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THE EFFECTIVENESS OF A BROCHURE-BASED BREASTFEEDING EDUCATION PROGRAM ON THE BEHAVIOR OF MOTHERS OF INFANTS AGED 0–6 MONTHS

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ABSTRACT

The low rate of exclusive breastfeeding in Tuban Regency reflects a fundamental gap between mothers' theoretical knowledge and practical skills in applying proper breastfeeding techniques. Limited access to structured health education is one of the key factors hindering the success of optimal breastfeeding practices. This study aims to analyze the effect of breastfeeding technique education using booklets on improving breastfeeding behavior among mothers with infants aged 0–6 months at the Plumpang Community Health Center, Tuban Regency. Methodologically, this quantitative study employed a *one-group pretest-posttest quasi-experimental* design involving 32 mothers recruited through *total sampling*. Behavioral measurements were collected using a structured questionnaire before and after the intervention, and the data were analyzed with *the Wilcoxon Signed-Rank Test* to assess the significance of behavioral changes. The results of the analysis showed a significant improvement in breastfeeding behavior, where the predominance of "adequate" and "inadequate" behavior before the intervention shifted to a majority falling into the "good" category at 90.6% after the intervention ($Z = -5.160$; $p < 0.001$) with effect of ($r = 0.91$). These scientifically prove that booklets are effective in improving information retention, technical understanding, and mothers' self-efficacy. In practical terms, the use of this concise and structured visual educational medium is recommended as a standard health promotion tool in Strengthening a continuous lactation education program from the antenatal to the postnatal period is crucial for enhancing mothers' psychomotor skills, extending the duration of breastfeeding, and supporting the widespread achievement of exclusive breastfeeding targets.

Keywords

Breastfeeding education, booklet, breastfeeding behavior, exclusive, health promotion.

INTRODUCTION

Exclusive breastfeeding for the first six months of life is the gold standard of infant nutrition and plays a crucial role in supporting an infant's growth, development, and immune system function (World Health Organization, 2022). Breast milk has dynamic biological characteristics that change according to the stage of lactation and can adapt to the infant's physiological needs. Colostrum, produced during the early phase of lactation, contains immunoglobulins and protective factors that play a vital role in the development of the infant's immune system, while transitional and mature breast milk provide balanced nutrition tailored to the infant's energy and growth needs (Victora et al., 2023).

Exclusive breastfeeding provides both short-term and long-term benefits for infants and mothers. For infants, exclusive breastfeeding helps reduce the risk of gastrointestinal infections, respiratory tract infections, and lowers the risk of obesity and metabolic diseases in adulthood (Victora et al., 2023). Meanwhile, for mothers, breastfeeding contributes to postpartum recovery and reduces the risk of breast and ovarian cancer, making breastfeeding an important part of efforts to promote women's reproductive health (Herman et al., 2021).

Although national and global targets for exclusive breastfeeding have been set, progress at the primary health care level often faces local obstacles. At the Plumpang Community Health Center in Tuban Regency, exclusive breastfeeding coverage remains below the national target, ranging between 45–50%. The main issue underlying this phenomenon is the high risk of early cessation of exclusive breastfeeding caused by mothers' limited knowledge and practical skills regarding proper breastfeeding techniques, particularly regarding suboptimal positioning and latching.

Based on a literature review, breastfeeding education interventions have been widely implemented through conventional methods such as face-to-face lectures, individual counseling, and hands-on demonstrations. However, there is a fundamental research gap: verbal and conventional educational interventions are often not sustained due to limited postpartum memory retention (postpartum forgetfulness), physical exhaustion, and the lack of self-help reference materials when mothers face real breastfeeding challenges at home without the support of healthcare professionals. Furthermore, most previous studies have focused primarily on evaluating the knowledge domain alone, but have not comprehensively assessed the impact of structured educational media on changes across all three behavioral domains (Knowledge, Attitudes, and Practices) at the rural community health center level.

To address these gaps, this study offers novelty and distinct scientific value compared to previous research. At the international level, a study by Funkquist & Oras (2024) showed that breastfeeding support programs generally did not result in significant differences in the breastfeeding patterns of 12-month-old children, underscoring the need for more focused, practical interventions that target the crucial early stages of life. Meanwhile, at the local level, the study by Samsinar et al. (2025) was limited to general education on exclusive breastfeeding to improve knowledge, and the study by Marleni & Anggrayni (2026) focused on the readiness of pregnant women in their third trimester.

To address these limitations, this study focuses on specific and practical technical interventions for mothers breastfeeding infants aged 0–6 months. This study integrates breastfeeding technique

education through a digital booklet specifically designed as a practical tool to simultaneously transform three domains of breastfeeding behavior: knowledge, attitudes, and practical psychomotor skills.

The use of this booklet offers the advantage of enhancing visual retention and providing flexible narrative guidance through a combination of concise, midwifery-standard text and step-by-step illustrations of positioning and latching. This facilitates self-paced learning that mothers can access at any time from home, without being limited by the brief duration of in-person services at healthcare facilities.

Unlike brief lectures or passive audio-visual presentations, this booklet effectively bridges the transition from theoretical understanding to the development of confidence and practical motor skills, such as the cradle and cross-cradle positions, as well as the correct technique for breaking the latch. The implementation of this booklet-based intervention provides empirical evidence regarding the effectiveness of self-directed educational modules within the local primary healthcare ecosystem through a measurable evaluation (pretest-posttest design) among a population of mothers breastfeeding infants aged 0–6 months in the service area of the Plumpang Community Health Center.

Based on these gaps and innovations, this study formulates the research question: "Does breastfeeding technique education via booklets influence mothers' behavioral patterns (knowledge, attitudes, and practices) regarding breastfeeding infants aged 0–6 months at the Plumpang Community Health Center in Tuban?" Specifically, this study aims to analyze the effect of booklet-based breastfeeding technique education on changes in mothers' breastfeeding behavior patterns.

This study holds significant urgency in the fields of midwifery and health promotion as a practical, applicable, and sustainable educational intervention. The results of this study are expected to provide a scientific contribution by confirming the effectiveness of a visual-based educational intervention model, while also serving as a standard reference for health practitioners at community health centers in developing lactation education strategies that can reduce the rate of early cessation of exclusive breastfeeding.

METHOD

This study used a quantitative approach with a one-group pretest-posttest quasi-experimental design to analyze the effect of an educational intervention. According to Sugiyono (2022), the one-group pretest-posttest design involves a single group of subjects who are administered a pretest before receiving the treatment, followed by a posttest after the treatment to determine the changes that occur, thereby allowing the treatment effect to be identified more accurately by comparing conditions before and after the intervention. The absence of a control group in this design has the potential to introduce biases (maturation, history, testing, and the Hawthorne effect), so that the observed changes are interpreted as temporal associations rather than absolute causality.

The subjects of this study were 32 breastfeeding mothers with infants aged 0–6 months at the Plumpang Community Health Center, Tuban Regency. The sampling technique used was total sampling. In line with Sugiyono (2022), total sampling or saturation sampling is a sampling technique in which the entire population is used as the sample; it is particularly appropriate when the population size is relatively small or fewer than 100 respondents. By using the entire population as the sample, this study is

expected to provide a more accurate and representative picture of the population under study. Statistically, with an effect size of r = 0.91 (a large effect size based on Z = -5.160), this sample of n = 32 has a test power of >95%, making it sufficiently robust to avoid type errors.

This study was conducted based on an official permit from the Plumpang Community Health Center, Tuban Regency (Letter No.: 000/33/414.102.029/2026) dated February 4, 2026. Research participants were recruited directly at the Plumpang Community Health Center based on the established inclusion and exclusion criteria. The inclusion criteria for this study included mothers who were currently breastfeeding infants aged 0–6 months, who visited and utilized health services at the Plumpang Community Health Center, and who were willing to participate voluntarily. Meanwhile, exclusion criteria included breastfeeding mothers who refused to participate, withdrew during the study, or filled out the questionnaire incompletely, rendering their data invalid for analysis. Prospective participants who met these selection criteria were provided with written and verbal explanations regarding the study's objectives, benefits, the right to withdraw, and data confidentiality guarantees, and were ultimately asked to sign an informed consent form before the pretest session began.

Education was provided using the digital booklet "Breastfeeding Techniques Guide," which integrates concise narratives, tables, and visual demonstrations of breastfeeding based on three behavioral domains (knowledge, attitudes, and practices). The material contained in this 23-page booklet covers the concepts and benefits of exclusive breastfeeding, the physiology of breastfeeding hormones, lactation preparation and hygiene, positioning and latch, techniques for burping the baby, as well as the prevention of lactation problems and evaluation of breast milk sufficiency.

The intervention was carried out through educational sessions conducted by researchers in the Plumpang Community Health Center's service area, using a combination of interactive lectures, booklet presentations, and practical demonstrations lasting one hour. During the demonstration session, the researchers demonstrated breastfeeding techniques (the "C" hold, areola attachment, and burping techniques) using a breast phantom and a baby, followed by independent re-demonstrations by the participants.

Data collection was conducted by distributing questionnaires to respondents before (pretest) and 3 months after the intervention (posttest) to measure the respondents' behavioral retention. Data collection in this study used a structured questionnaire designed to measure three domains of breastfeeding behavior: knowledge, attitudes, and practices. Each domain consisted of 10 items rated on a Likert scale with three response categories: Good (score 2), Fair (score 1), and Poor (score 0). The cumulative score for each respondent was then converted into a percentage of the ideal maximum score and categorized as Good Behavior (80%–100%), Fair (60%–79%), and Poor (< 60%).

Before the instrument was used in the main data collection, a pilot study was conducted on 30 breastfeeding mothers outside the research sample who shared similar characteristics. This pilot study aimed to evaluate readability and language clarity, and to avoid ambiguity in the statement items. Additionally, it was used to assess the instrument's statistical validity and reliability using IBM SPSS version 27.

The collected data were processed through the stages of editing, coding, and tabulation, then analyzed using the

Wilcoxon Signed-Rank Test. This analysis aimed to determine differences in mothers' behavior before and after the intervention, as well as to test the significance of the effect of breastfeeding technique education on changes in mothers' breastfeeding behavior at the study site.

RESULTS

This study aims to analyze the effect of providing breastfeeding technique education through booklets on changes in the breastfeeding behavior of mothers with infants aged 0–6 months at the Plumpang Community Health Center in Tuban Regency. Given the importance of proper breastfeeding techniques in supporting the success of exclusive breastfeeding and in addressing the low breastfeeding coverage in the region, this intervention was designed to systematically improve mothers' knowledge and practical skills.

Before presenting the main findings, the following section includes the results of the validity and reliability tests to ensure that the questionnaire used is accurate and consistent. Next, a description of mothers' behaviors before and after the intervention is presented, supported by statistical analysis to demonstrate the booklet's effectiveness as a health education tool in promoting significant behavioral changes among the respondents.

Validity Test Results

Validity refers to the extent to which an instrument is truly capable of measuring what it is intended to measure. In this study, the validity assessed is content validity. A test is considered valid if it is appropriate and capable of accurately measuring what it is intended to measure (Creswell, 2014).

The validity test decision was based on comparing the calculated r value with the table r value at a degree of freedom (df) of 28 (df = 30 - 2) and a significance level of 5% (alpha = 0.05), yielding a table r value of 0.3610. A statement item was deemed valid if the calculated r value was greater than the table r value. The calculated r value was computed using IBM SPSS version 27, and the results are presented as follows

Table1. Results of the Validity Test for Knowledge-Related Statements

Item	r-Count	r-Table	Validity Status
Item 1	.651	0,361	Valid
Item 2	.554	0,361	Valid
Item 3	.491	0,361	Valid
Item 4	.623	0,361	Valid
Item 5	.530	0,361	Valid
Item 6	.745	0,361	Valid
Item 7	.759	0,361	Valid
Item 8	.574	0,361	Valid
Item 9	.515	0,361	Valid
Item 10	.644	0,361	Valid

Based on the results of the validity test conducted on the knowledge-aspect instrument, all 10 items were found to be valid. Thus, all of these items were proven to be valid and can be used as a measurement tool to assess the variable of mothers' knowledge regarding breastfeeding in the main study.

Table 2. Results of the Validity Test for Attitude Aspect Statements

Item	r-Count	r-Table	Validity Status
Item 1	.811	0,361	Valid
Item 2	.918	0,361	Valid
Item 3	.861	0,361	Valid
Item 4	.841	0,361	Valid
Item 5	.867	0,361	Valid
Item 6	.866	0,361	Valid
Item 7	.910	0,361	Valid
Item 8	.856	0,361	Valid
Item 9	.878	0,361	Valid
Item 10	.891	0,361	Valid

As for the results of the validity test conducted on the attitude instrument, all 10 items were found to be valid. Thus, all of these items were proven to be valid and can be used as a measurement tool to assess the variable of mothers' attitudes toward breastfeeding in the main study

Table 3. Results of the Validity Test of Practice Aspect Statements

Item	r-Count	r-Table	Validity Status
Item 1	.827	0,361	Valid
Item 2	.944	0,361	Valid
Item 3	.828	0,361	Valid
Item 4	.770	0,361	Valid
Item 5	.847	0,361	Valid
Item 6	.808	0,361	Valid
Item 7	.779	0,361	Valid
Item 8	.886	0,361	Valid
Item 9	.841	0,361	Valid
Item 10	.841	0,361	Valid

Similarly, regarding the validity test results conducted on the practice-aspect instrument, all 10 statement items were deemed valid. Thus, all of these statement items were proven to be valid and can be used as a measurement tool to assess the variable of maternal breastfeeding practices in the main study.

Based on the validity test results, it can be concluded that this questionnaire instrument has adequate accuracy in measuring the educational level of breastfeeding mothers. All items were found to accurately represent the dimensions of knowledge, attitudes, and breastfeeding practices. This validity serves as the primary foundation for ensuring data quality, while also providing assurance that the instrument used is ready and suitable for producing accurate research findings.

Reliability Test Results

A research instrument is considered reliable if it produces consistent, precise, and accurate measurements. A reliability test is conducted to assess the extent to which an instrument is consistent as a measuring tool, thereby ensuring its reliability. The level of reliability is indicated by a reliability coefficient ranging from 0 to 1. The closer the value is to one, the higher the level of reliability (Creswell, 2014).

According to Ghozali (2021: 62), the basis for decision-making in reliability testing is that if the Cronbach's Alpha value is greater than 0.70, the questionnaire items are considered consistent or reliable. Conversely, if the Cronbach's alpha value is less than 0.70, the questionnaire items are considered inconsistent or unreliable. The results of the reliability test conducted using IBM SPSS 27 are as follows:

Tabel 4. Hasil Uji Reliabilitas Variabel

Variable	Cronbach's Alpha Score	Reliability Status
Knowledge	0,812	Reliabel
Attitude	0,963	Reliabel
Practice	0,951	Reliabel

Table 4 shows that the data collection instruments used to measure all research variables have a very good level of internal consistency. This reliability test was conducted to ensure that the questionnaire items are capable of producing consistent and reliable data when used repeatedly. The results of the statistical analysis show that the Knowledge variable obtained a Cronbach's Alpha value of 0.812, the Attitude variable 0.963, and the Practice variable 0.951.

The high coefficient values obtained for these three variables reflect that each item in the instrument has a strong and stable correlation in measuring its respective indicators. Thus, it can be concluded that the instrument for each variable meets the reliability criteria because the Cronbach's Alpha values exceed the required minimum threshold of 0.70.

General Data

The characteristics of breastfeeding mothers in this study encompass the mothers' identities, which serve as the basis for providing education on breastfeeding techniques. The frequency distribution of respondents by age, education, occupation, and parity is described in detail, with the tabulated data categorized into several percentage categories according to Notoatmodjo (2020).

1) Mother's Age

Table 5. Frequency Distribution based by Age of Breastfeeding Mothers at Plumpang Community Health Center, Tuban

Mother's Age	Frequency (n)	Percentage (%)
<20 Years	0	-
20-35 Years	28	87,5
>35 Years	4	12,5
Total	**32**	**100**

Based on these findings, it can be concluded that of the 32 mothers breastfeeding infants aged 0–6 months at the Plumpang Community Health Center in Tuban Regency, nearly all (87.5%) were aged 20–35 years, and a small proportion were over 35 years old.

2) Mother's Education Level

Table 6. Frequency Distribution of Respondents Based on Maternal Education Level

Mother's Education	Frequency (n)	Percentage (%)
Elementary School (SD)	0	-
Junior High School (SMP)	10	31,3
Senior High School (SMA) and equivalent	20	62,5
Higher Education (University)	2	6,2
Total	**32**	**100**

Table 6 shows that of the 32 mothers breastfeeding infants aged 0–6 months at the Plumpang Community Health Center in Tuban Regency, the majority (62.5%) had a high school education or equivalent, nearly half had a junior high school education, and a small proportion held a bachelor's degree (S1) or equivalent.

3) Mother's Occupation

Table 7. Frequency Distribution based on Mother's Occupation

Mother's Occupation	Frequency (n)	Percentage (%)
Housewife (IRT)	27	84,4
Entrepreneur	5	15,6
Total	**32**	**100**

Based on the findings above, it can be concluded that of the 32 mothers breastfeeding infants aged 0–6 months at the Plumpang Community Health Center in Tuban Regency, nearly all (84.4%) 27 women were homemakers, while a small proportion 5 women (15.6%) were self-employed.

4) Parity

Table 8. Frequency Distribution based on Parity

Parity	Frequency (n)	Percentage (%)
Primipara (1 child)	16	50
Multipara (2-4 children)	14	43,8
Grandemultipara (>4 children)	2	6,2
Total	**32**	**100**

Based on Table 8 above, it can be seen that of the 32 mothers breastfeeding infants aged 0–6 months at the Plumpang Community Health Center in Tuban Regency, half (50%) were primiparous mothers, nearly half (43.8%) were multiparous mothers, and a small proportion (6.2%) were grandemultiparous mothers.

Specific Data

This study aimed to identify breastfeeding behavior patterns among mothers of infants aged 0–6 months prior to the implementation of breastfeeding technique education at the Plumpang Community Health Center in Tuban. This study began by administering a breastfeeding behavior scale to the study participants to determine the extent of their breastfeeding behavior prior to receiving the intervention. The pretest results from the analysis of breastfeeding behavior data prior to the education session are as follows:

1) Pretest Data on Breastfeeding Behavior of Mothers with Infants Aged 0–6 Months Before Receiving Education on Breastfeeding Techniques at Plumpang Community Health Center, Tuban

Table 9. Frequency Distribution Table of Breastfeeding Mothers' Behavior Before Being Given Education on Breastfeeding Techniques at Plumpang Community Health Center, Tuban

No	Criteria	Frequency (n)	Percentage (%)
1	Good	0	0
2	Fair	19	59,4
3	Poor	13	40,6
	Total	**32**	**100**

Referring to the table above, the pretest results show that the majority (59.4%) of mothers fall into the "adequate" category in terms of breastfeeding behavior. Meanwhile, nearly half or 13 breastfeeding mothers fall into the "inadequate" category. These results indicate that many mothers have not yet implemented proper breastfeeding

techniques. In fact, the pretest results show that not a single breastfeeding mother falls into the "good" category.

2) Posttest Data on Breastfeeding Behavior of Mothers with Infants Aged 0–6 Months After Receiving Education on Breastfeeding Techniques at Plumpang Community Health Center, Tuban

The posttest results from the analysis of data on breastfeeding mothers' behavior are as follows:

Table 10. Frequency of Posttest Categories for Breastfeeding Mothers' Behavior After Receiving Education on Breastfeeding Techniques at Plumpang Community Health Center, Tuban Regency

No	Criteria	Frequency (n)	Percentage (%)
1	Good	29	90,6
2	Fair	3	9,4
3	Poor	0	0
	Total	**32**	**100**

The results confirm that there was a significant improvement in breastfeeding behavior patterns, with nearly all breastfeeding mothers falling into the "good" behavior category and a small proportion falling into the "adequate" category. Furthermore, based on these posttest results, no breastfeeding mothers were found to fall into the "poor" behavior category.

3) The Effect of Breastfeeding Technique Education Through Booklet Media on the Breastfeeding Behavior of Mothers with Infants Aged 0–6 Months at Plumpang Community Health Center, Tuban

Table 11. The Effect of Breastfeeding Technique Education Through Booklet Media on the Breastfeeding Behavior of Mothers with Infants Aged 0–6 Months at Plumpang Community Health Center, Tuban

Breastfeeding Mother's Behavior	*Pretest* (n)	(%)	*Posttest* (n)	(%)
Good	0	0	29	90,6
Fair	19	59	3	9,4
Poor	13	41	0	0
Total	32	100	32	100
Total score	2.883	60	4.415	92
Mean	90,09		137,96	

Based on the data in Table 11, it was found that the total number of study subjects was 32 breastfeeding mothers. Before the intervention—which consisted of education via a booklet (pretest)—no respondents fell into the "good" behavioral category. Most respondents were in the "fair" category, while nearly half were in the "poor" category. Thus, it can be concluded that prior to the education, breastfeeding behavior was generally still low and required intervention.

After the educational intervention via the booklet, there was an improvement in the distribution of breastfeeding behaviors. In the "good" category, nearly all respondents showed improvement. Furthermore, in the "adequate" category, there was a decrease among a small portion of respondents. Additionally, no respondents remained in the "poor" category, meaning that no breastfeeding

mothers exhibited poor behavior after the intervention.

The improvement in breastfeeding behavior was also reflected in the total scores obtained. The total score before the intervention was 2,883 (equivalent to 60% of the ideal maximum score), while the total score after the intervention increased to 4,415 (92%). The average score increased from 90.09 to 137.96 after the intervention. These results indicate that the educational intervention using booklets was effective in improving breastfeeding behavior, particularly in significantly shifting behavior from the "poor" and "adequate" categories to the "good" category.

Table 12. Median and Interquartile Range (IQR)

Category	N	Median (Q2)	Q1	Q3	IQR
Pretest	32	92,50	85,25	100,25	15,00
Posttest	32	143,50	123,75	150,00	26,25

The main findings of this study indicate a substantial improvement in mothers' breastfeeding behavior following an educational booklet-based intervention. Based on a non-parametric descriptive statistical analysis of 32 respondents, the baseline (pretest) condition recorded a median score of 92.50 with an interquartile range (IQR) of 15.00 (1st quartile = 85.25; 3rd quartile = 100.25). This baseline value indicates that, prior to the intervention, mothers' understanding and application of breastfeeding techniques remained at a moderate level, with relatively limited variation in ability.

Following the educational session (posttest), the median score of the respondents increased very significantly by 51 points to 143.50 (Q1 = 123.75; Q3 = 150.00). Along with this rise in the central tendency, the interquartile range (IQR) also widened from 15.00 to 26.25. In the context of non-parametric data analysis and intervention evaluation, this sharp increase in the median score demonstrates that the educational booklet was significantly effective in enhancing mothers' knowledge and improving their breastfeeding practices. Meanwhile, the widening of the interquartile range (IQR) in the posttest indicates varying levels of adoption rates and information retention among mothers following the intervention. Each mother has different learning speeds, levels of self-efficacy, and breastfeeding experiences, resulting in behavioral improvement responses ranging from moderate to very high.

Theoretically, this significant increase in the median score confirms the superiority of educational materials in the form of booklets. Structured visual materials enable self-paced learning, allowing mothers to review breastfeeding steps as needed.

Table 13. Statistical Test Results on the Effect of Breastfeeding Technique Education Through Booklet Media on the Breastfeeding Behavior of Mothers with Infants Aged 0–6 Months at Plumpang Community Health Center, Tuban

Behavior Variable	(n)	Nilai Z	p-value (Asymp.Sig.)
Before	32	−5,160	<,001
After	32		

Based on the results of the Wilcoxon Signed-Rank Test, a Z-value of -5.160 was obtained with a p-value of <0.001 (Asymp. Sig., 2-tailed), indicating a statistically significant difference between the pre- and post-intervention periods. Effect size analysis yielded an r value of 0.91, which, according to Cohen's criteria, falls into the large category (r > 0.50), indicating that the

educational booklet intervention had a highly significant effect.

This negative Z-value indicates the direction of change, where pre-intervention scores were significantly lower than post-intervention scores. In other words, there was a very clear improvement in the mothers' behavior after receiving the booklet-based education. Since the p-value was <0.05, these findings strongly support the research hypothesis.

In conclusion, there was a significant and highly effective impact of breastfeeding technique education via booklets on improving the breastfeeding behavior of mothers with infants aged 0–6 months at the Plumpang Community Health Center, Tuban Regency.

DISCUSSION

Mothers' Breastfeeding Behaviors for Infants Aged 0–6 Months Before the Intervention

Analysis of the baseline data showed that mothers' breastfeeding behaviors in the Plumpang Community Health Center's service area prior to receiving education remained suboptimal, with no respondent falling into the "good" behavior category. Most respondents fell into the "adequate" category (59.4%), and nearly half were classified as "inadequate" (40.6%), with a total cumulative pretest score of 2,883 (60% of the ideal maximum score) and an average score of 90.09. Based on Swarjana's (2022) behavioral level criteria, this 60% score formally falls within the "adequate" range (60–79%), but it sits precisely at the lower threshold—making it highly vulnerable to slipping into the "inadequate" category (<60%).

This situation reflects a high rate of technical inaccuracies in daily breastfeeding practices, such as improper latch and body positioning; according to the World Health Organization (2022) and UNICEF (2021), these pre-intervention technical skill limitations constitute a significant barrier that could potentially lead to failure in exclusive breastfeeding.

The low quality of breastfeeding behavior prior to this intervention was significantly influenced by the interaction of the mothers' internal factors, including their level of formal education, employment status, and parity. Mothers classified as primiparous (first-time mothers) tend to face challenges in achieving precise latch-on and positioning due to a lack of prior experience. This aligns with the research by Safayi et al. (2021), whose findings revealed that young mothers, particularly those in the primiparous group, remain less effective in applying proper breastfeeding techniques.

Regarding educational background, as explained by Nurmiaty et al. (2023), formal education alone has been shown not to guarantee good breastfeeding behavior without the support of structured non-formal education, such as lactation counseling. Non-formal education plays a strategic role because it transforms conceptual information into applied knowledge that mothers can immediately put into practice in their daily childcare routines. Without adequate technical skills training, mothers are prone to anxiety and may interpret discomfort during breastfeeding as a sign of lactation failure, which ultimately reduces their breastfeeding self-efficacy (Aktürk & Kolcu, 2023).

In addition to internal factors, pre-intervention breastfeeding behaviors which remain relatively low are exacerbated by external factors such as local sociocultural norms and a lack of follow-up support from health services. In the Plumpang region, a paternalistic culture and the dominance of advice from extended family often pressure mothers to adhere to traditional, time-honored practices that may not align with medical principles, such as the early

introduction of complementary foods. According to Hayuningsih and Ramadhani (2024), limited informational and emotional support from the immediate family weakens mothers' commitment to maintaining exclusive breastfeeding. The lack of ongoing monitoring and guidance from health workers after the early postpartum period also leaves first-time mothers without a valid reference when facing breastfeeding difficulties. Consequently, the combination of pressure from local myths and the lack of health promotion outreach at primary care facilities perpetuates inappropriate breastfeeding behaviors within the community.

Mothers' Breastfeeding Behavior Among Infants Aged 0–6 Months Following the Intervention

Posttest results showed a highly significant improvement in mothers' breastfeeding behaviors at the Plumpang Community Health Center in Tuban Regency. Of the 32 respondents, 29 mothers (90.6%) achieved the "good" behavior category, while the remainder fell into the "adequate" category, and no mothers (0%) were in the "poor" category. Quantitatively, the total lactation score jumped from 2,883 (60% of the ideal score) to 4,415 (92%), with the average score rising dramatically from 90.09 to 137.96. This 53.1% increase demonstrates that breastfeeding education using a booklet is highly effective in driving positive behavioral change.

This behavioral transformation aligns with the theory that behavior arises from the sensory perception of an object (Notoatmodjo, 2020). In this study, breastfeeding mothers absorbed information on breastfeeding positions and latch-on through visual stimulation (reading text and observing booklet visuals) as well as auditory stimulation during counseling sessions. This repeated sensory process gradually shaped a new understanding that underpins the development of proper breastfeeding practices (Swarjana, 2022).

The improvement in the respondents' behavior also reflects their successful progression through the five stages of new behavior adoption: awareness, interest, evaluation, trial, and adoption (Wawan & Dewi, 2021). Mothers were guided to recognize the inaccuracies of their previous breastfeeding techniques, develop an interest in the benefits of proper positioning, evaluate the efficiency of their breastfeeding practices, and directly try the correct breastfeeding steps. The success of all respondents in reaching the adoption stage was evidenced by the absence of any mothers in the "poor" category and their consistency in applying correct breastfeeding techniques without relying entirely on instant guides.

The success of this intervention is closely tied to the use of an educational method that combines booklets with hands-on practice. Education is understood as an interactive process aimed at fostering learning activities, shaping attitudes, and developing skills through real-world experiences (Sukmadinata & Syaodih, 2021). Active discussion sessions and reenactments using breast and infant phantom models proved effective in promoting the internalization of values, ensuring that participants did not merely passively absorb the material but actually mastered the skills (Hidayat & Uliyah, 2020).

The characteristics of the booklet as a medium also play a key role because it excels at presenting material in a structured and consistent manner and serves as a self-guided review tool (Rahmawati & Handayani, 2022). The booklet's flexibility and portability make it highly adaptable to the profiles of the majority of respondents, who are stay-at-home mothers with limited

time. The ability to independently review the material at home strengthens memory traces and enhances long-term retention in mothers' memories.

Based on the score results and the supporting theoretical framework, breastfeeding education via booklets has proven highly effective in improving the breastfeeding behavior of mothers with infants aged 0–6 months. This surge in scores from 60% to 92% confirms that systematic, structured, and sustained educational interventions are highly suitable as a premier health promotion tool.

These findings are also consistent with and reinforced by the study by Devi et al. (2026) at Dr. Sayidiman Magetan Regional General Hospital, which showed that structured breastfeeding education using visual aids (brochures), practical demonstrations, and interactive discussions significantly improved breastfeeding success among primiparous postpartum mothers ($Z = -5.35$; $p < 0.005$; $r = 0.85$). In that study, the breastfeeding success rate jumped from 75% of mothers initially classified as unsuccessful to 70% achieving good breastfeeding success after the intervention, leaving only 2.5% of mothers with an inadequate score. This success, measured using the LATCH indicators (latch, swallowing sounds, nipple type, comfort, and position), confirms that providing structured education and direct guidance is highly effective in addressing the challenges posed by mothers' lack of experience and limited knowledge, thereby promoting optimal breastfeeding practices. Therefore, this approach can be widely recommended in primary health care facilities to reduce breastfeeding errors while supporting the achievement of exclusive breastfeeding coverage.

The Impact of Breastfeeding Education Through Booklets

The results of the hypothesis test using the Wilcoxon Signed Ranks Test yielded a Z-value of -5.160 with an Asymp. Sig. (2-tailed) of <0.001 and an effect size of $r = 0.91$. Since the p-value is <0.05, it is concluded that these findings support the research hypothesis. These statistical results demonstrate a highly significant effect of breastfeeding education using booklet-based media on improving the breastfeeding behavior of mothers with infants aged 0–6 months at the Plumpang Community Health Center, Tuban Regency. The Sum of Ranks value of 528.00 and ties = 0 confirm that all respondents experienced an increase in their behavior scores, with none remaining stagnant or showing a decline.

This success is closely tied to the two-way educational process, which involved interactive discussions and repeated demonstrations of breastfeeding steps using a phantom model. This participatory approach helped mothers deeply internalize the information, enabling them to apply it accurately in their daily breastfeeding practices.

From a behavioral change perspective, this increase in scores signifies the respondents' success in gradually progressing through the stages of adopting new behaviors (Wawan & Dewi, 2021). The booklet served as an effective catalyst for transforming mothers' understanding, even among respondents with low baseline (pretest) scores. The fact that all mothers reached the adoption stage indicates that this educational intervention was able to transform inappropriate lactation habits into structured health behaviors.

The intervention's effectiveness is also supported by the characteristics of the booklet, which facilitates independent information processing. The booklet's strength lies in its ability to present material

in a structured and consistent manner, as well as its function as a self-reminder tool for mothers (Rahmawati & Handayani, 2022). The portable nature of the booklet allows for repetition of the material at home. This repetition of information is crucial for strengthening memory traces and improving long-term retention of proper breastfeeding techniques.

These findings regarding the effectiveness of this educational medium are consistent with research conducted by Susandra et al. (2026), who also found that a booklet-based health education intervention resulted in a statistically significant improvement ($p=0.000$) in understanding and breastfeeding behavior. In that study, booklet-based education proved capable of addressing the issue of exclusive breastfeeding coverage which remained below the national target by transforming respondents' understanding levels from predominantly moderate and poor to significantly improved following the intervention. The consistency of these results further reinforces that booklets are a reliable and practical educational medium for health workers particularly midwives at community health centers to use in promoting widespread and sustainable changes in maternal health behaviors.

In addition to the medium itself, this success was influenced by internal factors related to the mothers, such as educational level and being of childbearing age (20–35 years). Educational level and being of childbearing age are key factors in the reception of health information (Nurmiaty et al., 2023). The majority of respondents had a secondary education or higher, giving them a good level of health literacy to understand the technical instructions in the booklet. This success is further reinforced by external factors such as environmental and family support, which play a crucial role in shaping behavior and enhancing mothers' self-efficacy during breastfeeding (Ministry of Health of the Republic of Indonesia, 2023).

Statistically significant results ($p<0.001$) along with strong Z-scores underscore the practical implications of these findings for midwifery services in primary health care facilities. The use of booklets has been empirically proven to be not only efficient and easy to implement but also effective in overcoming barriers to breastfeeding. Therefore, booklet-based educational interventions are highly recommended as a standard health promotion strategy in efforts to sustainably improve the achievement of exclusive breastfeeding.

CONCLUSIONS

This study shows that providing education on breastfeeding techniques through booklets significantly improved mothers' breastfeeding behaviors for infants aged 0–6 months at the Plumpang Community Health Center in Tuban Regency. Before the intervention, most mothers exhibited adequate (59.4%) or inadequate (40.6%) breastfeeding behaviors. However, after the education was provided, there was a dramatic improvement, with nearly all mothers (90.6%) demonstrating good breastfeeding behavior. Statistical analysis using the Wilcoxon test confirmed a significant improvement in breastfeeding behavior following the intervention ($Z = -5.160$; $p < 0.001$) with an effect size of $r = 0.91$, indicating a strong impact of the program. These findings address the research question and indicate that education on breastfeeding techniques via booklets has a positive and significant effect on improving mothers' breastfeeding behavior.

In practical terms, booklets have proven effective as an educational tool that enhances mothers' knowledge and skills; therefore, their continued use is

recommended from pregnancy through the postpartum period to support the success of exclusive breastfeeding. The limitation of this study lies in its quasi-experimental, single-group pretest-posttest design, which did not include a control group. Therefore, it is recommended that future researchers use a Randomized Controlled Trial (RCT) design with a comparison group to obtain more comprehensive results.

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