of this study proposes that health education on exclusive breastfeeding functions as the primary independent variable influencing maternal knowledge regarding the benefits, techniques, and management of exclusive breastfeeding. Enhanced knowledge is expected to promote more favorable maternal attitudes toward exclusive breastfeeding practices. Therefore, the health education intervention is conceptualized as the principal mechanism for producing cognitive and affective changes among study participants..

Conceptual Framework

Health Education on Exclusive Breastfeeding, Interactive lectures, Educational videos, Leaflets, Discussion and demonstrations. Dependent Variable (Y_1), Maternal Knowledge of Exclusive Breastfeeding, Dependent Variable (Y_2), Maternal Attitudes Toward Exclusive Breastfeeding Controlled Variables: Maternal age **,** Educational level **,** Occupation **,** Parity **,** Previous sources of information.

Description of the conceptual framework: The independent variable (X) in this study is a structured health education program on exclusive breastfeeding. The first dependent variable (Y_1) is mothers' knowledge of exclusive breastfeeding, while the second dependent variable (Y_2) is mothers' attitudes toward exclusive breastfeeding practices. The relationships among these variables were examined while accounting for potential confounding factors to provide a more comprehensive evaluation of the effect of the health education intervention on maternal knowledge and attitudes. The conceptual model assumes that participation in the structured educational program enhances mothers' knowledge of exclusive breastfeeding, which subsequently contributes to the development of more positive attitudes toward exclusive breastfeeding practices.

4. Results And Discussion

Data Collection Process

The study was conducted at community health centers (Puskesmas) and integrated health service posts (Posyandu) within the study area from May to August 2026. Prior to data collection, ethical approval was obtained from the Health Research Ethics Committee, and permission to conduct the study was granted by the head of each participating community health center. Written informed consent was obtained from all participants after they had received a detailed explanation of the study objectives, potential benefits, intervention procedures, and assurances regarding the confidentiality and anonymity of their personal information.

A total of 60 eligible mothers were enrolled using a consecutive sampling technique. Participants were subsequently assigned to either the intervention group (n = 30) or the control group (n = 30). The intervention group received a structured health education program on exclusive breastfeeding consisting of interactive lectures, group discussions, educational videos, breastfeeding technique demonstrations, and printed leaflets during a single session lasting approximately 60 minutes. In contrast, participants in the control group received the routine breastfeeding education provided as part of standard maternal and child health services at the participating community health centers.

Maternal knowledge and attitudes regarding exclusive breastfeeding were assessed at two time points: immediately before the intervention (pretest) and seven days after the intervention (posttest). Data were collected using standardized questionnaires that had previously demonstrated satisfactory validity and reliability. Following data collection, all questionnaires underwent data editing, coding, entry, and cleaning procedures before statistical analyses were performed using appropriate statistical software.

Participants' Characteristics

Tabel 1. Participants' Characteristics (n = 60).

Karakteristik	Intervensi (n=30)	Kontrol (n=30)
Usia (tahun), rerata ± SD	28,9 ± 4,6	29,2 ± 4,8
Pendidikan Menengah–Tinggi	24 (80,0%)	23 (76,7%)
Ibu Bekerja	11 (36,7%)	12 (40,0%)
Multipara	18 (60,0%)	17 (56,7%)
Pernah memperoleh informasi ASI	20 (66,7%)	19 (63,3%)

Source: 2026 Research Data.

As presented in Table 1, the baseline characteristics of participants were generally comparable between the intervention and control groups. No substantial differences were observed with respect to maternal age, educational attainment, employment status, parity, or

previous exposure to information on exclusive breastfeeding. These findings indicate that the two groups were relatively homogeneous at baseline, suggesting that they had comparable initial characteristics prior to the implementation of the health education intervention.

Changes in Maternal Knowledge

Table 2. Changes in Knowledge Scores Before and After the Intervention.

Group	Pretest	Posttest Score	Improvement	p-value*
Intervention	61.8 ± 8.4	87.6 ± 6.3	25.8 ± 7.2	<0.001
Control	62.4 ± 7.9	68.9 ± 7.1	6.5 ± 4.6	0.018

Uji paired t-test

Source: 2026 Research Data.

As shown in Table 2, knowledge scores increased in both the intervention and control groups following the study period. However, the magnitude of improvement was substantially greater among participants who received the structured health education intervention than among those who received routine education. The results of the paired-samples t-test demonstrated that the health education program produced a statistically significant improvement in maternal knowledge regarding exclusive breastfeeding ($p < 0.001$).

Changes in Maternal Attitudes Toward Exclusive Breastfeeding

Table 3. Changes in Attitude Scores Before and After the Intervention.

Group	Pretest	Posttest Score	Improvement	p-value*
Intervention	65.4 ± 7.1	88.2 ± 5.8	22.8 ± 6.1	<0.001
Control	66.0 ± 6.8	71.5 ± 6.7	5.5 ± 4.4	0.022

Source: 2026 Research Data.

Uji paired t-test

As presented in Table 3, maternal attitudes toward exclusive breastfeeding improved in both study groups after the intervention. Nevertheless, the intervention group exhibited a markedly greater increase in attitude scores than the control group. These findings suggest that the structured health education program was effective not only in enhancing maternal knowledge but also in fostering more positive attitudes toward exclusive breastfeeding practices.

Comparison of Intervention Effectiveness Between Groups

Table 4. Independent-Samples t-Test Results for Changes in Knowledge and Attitude Scores.

Variable	Mean Difference	95% CI	p-value
Knowledge	19.3	15.7–22.9	<0.001
Attitude	17.3	13.8–20.8	<0.001

Source: 2026 Research Data.

The results of the independent-samples t-test revealed statistically significant differences in the improvements of both knowledge and attitude scores between the intervention and control groups ($p < 0.001$). Participants who received the structured health education intervention demonstrated significantly greater improvements than those who received routine health education. These findings indicate that the educational intervention was more effective than standard educational services in enhancing maternal knowledge and promoting positive attitudes toward exclusive breastfeeding.

Multiple Linear Regression Analysis

Table 5. Factors Associated with Improvements in Maternal Knowledge and Attitudes.

Variable	β	t	p-value
Health Education	0.73	7.21	<0.001
Maternal Education Level	0.18	1.87	0.066
Parity	0.11	1.08	0.285
Previous Information	0.24	2.42	0.019

$R^2 = 0{,}66$

Source: 2026 Research Data.

Multiple linear regression analysis identified the health education intervention as the strongest predictor of improvements in maternal knowledge and attitudes ($\beta = 0.73$, $p < 0.001$). The model explained 66% of the variance in changes in participants' knowledge and attitude scores ($R^2 = 0.66$), indicating a substantial explanatory power after adjusting for potential confounding variables. These findings suggest that the structured health education

program made a significant independent contribution to improving mothers' knowledge and attitudes regarding exclusive breastfeeding.

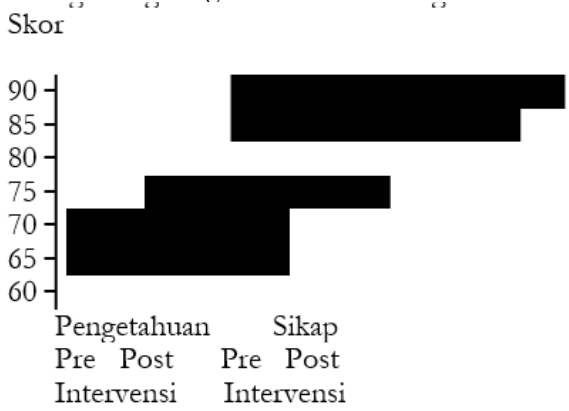

Figure 1. Mean Changes in Knowledge and Attitude Scores.
Source: 2026 Research Data.

Figure 1, both knowledge and attitude scores increased noticeably following the implementation of the health education intervention. The graphical presentation supports the statistical findings by demonstrating clear improvements in participants' cognitive understanding and affective responses toward exclusive breastfeeding. Overall, the visualization reinforces the effectiveness of the educational intervention in promoting favorable changes in both knowledge and attitudes.

Interpretation of the Findings

The findings of this study demonstrate that the structured health education intervention significantly improved mothers' knowledge and attitudes regarding exclusive breastfeeding. The observed increase in knowledge is likely attributable to participants receiving comprehensive and systematic information on the benefits of exclusive breastfeeding, appropriate breastfeeding techniques, and effective lactation management. Furthermore, the improvement in maternal attitudes suggests that enhanced understanding strengthened mothers' confidence and commitment to practicing exclusive breastfeeding in accordance with established recommendations. These findings support the theoretical perspectives of the Health Belief Model (HBM) and the PRECEDE–PROCEED Model, both of which emphasize that increased knowledge serves as a predisposing factor capable of influencing attitudes and, ultimately, health-related behaviors. The interactive educational approach adopted in this study, incorporating multiple teaching methods and educational media, provided participants with opportunities to engage actively with the learning materials. This interactive process likely facilitated a deeper understanding of exclusive breastfeeding and contributed to the development of more positive attitudes toward breastfeeding practices.

The results are consistent with previous studies reporting that health education effectively enhances maternal knowledge of exclusive breastfeeding. Moreover, the present study demonstrates that improvements in knowledge were accompanied by significant positive changes in maternal attitudes. This finding provides further empirical support for the role of health education as an effective health promotion strategy for strengthening exclusive breastfeeding programs and improving maternal and child health outcomes.

Implications of the Study

From a theoretical perspective, the findings reinforce existing evidence that health education is an effective intervention for enhancing cognitive understanding and fostering positive attitudes toward health-promoting behaviors, particularly exclusive breastfeeding. The study also supports established behavioral theories that identify knowledge and attitudes as essential determinants of behavioral change.

From a practical perspective, the findings suggest that healthcare professionals, particularly midwives, nurses, and health promotion practitioners, should integrate structured and interactive health education into antenatal care, postnatal care, and community-based maternal and child health services such as Posyandu. The use of engaging educational media, individualized counseling, practical breastfeeding demonstrations, and active family involvement may further improve the effectiveness of educational interventions. Implementing these strategies is expected to increase exclusive breastfeeding coverage and contribute to the achievement of national and global maternal and child health targets.

The findings of this study indicate that the structured health education intervention had a significant positive effect on improving mothers' knowledge regarding exclusive breastfeeding. Mothers who participated in the intervention demonstrated a substantial increase in their knowledge scores following the educational session, whereas only modest

improvements were observed among participants in the control group. These findings suggest that well-organized, systematic, and needs-based educational programs effectively enhance maternal understanding of the benefits of exclusive breastfeeding, appropriate breastfeeding techniques, recommended breastfeeding duration, and lactation management. This evidence supports the role of health education as an effective health promotion strategy for improving maternal health literacy within primary healthcare settings (World Health Organization [WHO], 2023).

The observed improvement in maternal knowledge can be interpreted through cognitive learning theory, which proposes that new information is more effectively acquired when presented in a structured manner, supported by engaging educational media, and reinforced through active interaction between educators and learners. In the present study, the combination of interactive lectures, group discussions, educational videos, breastfeeding demonstrations, and printed educational materials created a comprehensive learning environment that facilitated participants' understanding of exclusive breastfeeding. Furthermore, Notoatmodjo's Health Behavior Theory identifies knowledge as a predisposing factor that forms the foundation of health-related behavior. Consequently, increasing maternal knowledge is expected to support informed decision-making and encourage adherence to recommended exclusive breastfeeding practices (Notoatmodjo, 2018).

In addition to improving knowledge, the intervention produced significant positive changes in maternal attitudes toward exclusive breastfeeding. Participants reported greater confidence in the benefits of breastfeeding, stronger intentions to exclusively breastfeed for the first six months of life, and increased commitment to maintaining breastfeeding despite potential challenges. These findings are consistent with the Theory of Planned Behavior, which suggests that favorable attitudes strengthen behavioral intentions when supported by positive beliefs and perceived social approval (Ajzen, 2020). Improved attitudes are therefore likely to increase mothers' willingness to initiate and sustain exclusive breastfeeding. The multiple linear regression analysis further demonstrated that health education was the strongest predictor of improvements in maternal knowledge and attitudes after controlling for maternal education, parity, and previous exposure to breastfeeding information. This finding indicates that the educational intervention exerted a greater influence on the study outcomes than participants' baseline demographic characteristics. The effectiveness of the intervention is likely attributable to the quality of the educational content, the use of interactive teaching methods, and the active participation of mothers throughout the learning process. These components appear to play a central role in promoting both cognitive and affective changes among participants.

The present findings also support the Health Belief Model (HBM), which proposes that individuals are more likely to adopt health-promoting behaviors when they recognize the benefits of the recommended action, understand the potential consequences of failing to perform it, and believe in their ability to carry out the behavior successfully. The health education program implemented in this study likely strengthened mothers' perceptions of the benefits of exclusive breastfeeding while correcting common misconceptions that often discourage successful breastfeeding. By increasing both perceived benefits and self-confidence, the intervention enhanced mothers' readiness to practice exclusive breastfeeding in accordance with established recommendations (Green & Kreuter, 2015).

The results are consistent with previous studies reporting that health education effectively improves maternal knowledge and attitudes toward exclusive breastfeeding. However, this study contributes additional evidence by employing a quasi-experimental pretest–posttest control group design, which enables direct comparison between the intervention and control groups. Compared with observational studies, this methodological approach provides stronger evidence for evaluating the effectiveness of educational interventions and strengthens the internal validity of the study findings.

Previous research conducted by Retno Dewi Prisusanti demonstrated that the effectiveness of health education depends not only on the educational content but also on the methods of delivery, the use of engaging educational media, participant involvement, and continuous follow-up support. The findings of the present study are consistent with this perspective, as the combination of interactive lectures, audiovisual materials, practical demonstrations, and group discussions successfully improved maternal knowledge while simultaneously fostering more positive attitudes toward exclusive breastfeeding. These findings suggest that participatory educational approaches are more effective in promoting meaningful behavioral change than traditional one-way health education.

Although the intervention significantly improved maternal knowledge and attitudes, actual breastfeeding practices are influenced by a broader range of factors beyond educational exposure alone. Family support, particularly from husbands, successful early initiation of breastfeeding, previous breastfeeding experience, maternal employment,

sociocultural beliefs, and access to professional lactation counseling all contribute to the continuation of exclusive breastfeeding. Therefore, health education should be integrated with ongoing breastfeeding support, family-centered interventions, and breastfeeding-friendly healthcare policies to ensure that improvements in knowledge and attitudes translate into sustained breastfeeding behavior. Future research should evaluate the long-term effectiveness of health education by monitoring exclusive breastfeeding practices throughout the first six months postpartum using randomized controlled trial designs with larger sample sizes to provide more robust evidence for policy and clinical practice (Polit & Beck, 2021; WHO, 2023).

5. Conclusion and Recommendations

findings of this study demonstrate that the structured health education intervention had a significant positive effect on improving mothers' knowledge and attitudes regarding exclusive breastfeeding. Participants who received the educational intervention showed substantially greater improvements in both knowledge and attitude scores than those in the control group, and these differences were statistically significant. Furthermore, multivariable analysis identified health education as the strongest independent predictor of changes in maternal knowledge and attitudes after adjusting for potential confounding variables, including educational attainment, parity, and previous sources of breastfeeding information. These findings indicate that the study objective—to examine the effect of health education on mothers' knowledge and attitudes toward exclusive breastfeeding—was successfully achieved, and the research hypothesis was supported by the empirical evidence generated through this investigation. Nevertheless, the findings should be interpreted with appropriate caution because maternal knowledge and attitudes represent behavioral determinants that are influenced by multiple interacting factors. Husband and family support, previous breastfeeding experience, socioeconomic conditions, educational background, cultural beliefs, access to reliable health information, and the quality of lactation counseling services may all influence mothers' breastfeeding decisions and practices. Therefore, the results should not be generalized to other populations or healthcare settings without considering differences in demographic characteristics, sociocultural contexts, and health service delivery systems.

Based on the findings, structured health education may be recommended as an effective health promotion strategy for improving maternal knowledge and fostering positive attitudes toward exclusive breastfeeding. Educational interventions should be implemented in a systematic, interactive, and continuous manner using diverse instructional approaches, including educational videos, printed leaflets, practical breastfeeding demonstrations, and individualized counseling. In addition, greater involvement of husbands, family members, community health volunteers, and healthcare professionals is recommended to reinforce educational messages and facilitate the consistent application of exclusive breastfeeding practices in everyday life. Such collaborative efforts have the potential to increase exclusive breastfeeding coverage and improve maternal and child health outcomes.

Several limitations should be acknowledged when interpreting the findings of this study. First, the relatively small sample size and the inclusion of participants from only one community health center service area limit the external validity and generalizability of the results. Second, the short follow-up period allowed the study to evaluate only immediate changes in maternal knowledge and attitudes following the intervention, without assessing the sustainability of behavioral changes or the continuation of exclusive breastfeeding until six months postpartum. Finally, this study did not examine other influential determinants, such as family support, successful early initiation of breastfeeding, maternal employment, or psychosocial factors, all of which may substantially affect breastfeeding practices.

Future studies are encouraged to employ randomized controlled trial designs involving larger sample sizes and multiple healthcare facilities to strengthen the external validity of the findings. Longitudinal follow-up should also be incorporated to evaluate the long-term effects of health education on exclusive breastfeeding practices throughout the recommended six-month period. In addition, future research should compare the effectiveness of various educational strategies, including digital health interventions, mobile health technologies, and family-centered counseling approaches. Generating stronger scientific evidence in these areas will provide valuable guidance for policymakers and healthcare professionals in developing more effective health promotion programs aimed at increasing exclusive breastfeeding rates and improving maternal and child health in Indonesia.

Acknowledgments

The authors would like to express their sincere gratitude to all individuals and institutions whose invaluable support, collaboration, and contributions made this research possible. Their assistance throughout the planning, implementation, data collection, statistical analysis, and manuscript preparation was instrumental in the successful completion of this study.

The authors are particularly grateful to their affiliated institution for providing academic guidance, institutional support, and the opportunity to conduct this research. Special appreciation is also extended to the directors of the participating community health centers (Puskesmas), coordinating midwives, health promotion officers, Posyandu volunteers, and all healthcare personnel who granted research permission, facilitated field coordination, supported the implementation of the health education program, and assisted with participant recruitment and data collection. Their commitment and cooperation greatly contributed to the smooth execution of every stage of the study.

The authors also wish to thank all mothers who voluntarily participated in this research. Their willingness to complete the baseline questionnaires, attend the health education sessions on exclusive breastfeeding, actively participate in discussions and practical demonstrations, and complete the post-intervention evaluation was essential to the success of this study. Appreciation is likewise extended to the participants' family members for their encouragement and support throughout the research process.

The authors sincerely acknowledge the valuable guidance provided by academic supervisors, peer reviewers, experts in midwifery, health promotion specialists, and professional colleagues. Their constructive comments, critical feedback, and scholarly recommendations significantly enhanced the methodological rigor of the study, strengthened the statistical analyses, improved the interpretation of the findings, and contributed to the overall quality of the manuscript in accordance with international standards for scientific publication.

If this study received financial support from governmental agencies, universities, professional organizations, or other funding institutions, the authors gratefully acknowledge their generous support. Such funding facilitated all phases of the research, including instrument development, implementation of the health education intervention, data collection, statistical analysis, and manuscript preparation. The content of this publication, including the analyses, interpretations, conclusions, and recommendations, is solely the responsibility of the authors and does not necessarily reflect the official views of the funding organizations.

This article is derived from the research project entitled "The Effect of Health Education on Mothers' Knowledge and Attitudes Regarding Exclusive Breastfeeding." If the manuscript forms part of a thesis, dissertation, conference proceeding, or funded research project, it represents an integral component of that academic work. The authors hope that the findings will contribute to the advancement of knowledge in midwifery, health promotion, and public health, while serving as a valuable reference for healthcare professionals and policymakers in developing more effective educational strategies to improve exclusive breastfeeding practices in Indonesia.

References

Ajzen, I. (2020). The theory of planned behavior: Frequently asked questions. *Human Behavior and Emerging Technologies, 2*(4), 314–324. https://doi.org/10.1002/hbe2.195

Creswell, J. W., & Creswell, J. D. (2018). *Research design: Qualitative, quantitative, and mixed methods approaches* (5th ed.). SAGE Publications.

Field, A. (2018). *Discovering statistics using IBM SPSS Statistics* (5th ed.). SAGE Publications.

Green, L. W., & Kreuter, M. W. (2015). *Health program planning: An educational and ecological approach* (4th ed.). McGraw-Hill Education.

Kementerian Kesehatan Republik Indonesia. (2023a). *Pedoman pelayanan kesehatan ibu dan anak*. Direktorat Jenderal Kesehatan Masyarakat.

Kementerian Kesehatan Republik Indonesia. (2023b). *Profil Kesehatan Indonesia tahun 2023*. Kementerian Kesehatan Republik Indonesia.

Notoatmodjo, S. (2018). *Promosi kesehatan dan perilaku kesehatan* (Edisi revisi). Rineka Cipta.

Polit, D. F., & Beck, C. T. (2021). *Nursing research: Generating and assessing evidence for nursing practice* (11th ed.). Wolters Kluwer.

Prisusanti, R. D. (2021). *Metodologi penelitian di berbagai bidang*. Media Sains Indonesia.

Prisusanti, R. D. (2026). Pepe leaf extract (*Gymnema sylvestre*) to reduce blood glucose levels in pregnant women. *Malahayati International Journal of Nursing and Health Science, 8*(11). https://doi.org/10.33024/minh.v8i11.1581

Prisusanti, R. D., & Nurlaeli, F. (2025). The effect of cassava leaf (*Manihot esculenta*) therapy on hemoglobin levels in pregnant women with second trimester anemia. *Antigen: Jurnal Ilmiah Kesehatan*.

United Nations Children's Fund. (2023). *The state of the world's children 2023: For every child, nutrition*. UNICEF.

Victora, C. G., Bahl, R., Barros, A. J. D., França, G. V. A., Horton, S., Krasevec, J., Murch, S., Sankar, M. J., Walker, N., & Rollins, N. C. (2016). Breastfeeding in the 21st century: Epidemiology, mechanisms, and lifelong effect. *The Lancet, 387*(10017), 475–490. https://doi.org/10.1016/S0140-6736(15)01024-7

World Health Organization, & United Nations Children's Fund. (2023). *Protecting, promoting and supporting breastfeeding in facilities providing maternity and newborn services: Guideline implementation update*. World Health Organization.

World Health Organization. (2023). *Infant and young child feeding*. World Health Organization.