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The Effect of Animated Video-Based Health Education on Mothers' Knowledge and Attitudes Toward Stunting Prevention During the First 1000 Days of Life

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ABSTRACT Stunting remains a major public health challenge, particularly in developing countries, because it negatively affects children's physical growth, cognitive development, and future productivity. The first 1,000 days of life constitute a critical period for growth and development, during which nutritional deficiencies and inadequate maternal understanding of child health may increase the risk of stunting. Limited knowledge and unfavorable attitudes among mothers toward stunting prevention may hinder early preventive efforts. Therefore, effective educational interventions are needed to improve maternal awareness and promote positive health-related attitudes during this crucial period. This study aimed to determine the effect of animated video-based health education on mothers' knowledge and attitudes regarding stunting prevention during the first 1,000 days of life. A quasi-experimental study with a pre-test–post-test control group design was conducted in the working area of the Sidotopo Wetan Health Center, Surabaya, Indonesia. A total of 44 respondents were selected using cluster sampling and divided into intervention and control groups. The independent variable was health education delivered through animated videos, while the dependent variables were mothers' knowledge and attitudes toward stunting prevention. Data were collected using structured knowledge and attitude questionnaires. Statistical analysis was performed using the Wilcoxon Signed Rank Test to assess within-group differences and the Mann–Whitney U Test to compare differences between groups. The findings revealed a statistically significant improvement in mothers' knowledge and attitudes after receiving animated video-based health education on stunting prevention during the first 1,000 days of life ($p < 0.05$). Mothers in the intervention group demonstrated better post-test outcomes than those in the control group. In conclusion, animated video-based health education is effective in improving mothers' knowledge and attitudes toward stunting prevention. This approach may serve as an engaging and practical educational strategy to strengthen maternal awareness and support early stunting prevention programs in community health settings.

INDEX TERMS Stunting Prevention, Animated Video-Based Health Education, Mothers' Knowledge, Mothers' Attitudes, First 1000 Days of Life.

I. INTRODUCTION

Stunting remains a major public health problem because it reflects chronic growth faltering caused by prolonged nutritional deprivation and repeated exposure to infection during early life [1]. The condition is not only associated with impaired linear growth, but also with long-term deficits in cognition, learning capacity, immune function, and adult productivity [1], [2]. The first 1,000 days of life, spanning pregnancy until a child reaches two years of age, are therefore widely recognized as a critical developmental window. During this period, adequate maternal nutrition, appropriate infant feeding, and timely health care are essential to support optimal brain development, metabolic programming, and physical growth [2].

In Indonesia, the burden of stunting remains substantial despite gradual improvement over recent years. National reports continue to identify stunting reduction as a priority in human development and public health policy [3], [4]. The 2023 Indonesian Health Survey (SKI) reported that the national prevalence of stunting among children under five was still 21.5%, indicating that approximately one in five Indonesian children remained affected [5], [6]. Local disparities also persist. In Surabaya, official reports show a marked decline in prevalence, from 4.8% in 2022 to 1.6% in 2023, reflecting strong municipal commitment to the Zero

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Stunting agenda [7], [8]. Nevertheless, preliminary records from the working area of Puskesmas Sidotopo Wetan identified 26 stunting cases and 50 pre-stunting cases during January–May 2025, while initial interviews suggested that many mothers still had limited understanding of the 1,000 HPK concept [9]. These findings indicate that reduced city-level prevalence does not automatically eliminate pockets of vulnerability at the primary healthcare level.

The literature shows that stunting is shaped by multidimensional determinants involving maternal, child, household, and environmental factors [10]–[17]. Maternal knowledge is repeatedly discussed as an important component in prevention because it influences antenatal care utilization, maternal diet, breastfeeding practices, and complementary feeding decisions [10]–[13]. Likewise, recent evidence on infant and young child feeding highlights the continuing importance of improving mothers' knowledge, attitudes, and practices related to MP-ASI and exclusive breastfeeding as part of stunting prevention efforts [18]–[21]. Thus, strengthening maternal health literacy remains a strategically relevant intervention pathway, particularly in communities where information access is uneven.

State-of-the-art studies increasingly demonstrate that health education delivered through audiovisual media is more engaging than conventional counseling alone and can improve information retention, maternal understanding, and preventive behavior [22], [23]. In the Indonesian context, several recent studies have reported significant gains in knowledge and attitudes after education using animated videos or video-based nutrition messages, including interventions on stunting prevention, complementary feeding, and maternal nutrition practices [24]–[30]. However, most studies have been conducted in different sociocultural settings, and only limited evidence specifically addresses mothers in the Sidotopo Wetan area with a focus on the 1,000 HPK framework. This creates a clear research gap, because local context may shape both baseline knowledge and the effectiveness of media-based interventions.

Based on this gap, the present study aims to examine the effect of animated video–based health education on mothers' knowledge and attitudes regarding the first 1,000 days of life in the working area of Puskesmas Sidotopo Wetan, Surabaya. This study contributes in three ways:

1. It provides local empirical evidence on the effectiveness of animated video media in stunting-related education.
2. It extends the literature on audiovisual health promotion in primary healthcare settings, particularly for maternal education on 1,000 HPK.
3. It offers practical recommendations for integrating media-based education into community-level stunting prevention strategies.

The structure of this article is organized as follows: Section II presents the research methodology, including the study design, setting, sample selection, research instruments, intervention procedures, and statistical analysis. Section III reports the findings on the effects of animated video-based health education on mothers' knowledge and attitudes toward stunting prevention during the first 1,000 days of life. Section IV discusses the findings in relation to previous studies, highlights their implications for nursing practice and public health promotion, and addresses the limitations of the study. Finally, Section V concludes the article by summarizing the main findings and providing recommendations for future practice and research.

II. METHOD

A. STUDY DESIGN AND RATIONALE

This study employed a prospective quasi-experimental design using a pretest-posttest control group approach to examine the effect of animated video–based health education on mothers' knowledge and attitudes regarding stunting prevention during the first 1,000 days of life. A quasi-experimental design was selected because the study was conducted in a real community setting, where full randomization of participants was not feasible due to administrative and logistical considerations at the Family Posyandu level. This design nevertheless allowed the researcher to compare changes in outcome variables before and after the intervention within each group, as well as to assess differences between the intervention and control groups. In community-based health education research, such an approach is considered appropriate for evaluating the practical effectiveness of an intervention under routine service conditions [31], [32].

B. STUDY SETTING

The study was conducted in the working area of Puskesmas Sidotopo Wetan, Surabaya, located at Jl. Randu No. 38, Sidotopo Wetan Village, Kenjeran District, Surabaya City, Indonesia. This primary healthcare center serves a densely populated urban community with diverse socioeconomic and educational backgrounds. The site was chosen because preliminary local records indicated the presence of stunting and pre-stunting cases and because maternal understanding of the first 1,000 days of life was still limited. Data collection was carried out at four Family Posyandu under the health center's coverage area, namely Lavenda 1, Anggrek 1, Nusa Indah 1, and Gading 2. The field implementation of the study, including baseline assessment, intervention, and post-intervention evaluation, was conducted in September 2025.

C. PARTICIPANTS AND SAMPLING METHOD

The study population comprised mothers with children aged 0–24 months who were registered at the selected Family Posyandu. A total of 44 respondents participated in the study, consisting of 22 mothers in the intervention group and 22 mothers in the control group. Sample recruitment was conducted using a cluster sampling technique, with Family Posyandu serving as the recruitment clusters. This approach was chosen to facilitate field implementation and reduce contamination between participants who routinely interact within the same community service groups.

The inclusion criteria were: (1) mothers who had children aged 0–24 months; (2) mothers who were able to read and write; (3) mothers who attended both pretest and posttest sessions; (4) mothers who agreed to participate and were physically and mentally healthy during the study period; and

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(5) mothers who owned a mobile phone and were members of the relevant WhatsApp group to support intervention access. The exclusion criteria were: (1) mothers who declined participation and (2) mothers who were illiterate. Group allocation was non-randomized, and respondents were assigned into intervention and control groups according to the selected community clusters

D. MATERIALS AND EDUCATIONAL INTERVENTION

The educational medium used in this study was an animated video designed for maternal health education on stunting prevention during the first 1,000 days of life. The video was developed based on health promotion principles and structured to present key information in a concise, visually attractive, and easily understandable format. The educational content covered: the definition of stunting, causes and risk factors, consequences of stunting, the concept and importance of the first 1,000 days of life, characteristics and categories of stunting, and prevention strategies through maternal nutrition during pregnancy, exclusive breastfeeding, complementary feeding, growth monitoring, and infection prevention.

Animated video was selected because audiovisual media can improve attention, comprehension, and message retention more effectively than conventional one-way education, particularly for preventive health topics [34], [35]. The intervention group received the animated video–based education for seven consecutive days, with a video duration of approximately 10 minutes per session. The control group received a leaflet containing similar core information but without audiovisual reinforcement.

E. DATA COLLECTION INSTRUMENTS AND PROCEDURE

Data were collected using structured questionnaires measuring two outcome variables: knowledge and attitudes related to stunting prevention during the first 1,000 days of life. Prior to data collection, the questionnaires underwent validity and reliability testing to ensure adequacy for use in the study. Item validity testing showed that all knowledge and attitude items met the required threshold, with r-count values greater than r-table (N = 10; r-table = 0.632). Reliability testing of the attitude questionnaire demonstrated satisfactory internal consistency, with Cronbach's alpha values of 0.838 for positive attitude items and 0.842 for negative attitude items, indicating that the instrument was sufficiently reliable for research use [33].

The study procedure consisted of three sequential stages. First, a pretest was administered to both groups to measure baseline knowledge and attitudes before the intervention. Second, the intervention phase was implemented, during which the intervention group received animated video–based health education for seven days, while the control group received leaflet-based education only. Third, a posttest was conducted on the seventh day using the same questionnaire to assess changes in knowledge and attitudes following the intervention. All questionnaires were administered directly under the supervision of the researcher to maintain consistency of instructions and response conditions across participants.

F. DATA ANALYSIS

Data were coded, entered, and analyzed using **SPSS version** 26.0. Univariate analysis was performed to describe respondents' characteristics and the distribution of knowledge and attitude scores before and after the intervention in both groups. Bivariate analysis was then conducted to test the effect of the intervention. The Wilcoxon Signed-Rank Test was used to compare pretest and posttest scores within each group because the data were paired and ordinal in nature. The Mann-Whitney U Test was used to compare outcomes between the intervention and control groups. Statistical significance was determined at $\alpha = 0.05$; therefore, $p \leq 0.05$ indicated a statistically significant effect of the intervention.

G. ETHICAL CONSIDERATIONS

This study received ethical approval from the Health Research Ethics Committee of Poltekkes Kemenkes Surabaya with ethical clearance number EA/3883/KEPK-Poltekkes_Sby/V/2025. Written informed consent was obtained from all respondents prior to participation. Participants were informed that their involvement was voluntary, that they could withdraw at any time without consequences.

III. RESULTS

TABLE 1
Respondent Distribution Across Both the Intervention and Control Groups in the Sidotopo Wetan Health Center's Coverage Area

Characteristics	Intervention Group		Control group	
	Σ	%	Σ	%
Mother's age				
1. 20-25 years	9	40,9%	7	31,8%
2. 26-30 years	8	36,4%	9	40,9%
3. 30-40 years	5	22,7%	6	27,3%
Total	22	100%	22	100%
Last Education				
1. Elementary School	1	4,5%	2	9,1%
2. Junior High School	4	18,2%	7	31,8%
3. Senior High School	16	72,8%	13	59,1%
4. University	1	4,5%	0	0%
Total	22	100%	22	100%
Job				
1. Housewife	19	86,4%	17	77,3%
2. Private Employee	3	13,6%	4	18,2%
3. Civil Servant	0	0%	0	0%
4. Enterpreneur	0	0%	1	4,5%
Total	22	100%	22	100%
Income				
1. < 1.000.000	7	31,8%	8	36,4%
2. 1.000.000 – 3.500.000	9	40,9%	14	63,6%
3. >3.500.000	6	27,3%	0	0%
Total	22	100%	22	100%
Number of children				
1. 1	10	45,4%	8	36,4%
2. 2	6	27,3%	10	45,5%
3. > 2	6	27,3%	4	18,1%
Total	22	100%	22	100%

This research was conducted in September 2025 in the working area of Sidotopo Wetan Health Center, Jl. Randu No.

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38, Sidotopo Wetan Village, Kenjeran District, Surabaya City, at the Lavenda 1, Anggrek 1, Nusa Indah 1, and Gading 2 family health posts. The activities normally carried out each month at the health posts were: at the first table registration, at the second table weight measurement and height measurement, at the third table recording results and consultation, and at the fourth table vitamin distribution. At these four health posts, at the time of the research, there was still no table for counseling; therefore, with the assistance of the cadres, a space was provided for this research to take place.

According to the information in TABLE 1, it is known that the mothers' age in the intervention group is mostly between 20-25 years, which is 9 respondents (40.9%), and the control group is between 26-30 years, which is 9 respondents (40.9%). The most recent education attained in both groups was senior high school. The most common occupation among respondents in both groups was housewife. The family income of mothers in the intervention group and the control group was 1,000,000-3,500,000, namely 9 respondents (40.9%) and 14 respondents (63.6%), respectively. The number of children in the intervention group was mostly 1 child, totaling 10 respondents (45.4%), while in the control group, it was mostly 2 children, totaling 10 respondents (45.5%).

TABLE 2
Distribution of Knowledge Variable Results Before and After Health Education Given to Respondents: Mothers of Children Aged 0–24 months in the Sidotopo Wetan Health Center Service Area, September 2025

Category	Intervention Group				Control group			
	Pre Test		*Post Test*		*Pre Test*		*Post Test*	
	Σ	%	Σ	%	Σ	%	Σ	%
Good	7	31,8	22	100	4	18,2	10	45,5
Enough	10	45,5	0	0	11	50,0	7	31,8
Less	5	22,7	0	0	7	31,8	5	22,7
Total	22	100	22	100	22	100	22	100

Data indicate that presented in TABLE 2, the distribution of respondents' knowledge levels in both the intervention and control groups was assessed before and after receiving health education. In the intervention group, most respondents during the pre-test were categorized as having sufficient knowledge, totaling 10 individuals (45.5%). After the intervention, their knowledge improved markedly, with all 22 respondents (100%) falling into the good knowledge category. Meanwhile, in the control group, half of the respondents (11 people; 50.0%) initially had sufficient knowledge, and in the post test, only 10 individuals (45.5%) reached the good knowledge category.

TABLE 3
Distribution of Attitude Variable Results Before and After Health Education Given to Respondents: Mothers of children aged 0–24 months in the Sidotopo Wetan Health Center service area, September 2025

Category	Intervention Group				Control group			
	Pre Test		*Post Test*		*Pre Test*		*Post Test*	
	Σ	%	Σ	%	Σ	%	Σ	%
Negative	13	59,1	7	31,8	14	63,6	10	45,5
Positive	9	40,9	15	68,2	8	36,4	12	54,5
Total	22	100	22	100	22	100	22	100

Data indicate that presented in TABLE 3, the distribution of respondents' attitude levels in both the intervention and control groups was identified before and after the provision of health education. In the intervention group, most respondents showed negative attitudes during the pre-test, totaling 13 individuals (59.1%). After the intervention, their attitudes improved markedly, with 15 respondents (68.2%) demonstrating positive attitudes in the post-test. In the control group, the majority initially displayed negative attitudes, with 14 respondents (63.4%), and after the post-test, only 12 individuals (54.5%) were categorized as having positive attitudes.

TABLE 4
Impact of Health Education Using Animated Videos on Mothers' knowladge Regarding Stunting Prevention in the First 1,000 Days of Life Across Both Intervention and Control Groups.

Category	Intervention Group				Control group			
	Pre Test		*Post Test*		*Pre Test*		*Post Test*	
	Σ	%	Σ	%	Σ	%	Σ	%
Good	7	31,8	22	100	4	18,2	10	45,5
Enough	10	45,5	0	0	11	50,0	7	31,8
Less	5	22,7	0	0	7	31,8	5	22,7
Total	22	100	22	100	22	100	22	100
Wilcoxon Sign Rank Test	p=0,000				p=0,102			
Mann Whitney U Test	*Pre Test* = 0,499 *Post Test* = 0,000							

According to the information in TABLE 4, it shows the effect of using animated video-based health education on mothers' knowledge regarding stunting prevention was assessed, with the Wilcoxon Signed-Rank Test showing a p-value of 0.000 ($\alpha<0.05$), indicating a significant difference in knowledge levels between the pre-test and post-test within the intervention group after the health education was provided. Additionally, the Mann–Whitney U Test revealed a p-value of 0.000 for the post-test knowledge comparison between the intervention and control groups, demonstrating statistical significance ($\alpha<0.05$), a significant difference existed following the intervention.

TABLE 5
Impact of Health Education Using Animated Videos on Mothers' Attitudes Regarding Stunting Prevention in the First 1,000 Days of Life Across Both Intervention and Control Groups.

Category	Intervention Group				Control group			
	Pre Test		*Post Test*		*Pre Test*		*Post Test*	
	Σ	%	Σ	%	Σ	%	Σ	%
Negative	13	59,1	7	31,8	14	63,6	10	45,5
Positive	9	40,9	15	68,2	8	36,4	12	54,5
Total	22	100	22	100	22	100	22	100
Wilcoxon Sign Rank Test	p=0,000				p=0,087			
Mann Whitney U Test	*Pre Test* = 0,841 *Post Test* = 0,002							

According to the information in TABLE 5, it shows the influence of health education on stunting prevention using animated videos on mothers' attitudes. The Wilcoxon Signed Ranks Test yielded a p-value of 0.000 ($\alpha<0.05$), indicating a significant change in attitudes toward stunting prevention during the first 1000 days of life between the pre-test and post-test in the intervention group after the intervention was administered. Additionally, the Mann–Whitney U Test produced a p-value of 0.002 for the post-test attitude comparison between the intervention and control groups,

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demonstrating that (α<0.05) a significant difference was present following the intervention.

IV. DISCUSSION

This study demonstrated that animated video–based health education significantly improved mothers' knowledge and attitudes toward stunting prevention during the first 1,000 days of life. Before the intervention, most respondents in both groups had only moderate knowledge, and negative attitudes were more common than positive ones. After seven consecutive days of exposure to the educational videos, all respondents in the intervention group reached the good knowledge category, whereas the control group showed only modest improvement. A similar pattern was observed for attitudes. The intervention group shifted from predominantly negative attitudes at baseline to predominantly positive attitudes at post-test, while the control group showed a less pronounced change. These findings, together with the statistically significant Wilcoxon and Mann–Whitney test results, indicate that the observed improvements were unlikely to have occurred by chance and were plausibly attributable to the educational intervention.

The improvement in knowledge can be interpreted as the result of repeated, structured, and multimodal learning. Animated videos combine narration, text, images, and motion, allowing mothers to receive the same information through more than one sensory channel. In practical terms, this may increase attention, comprehension, and memory retention, especially when the material addresses concrete maternal behaviors such as pregnancy nutrition, exclusive breastfeeding, complementary feeding, infection prevention, and growth monitoring. The seven-day repetition used in this study also likely strengthened recall and helped participants consolidate newly acquired information. This interpretation is supported by recent studies showing that animated or audiovisual education is effective in increasing maternal understanding of stunting-related topics. Dewi *et al.* reported that animation-based nutrition education improved mothers' knowledge and attitudes regarding stunting [37]. Likewise, Ningrum *et al.* found that animated video education significantly increased maternal knowledge about animal-protein feeding as a strategy to prevent stunting among toddlers [38]. Similar results were also reported by Armiyanti and Hanim, who observed significant improvements in knowledge and attitudes after health video education among pregnant women [39]. Taken together, these studies reinforce the conclusion that audiovisual education is a suitable medium for delivering maternal and child nutrition messages in community settings.

Although both knowledge and attitudes improved, the gain in knowledge was stronger and more complete than the gain in attitudes. In the intervention group, knowledge reached 100% in the good category, while attitudes improved substantially but remained mixed, with 68.2% classified as positive and 31.8% still negative. This difference is important because it suggests that cognitive change may occur more rapidly than attitudinal change. Knowledge can increase once participants receive accurate and comprehensible information, but attitudes are often shaped by broader and more persistent influences, including prior beliefs, family practices, cultural feeding norms, social expectations, and the perceived feasibility of changing behavior in everyday life. In this context, some mothers may have understood the recommended practices but still hesitated to fully endorse them because of habit, household constraints, or conflicting experiences. The persistence of some negative attitudes may therefore reflect the complexity of behavior change rather than failure of the intervention. This interpretation is consistent with digital education research showing that technology-based health education can significantly improve both knowledge and attitudes, but attitudinal shifts are often less immediate and may require longer reinforcement [40].

The baseline findings are also meaningful. Before the intervention, most respondents had sufficient rather than good knowledge, and negative attitudes predominated in both groups. This suggests that mothers were not completely uninformed, but their understanding was still incomplete and possibly fragmented. In real-world maternal and child health settings, partial knowledge can be insufficient for preventive action, especially when stunting prevention requires integrated behavior across pregnancy, lactation, complementary feeding, hygiene, and health service use. The finding that some mothers in the control group showed limited improvement, and some even appeared to perform less well at post-test, may reflect the weaker educational intensity of the leaflet-only approach and the absence of repeated audiovisual reinforcement. It is also plausible that educational background influenced the ability to absorb new information. Laksono *et al.* showed that maternal education is significantly associated with stunting among children under two years in Indonesia, highlighting how educational disadvantage remains closely linked to child nutrition vulnerability [36]. Although that study examined stunting rather than educational uptake directly, it strengthens the argument that maternal education shapes health literacy, decision-making, and the practical application of nutrition information. In the present study, respondents with lower educational attainment may therefore have required more guided discussion, reinforcement, or family support beyond video exposure alone.

This study also aligns with a growing body of evidence suggesting that effective stunting prevention education should be structured, repeated, and embedded in the community. Athiyyah *et al.* demonstrated that community-based health education significantly improved maternal knowledge in a rural Indonesian setting [41]. Similarly, Andriyani *et al.* found that a PRECEDE–PROCEED model–based health promotion intervention improved mothers' knowledge of stunting prevention in Indonesian communities, emphasizing the value of theory-informed program design [42]. More recently, Setiawan *et al.* reported that family-based nursing interventions improved mothers' knowledge, attitudes, and self-efficacy related to stunting prevention, suggesting that educational gains may be even stronger when mothers are supported by family-centered approaches rather than individual education alone [43]. Compared with those studies, the present research contributes additional evidence that even

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a relatively short, seven-day animated video intervention can produce measurable gains. This is important for primary health care services because it shows that effective education does not always require long and resource-intensive programs, provided that the content is accessible, focused, and delivered repeatedly.

Another important interpretation concerns the practical suitability of animated videos for public health settings. Mothers in the study were required to own a mobile phone and participate in a WhatsApp group, which reflects a communication pattern that is increasingly common in Indonesian communities. This means the intervention was not only educationally effective but also operationally feasible. Compared with conventional one-time counseling or print leaflets, animated videos can be replayed, shared, and accessed outside formal service hours. Such flexibility may help mothers revisit complex information at their own pace, discuss it with family members, and integrate it into everyday caregiving practices. The implication is that health centers and *posyandu* programs could adopt animated videos as a scalable complement to face-to-face counseling. Rather than replacing direct interaction with health workers, video-based education may strengthen it by standardizing key messages and allowing in-person sessions to focus on questions, motivation, and practical problem-solving.

Despite these strengths, several limitations should be acknowledged. First, the study used a quasi-experimental design with a relatively small sample of 44 respondents from one public health center area, which limits generalizability. The results are promising, but they may not fully represent mothers in rural settings, remote areas, or populations with different socioeconomic and digital access profiles. Second, the follow-up period was short, with post-test assessment conducted on the seventh day. Consequently, the study demonstrates immediate educational effectiveness but cannot confirm whether knowledge and attitudes were sustained over weeks or months. Third, the outcomes were limited to knowledge and attitudes measured by questionnaire. The study did not assess whether mothers subsequently changed feeding practices, antenatal behavior, hygiene behavior, service utilization, or child growth outcomes. Therefore, the findings should not be overextended to claim direct reductions in stunting incidence. Fourth, because respondents knew they were being studied, social desirability and testing effects may have influenced post-test responses. Finally, some improvement in the control group suggests the possibility of information contamination, repeated-test familiarity, or limited educational benefit from the leaflet, all of which should be considered when interpreting the between-group difference.

These limitations point to several implications for research and practice. Future studies should use larger and more diverse samples, include longer follow-up periods, and measure behavioral as well as anthropometric outcomes to determine whether educational gains translate into real reductions in stunting risk. Comparative studies between video, booklet, counseling, and blended interventions would also be valuable for identifying the most efficient delivery model. From a service perspective, the present findings support integrating animated video education into routine maternal and child health promotion at the *puskesmas* and *posyandu* levels, particularly for topics related to the first 1,000 days of life. However, to maximize impact, video-based education should ideally be combined with interpersonal counseling, family involvement, and reinforcement by community health cadres. In conclusion, the present study provides credible evidence that animated video–based health education is an effective and practical strategy for improving maternal knowledge and attitudes toward stunting prevention. While additional research is needed to confirm long-term behavioral and nutritional effects, the findings suggest that this medium has strong potential to strengthen community-based stunting prevention programs in Indonesia.

V. CONCLUSION

This study aimed to determine the effect of animated video–based health education on mothers' knowledge and attitudes toward stunting prevention during the first 1,000 days of life in the working area of Sidotopo Wetan Public Health Center, Surabaya. The findings indicate that the intervention was effective in improving both outcome variables among mothers in the intervention group. In terms of knowledge, before the intervention, only 7 respondents (31.8%) were categorized as having good knowledge, while most were in the sufficient category (10 respondents; 45.5%) and 5 respondents (22.7%) had low knowledge. Following the seven-day animated video intervention, all 22 respondents (100%) in the intervention group reached the good knowledge category. By contrast, in the control group, the proportion of respondents with good knowledge increased only from 4 respondents (18.2%) to 10 respondents (45.5%). Statistical analysis further confirmed this effect, with the Wilcoxon Signed-Rank Test showing a significant improvement in knowledge in the intervention group ($p = 0.000$), while the control group showed no significant change ($p = 0.102$), and the post-test Mann–Whitney U Test demonstrated a significant difference between groups ($p = 0.000$). A similar trend was found for attitudes. In the intervention group, the proportion of mothers with positive attitudes increased from 9 respondents (40.9%) before the intervention to 15 respondents (68.2%) after the intervention, whereas negative attitudes decreased from 13 respondents (59.1%) to 7 respondents (31.8%). In the control group, positive attitudes increased only from 8 respondents (36.4%) to 12 respondents (54.5%), with no statistically significant within-group change ($p = 0.087$), while the intervention group showed significant improvement ($p = 0.000$) and a significant post-test difference between groups was identified ($p = 0.002$). Therefore, animated video–based health education can be considered an effective and practical educational medium for strengthening maternal understanding and attitudes related to stunting prevention in community settings. Future studies are recommended to involve larger and more diverse samples, apply longer follow-up periods, and assess whether improvements in knowledge and attitudes are sustained over time and translated into actual maternal practices and child nutritional outcomes.

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DATA AVAILABILITY

No datasets were generated or analyzed during the current study.

AUTHOR CONTRIBUTION

Margaretha Angelia Prajogo conceptualized and designed the study, conducted data collection, implemented the intervention, performed data analysis, and drafted the manuscript. Irine Christiany contributed to the study design, supervised the research process, and critically reviewed the manuscript. Endah Suprihatin contributed to the development of the educational intervention, assisted in data interpretation, and revised the manuscript for important intellectual content. Mohammad Najib contributed to methodological guidance, data analysis and interpretation, and final manuscript review. All authors read and approved the final version of the manuscript and agreed to be accountable for all aspects of the work.

DECLARATIONS

ETHICAL APPROVAL

This study adhered to ethical guidelines and was approved by the Health Research Ethics Committee (KEPK) of Poltekkes Kemenkes Surabaya, under ethical clearance No. EA/3883/KEPK-Poltekkes_Sby/V/2025. Informed consent was obtained from all participating mothers with children aged 0–24 months, and both confidentiality and anonymity were upheld throughout the study. All research procedures complied with established ethical standards for studies involving human participants.

CONSENT FOR PUBLICATION PARTICIPANTS.

Consent for publication was given by all participants

COMPETING INTERESTS

The authors declare no competing interests.

REFERENCES

[1] World Health Organization, UNICEF, and World Bank Group, "Joint child malnutrition estimates," 2025. [Online]. Available: WHO Joint Child Malnutrition Estimates.

[2] A. Pettoello-Mantovani *et al*., "The first thousand days: nourishing the developing brain for a lifetime of mental well-being. Narrative review," *Global Pediatrics*, vol. 13, Art. no. 100270, 2025, doi: 10.1016/j.gpeds.2025.100270.

[3] Badan Pusat Statistik, *Laporan Indeks Khusus Penanganan Stunting (IKPS) 2022–2023*. Jakarta, Indonesia: BPS, 2024.

[4] Badan Kebijakan Pembangunan Kesehatan, Kementerian Kesehatan RI, *Laporan Tematik Survei Kesehatan Indonesia Tahun 2023*. Jakarta, Indonesia: BKPK, 2024.

[5] Badan Kebijakan Pembangunan Kesehatan, Kementerian Kesehatan RI, *Survei Kesehatan Indonesia (SKI) 2023 Dalam Angka*. Jakarta, Indonesia: BKPK, 2024.

[6] Badan Kebijakan Pembangunan Kesehatan, Kementerian Kesehatan RI, *Stunting di Indonesia dan Determinannya*. Jakarta, Indonesia: BKPK, 2024.

[7] Dinas Kesehatan Kota Surabaya, *Profil Kesehatan Kota Surabaya 2023*. Surabaya, Indonesia: Dinas Kesehatan Kota Surabaya, 2023.

[8] Pemerintah Kota Surabaya, "Kasus stunting di Surabaya tinggal 1,6 persen, Wali Kota Eri optimis segera zero stunting," 2024. [Online]. Available: Portal Resmi Pemerintah Kota Surabaya.

[9] Puskesmas Sidotopo Wetan, "Preliminary records of stunting and pre-stunting cases, January–May 2025," unpublished local data, Surabaya, Indonesia, 2025.

[10] P. M. Putri, A. S. Shafira, and G. S. Mahardhika, "Stunting reduction strategy in Indonesia: maternal knowledge aspects," *The Indonesian Journal of Public Health*, vol. 19, no. 2, pp. 329–343, 2024, doi: 10.20473/ijph.v19i2.2024.329-343.

[11] F. Haryanti *et al*., "Maternal knowledge on nutritional-focused nurturing care and associated factors among women with stunted children aged 6–23 months in Yogyakarta, Indonesia: A cross-sectional study," *Belitung Nursing Journal*, vol. 10, no. 4, pp. 472–480, 2024, doi: 10.33546/bnj.3481.

[12] M. F. Ramadhan, H. Dimiati, Hidayaturrahmi, and R. Indah, "The correlation between stunting, maternal knowledge, and nutritional care in Aceh, Indonesia," *Amerta Nutrition*, vol. 8, no. 4, pp. 513–518, 2024, doi: 10.20473/amnt.v8i4.2024.513-518.

[13] S. I. Hermawan, D. I. Yani, H. Yulianita, and L. Rahayuwati, "Correlation mothers' knowledge about stunting and exclusive breastfeeding behavior," *Journal of Nursing Care*, vol. 6, no. 2, 2023, doi: 10.24198/jnc.v6i2.44398.

[14] M. R. Dewi, A. A. P. Wirawan, and A. Muslihah, "Determinants of stunting in urban and rural areas of Indonesia: A systematic review," *AcTion: Aceh Nutrition Journal*, vol. 10, no. 3, pp. 860–874, 2025, doi: 10.30867/action.v10i3.2690.

[15] S. Siramaneerat *et al*., "Examining determinants of stunting in urban and rural Indonesia: a multilevel analysis using the population-based Indonesian Family Life Survey (IFLS)," *BMC Public Health*, vol. 24, Art. no. 1371, 2024, doi: 10.1186/s12889-024-18824-z.

[16] Y. D. Purwani *et al*., "Determinants of childhood stunting in Central Java, Indonesia: The role of maternal mental health and child health history," *SAGE Open Pediatrics*, vol. 12, 2025, doi: 10.1177/30502225251401695.

[17] S. Supadmi *et al*., "Factors related to stunting incidence in toddlers with working mothers in Indonesia," *International Journal of Environmental Research and Public Health*, vol. 19, no. 17, Art. no. 10654, 2022, doi: 10.3390/ijerph191710654.

[18] I. Dwijayanti, A. Al Mamun, D. Setiarsih, M. Sulistyowati, and T. Mahmudiono, "Exploring global mothers' knowledge, attitudes, and practice of complementary feeding: A scoping review," *Nutrition*, vol. 120, Art. no. 112335, 2024, doi: 10.1016/j.nut.2023.112335.

[19] J. Tengkawan *et al*., "Improving knowledge, attitude, and practices of complementary feeding using practical intervention training for parents living in Central Lombok, Indonesia: A community-based study," *WHO South-East Asia Journal of Public Health*, vol. 11, no. 1, pp. 54–60, 2022, doi: 10.4103/WHO-SEAJPH.WHO-SEAJPH_336_20.

[20] E. M. M. Has, Nursalam, and Y. S. Arief, "Improving complementary feeding practice and child growth in Indonesia through family empowerment intervention," *Journal of the Pakistan Medical Association*, vol. 73, no. 2 Suppl., pp. S7–S12, 2023, doi: 10.47391/JPMA.Ind-S2-2.

[21] D. Simbolon and N. Putri, "Stunting prevention through exclusive breastfeeding in Indonesia: A meta-analysis approach," *Amerta Nutrition*, vol. 8, no. 1SP, pp. 105–112, 2024, doi: 10.20473/amnt.v8i1SP.2024.105-112.

[22] S. Pujari *et al*., "Effect of video-assisted educational intervention on improving knowledge, attitude and practice among mothers of children below five years on malnutrition: A systematic review,"

e-ISSN:2808-6422; p-ISSN:2829-3037
Vol. 6 No.3, pp. 175-182, June 2026

Public Health, vol. 242, pp. 28–36, 2025, doi: 10.1016/j.puhe.2025.02.031..

[23] A. Haris, I. K. Swarjana, A. A. A. Y. Darmini, and N. M. S. Rahyanti, "The effectiveness of animated videos in health education: Improving knowledge, attitudes, and behaviors," *Journal of Nursing Care*, vol. 9, no. 1, 2026, doi: 10.24198/jnc.v9i1.66263.

[24] R. D. Pratiwi, J. N. Azahra, F. Kasumawati, S. N. Romlah, and T. B. Sansuwito, "Effectiveness of health promotion through animation video on knowledge and attitudes in stunting prevention among mothers in the Baduy Tribe," *Window of Health: Jurnal Kesehatan*, vol. 8, no. 3, pp. 346–355, 2025, doi: 10.33096/woh.vi.2681.

[25] N. D. Oktarina and F. Wijayanti, "Health education using videos to increase mothers' knowledge about stunting prevention in the first 1000 days of a child's life," *Journal of Integrated Health Research*, vol. 1, no. 2, pp. 33–39, 2025, doi: 10.70109/jinher.v1i2.9.

[26] F. S. Kusumarini, I. N. T. Komalyna, Tapriadi, and I. D. N. Supariasa, "Differences in mother's knowledge, energy consumption, and protein in stunted toddlers between nutrition education with video media and without video media in Purwodadi Village, Blimbing District, Malang City," *Media Publikasi Promosi Kesehatan Indonesia (MPPKI)*, vol. 7, no. 8, pp. 2192–2202, 2024, doi: 10.56338/mppki.v7i8.5698.

[27] Fathinatusholihah, E. Destarianiy, R. Efriani, D. Simbolon, and E. Wahyuni, "Pengaruh video animasi dan e-leaflet terhadap perilaku deteksi dini stunting," *Jurnal SAGO Gizi dan Kesehatan*, vol. 5, no. 3A, pp. 811–819, 2024, doi: 10.30867/gikes.v5i3A.1777.

[28] R. Astriani, D. Sutinbuk, and F. Rizkiah, "Pengaruh penyuluhan menggunakan media video tentang stunting terhadap pengetahuan, sikap dan tindakan ibu balita," *Masker Medika*, vol. 11, no. 2, pp. 420–431, 2023, doi: 10.52523/maskermedika.v11i2.586.

[29] A. Kinasih and C. A. N. Afifah, "Eduting (Edukasi Stunting) dengan media video untuk meningkatkan pengetahuan dan sikap ibu balita di Desa Ngepung Kabupaten Nganjuk," *Nutrizione: Nutrition Research and Development Journal*, vol. 3, no. 3, pp. 66–75, 2024.

[30] N. Burah, S. Reski, D. R. Wahyunigrum, and J. Cahyono, "The effectiveness of nutrition education about stunting using video media on the knowledge and attitudes of mothers of toddlers," *Journal of Health and Nutrition Research*, vol. 3, no. 1, pp. 74–82, 2024, doi: 10.56303/jhnresearch.v3i1.202.

[31] S. Sugiyono, *Metode Penelitian Kuantitatif*, 3rd ed. Bandung, Indonesia: Alfabeta, 2022.

[32] I. K. Swarjana, *Metodologi Penelitian Kesehatan: Edisi Terbaru*. Yogyakarta, Indonesia: Penerbit Andi, 2023.

[33] A. Roebianto, S. I. Savitri, I. A. Syaiful, A. Suciyana, and L. Mubarokah, "Content validity: Definition and procedure of content validation in psychological research," *TPM-Testing, Psychometrics, Methodology in Applied Psychology*, vol. 30, no. 1, pp. 5–18, 2023, doi: 10.4473/TPM30.1.1.

[34] R. Astriani, D. Sutinbuk, and F. Rizkiah, "Pengaruh penyuluhan menggunakan media video tentang stunting terhadap pengetahuan, sikap dan tindakan ibu balita," *Masker Medika*, vol. 11, no. 2, pp. 420–431, 2023, doi: 10.52523/maskermedika.v11i2.586.

[35] D. Ningrum, D. K. Setiadi, A. P. Sejati, and R. N. Fauziyah, "The influence of animation video-based education on mothers' knowledge about animal protein to prevent stunting in toddlers," *Jurnal Riset Kesehatan Poltekkes Kemenkes Bandung*, vol. 16, no. 1, pp. 238–251, 2024, doi: 10.34011/juriskesbdg.v16i1.2411.

[36] A. D. Laksono, R. D. Wulandari, N. Amaliah, and R. W. Wisnuwardani, "Stunting among children under two years in Indonesia: Does maternal education matter?," *PLOS ONE*, vol. 17, no. 7, Art. no. e0271509, Jul. 2022, doi: 10.1371/journal.pone.0271509.

[37] B. Dewi, Z. Dewi, and N. W. Hariati, "Pengaruh edukasi gizi dengan media animasi terhadap pengetahuan dan sikap ibu tentang stunting," *Jurnal Riset Pangan dan Gizi (JR-PANZI)*, vol. 5, no. 1, pp. 14–25, 2023, doi: 10.31964/jr-panzi.v5i1.178.

[38] D. Ningrum, D. K. Setiadi, A. P. Sejati, and R. N. Fauziyah, "Pengaruh pendidikan berbasis media video animasi terhadap pengetahuan ibu tentang protein hewan untuk mencegah balita stunting," *Jurnal Riset Kesehatan Poltekkes Depkes Bandung*, vol. 16, no. 1, pp. 238–251, 2024, doi: 10.34011/juriskesbdg.v16i1.2411.

[39] Armiyanti and B. Hanim, "Efektivitas video kesehatan terhadap pengetahuan dan sikap ibu tentang stunting di wilayah kerja Puskesmas Bangeko Kanan," *Zona Kebidanan*, vol. 14, no. 3, pp. 95–105, Aug. 2024, doi: 10.37776/zkeb.v14i3.1490.

[40] S. A. Andayani, E. Hasim, and N. E. C. Dewi, "The Effect of Web-Based Education on Mother's Knowledge and Attitudes in Stunting Prevention," *Journal of Nursing Care*, vol. 7, no. 2, Aug. 2024, doi: 10.24198/jnc.v7i2.54015.

[41] A. F. Athiyyah, I. G. M. R. Ranuh, A. Darma, K. R. Sumitro, B. Budiyanto, M. Irawan, S. C. Susianto, S. Z. T. Thirafi, S. Yasmine, and S. M. Sudarmo, "Community-Based Health Education for Improving Maternal Knowledge of Childhood Stunting and Gastrointestinal Disorders in Rural Bondowoso, Indonesia," *Indonesian Journal of Community Engagement*, vol. 11, no. 3, pp. 167–171, Sep. 2025, doi: 10.22146/jpkm.100888.

[42] S. Andriyani, A. Sulastri, L. A. Fitriana, D. Darmawan, A. L. Perdani, T. D. Safariah, N. Malisa, T. H. Putri, and H. S. Mediani, "Effectiveness of a Precede–Proceed Model-Based Health Promotion Intervention on Evaluating Changes In Mothers' Knowledge of Stunting Prevention in Indonesian Communities," *Journal of Multidisciplinary Healthcare*, vol. 18, pp. 8249–8256, Dec. 2025, doi: 10.2147/JMDH.S541443.

[43] A. Setiawan, S. B. Syamsir, D. C. Rahmadiyah, Astuti, L. Atamou, R. Talilah, and S. Shorey, "Effects of family-based nursing interventions on mothers' knowledge, attitudes, and self-efficacy related to stunting prevention in Indonesia: A quasi-experimental study," *International Journal of Nursing Sciences*, early access, Feb. 09, 2026, doi: 10.1016/j.ijnss.2026.02.008.