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The Power of Visual Learning: Audio-Visual Health Education to Combat Stunting in Toddlers

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ABSTRACT

Purpose of the study: The aim of this study was to determine the effect of health education using audio-visual media on mothers' knowledge about stunting in toddlers.

Methodology: The research was quantitative, using a pre-experimental design with a one-group pretest-posttest design. The sample consisted of 34 mothers with toddlers in Sitardas Village.

Main Findings: The results of the study showed that the average score of mothers' knowledge about stunting before health education using audio-visual media was 6.12 and after health education using audio-visual media, there was an increase in knowledge of 9.18. Based on analysis using the Wilcoxon test, a p-value of 0.000 was obtained, which means there is an effect of health education using audio-visual media on mothers' knowledge about stunting in toddlers.

Novelty/Originality of this study: This research is novel in that it examines the effectiveness of audiovisual media in health education for mothers regarding stunting in toddlers. The use of interactive media provides a more engaging and understandable approach, potentially significantly increasing mothers' knowledge and becoming a more effective educational strategy at the community level.

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1. INTRODUCTION

Stunting is a condition of growth failure in toddlers due to chronic malnutrition, particularly during the first 1,000 days of life [1]-[3]. This condition not only impacts physical growth but also affects a child's brain development. Children who experience stunting are at higher risk of developing chronic diseases in adulthood. Stunting usually begins in the womb and is not fully apparent until the child is two years old [4], [5]. UNICEF and WHO define stunting as a child's height falling below established growth standards.

Stunting is often referred to as a condition of short stature in children during their growth period [6], [7]. Stunting is categorized based on a Z-score, ranging from tall, normal, stunted, to severely stunted. In Indonesia, the prevalence of stunting remains relatively high and is a serious concern for the government [8], [9]. National programs continue to strive to reduce the incidence of stunting, in line with the global sustainable development target of reducing stunting cases by 40% by 2025. The government has also launched various interventions to address this issue holistically. According to the WHO, in 2020, there were approximately 83.6 million stunted children in Asia, with the largest proportion in South Asia. Stunting is also the second-largest problem globally after wasting and obesity in children. Global data shows that the majority of stunting cases

occur in developing, lower-middle-income countries. This reflects that stunting is not only a nutritional issue but also closely related to social and economic aspects [10], [11]. Therefore, stunting interventions need to be tailored to the local context of each region.

Indonesia has one of the highest stunting prevalence rates in the world, ranking fourth globally. According to the 2021 National Survey of Children and Children, the stunting prevalence in Indonesia reached 24.4%, although this figure has decreased from the previous year. However, this figure still falls short of the WHO standard of 20%. Several provinces, such as East Nusa Tenggara, West Sulawesi, and Aceh, have stunting prevalence rates above 35%, indicating the need for more intensive interventions. This indicates that the stunting problem has not been fully resolved, especially in areas with limited access and information.

One area with a high prevalence of stunting is Central Tapanuli Regency, particularly in the Hutabalang Community Health Center (Puskesmas) area. In 2022, there were 54 cases of stunting in toddlers out of a total of 1,613 in this area. Sitardas Village even recorded 15 cases out of a total of 200 toddlers. Various factors contribute to the high stunting rate, including low maternal knowledge, recurrent infections, and limited health services [12], [13]. The dominant factor is the lack of education and accurate information regarding stunting prevention from pregnancy.

Various studies have shown a significant relationship between maternal knowledge and the incidence of stunting in children [14]-[16]. Mothers with low knowledge tend to ignore the importance of proper nutrition and parenting. Health education has been shown to improve mothers' understanding of stunting and its prevention [17]-[19]. Previous research has also shown that the use of educational media can strengthen the impact of health education [20], [21]. Therefore, the method of information delivery is a crucial aspect in increasing the effectiveness of education for mothers of toddlers.

Audio-visual media is an effective educational tool for conveying health information in an engaging and easy-to-understand manner [22], [23]. This media can stimulate both senses: hearing and sight, thus facilitating understanding and memory. Research shows that the use of audiovisual media in health education significantly improves mothers' knowledge. Compared to other media such as leaflets, audiovisual media is considered more efficient and interactive [24], [25]. Therefore, this study aims to determine the effect of health education using audiovisual media on improving mothers' knowledge about stunting in toddlers.

The novelty of this study lies in the use of contextually developed and validated audiovisual media for rural communities, combining local menu examples, practical illustrations, and accessible language as a relatively brief yet structured nutrition education tool; this differs from many previous studies that still focus on face-to-face lectures or printed materials. The urgency is clear because the prevalence of stunting remains high and mothers' low knowledge about stunting prevention makes effective and easily replicable communication interventions a priority to reduce long-term risks to children. Therefore, the main objective of this study was to test the effectiveness of audiovisual-based health education in improving mothers' knowledge of stunting prevention among toddlers, while also providing practical evidence for the development of scalable and locally appropriate health communication strategies.

2. RESEARCH METHOD

2.1. Type and Design of Research

This study uses a quantitative research method with an experimental research type and the design used in this study is Pre-Experimental Design [26], [27]. Pre-Experimental Design is an experimental study that still has external variables that influence the dependent variable, because the experiment conducted only involves one group without a comparison or control group [28], [29]. The design model used is One Group Pretest Posttest, namely an experimental design carried out with a pretest before treatment and a posttest after treatment is given.

Table 1. One-Group Pretest-Posttest Design

Pretest	Treatment	Posttest
O_1	X	O_2

Information:
O_1 : Pretest value before treatment
X : Treatment
O_2 : Posttest scores after receiving treatment

2.2. Population and Sample

A population is all objects or subjects within a given area that meet certain requirements related to the problem being studied [30]. The population in this study was all 171 mothers with toddlers in Sitardas Village. The sample is a subset of the population. Samples drawn from the research population must be representative. In determining the sample size, the sample size was 34 individuals, using simple random sampling. The inclusion criteria established by the researcher in this study were as follows: mothers residing in Sitardas Village, mothers

with children aged 1–5 years, physically and mentally healthy, and willing to participate in the research by providing voluntary consent.

2.3. Data Collection Instruments

Research instruments are the tools used for data collection. The data collection tools in this study included respondents' demographic data, including age, education, and occupation. For health education data, audio-visual media were used, including video cameras, laptops, and LCDs [31], [32]. The questionnaire used in this study consisted of 10 questions with a Cronbach's Alpha value of 0.954.

Knowledge was measured using a questionnaire containing 10 multiple-choice questions (a score of 1 for a correct answer and a score of 0 for an incorrect answer). Respondents' knowledge was categorized using a ratio scale, with the measurement result being the average (mean).

2.4. Data Collection Procedures

Data collection for this study was conducted at the Hutabalang Community Health Center in Central Tapanuli Regency, in several stages. First, the researcher applied for research permission from the academic department of Aufa Royhan University in Padangsidimpuan City. Next, the researcher submitted a research request letter to the Head of Sitardas Village, Badiri District, Central Tapanuli Regency. After obtaining permission, the researcher conducted an on-site survey to ensure the site was ready and the respondents were ready. The researcher then introduced herself, explained the purpose and data collection procedures to potential respondents, and obtained their consent to participate by signing an informed consent form.

After obtaining consent, the researcher distributed an initial questionnaire to respondents to complete before conducting health education. Next, the researcher provided health education using audio-visual media about stunting to the mothers, which lasted approximately 30 minutes. After the education was completed, respondents were asked to complete the questionnaire again to measure changes in their knowledge post-intervention. After the entire process was completed and data collected from all respondents, the data was tabulated and analyzed to determine whether the audio-visual media health education had an impact on mothers' knowledge about stunting in toddlers.

2.5. Data Analysis

Data analysis in this study was conducted by first measuring each respondent's score and then entering it into a frequency distribution table. Afterward, data from each variable was presented and discussed using relevant theories from the existing literature. Univariate analysis was used to illustrate the results of the assessment and data collection on several variables, which were presented in the form of a frequency distribution table. The variable analyzed univariately was mothers' knowledge about stunting in toddlers.

Meanwhile, bivariate analysis began with a normality test using the Shapiro-Wilk test. The test results showed a p-value of 0.000 ($p < 0.05$), concluding that the data were not normally distributed [33], [34]. Therefore, bivariate analysis was conducted using the Wilcoxon test. This test was used to determine the effect of health education using audio-visual media on mothers' knowledge about stunting in toddlers.

2.6. Research Procedures

The health education intervention was conducted using audiovisual media in the form of a 10-minute video containing material on the definition of stunting, its causative factors, long-term impacts, and preventive measures through exclusive breastfeeding, balanced nutritional complementary feeding (MP-ASI), good sanitation, and monitoring child growth and development. The video was presented in Indonesian using simple graphic illustrations, clear narration, and examples of everyday situations relevant to the lives of rural communities. Prior to use, the video material was validated by two nutritionists and one learning media expert to ensure content accuracy, language appropriateness, and presentation quality.

3. RESULTS AND DISCUSSION

3.1. Univariate Analysis

Univariate analysis was used to analyze the research findings related to mothers' knowledge about stunting in toddlers, both before and after the intervention. The analysis results are presented in frequency distribution tables and percentages. The results of the study on the effect of health education using audiovisual media on mothers' knowledge about stunting in toddlers are shown in the following table.

Table 2. Distribution of Respondent Characteristics

Respondent Characteristics	N	Percentage (%)
Age		
17-25 years	5	14.7
26-35 years	21	61.8
36-45 years	8	23.5

Total	34	100.0
Level of education		
Elementary school	5	14.7
Junior high school	11	32.4
Senior High School	12	35.3
Bachelor	6	17.6
Total	34	100.0

Table 2, based on the data in the table above, shows that in terms of age, the majority of respondents were 26-35 years old (21 people) and a minority were 17-25 years old (5 people) and 14.7%, respectively. In terms of education, the majority of respondents had a high school education (12 people) and a minority had an elementary school education (5 people) and 14.7% had an elementary school educatio.

Table 3. Mothers' Knowledge of Stunting in Toddlers Before and After Health Education with Audio-Visual Media

Variables	n	Mean	SD	Min	Max
Knowledge Before Intervention	34	6.12	1.274	4	8
Knowledge After Intervention	34	9.18	758	8	10

Table 3 based on the data results in the table above shows that the average (mean) of mothers' knowledge about stunting in toddlers before health education with audio-visual media was 6.12 with a minimum value of 4 and a maximum value of 8, which indicates that mothers' knowledge was sufficient, while the average (mean) of mothers' knowledge about stunting in toddlers after health education with audio-visual media was 9.18 with a minimum of 8 and a maximum value of 10, which indicates that mothers' knowledge had increased.

3.2. Bivariate Analysis

This study conducted a bivariate analysis to determine the effect of health education using audiovisual media on mothers' knowledge about stunting in toddlers. To conduct the bivariate analysis, the Shapiro-Wilk test was first used to determine whether the data were normally distributed. The results of the normality test are as follows.

Table 4. Results of the Normality Test of Mothers' Knowledge Data on Stunting in Toddlers Before and After Health Education with Audio-Visual Media

Tests of Normality			
	Shapiro-Wilk		
	Statistic	df	sig
Before Intervention	.908	34	.007
After Intervention	.799	34	.000

Table 4 shows that maternal knowledge about stunting in toddlers before and after health education using audiovisual media was 0.007 and 0.000, respectively, with a p-value <0.05, indicating that the data were not normally distributed. Therefore, the statistical test used in this study was the Wilcoxon test. The following are the results of the Wilcoxon test.

Table 5. The Effect of Health Education Using Audio Visual Media on Mothers' Knowledge of Stunting in Toddlers

Variables	N	Mean (Min-Max	Negative Ranks	Positive Ranks	Z	p value
Before Intervention (pretest)	34	6.12 (4-8)	0	34	-5.121[b]	.000
After Intervention (pretest)	34	9.18 (8-10)				

Table 5, based on the data in the table above, shows that the mean score before the intervention (pretest) was 6.12 and the mean score after the intervention (posttest) was 9.18. The Wilcoxon test showed that 0 respondents' knowledge decreased, and 34 respondents' knowledge increased, with a 2-tailed sig. p = 0.000 (<0.05). Therefore, the results can be concluded that there was a difference between the pretest and posttest results, proving the effect of health education using audiovisual media on mothers' knowledge about stunting in toddlers.

Based on the research results, the majority of respondents were aged 26-35 (21 respondents (61.8%), while the minority were aged 17-25 (5 respondents (14.7%). According to theory, age is the length of a person's life in years calculated from birth, and age influences knowledge. As a person ages, their knowledge and skills

increase, and they become more capable of making decisions, becoming wiser, thinking rationally, controlling their emotions, and being tolerant of others' opinions.

Cognitively, rational thinking habits increase in early and middle adulthood. Age influences a person's comprehension and thought patterns. As they age, their comprehension and thought patterns develop, thus enhancing their knowledge. Age can influence knowledge. The older a person is, the more likely their knowledge is to increase through experience. Based on this theory, researchers assume that the age of 26-35 is considered to be the age at which a person is considered to be mature in their thinking, both physiologically, psychologically, and cognitively.

Based on the research results, the majority of respondents (12 respondents) had a high school education, while a minority (5 respondents) had an elementary school education (14.7%). Education is the process of a person developing abilities, attitudes and forms of human behavior in the society in which he lives, a social process, where people are exposed to the influence of a selected and controlled environment, so that he can obtain or experience the development of optimal social abilities and individual abilities.

Education can influence a person's behavior, including their lifestyle, and motivate them to participate in health changes. The lower a person's education, the less likely they are to utilize health services, and conversely, the higher their education, the easier it is to receive information and utilize available health services [35], [36]. Low education significantly impacts a person's ability to grasp the information they receive. Education can also influence a person's behavior, including lifestyle, particularly their motivation to participate in activities.

The higher a person's level of knowledge, the easier it is to receive information, thus increasing their knowledge. Conversely, the lower their education, the more difficult it is to absorb information. Education significantly determines a person's performance. The higher the education, the greater the desire to utilize knowledge and skills. According to this theory, researchers assume that parents with higher education process information that is beneficial to themselves and their families, relating to childcare, child health, and education. Based on the results of the study, health education using audiovisual media influenced mothers' knowledge about stunting in toddlers in Sitardas Village, Badiri District, Central Tapanuli Regency, with a p-value of 0.000. This study found that the average knowledge score before the intervention was 6.12 among 34 respondents, and after the audiovisual health education intervention, mothers' knowledge increased by an average of 9.18.

Providing health education through audiovisual media is one method and medium used to improve knowledge, attitudes, and actions. Audiovisual media is considered capable of providing clearer and more engaging images as a medium for conveying health education messages [37], [38]. It is considered capable of effectively conveying the message contained in the media to the audience. Audiovisual media also serves several functions in health education, including educational, social, and economic functions.

The results of the study indicate an influence on mothers' knowledge about stunting before and after health education using audiovisual media. This can be seen from the average knowledge score before the intervention, which was 6.12, and after health education with audio-visual media, there was an increase in maternal knowledge of 9.18. Therefore, efforts are needed to provide continuous information in Sitardas Village through audio-visual media. Through health education with audio-visual media, the community can utilize all their senses to remember, recognize, and recall what has been heard or seen, making it easier for mothers to understand the messages that have been conveyed.

Audiovisual approaches have the potential to strengthen mothers' understanding through a combination of verbal-visual processing pathways (dual coding theory) and reduced cognitive load. Concrete visuals such as illustrations of complementary feeding portions, handwashing demonstrations, or growth curve graphs help overcome the abstraction of nutrition and sanitation concepts. When simple narratives are combined with contextual examples (local language, home-cooked meals, local water conditions), messages become more "imaginable" and easier to replicate at home.

From a behavioral perspective, education operates primarily on the beliefs and intentions domain, as predicted by the Health Belief Model and the Theory of Planned Behavior [39], [40]. This means that increased knowledge needs to be accompanied by strengthening perceived benefits (the benefits of nutritious complementary feeding), reducing barriers (cost, food availability, cooking time), providing cues to action (such as reminders to visit health posts), and increasing maternal self-efficacy. Without strategies addressing these four factors, knowledge tends to remain at the cognitive level and not be translated into stunting prevention practices at home.

The socioeconomic context also determines the "absorption" of education. The availability of nutritious food, access to clean water, and family support (husband/grandmother) can strengthen or weaken the adoption of behaviors. Because child feeding decisions are often negotiated within the household, involving key decision-makers (fathers/extended family) in short sessions or supplementary materials will increase the chances of practice change. Integration with routine services (integrated health service posts, prenatal classes, cadre visits) also provides repeated touchpoints to ensure messages don't fade quickly.

From an implementation perspective, three crucial aspects need to be considered: dosage, fidelity, and local adaptation. Dosage concerns the number of exposures and their adequate duration; fidelity ensures the message is delivered as scripted (not truncated/distorted); local adaptation requires that sample menus, ingredient prices, and daily habits truly reflect village conditions. Simple documentation (video screening checklists, question-and-answer lists, notes on electrical/room constraints) helps maintain implementation quality and facilitates replication.

Audiovisuals are not without limitations. Reliance on equipment (electricity, LCD, speakers) poses technical risks; Some mothers may be more responsive to hands-on practice (cooking demos, hands-on handwashing) than watching videos. Therefore, a hybrid format a short video followed by a micro-demonstration and menu-making practice is often more effective. The material should be re-accessible (link/flash drive/WhatsApp) so mothers can watch it with their families at home.

Ideally, subsequent measures of educational success should go beyond knowledge to proximal indicators of behavior change (e.g., frequency of animal protein intake per week, adherence to iron supplementation during pregnancy, handwashing with soap at the five moments). Follow-up measurements several weeks/months after the education will demonstrate knowledge retention and consistency of practice, and help distinguish the effects of "just watching" from sustained habit change.

Finally, program findings like these have policy implications: validated audiovisual materials can be included as standard nutrition and sanitation education packages at the community health center/village level, accompanied by short training for cadres. Monitoring and learning mechanisms—such as gathering maternal feedback, rapid analysis of local barriers, and regular updates to the materials—will ensure the program remains relevant and impactful in communities with varying challenges.

4. CONCLUSION

Based on the research results and discussions that have been conducted, it can be concluded that the majority of respondents are in the 26–35 year age group (61.8%) and the majority have a high school education level (35.3%). Mothers' knowledge about stunting in toddlers before being given health education using audio-visual media showed an average value of 6.12. After health education using audio-visual media, the average knowledge of mothers increased to 9.18. The results of the bivariate analysis showed that there was a significant influence between health education and audio-visual media on increasing mothers' knowledge about stunting in toddlers, with a p-value of 0.000 ($p < 0.05$). This indicates that the use of audio-visual media is effective in increasing mothers' understanding of stunting. Further research is recommended to use experimental designs with larger samples, long-term follow-up, measurement of children's behavior and nutritional indicators, and involve local adaptation and mixed methods to evaluate the effectiveness and sustainability of audiovisual interventions for stunting prevention.

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