Original Article

Effectiveness of Video and Leaflet Educational Media on Postpartum Mothers' Knowledge and Attitudes Toward Exclusive Breastfeeding: A Quasi-Experimental Study

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ABSTRACT

Background: Exclusive breastfeeding (EBF) is essential to reduce infant morbidity and mortality, yet EBF coverage in Indonesia remains suboptimal, partly due to limited maternal knowledge and less supportive attitudes. Comparing educational media such as video and leaflets is important to identify effective and scalable approaches for postpartum breastfeeding counseling. To determine the effectiveness of video media and leaflet media in improving postpartum mothers' knowledge and attitudes toward exclusive breastfeeding.

Methods: This quasi-experimental two-group pretest–posttest study was reported in line with the TREND guideline for nonrandomized evaluations. Participants were recruited using purposive sampling from postpartum mothers and allocated into two nonrandomized intervention groups (video vs leaflet; 30 per group). Inclusion criteria were postpartum mothers ≤6 weeks, willing to participate, able to communicate in Bahasa Indonesia, and (for video group) having smartphone access to view the material; exclusion criteria included cognitive/psychological disorders or inability to complete the session. Knowledge and attitude were assessed using validated questionnaires before and immediately after a standardized 30-minute education session. Data were analyzed using SPSS version 25; within-group changes were tested with paired-samples t-tests, and effect sizes were calculated using Cohen's d.

Results: Both interventions significantly improved knowledge and attitude scores ($p<0.001$). In the video group, knowledge increased from 50.67±9.59 to 89.77±7.27 (Cohen's d=3.93), and attitude increased from 48.53±10.23 to 85.37±5.56 (Cohen's d=3.56). In the leaflet group, knowledge increased from 49.60±10.13 to 88.00±6.75 (Cohen's d=3.89), and attitude increased from 48.17±10.29 to 85.53±6.25 (Cohen's d=3.31).

Conclusion: Video and leaflet education were both highly effective in improving postpartum mothers' knowledge and attitudes toward EBF, with very large effect sizes in both groups; video showed a slightly larger effect on attitudes. Integrating video and leaflets into routine postpartum counseling may strengthen EBF promotion in primary care settings.

Keywords: Educational media; video; leaflets; breastfeeding; postpartum mothers; health education

Implications for Practice:

- Video media provides stronger engagement and may enhance the effectiveness of breastfeeding counseling for postpartum mothers, especially when used during routine visits at primary care facilities in low- and middle-income countries.
- Leaflets remain essential as supplementary tools, particularly in resource-limited or low-literacy settings, because they can be taken home, reread, and shared with family members who influence infant feeding decisions.
- These findings support integrating blended educational media (video and leaflet) into maternal health protocols and breastfeeding promotion guidelines in LMIC primary care settings, accompanied by training for community health workers and nurses in audiovisual counseling techniques and culturally adapted message delivery.

Introduction

Breastfeeding is an unparalleled way to provide ideal nutrition for the healthy growth and development of infants; it is also an integral part of the reproductive process with important implications for maternal health. Global public health recommendations require that infants be exclusively breastfed for the first six months of life to achieve optimal growth, development, and health. Thereafter, to meet their evolving nutritional needs, infants should receive nutritionally adequate and safe complementary foods while continuing breastfeeding until two years of age or beyond. Exclusive breastfeeding from birth is possible except in certain medical conditions, and exclusive breastfeeding without restriction results in adequate milk production (WHO & UNICEF, 2003)(Pérez-Escamilla et al., 2019).

Over 500 million working women worldwide continue to become pregnant, and nurses without sufficient legal protection. Just 20% of nations, including Indonesia, mandate paid maternity leave and workplace breastfeeding facilities. This lack of support also affects babies; fewer than half of infants younger than 6 months are exclusively breastfed. In fact, Indonesia's exclusive breastfeeding coverage decreased from 69.7% in 2021 to 67.96% in 2022. This is more than just a statistic; it indicates that women still require Time and genuine assistance to give their children the best possible(WHO, 2023).

Because exclusive breastfeeding is the optimum nutrition for a baby's growth and development and because it effectively reduces the risk of pneumonia, diarrhea, and other significant causes of infant mortality, it is crucial. The World Health Assembly (WHA) has set a global goal of 50% of infants under 6 months old being exclusively breastfed by 2025, but only 41% were exclusively breastfed in 2017(UNICEF & WHO, 2020).

From birth to five months of age, newborns who are exclusively breastfed are not given any other food or liquids (including water), except medication and vitamin or mineral drops. According to the National Social Survey conducted in March 2021, 71.58% of infants were exclusively breastfed. According to the Indonesian Minister of Health Regulation No. 21 of 2020 on the Ministry of Health's Strategic Plan for 2020-2024, the goal for exclusive breastfeeding coverage in 2024 is 60%; thus, achieving exclusive breastfeeding is considered good. Six out of ten youngsters between the ages of six and twenty-three months are still being breastfed(Badan Pusat Statistik, 2021).

From 2017 to 2021, the proportion of infants aged 0–23 months who were breastfed varied. Between 2017 and 2018, there was a 1.56 percent decline, while between 2018 and 2019, there was a 2.19 percent growth. Following 2019, the proportion of breastfed newborns fell to 95.02 percent in 2020 and then to 94.65 percent in 2021. This suggests a decrease in breastfeeding among babies and an

anticipated rise in formula feeding(KemenPPA, 2022)

Data from the 2020 District/City Health Profile showed that 90,207 of the 234,812 children in North Sumatra Province under the age of six months were exclusively breastfed (38.42%)(Dinkes Sumut, 2020). Out of 198,734 infants under 6 months old in North Sumatra Province in 2021, 87,529 (or 44.04%) were determined to be exclusively breastfed(Dinkes Provinsi Sumatera Utara, 2021). In North Sumatra Province, 50% of children under 6 months old were exclusively breastfed in 2022(Dinas Kesehatan Sumatera Utara, 2022). Of the 127,586 infants in North Sumatra Province under the age of six months in 2023, 63,505 (49.77%) were reported to be exclusively breastfed(Dinas Kesehatan Sumatera Utara, 2023)

According to data from the Medan City Health Office's Health Services Division in 2020, out of 17,449 infants under six months old, 27.1% were exclusively breastfed(D. K. K. Medan, 2020). Of 10,608 infants less than six months old in 2021, 29.9% were exclusively breastfed(P. Medan, 2021). Of the 3,187 infants under six months old in 2022, 32.1% were exclusively breastfed(Dinkes Kota Medan, 2022). Of the 6,857 infants under 6 months old in 2023, 47.7% were exclusively breastfed(Dinkes Kota Medan, 2024).

33.82% of infants were exclusively breastfed in 2020, according to data from the Deli Serdang Health Office(D. D. Serdang, 2020). A total of 38.21% of newborns were exclusively breastfed in 2021(D. K. K. D. Serdang, 2022). The percentage of babies who were exclusively breastfed in 2022 was 2.48%(Dinas Kesehatan Deli Serdang, 2023).

During breastfeeding, significant energy and essential nutrients are required. Consequently, women are at risk of nutritional deficiencies during lactation. Although breastfeeding mothers may deplete their milk reserves, they still produce sufficient, high-quality milk despite inadequate nutritional status. A wide variety of factors actually influence the composition of breast milk. The mother's diet, body composition, and fat reserves all have a significant impact.(Carretero-Krug et al., 2024).

Exclusive breastfeeding is an important public health strategy in improving child and maternal health by reducing child morbidity and mortality and helping to control health care costs in the community. (Mercan & Selcuk, 2021).

Breast milk is a whitish fluid produced by a mother's mammary glands during lactation. It is the food prepared for the baby during pregnancy. The breasts change during pregnancy to prepare for milk production (Zubaida & Kesuma Dewi, 2024). Breastfeeding has been shown to improve newborn health and reduce mortality from infectious diseases. Breastfed babies are less likely to develop allergies and digestive problems (Dukuzumuremyi J P C, Acheampong K, 2020).

Understanding proper breastfeeding practices is essential for effective breastfeeding. Proper maternal and infant body positioning, proper attachment, and efficient suckling (effective sucking) are all indicators of successful breastfeeding (Mamuroh et al., 2024).

Exclusive breastfeeding for the first six months is a key global strategy to reduce infant morbidity and mortality. Yet, coverage remains suboptimal in many low- and middle-income countries (LMICs), including Indonesia, where a substantial proportion of infants still do not receive exclusive breastfeeding despite national targets and policies. In this context, postpartum mothers often have limited access to effective, engaging health education, and gaps in knowledge and attitudes about breastfeeding contribute to

early supplementation and discontinuation. The Knowledge–Attitude–Practice (KAP) model and the Health Promotion Model suggest that improving mothers' knowledge and shaping positive attitudes through appropriate educational strategies are critical steps toward sustaining exclusive breastfeeding behaviour. Previous studies in LMICs have shown that health education can improve breastfeeding outcomes, but evidence directly comparing different educational media—particularly video versus leaflet formats—remains limited, and few studies have examined how multimedia approaches can be integrated into routine nursing practice at the primary care level. In Indonesia, community health centers commonly rely on printed leaflets and brief verbal counseling, while the potential of video-based education to provide more vivid, emotionally engaging messages tailored to local culture has not been adequately evaluated (Bhattacharjee et al., 2021)(Gayatri, 2021)(Tomori et al., 2022). Therefore, this study, grounded in the KAP framework, aimed to determine the effectiveness of video and leaflet media in improving postpartum mothers' knowledge and attitudes regarding exclusive breastfeeding at the Sei Mencirim Community Health Center in North Sumatra, Indonesia, and to generate evidence that can inform breastfeeding counseling protocols and nursing practice in similar LMIC primary care settings.

Methods

Study Design

This quantitative study used a quasi-experimental, two-group pretest–posttest design without randomization to evaluate the effectiveness of video media and leaflet media educational media on postpartum mothers' knowledge and attitudes about exclusive breastfeeding at the Sei Mencirim Community Health Center in 2025. A quasi-experimental approach was chosen because random allocation of mothers to intervention groups was not feasible within the routine service context of the health center. Yet, the design still allows examination of changes over time and comparison between groups in a real-world setting. In accordance with the TREND (Transparent Reporting of Evaluations with Nonrandomized Designs) guideline for nonrandomized behavioral and public health intervention studies, the report describes eligibility criteria, intervention procedures, participant flow, and statistical analysis in detail.

Participants

The study population comprised all postpartum mothers registered in the working area of the Sei Mencirim Community Health Center in Sunggal Subdistrict, Deli Serdang Regency, North Sumatra Province, Indonesia, during July–August 2025, totaling 60 women. These mothers were identified from postpartum registers and routine visit records at the health center and were approached consecutively during their visits or via telephone, informed about the study, and invited to participate; all who met the eligibility criteria and provided written informed consent were enrolled, resulting in no refusals or dropouts across the study period. A purposive sampling technique was applied by including all postpartum mothers within six weeks after delivery who were willing to participate, able to communicate in Bahasa Indonesia, and, for allocation to the video group, had access to a smartphone to view the educational material, while mothers with known cognitive or psychological disorders or those unable to attend the full counseling session were excluded. Because the total accessible population in the study period was 60 mothers and all eligible mothers were successfully recruited, the final sample size was fixed at 60 without

additional external recruitment; this census-like approach in a single health center was considered sufficient to detect meaningful pre–post changes in knowledge and attitudes for a pragmatic quasi-experimental evaluation. All 60 enrolled mothers completed both the pretest and posttest assessments and received the full 30-minute counseling intervention, and they were then allocated in equal numbers to two non-randomized intervention groups (30 in the video media group and 30 in the leaflet media group) to allow comparison of the effectiveness of the two educational media on knowledge and attitudes regarding exclusive breastfeeding.

Instruments

The main research instrument was a structured self-administered questionnaire on mothers' knowledge and attitudes regarding exclusive breastfeeding. The knowledge section consisted of multiple-choice items scored 1 for each correct answer and 0 for each incorrect answer, with total scores converted to percentages and interpreted as good (≥76% correct), sufficient (56–75% correct), and poor (≤55% correct). The attitude section used a four-point Likert scale (strongly agree, agree, disagree, strongly disagree), with items worded positively and negatively; responses were summed to generate a total attitude score, with higher scores indicating more positive attitudes, and then dichotomized into positive (score ≥ median) and negative (score < median) attitude categories. Reliability testing using Cronbach's alpha in the pilot sample showed good internal consistency for both scales ($\alpha = 0.875$ for the knowledge scale and $\alpha = 0.839$ for the attitude scale), so all items were retained for the main study. The educational content delivered through the video media and leaflet media was developed based on the questionnaire domains and covered the definition of exclusive breastfeeding, benefits of breast milk for mothers and infants, signs that infants are receiving sufficient breast milk, types of breast milk (colostrum, transitional, mature), and recommended foods for breastfeeding mothers; the leaflet presented this information using concise text and illustrations, while the video delivered the same material in audiovisual form with narration and moving images. The intervention lasted 30 minutes in total, consisting of approximately 10 minutes for the pretest, 15 minutes for the educational session using the assigned medium, and 5 minutes for the posttest, which was considered sufficient to convey the material without causing fatigue. The full questionnaire (knowledge and attitude items in Bahasa Indonesia and the original language) is provided as a supplementary appendix to facilitate transparency and replication.

Intervention

The intervention in this study was designed based on the Cognitive Theory of Multimedia Learning, which posits that combining visual and auditory channels and segmenting information into manageable units can enhance understanding and retention, and was further informed by health-education principles that emphasize modeling and repetition to support behavior change in breastfeeding practices. The educational media (video and leaflet) were developed from the same script and content outline to ensure equivalence: both covered the definition of exclusive breastfeeding, benefits of breast milk for mothers and infants, signs that infants are receiving sufficient breast milk, types of breast milk (colostrum, transitional, and mature milk), and recommended dietary practices for breastfeeding mothers. The final video (available at https://youtu.be/Ci1xu9YLSzU?si=ZIHTMEJFCr3PMzah) was an approximately 10-

minute MP4 file produced in collaboration with a professional multimedia team, using narrator voice-over, simple animations, and real-life illustrations of breastfeeding positions; the leaflet consisted of a four-page, full-color A5 brochure with concise text and illustrative images aligned with each section of the video (**Figure 1**). All sessions were delivered face-to-face at the Sei Mencirim Community Health Center following a standard operating procedure (SOP): (1) welcoming and checking eligibility; (2) obtaining informed consent; (3) administering the pretest questionnaire; (4) providing the assigned educational media —either playing the video once in a small group viewing on a tablet or projector, or guiding mothers through each page of the leaflet; (5) allowing 5 minutes for questions and clarification; and (6) administering the posttest questionnaire, for a total intervention time of around 30 minutes per participant. Safety was considered throughout the intervention: all sessions took place in a room within the health center, no invasive procedures or clinical interventions were involved, and mothers could pause or withdraw from the session at any time without consequences; any emotional discomfort or breastfeeding difficulties identified during the session were referred to routine clinical services for follow-up. To minimize contamination between groups, video viewing was conducted individually. Participants were asked not to share video files or photographs of the leaflet content with mothers in the other group until the study was completed, and the video file was not distributed for personal use during the data collection period; printed leaflets were given only to participants in the leaflet group.

Figure 1. Leaflet Media

Data Collection

Data collection was carried out at the Sei Mencirim Community Health Center. At each visit, eligible postpartum mothers were first identified from clinic registers, screened against the inclusion and exclusion criteria, and invited to participate; after providing written informed consent, they completed the paper-based pretest questionnaire, received the assigned educational intervention (video or leaflet), and then completed the paper-based posttest immediately afterward. All questionnaires were labeled only with participant codes and were double-checked on the same day by the principal investigator to ensure that every item had been answered; because all 60 participants completed both pretest and posttest fully, no missing data occurred for the primary outcome variables, so no imputation methods were required. After verification, data were entered into a password-protected SPSS database using double data

entry (two independent entries compared and reconciled) to minimize transcription errors, and all original paper forms were stored in a locked cabinet at the research institution.

Data Analysis

Data were analyzed in two stages, using SPSS version 25. Univariate analysis was conducted to describe respondent characteristics and the distribution of knowledge and attitude scores, which are presented in tables as mean ± standard deviation (SD), minimum, and maximum values. For bivariate analysis, the normality of continuous variables (knowledge and attitude scores) was assessed using the Kolmogorov–Smirnov test together with inspection of histograms and skewness–kurtosis values; when the normality assumption was met, pretest and posttest scores within each group were compared using paired-samples t-tests and between-group differences in change scores (video vs leaflet) were examined using independent-samples t-tests, whereas non-parametric Wilcoxon signed-rank tests and Mann–Whitney U tests were applied if distributions were non-normal. For all comparisons, two-sided p-values < 0.05 were considered statistically significant, and 95% confidence intervals (95% CI) for mean differences were reported to quantify the precision of the estimates. In addition, effect sizes (Cohen's d) were calculated for within-group pre–post changes and between-group differences to facilitate interpretation of the magnitude of intervention effects. Missing data were handled according to TREND recommendations: because all 60 participants completed both pretest and posttest assessments, there were no missing outcome data for the primary analyses and no imputation was required; any incomplete responses at the item level were checked against the original questionnaires, and if still missing, those items were treated as missing and excluded pairwise from descriptive summaries without affecting total scale scores used in the main analyses.

Ethical Considerations

Ethical approval for this study was obtained from the Health Research Ethics Committee, Faculty of Medicine, Universitas Islam Sumatera Utara (Komisi Etik Penelitian Kesehatan, Fakultas Kedokteran UISU), Medan, Indonesia, with approval number 286/KEPK/FK-UISU/VI/2025. The study was conducted in accordance with the ethical principles of the Declaration of Helsinki and applicable national regulations governing research involving human participants. Before data collection, all eligible postpartum mothers received a clear explanation of the study objectives, procedures, potential benefits, and minimal risks, and were then asked to provide written informed consent; participation was entirely voluntary, and respondents could decline or withdraw at any time without any consequences for their access to health services. To protect privacy, each participant was assigned a unique identification code, and only coded data were used in the database and analysis; names and other direct identifiers were stored separately in a password-protected file accessible only to the principal investigator and were not reported in any publication. No invasive procedures or medical interventions were performed, and the intervention consisted solely of educational counseling using video or leaflet media, so the risk of physical or psychological harm to respondents was considered minimal.

Results

The characteristics of the respondents in the video and leaflet groups were generally comparable in terms of age,

education, and occupation. Most postpartum mothers in both groups were in the productive age range of 20–35 years, had completed at least senior high school, and were primarily homemakers. These similarities in sociodemographic profiles help ensure that differences observed in knowledge and attitudes are more likely attributable to the educational interventions rather than to baseline differences between the groups.

Table 1. Frequency Distribution of Respondents in the Study

Characteristics	Video Media Group		Leaflet Media Group	
	N	Percentage (%)	N	Percentage (%)
Mother's age				
<20 years old	3	10.00	4	13.33
20-35 years old	22	73.33	24	80.00
>35 years old	3	10.00	2	6.67
Mother's Education				
Elementary School	7	23.33	5	16.67
Junior High School	2	6.67	4	13.33
Senior High School	20	66.67	19	63.33
Diploma / Bachelor's Degree	1	3.33	2	6.67
Mother's Occupation				
Housewife	20	66.67	25	83.33
Teacher	2	6.67	1	3.33
Laborer	7	23.33	3	10.00
Civil Servant	1	3.33	1	3.33
Other	0	0.00	0	0.00
Total	30	100	30	100

According to **Tabel 1,** the distribution of respondent characteristics in the leaflet media and video media groups, most mothers in both groups are between 20 and 35 years old, which is the productive age range. Twenty-two respondents (73.33%) in the video media group and twenty-four respondents (80%) in the leaflet media group were between the ages of twenty and thirty-five. Some respondents were under 20 years old (3 in the video group, 4 in the leaflet group) and over 35 (3 in the video group, 2 in the leaflet group) in both groups. This indicates that women of working age made up the majority of the mothers who took part in the survey.

The majority of mothers in the video media group had completed high school (20, or 66.67%), followed by mothers who had only completed primary school (7, or 23.33%) and junior high school (2, or 6.67%). Just one mother (3.33%) held a bachelor's degree or diploma. In contrast, 19 mothers (63.33%) in the leaflet media group had a high school degree, followed by five mothers (16.67%) with only an elementary school education and four mothers (13.33%) with a junior high school degree. Just two mothers (6.67%) held a bachelor's degree or diploma. Although some mothers had less education, the majority had formal education up to upper secondary level.

Mothers in both categories were mainly housewives. Twenty moms (66.67%) were housewives in the video media group, followed by seven mothers (23.33%) who were laborers and two mothers (6.67%) who were instructors. Only one mother (3.33%) was employed by the PNS. In contrast, 25 moms (83.33%) in the leaflet media group were housewives; 3 mothers

(10%) were laborers; 1 mother (3.33%) was a teacher; and one mother (3.33%) was a civil servant. Neither group's mothers held any additional jobs. The majority of the mothers in this study were homemakers, according to their employment profiles, which may have affected how they responded to the educational media intervention.

Table 2. Frequency Distribution of Mothers' Knowledge and Attitude Levels Before and After Being Given Video Media and Leaflet

	Video Media				Leaflet Media			
	Knowledge		Attitude		Knowledge		Attitude	
Description	Pre	Post	Pre	Post	Pre	Post	Pre	Post
Good	4	30	1	30	5	30	3	29
Enough	10	0	4	0	10	0	5	1
Not enough	16	0	25	0	15	0	22	0

Tabel 2 shows that the results of the study showed that both video media and leaflet media were highly effective in improving participants' Knowledge and attitudes. Before the intervention, the majority of participants were in the poor-knowledge and poor-attitude categories. However, after being educated through both media, there was a significant jump to the good category. In the video media, the increase was very drastic: participants with good Knowledge increased from 4 to 30, and those with good attitudes jumped from 1 to 30. There were no participants left in the sufficient or poor categories after the video intervention.

Meanwhile, the leaflet media also showed very positive results, with Knowledge increasing from 5 to 30 participants and good attitudes increasing from 3 to 29 participants. Although one participant still had a sufficient attitude, none were in the poor category. Overall, both media were shown to change participants' initial condition from predominantly poor to predominantly good, with the video media showing a slightly greater impact on attitude change.

Bivariate analysis was conducted to determine whether there were differences in pretest and posttest results between the video media and leaflet media groups, and between the video and booklet groups. After conducting a data normality test using SPSS v.25 with the Kolmogorov test on Knowledge, the results were as follows.

Table 3. Kolmogorov Test Results

	N	*p-value*	Information
Video Group			
Knowledge			
Pretest	30	0.200	Normal
Posttest	30	0.076	Normal
Attitude			
Pretest	30	0.174	Normal
Posttest	30	0.051	Normal
Leaflet Group			
Knowledge			
Pretest	30	0.200	Normal
Posttest	30	0.196	Normal

	N	*p-value*	Information
Attitude			
Pretest	30	0.107	Normal
Posttest	30	0.200	Normal

Based on **Tabel 3,** the results of the normality test using the Kolmogorov-Smirnov test in SPSS version 25, all data in the video media and leaflet intervention groups showed a normal distribution. In the video media group, the p-value for the knowledge variable was 0.200 in the pretest and 0.076 in the posttest, while for the attitude variable, the p-values were 0.174 in the pretest and 0.051 in the posttest. Although the p-value in the attitude posttest approached the significance threshold (α = 0.05), it remained above the set limit, so the data remained categorized as normally distributed.

Meanwhile, in the leaflet media group, the p-values for Knowledge in the pretest and posttest were 0.200 and 0.196, respectively, while for attitudes, the p-values were 0.107 in the pretest and 0.200 in the posttest. All p-values were above the significance threshold, indicating that the data did not deviate from a normal distribution.

By meeting the assumption of normality in both groups and all tested variables, a parametric statistical analysis can be applied to test differences in the effectiveness of educational interventions between video media and leaflet media in improving participants' Knowledge and attitudes. The validity of this normal distribution is an important basis for selecting subsequent testing methods, such as paired t-tests or independent t-tests, in bivariate analysis.

Table 4. Effectiveness of Video Media on Postpartum Mothers' Knowledge and Attitudes in Providing Exclusive Breastfeeding.

Rank		N	Mean Rank	Sum of Rank
Video Media				
Posttest - Pretest Knowledge Video	Negative Ranks	0a	.00	.00
	Positive Ranks	30b	15.50	465.00
Posttest Attitude Video - Pretest	Negative Ranks	0a	.00	.00
	Positive Ranks	30b	15.50	465.00
Leaflet Media				
Posttest - Pretest Knowledge Leaflet	Negative Ranks	0a	.00	.00
	Positive Ranks	30b	15.50	465.00
Posttest - Pretest Attitude Leaflet	Negative Ranks	0a	.00	.00
	Positive Ranks	30b	15.50	465.00

Based on **Tabel 4** The Wilcoxon test results above show that all respondents experienced an increase in Knowledge after receiving counseling using video media (30 respondents with positive scores). There was no decrease in Knowledge (negative ranks = 0). This proves that video media is highly effective in increasing Knowledge among postpartum mothers. The Table above also shows that all 30 respondents

experienced an increase in positive attitudes after receiving counseling using leaflets. No respondents experienced a decrease in attitudes (negative ranks = 0). This proves that leaflets also have a positive effect on improving postpartum mothers' attitudes.

Table 5. Effectiveness of Video media and leaflet media on Postpartum Mothers' Knowledge and Attitudes regarding Exclusive Breastfeeding.

Variables	Group	Pretest Mean ± SD	Posttest Mean ± SD	Mean Change (Δ) ± SD	95% CI of Δ mean	Cohen's d (within-group)	p-value (within group)
Knowledge	Video media	50.67 ± 9.586	89.77 ± 7.267	39.10 ± 2.319	35.38 to 42.82	3.93	p < 0.001
	Leaflet Media	49.60 ± 10.129	88.00 ± 6.747	38.40 ± 3.381	34.72 to 42.08	3.89	p < 0.001
Attitude	Video media	48.53 ± 10.228	85.37 ± 5.555	36.84 ± 4.673	32.97 to 40.70	3.56	p < 0.001
	Leaflet Media	48.17 ± 10.286	85.53 ± 6.252	37.36 ± 4.034	33.17 to 41.57	3.31	p < 0.001

Note: The mean difference between the groups (treatment pretest & posttest) was analyzed using a paired t-test at the 5% significance level.

Both video media and leaflet media interventions produced very large and statistically significant improvements in postpartum mothers' knowledge and attitudes about exclusive breastfeeding. In the video group, mean knowledge scores increased from 50.67 ± 9.59 at pretest to 89.77 ± 7.27 at posttest, corresponding to a mean change of 39.10 points (95% CI 35.38 to 42.82; Cohen's d = 3.93; p < 0.001). Similarly, in the leaflet group, knowledge rose from 49.60 ± 10.13 to 88.00 ± 6.75, with a mean change of 38.40 points (95% CI 34.72 to 42.08; Cohen's d = 3.89; p < 0.001), indicating an effect magnitude comparable to the video intervention.

Attitude scores showed a similar pattern. Among mothers receiving video education, the mean attitude score increased from 48.53 ± 10.23 to 85.37 ± 5.56, yielding a mean change of 36.84 points (95% CI 32.97 to 40.70; Cohen's d = 3.56; p < 0.001). In the leaflet group, attitudes improved from 48.17 ± 10.29 to 85.53 ± 6.25, with a mean change of 37.36 points (95% CI 33.17 to 41.57; Cohen's d = 3.31; p < 0.001). Across both outcomes, the narrow 95% confidence intervals and very large Cohen's d values show that the improvements were not only statistically significant but also clinically meaningful, and that video media and leaflet media were similarly effective in enhancing mothers' knowledge and attitudes toward exclusive breastfeeding (**Table 5**).

Discussion

This study provides practical evidence to address a key gap in routine primary care breastfeeding education. Although postpartum counseling in Puskesmas commonly relies on brief face-to-face messages and printed materials, the routine use of standardized video-based education—and direct comparisons between video and leaflet formats using equivalent content—remains limited in real-world settings. By testing two commonly implementable media (video and leaflet) under routine Puskesmas conditions using the same educational content and a structured delivery procedure, this study demonstrates that both approaches can significantly improve postpartum mothers' knowledge and attitudes. These findings support

integrating standardized multimedia and print education into postpartum breastfeeding counseling and inform service-level decisions on scalable strategies, including a blended approach that combines clinic-based engagement (video) with take-home reinforcement (leaflet).

This study contributes practical evidence for primary care by testing two commonly implementable media (video and leaflet) under routine Puskesmas conditions, using the same educational content and a structured delivery procedure. The findings demonstrate that both media can significantly improve postpartum mothers' knowledge and attitudes, supporting the integration of standardized multimedia and print education into postpartum breastfeeding counseling. In this way, the study informs service-level decisions on scalable education strategies and supports a blended approach that combines clinic-based engagement (video) with take-home reinforcement (leaflet).

This study found that educational interventions using both video and leaflet media significantly improved postpartum mothers' knowledge and attitudes toward exclusive breastfeeding. The improvement was reflected by a shift in participants' knowledge and attitude categories from predominantly low/negative before the intervention to predominantly good/positive after the intervention, indicating statistically significant changes in both groups. These findings align with research by, who found that audiovisual media were effective in increasing Knowledge and attitudes among breastfeeding mothers towards exclusive breastfeeding.

The advantage of video media lies in its ability to present information visually and auditorily, which can improve comprehension and retention. This is important in the context of exclusive breastfeeding, where a good understanding can influence mothers' positive attitudes toward the practice. These results align with the(Notoatmodjo, 2012) theory, which states that media for health education is critical in improving the ability of the five senses to process information. Because it combines visual and audio elements, audiovisual media (video) is more effective, making messages more straightforward to understand and remember.(Jatmika et al., 2019). According to related studies, maternal awareness of reproductive health can be increased more effectively using video media than through print media. According to Notoatmodjo (2012), attitudes are emotional reactions formed by experience and beliefs. Because they provide concrete examples of behavior that are more easily internalized, video media helps influence attitudes. (Paulina, 2023)However, by providing written information that can serve as a reminder, leaflets help improve attitudes. This finding aligns with a study (Marlina et al., 2023), which found that postpartum mothers' opinions on breastfeeding practices improved through a combination of films and leaflets.

The leaflet intervention also resulted in statistically significant improvements in postpartum mothers' knowledge and attitudes toward exclusive breastfeeding. After the intervention, most participants shifted from lower baseline categories to good knowledge and more positive attitudes, indicating that leaflet-based education was effective. Leaflets have several advantages, particularly as practical take-home materials that can be reread and shared with family members. One advantage is that they can be saved, reread, and used as a reference (Ummah et al., 2021). This allows mothers to benefit from education even without direct support. However, a disadvantage is that leaflets lack

movement and sound, which might help jog memory. Research supports these findings, showing that education using leaflet media is effective in increasing pregnant women's Knowledge and attitudes towards exclusive breastfeeding.

Although leaflets are more straightforward and more accessible, their effectiveness depends on their design and the precise delivery of information. Leaflets can be an effective tool in providing basic information to postpartum mothers, especially when resources are limited. Research results (Pinem et al., 2022). This study aimed to determine the effect of leaflet counseling on postpartum mothers' Knowledge and attitudes regarding exclusive breastfeeding at Frans Primary Clinic. The results showed that leaflet counseling significantly improved postpartum mothers' Knowledge and attitudes regarding exclusive breastfeeding.

A comparison between the two media, namely videos and leaflets, shows that although both are effective in increasing postpartum mothers' Knowledge and attitudes towards exclusive breastfeeding, there are some striking differences in their impact on these two variables.

In terms of knowledge, both media led to statistically significant improvements from pretest to posttest. Participants in both the video and leaflet groups generally shifted from lower baseline knowledge categories to predominantly good knowledge after the intervention, indicating that both approaches were comparably effective for improving mothers' understanding of exclusive breastfeeding. Although the between-media difference in knowledge gains was not statistically significant, video may offer practical advantages for learning because it delivers information in a more dynamic and engaging format through combined visual and auditory cues, which can support comprehension and retention. In contrast, leaflets remain effective but rely on static text and images, so their impact may depend more strongly on readability, design quality, and mothers' literacy and attention during counseling.

In terms of attitudes, both media produced statistically significant improvements from pretest to posttest. Overall, participants in both groups tended to shift from predominantly negative baseline attitudes to more positive attitudes after the intervention, suggesting that bothvideo- and leaflet-based education can effectively support attitude change toward exclusive breastfeeding. Although the between-media difference was not statistically significant, video-based education may have a practical advantage for shaping attitudes because it is more engaging and can facilitate emotional involvement through narration, moving images, and sound, which may strengthen perceived benefits and motivation. Leaflets remain beneficial, especially as simple take-home reminders; however, because they rely on static text and images, they may be less effective than video at eliciting emotional responses that often underpin attitude change.

However, while video media has a slight edge in improving attitudes, leaflets still play a crucial role, particularly in specific contexts where access to technology is limited. Leaflets have the advantage of being cheaper and easier to distribute, allowing them to reach a wider audience, particularly in areas with less developed technological infrastructure. Leaflets allow mothers to read and access information at any Time without relying on electronic devices or an internet connection. This makes leaflets a handy tool in situations where limited access to technology is a significant challenge.

This is supported by research results (Marlina et al., 2023). The results of this study indicate that both videos and leaflets

can improve mothers' Knowledge of proper breastfeeding techniques. However, video proved more effective at increasing mothers' positive attitudes toward breastfeeding techniques because it can present information in a more dynamic, interactive manner. Nevertheless, leaflets still make a positive contribution, especially in areas with limited access to technology. This study suggests that a combination of video and leaflets may be more effective in educating postpartum mothers about proper breastfeeding techniques, depending on accessibility and individual preferences.

The research results (BÜYÜK et al., 2023) showed that mothers who received video training demonstrated a significant increase in breastfeeding self-efficacy compared with the control group. Video training has been shown to help mothers feel more confident and comfortable in breastfeeding, even when their babies are hospitalized. This study suggests that video training can be an effective tool for improving mothers' breastfeeding self-efficacy when their infants are hospitalized. This demonstrates the importance of video-based educational approaches in supporting mothers to overcome breastfeeding challenges, particularly in more challenging situations such as hospitalization.

This quasi-experimental study found that both video and leaflet educational media produced very large and statistically significant improvements in postpartum mothers' knowledge and attitudes regarding exclusive breastfeeding, with similarly strong effect sizes in both groups and a slight advantage of video in shaping attitudes. These findings indicate that relatively brief, structured health education sessions embedded in routine primary care can substantially enhance breastfeeding-related cognition and motivation among mothers in a low- and middle-income country (LMIC) setting (Alhamedi et al., 2025).

From a theoretical perspective, the effectiveness of the video intervention can be understood through the Cognitive Theory of Multimedia Learning, which proposes that information is processed more deeply when presented simultaneously through visual and auditory channels, organized in short segments, and supported by concrete examples. In this study, the video combined narration, images, and demonstrations of breastfeeding techniques, which likely reduced cognitive load and helped mothers integrate new information with prior experience, thereby reinforcing both knowledge and affective responses, while leaflets relied mainly on text and static images. The slightly greater impact of video on attitudes may also be explained by social–cognitive mechanisms: seeing model mothers successfully breastfeed and hearing empathetic messages in the video could enhance self-efficacy and perceived benefits, which are key predictors of breastfeeding behavior in many LMIC contexts (Candido & Cattaneo, 2025).

The results are consistent with multiple studies from LMICs showing that audiovisual and blended educational strategies can significantly improve breastfeeding knowledge, attitudes, and self-efficacy. Recent research from East Africa, South Asia, and Indonesia has reported that structured counseling, digital videos, and community-based education all contribute to higher exclusive breastfeeding knowledge and more positive attitudes, often with large effect sizes similar to those observed in this study. Studies focusing specifically on multimedia breastfeeding education have also found that video-based interventions can increase breastfeeding self-efficacy and practice compared with usual care or print-only materials. However, differences between media types are

sometimes modest and context-dependent. At the same time, some evaluations in LMICs have reported smaller gains when baseline knowledge is already high or when interventions are not well integrated into existing health services, highlighting that the magnitude of effect observed here may reflect both the low initial knowledge/attitude levels and the structured, supervised delivery within a community health center (Alhamedi et al., 2025).

The LMIC context is crucial for interpreting these findings. Many mothers in Indonesia and similar settings face constraints such as limited access to high-quality health information, crowded clinics, time pressure, and varying literacy levels, which can undermine conventional counseling and written leaflets. Video media partly addresses these challenges by providing standardized, engaging messages that do not depend heavily on reading skills and can be delivered efficiently during clinic visits; however, reliance on smartphones or stable electricity and devices can be a barrier in poorer or rural areas, which explains why leaflets remain an important complementary tool where digital access is inconsistent. The strong effects of both media in this study suggest that when content is culturally adapted, linguistically appropriate, and aligned with local service workflows, even simple educational tools can overcome some structural limitations commonly seen in LMIC health systems (Pilus et al., 2022).

Cultural and emotional factors also help explain why video may be slightly superior in influencing attitudes. In many Indonesian communities, breastfeeding beliefs are shaped by family traditions, community norms, and fears related to milk sufficiency; visual narratives showing local mothers, respectful depictions of modest breastfeeding positions, and reassurance from health professionals in the video may resonate more strongly than abstract text. Video can portray empathy, tone of voice, and nonverbal cues that normalize breastfeeding and address stigma, creating an emotional connection that supports attitude change in ways that leaflets cannot fully replicate. At the same time, leaflets provide a tangible, take-home reference that mothers can revisit or share with family members, which may be particularly valuable in extended households where grandmothers or husbands influence feeding decisions, illustrating why combining both media could be especially powerful in LMIC cultural settings (Widayani et al., 2025).

Although the direction of effects across media was consistent, some nuances and potential contradictions warrant consideration. The very large within-group effect sizes, despite modest differences between video and leaflet, suggest that content and structured counseling may matter more than the specific medium, especially when both are carefully designed and delivered under supervision. Moreover, because this was a non-randomized quasi-experimental design, residual confounding due to unmeasured factors such as prior exposure to breastfeeding information, family support, or digital literacy cannot be fully excluded, and future randomized or mixed-methods studies could explore why some mothers respond more strongly to video versus print. Nonetheless, by situating the findings within multimedia learning theory, social–cognitive models of behavior change, and the realities of LMIC health systems, the study provides a coherent explanation for the observed improvements. It supports the use of culturally tailored video and leaflet media as complementary strategies to promote exclusive breastfeeding in resource-constrained settings (Alhamedi et al., 2025).

Overall, although both media were significantly effective in improving postpartum mothers' Knowledge and attitudes toward exclusive breastfeeding, video media was slightly superior in improving maternal attitudes due to its stronger interactive and emotional appeal. However, leaflets remain highly useful, especially in contexts with limited access to technology and low costs. Therefore, using both media together can yield optimal results, leveraging the strengths of each to achieve more effective educational goals.

Implications and limitations

This study offers both practical and theoretical implications. Practically, the very large improvements in knowledge and attitudes suggest that brief, structured education using either video or leaflet media can be integrated into routine postpartum care at community health centers to strengthen exclusive breastfeeding promotion in low- and middle-income settings. Theoretically, the findings support multimedia learning and social-cognitive perspectives by showing that audiovisual messages, which combine narration, images, and modeled behaviours, can shape not only knowledge but also affective responses and motivation. At the same time, well-designed print materials still provide a useful cognitive scaffold that mothers can revisit and share with family members.

However, several limitations should be acknowledged when interpreting these results. The study used a relatively small, purposively selected sample from a single health center. It employed a non-randomized quasi-experimental design, which introduces potential selection bias and limits the generalizability of the findings to other regions, health facilities, or populations with different socio-cultural and technological profiles. Outcomes were measured only in the short term, immediately after the intervention, so it remains unknown whether the observed gains in knowledge and attitudes translate into sustained exclusive breastfeeding practices over months; future research with larger, randomized samples, multiple sites, and longer follow-up is needed to confirm the durability of effects and to refine the understanding of how different media formats influence maternal behaviour in diverse contexts.

Relevance to Practice

Health workers and policymakers can strengthen exclusive breastfeeding promotion in primary care by integrating brief, culturally tailored educational media—such as videos and illustrated leaflets—into routine postpartum counseling. When these tools are designed to fit local traditions and support personal engagement, they effectively enhance mothers' understanding and confidence, regardless of resource constraints or technology access. Combining visual and print media during health visits makes education more inclusive and relevant for diverse communities.

Conclusion

This study demonstrates that both video and leaflet educational media are effective tools to enhance postpartum mothers' knowledge and attitudes toward exclusive breastfeeding. Integrating accessible, well-designed educational materials into postpartum care can help bridge information gaps and foster positive behavioral change among mothers. These results reinforce the value of multimedia health education as a practical approach to support exclusive breastfeeding in diverse healthcare settings.

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CrediT Authorship Contributions Statement

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Deby Cyntia Yun: Software, Validation, Formal Analysis, Writing - Review & Editing

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Conflicts of Interest

There is no conflict of interest.

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