

The effectiveness of booklet-based health education on exclusive breastfeeding knowledge among pregnant women

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Abstract

In 2021, data from Lambunu I Primary Health Center showed that only 62.3% of infants under six months of age received exclusive breastfeeding. This coverage remains below the national target of 100%. Improving maternal knowledge during pregnancy is essential to increasing exclusive breastfeeding practices. This study aimed to examine the effect of booklet-based breastfeeding education on pregnant women's knowledge of exclusive breastfeeding in the service area of Lambunu I Primary Health Center, Bolano District, Parigi Moutong Regency. A quasi-experimental study design was employed. The study population consisted of 140 pregnant women attending Lambunu I Primary Health Center. A total of 45 respondents were selected using purposive sampling. Data were collected using a structured questionnaire. Univariate and bivariate analyses were conducted, with the Wilcoxon signed-rank test used to assess changes in knowledge before and after the intervention. Prior to the intervention, most pregnant women demonstrated moderate knowledge of exclusive breastfeeding (48.9%), while 26.7% had poor knowledge and only 24.4% had good knowledge. Post-intervention analysis showed a statistically significant improvement in knowledge following booklet-based education, with a Wilcoxon test p-value of 0.000 ($p < 0.05$). Booklet-based breastfeeding education significantly improved pregnant women's knowledge of exclusive breastfeeding in the Lambunu I Primary Health Center area. Lambunu I Primary Health Center is encouraged to adopt breastfeeding booklets as an educational tool for midwives in providing antenatal education to pregnant women and the wider community to increase exclusive breastfeeding coverage.

Keywords: Breastfeeding; Pregnancy; Health Education; Booklet-based

1. Introduction

Human breast milk is an essential nutrition for infants during the first six months of life and can continues after six months. Human breast milk contains nutrients that are critical for infant growth and also provides protective factors against infections. Exclusive breastfeeding during the first six months can supply key nutrients that support optimal growth and developmental processes(1).

The United Nations International Children's Emergency Fund (UNICEF) recommends that infants be exclusively breastfed for at least the first six months of life, with continued up to two years of age. According to data from the World Health Organization (WHO), Indonesia coverage of exclusive breastfeeding was rising from 52% in 2017 to 66.4% in 2024. Despite this progress, the coverage remains uneven across regions and has not yet achieved universal adherence to global recommendations(2).

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Awareness and implementation of optimal infant feeding practices remains suboptimal in many settings. Empirical evidence indicates that complementary foods such as porridge, sugar solutions, infant formula, and fruit pures, are frequently introduced earlier than recommended. WHO defines exclusive breastfeeding as the practice of providing infants with only breast milk, without any additional foods or liquids, from birth until six months of age. Early introduction of complementary feeding may compromise nutritional adequacy and increase the risk of infections and growth disturbances(3).

Multiple factors contribute to suboptimal breastfeeding practices. These include both infant and maternal related conditions, such as delayed initiation of breastfeeding, maternal lack of experience, parity, maternal age, absence of family support, insufficient knowledge, and suboptimal feeding behaviours. In addition, sociocultural norms and health facility policies that inadequately support lactation have been identified as significant barriers to successful exclusive breastfeeding(4, 5).

Maternal knowledge during pregnancy plays a pivotal role in shaping breastfeeding intentions and practices. Pregnant women who receive adequate, accurate, and timely information about exclusive breastfeeding are more likely to initiate breastfeeding early and sustain exclusive breastfeeding practices postpartum. Conversely, limited access to evidence based education during antenatal care can perpetuate misconceptions and negatively influence feeding decisions after birth(6, 7).

Health education interventions have been widely recognised as effective strategies to improve maternal knowledge and attitudes towards exclusive breastfeeding. Among various educational approaches, printed educational materials such as booklets offer several advantages, including standardized messaging, ease of use, and the ability to reinforce verbal counselling. Booklets can be reviewed repeatedly by pregnant women and shared with family members, thereby extending the reach of health education beyond clinical encounters(8, 9).

In primary healthcare settings, midwives play a central role in delivering breastfeeding education during antenatal care. Strengthening midwives' capacity to provide structured and accessible educational materials may contribute to improved maternal knowledge and support informed decisionmaking related to infant feeding practices(10). Therefore, this study aims to determine the effect of breastfeeding education using an educational booklet on pregnant women's knowledge of exclusive breastfeeding.

2. Material and methods

This study employed a quantitative approach using a quasi-experimental design with a one group pre-test and post-test. The study was conducted at Lambunu I Primary Healthcare Centre (Puskesmas Lambunu I), located in Bolano District, Parigi Moutong Regency, Indonesia. This facility serves as a primary point of maternal health services for the surrounding community. Sample size determination was calculated using the Lemeshow formula with a 95% confidence level, resulting in a minimum required sample of 45 respondents. Participants were selected using purposive sampling based on predefined inclusion and exclusion criteria. Inclusion criteria included pregnant women who provided informed consent and were experiencing their first pregnancy. Exclusion criteria comprised pregnant women with breast complications and those who relocated during the study period.

Baseline data were collected through a pre-test using a structured questionnaire to assessing knowledge of exclusive breastfeeding. Respondents were given approximately 30 minutes to complete the questionnaire. Following the pre-test, participants received a structured health education session on exclusive breastfeeding delivered using a booklet. The counselling session covered key topics including the definition, benefits, objectives, and recommended duration of exclusive breastfeeding. After completion of the educational intervention, a post test was administered using the same questionnaire as the pre-test to assess changes in participants' knowledge. The use of identical instruments before and after the intervention allowed for direct comparison of knowledge levels and evaluation of the effect of the booklet-based education.

Univariate analysis was performed to present frequency distributions and percentages. Bivariate analysis was conducted to examine the effect of the educational intervention using Wilcoxon test.

3. Results and Discussion

3.1. Characteristics of Respondents

Characteristics of Pregnant Women Regarding Knowledge of Exclusive Breastfeeding at Lambunu I Primary Healthcare Centre, Bolano District, Parigi Moutong Regency.

Table 1 Distribution of Respondents by Age and Educational Level

Characteristics	frequencies (n = 45)	percentage (%)
Age		
≤ 20 years	5	11.1
21-35 years	38	84.4
> 35 years	2	4.5
Educational level		
Primary	22	48.9
Secondary	16	35.6
Higher	7	15.5

Table 1 presents the distribution of respondents by age and educational level. The majority of pregnant women were aged 21 – 35 years (84.4%), representing the optimal reproductive age group. A smaller proportion of respondents were aged ≤20 years (11.1%), while only 4.5% were aged >35 years.

In terms of Indonesian educational attainment, primary education (48.9%) refers to respondents who completed elementary school and/or junior secondary school. Secondary education (35.6%) includes respondents who completed senior high school or vocational high school. Meanwhile, higher education (15.5%) represents respondents who attained tertiary-level education, such as a diploma, bachelor's degree, or higher.

Overall, the findings indicate that most respondents had low to moderate educational levels, which may affect baseline knowledge and comprehension of exclusive breastfeeding information. This distribution underscores the importance of using simple, structured, and accessible educational media, such as booklets, to ensure effective knowledge transfer during antenatal care.

Table 2 Distribution of Pregnant Women's Knowledge Before and After Intervention

Variable	Before intervention		After Intervention	
	f (n = 45)	%	f (n = 45)	%
Level of Knowledge				
Poor	12	26.7	0	0
Moderate	22	48.9	0	0
Good	11	24.4	45	100

Table 2 illustrates the distribution of pregnant women's knowledge regarding exclusive breastfeeding before and after the booklet-based educational intervention. Prior to the intervention, the majority of respondents demonstrated moderate knowledge (48.9%), followed by those with poor knowledge (26.7%). Only 24.4% of pregnant women were classified as having good knowledge before receiving the educational booklet.

Following the intervention, a marked improvement in knowledge levels was observed. All respondents (100%) achieved a good level of knowledge, while no participants remained in the poor or moderate categories. This shift

indicates a substantial increase in understanding of exclusive breastfeeding concepts after exposure to the educational booklet.

3.2. Comparison of Mean Knowledge Scores Before and After the Intervention

Table 3 Distribution of Mean Knowledge Scores Before and After Exclusive Breastfeeding Education among Pregnant Women

	n	mean	median	modus	minimum	maximum	p-value
Pre test	45	9.87	9.00	9	5	14	0.019
Post test	45	13.87	14.00	14	12	15	0.000

Table 3 presents the distribution of mean knowledge scores of pregnant women before and after receiving exclusive breastfeeding education using a booklet. Prior to the intervention, the mean pre-test knowledge score was 9.87, with a median of 9.00 and a mode of 9, indicating that most respondents had moderate to low baseline knowledge. The minimum and maximum scores ranged from 5 to 14, reflecting considerable variability in initial understanding of exclusive breastfeeding.

Following the educational intervention, a substantial improvement in knowledge was observed. The mean post-test score increased to 13.87, with a median and mode of 14, suggesting that the majority of participants achieved a high level of knowledge after the intervention. The post-test scores showed a narrower range (12 to 15). This upward shift across all central tendency measures indicates not only an overall improvement but also a more homogeneous distribution of higher knowledge scores after the intervention.

Bivariate analysis using the Wilcoxon signed-rank test demonstrated a statistically significant difference between pre-test and post-test knowledge scores ($p < 0.001$), confirming that the booklet-based breastfeeding education effectively improved pregnant women's knowledge of exclusive breastfeeding.

Table 4 Effectiveness of Booklet-Based Breastfeeding Education on Pregnant Women's Knowledge of Exclusive Breastfeeding

	Rank	N	Mean Rank	Sum of Rank	p value
Pre-test – post-test	Negative rank	33	17.00	561.00	0.000
	Positive rank	0	0.00	0.00	
	Ties	12			
	Total	45			

Table 4 presents the results of the Wilcoxon signed rank test assessing the effectiveness of booklet-based breastfeeding education on pregnant women's knowledge of exclusive breastfeeding. The analysis shows that 33 respondents experienced an increase in knowledge scores after the intervention, as indicated by the negative ranks (pre-test < post-test), with a mean rank of 17.00 and a total rank sum of 561.00. No respondents demonstrated a decrease in knowledge scores following the intervention, as reflected by the absence of positive ranks.

Additionally, 12 respondents showed no change in their knowledge scores between the pre-test and post-test measurements (ties). The overall test result yielded a p value of 0.000 ($p < 0.05$), indicating a statistically significant difference between pre-test and post-test knowledge levels.

The Wilcoxon signed-rank test confirms that the booklet based educational intervention had a significant positive effect on pregnant women's knowledge of exclusive breastfeeding. The absence of positive ranks suggests that no participant experienced a decline in knowledge, reinforcing the consistency and effectiveness of the educational material. The presence of ties may reflect participants who already possessed relatively high baseline knowledge prior to the intervention.

Overall, these findings demonstrate that booklet-based health education is an effective and reliable strategy for improving maternal knowledge during pregnancy, particularly in primary healthcare settings where structured and repeatable educational tools are needed.

4. Discussion

This study demonstrates that booklet-based health education significantly improves pregnant women's knowledge of exclusive breastfeeding. The statistically significant increase in mean knowledge scores, supported by Wilcoxon signed rank test results, indicates that structured educational interventions delivered during antenatal care can effectively strengthen maternal understanding of optimal infant feeding practices. These findings are particularly relevant in primary healthcare settings where midwives serve as the main providers of maternal and child health education.

4.1. Knowledge as a Foundation for Behaviour Change

From a behavioural science perspective, knowledge is a critical precursor to health related behaviour change. According to the Health Belief Model (HBM), individuals are more likely to adopt recommended health behaviours when they understand the benefits and risks associated with those behaviours. In the context of breastfeeding, increased knowledge regarding the benefits of exclusive breastfeeding, appropriate duration, and potential risks of early complementary feeding enhances perceived benefits and reduces perceived barriers. The significant improvement in knowledge observed in this study suggests that the booklet intervention effectively addressed these cognitive components(11).

Similarly, the Theory of Planned Behavior (TPB) posits that knowledge influences attitudes, subjective norms, and perceived behavioural control, which together shape behavioural intention(12). By providing clear, standardized, and evidence-based information, the booklet likely contributed to more favourable attitudes towards exclusive breastfeeding and increased women's confidence in their ability to practice it. Although this study focused on knowledge outcomes, previous research has shown that improved knowledge during pregnancy is strongly associated with breastfeeding intention and subsequent breastfeeding behaviour(13).

4.2. Effectiveness of Printed Educational Materials

The findings align with existing literature indicating that printed educational materials, such as booklets, are effective tools for maternal health education when appropriately designed and integrated into routine care. Booklets offer several advantages such as reinforce verbal counselling, allow repeated exposure to information, and can be shared with family members, thereby extending the educational impact beyond the clinical encounter(14).

Studies conducted in low and middle income countries have shown that educational materials combined with interpersonal counselling significantly improve maternal knowledge and breastfeeding outcomes(8). In Indonesia and similar contexts, where time constraints during antenatal visits may limit in depth counselling, booklets serve as a practical and sustainable complement to midwife led education. The universal improvement in knowledge scores observed in the post-intervention phase of this study underscores the potential of booklets to standardize key breastfeeding messages and reduce misinformation(15).

4.3. Role of Midwives in Antenatal Breastfeeding Education

Midwives play a central role in shaping maternal knowledge and attitudes toward breastfeeding. Antenatal care is a critical window for intervention, as beliefs and intentions related to infant feeding are often formed during pregnancy(6). Strengthening midwives' educational tools enhances their capacity to deliver consistent, rights based, and woman-centred counselling.

The results of this study support evidence that midwife led education, when supported by structured materials, leads to meaningful improvements in maternal knowledge. Previous studies have reported that women who receive breastfeeding education from skilled health professionals during pregnancy are more likely to initiate breastfeeding early and maintain exclusive breastfeeding for longer durations(9). The booklet used in this study likely facilitated clearer communication, reduced variability in counselling quality, and supported midwives in addressing common misconceptions.

4.4. Addressing Persistent Barriers to Exclusive Breastfeeding

Despite global and national recommendations, exclusive breastfeeding rates remain suboptimal in many settings. Knowledge gaps, cultural beliefs, family influence, and exposure to formula marketing continue to undermine optimal

feeding practices(16). The baseline findings in this study, where a substantial proportion of pregnant women demonstrated poor to moderate knowledge prior to intervention, reflect these broader challenges.

By significantly improving knowledge levels, the booklet-based intervention may contribute to addressing one of the modifiable determinants of suboptimal breastfeeding practices. However, knowledge alone is not sufficient to guarantee behaviour change. The Social Cognitive Theory emphasizes the interaction between personal factors, environmental influences, and behavioural capability(17). While this study focused on cognitive outcomes, integrating educational interventions with family involvement, community support, and supportive health system policies is essential to translate knowledge gains into sustained breastfeeding behaviour.

4.5. Implications for Health Systems and Policy

The findings have important implications for maternal and child health programmes, particularly in primary healthcare settings. Integrating standardized breastfeeding booklets into routine antenatal care can serve as a cost-effective strategy to improve maternal knowledge at scale. This approach aligns with WHO and UNICEF recommendations that emphasize the importance of antenatal breastfeeding education as part of comprehensive breastfeeding support(18).

Moreover, the use of printed educational materials can help reduce inequities in information access, especially in rural or resource with limited settings. For health systems aiming to improve exclusive breastfeeding coverage, strengthening educational components within antenatal care should be accompanied by supportive postnatal follow up, Baby Friendly Hospital Initiative (BFHI) implementation, and protection against inappropriate marketing of breastmilk substitutes.

5. Conclusion

In conclusion, this study provides strong evidence that booklet-based breastfeeding education delivered during pregnancy significantly improves women's knowledge of exclusive breastfeeding. Grounded in behavioural change theory and supported by international literature, the findings highlight the value of structured educational tools in strengthening antenatal care services. Enhancing maternal knowledge is a critical step toward empowering women to make informed infant feeding decisions and improving exclusive breastfeeding outcomes at the population level.

Compliance with ethical standards

Disclosure of conflict of interest

The authors declare that there are no conflicts of interest or competing interests associated with the publication of this manuscript. Each author confirms that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest. No institution, product, or organization mentioned in this manuscript influenced the study design, data collection, analysis, interpretation of results, or the decision to publish the findings.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study prior to their participation. Participants were informed about the study objectives, procedures, potential benefits, and their right to withdraw at any time without any consequences.

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