



RESEARCH ARTICLE

URL article: <http://jurnal.fkmumi.ac.id/index.php/woh/article/view/woh9328>**Knowledge of Mothers of Stunted Toddlers Before and After Audiovisual Health Education in Ambonese Malay Combined with Demonstration: A One-Group Pretest–Posttest Study****Sinthia Rosanti Maelissa^{1C}, Feby Manuhutu², Valensya Yeslin Tomaso³, Abdullah Al Mamun⁴**^{1,3}Nursing Professional Program, Faculty of Health, Christian University of Indonesia, Maluku, Indonesia²Nursing Science, Faculty of Health, Christian University of Indonesia, Maluku, Indonesia⁴Center for Multidisciplinary and Contemporary Research (CMCR), Rangpur, BangladeshEmail Corresponding Author^(C): maelissasinthia@gmail.commaelissasinthia@gmail.com¹, nsfebymanuhutu@gmail.com², vallytomasoa0212@gmail.com³, aamfst@gmail.com⁴

ABSTRACT

Stunting remains a major public health problem in Indonesia. In 2023, its prevalence was 21.5% nationally and 28.4% in Maluku Province, which is within the range that the WHO classifies as high. Maternal knowledge is one modifiable determinant of child feeding and care practices, yet health education is usually delivered in the national language, which may limit comprehension among mothers with low formal education. This study aimed to assess changes in knowledge among mothers of stunted toddlers before and after an education package combining short audiovisual videos in the Ambonese Malay dialect with a practical demonstration. A quasi-experimental one-group pretest–posttest study without a control group was conducted over four months in the working area of the Laha-Tawiri Community Health Centre, Ambon City. All 36 eligible mothers (total sampling) watched three 3–4-minute Ambonese Malay videos and attended a demonstration session; the videos were then shared via WhatsApp for repeated viewing for one week. Knowledge was measured with a structured questionnaire, categorized as poor, sufficient, or good, and analyzed using the Wilcoxon signed-rank test. The median knowledge category rose from poor at pretest to good at posttest ($Z = -5.25$, $p < 0.001$, $r = 0.87$); no mother moved to a lower category, and the proportion with good knowledge rose from 0% to 86.1%. The education package was associated with a substantial improvement in maternal knowledge and offers a promising, low-cost approach to stunting education in Maluku; controlled studies are recommended to confirm its effectiveness.

Keywords : Stunting; maternal knowledge; audiovisual education; Ambonese malay; demonstration**PUBLISHED BY :**Faculty of Public Health
Universitas Muslim Indonesia**Address :**Jl. Urip Sumohardjo Km. 5 (Campus II UMI)
Makassar, Sulawesi Selatan.**Email :** jurnalwoh.fkm@umi.ac.id**Phone :** +62 82188474722**Article history**

Received 02 April 2026

Received in revised form 07 October 2026

Accepted 21 October 2026

Available online 25 October 2026

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INTRODUCTION

Stunting, defined as a length- or height-for-age more than two standard deviations below the median of the WHO Child Growth Standards, remains one of the most important child health problems worldwide (1). According to the UNICEF/WHO/World Bank Group Joint Child Malnutrition Estimates, an estimated 150.2 million children under five years of age (23.2%) were stunted globally in 2024 (2). The WHO classifies a stunting prevalence of 20% to <30% as “high” and $\geq 30\%$ as “very high”; the 20% threshold is therefore a classification boundary, not a tolerable level (1). In Indonesia, the 2023 Indonesian Health Survey (Survei Kesehatan Indonesia, SKI) reported a national prevalence of 21.5%, still well above the national target of 14% by 2024 (3,4). At the provincial level, the prevalence in Maluku rose from 26.1% in the 2022 Indonesian Nutritional Status Survey (SSGI) to 28.4% in SKI 2023 (3,5), with the Aru Islands Regency (40.6%) and Tual City (32.0%) recording the highest district-level rates (3). In Ambon City, the study setting, the prevalence was 21.1% in 2022 (5). Stunting is associated not only with impaired physical growth but also with poorer cognitive development, lower educational attainment and adult productivity, and a higher risk of metabolic and chronic disease later in life (6).

Stunting has multiple determinants that operate at household, community, and health-system levels, including maternal education, feeding practices, child health status, water, sanitation and hygiene, household socioeconomic conditions, and access to health services (7,8). Within this framework, maternal knowledge is not a direct cause of stunting but an upstream, modifiable factor that shapes caregiving behavior: mothers' understanding of child growth, feeding, and hygiene influences how they select, prepare, and give food and how they use health services (9,10). Indonesia has implemented nutrition-specific and nutrition-sensitive interventions to accelerate stunting reduction in line with the Sustainable Development Goals (4,11), but the success of these programs depends in part on caregivers' understanding of and adherence to the recommended practices. Improving maternal knowledge is therefore a pragmatic target for health education, although knowledge alone is unlikely to be sufficient to change child growth outcomes.

Previous efforts to improve maternal stunting literacy in Indonesia have included literacy programs and digital applications that help mothers detect and prevent stunting (12,13). These studies indicate that caregivers' health literacy is related to better child-care practices; however, many of these approaches rely on written materials or smartphone applications in Bahasa Indonesia, which require adequate reading skills and familiarity with the national language. Mothers of stunted children frequently have low educational attainment, so text-based education may not reach those who need it most. The present intervention differs from these application-based approaches in that it relies on spoken, visual, and hands-on learning rather than on reading.

Audiovisual education is a promising alternative. A video combines spoken narration with images and modeled behavior, so key messages, such as how to prepare a balanced complementary meal, can be shown rather than only described, and recorded videos can be replayed to reinforce learning (14). In Indonesia, audiovisual education improved the knowledge of mothers caring for stunted children (15), and a recent systematic review of video-assisted educational interventions among mothers of children under five reported

improvements in knowledge, attitudes, and practices related to malnutrition (16). The evidence is, however, heterogeneous: the same review found that effects on children's anthropometric z-scores were inconclusive (16), while in Kenya, short infant- and young-child-feeding videos displayed in mother and child health centers were well received and mothers reported learning from them (17). Previous studies also differ widely in population, topic, video duration, delivery platform, and outcome measures, and most delivered content in national or major languages. Because a video alone does not provide hands-on practice, combining it with a live demonstration, in which mothers observe and try food preparation, may help them translate information into skills; this is the rationale for combining audiovisual materials with demonstrations in the present study.

Language is a second, conceptually distinct, determinant of educational success. Language barriers are consistently associated with poorer understanding of health information, whereas communication in the language the recipient uses in daily life can improve comprehension (18). In Indonesia, health education in regional languages has improved knowledge of hypertension, diabetic foot care, pregnancy danger signs, and appropriate antibiotic use (19–22). Ambonese Malay (Melayu Ambon) is the everyday lingua franca of Ambon and the surrounding islands and is spoken across religious and ethnic communities (23), whereas Bahasa Indonesia is used mainly in formal settings. Delivering stunting messages in Ambonese Malay may therefore make the content easier to understand and more culturally familiar for local mothers. Nevertheless, regional-language education has not yet been evaluated for stunting-related knowledge among mothers of stunted toddlers in Maluku.

Thus, the research gap addressed by this study is the lack of evidence on a culturally and linguistically adapted, multicomponent education package for mothers of stunted toddlers in eastern Indonesia. The novelty of this study lies in the combination of (1) short audiovisual videos, (2) narrated in Ambonese Malay, and (3) followed by a practical demonstration, delivered specifically to mothers of stunted toddlers. Because the three components were delivered together, the study evaluates the package as a whole rather than the separate contribution of each component. The objective of this study was to assess changes in knowledge about stunting among mothers of stunted toddlers in Ambon City before and after this education package.

METHOD

Study design and setting

This study used a quasi-experimental one-group pretest–posttest design without a control group; knowledge was measured in the same mothers before and after the intervention. The study was conducted over four months in 2026 in the working area of the Laha-Tawiri Community Health Center (Puskesmas), which had the highest stunting prevalence in Ambon City at the time of the study. Potential influences inherent in this design, namely history, maturation, testing effects, and regression to the mean (24), were taken into account when interpreting the results.

Population, sample and eligibility criteria

The population comprised all mothers of toddlers registered as stunted at the Puskesmas ($n = 36$). Total sampling was used. A toddler was classified as stunted when his or her length- or height-for-age z-score was below -2 SD of the WHO Child Growth Standards, which form the basis of the Indonesian national anthropometric standard (25). Inclusion criteria were being the mother of a toddler registered as stunted at the Puskesmas, living in its working area, and providing written informed consent. No eligible mother was excluded or declined, and all 36 mothers completed both the pretest and the posttest.

Intervention

The intervention was an education package consisting of three educational videos in Ambonese Malay, followed by a demonstration (Figure 1). The videos, each 3–4 minutes long, were developed by the research team and narrated in Ambonese Malay, the everyday language of the participants. Together they covered the definition, causes, consequences and prevention of stunting; balanced nutrition and complementary feeding (MP-ASI), including sources of carbohydrate, protein and minerals; and the importance of a clean environment. These topics corresponded to the domains of the knowledge questionnaire.

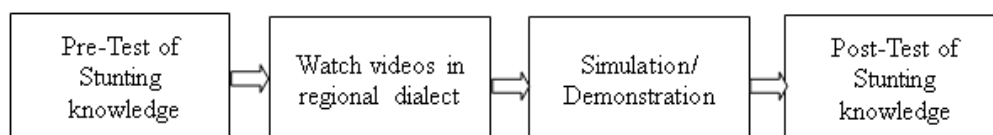


Figure 1. Flow of the research process

The intervention was delivered face-to-face to the mothers. After the pretest, the three videos were shown using a tablet or laptop and an LCD projector (InFocus). This was followed by a demonstration and simulation in which the research team showed how to apply the messages when preparing complementary food, and mothers were invited to practice and ask questions. The videos were then sent to each mother's WhatsApp so they could rewatch them at home the following week, after which the posttest was administered. All mothers received the same videos and demonstration. Attendance was recorded on an observation sheet.

Instrument

Maternal knowledge was measured using a structured questionnaire adopted from previous research, covering five domains: the definition, causes, consequences, and prevention of stunting, and recommended feeding patterns for toddlers. Each correct answer scored 1, and each incorrect answer 0, and the total score was converted to a percentage of the maximum score. Knowledge was categorized as good ($\geq 76\%$), sufficient (56–75%), or poor ($< 56\%$) (26). The questionnaire has been used in previous research; its validity and reliability were not re-tested in the present sample.

Data analysis

Respondent characteristics and knowledge categories were described using frequencies and percentages. Because the outcome analyzed was an ordinal variable (knowledge category coded 1 = poor, 2 = sufficient, 3 = good), a non-parametric test was selected a priori, and pretest and posttest knowledge were compared using the

Wilcoxon signed-rank test; a normality test was therefore not required. Medians (interquartile range, IQR) and mean category scores (standard deviation, SD) with the 95% confidence interval (CI) of the mean change are reported. The effect size was calculated as $r = |Z|/\sqrt{N}$, where N is the number of pairs, and interpreted as small (0.1), medium (0.3) or large (≥ 0.5) (27); the matched-pairs rank-biserial correlation is also reported. Where the pairing of categories could not be determined, the most conservative assumption (the maximum number of tied pairs) was used to calculate Z . Statistical significance was set at $\alpha = 0.05$, and p -values below 0.001 are reported as $p < 0.001$.

Ethical considerations

This study was approved by the Health Research Ethics Committee of the Faculty of Public Health, Universitas Airlangga (approval number 155/EA/KEPK/2026). All mothers received an explanation of the study and provided written informed consent before data collection. Participation was voluntary, and the data were kept confidential.

RESULTS

1. Respondent Characteristics

A total of 36 mothers of stunted toddlers participated, and all completed both the pretest and the posttest. Most mothers were aged 20–40 years (30; 83.3%), 11 (30.6%) had not completed elementary school, and 26 (72.2%) were not employed (Table 1).

Table 1. Respondent characteristics (n = 36)

Variable	n	%
Age		
Early adulthood (20–40 years)	30	83.3
Middle adulthood (41–60 years)	6	16.7
Education		
Did not complete elementary school	11	30.6
Elementary school	7	19.4
Junior high school	8	22.2
Senior high school	10	27.8
Employment		
Not employed	26	72.2
Employed	10	27.8
Total	36	100.0

2. Maternal Knowledge Categories

At pretest, 26 mothers (72.2%) had poor knowledge and 10 (27.8%) had sufficient knowledge; none had good knowledge. At posttest, 31 mothers (86.1%) had good knowledge and 5 (13.9%) had sufficient knowledge, and none remained in the poor category (Table 2).

Table 2. Maternal knowledge categories at pretest and posttest (n = 36)

Maternal knowledge	Pretest		Posttest	
	n	%	n	%
Poor	26	72.2	0	0.0
Sufficient	10	27.8	5	13.9
Good	0	0.0	31	86.1
Total	36	100.0	36	100.0

3. Changes in Maternal Knowledge before and after the Intervention

Because no mother had good knowledge at pretest and no mother had poor knowledge at posttest, no mother could have moved to a lower category. At least 31 of the 36 mothers (86.1%; 95% CI 71.3–93.9%) moved to a higher category, and at most five remained in the sufficient category. The median knowledge category increased from 1 (poor; IQR 1–2) at pretest to 3 (good; IQR 3–3) at posttest, and the mean category score increased by 1.58 points (95% CI 1.34–1.83) (Table 3). The Wilcoxon signed-rank test showed that posttest knowledge was significantly higher than pretest knowledge ($Z = -5.25$, $p < 0.001$), with a large effect size ($r = 0.87$); all non-tied pairs showed an increase (matched-pairs rank-biserial correlation = 1.00).

Table 3. Maternal knowledge category scores before and after audiovisual education in Ambonese Malay combined with demonstration (n = 36)

Measurement	Mean (SD)	Median (IQR)	<i>Z</i>	<i>p</i>	<i>r</i>
Pretest	1.28 (0.45)	1 (1–2)			
Posttest	2.86 (0.35)	3 (3–3)	-5.25	<0.001	0.87
Change, mean (95% CI)	1.58 (1.34–1.83)				

Knowledge category coded 1 = poor, 2 = sufficient, 3 = good. SD = standard deviation; IQR = interquartile range; CI = confidence interval. *Z* and *p* from the Wilcoxon signed-rank test, calculated under the most conservative pairing assumption; effect size $r = |Z|/\sqrt{N}$; matched-pairs rank-biserial correlation = 1.00.

DISCUSSION

This study found that the knowledge of mothers of stunted toddlers was higher after an education package combining Ambonese Malay audiovisual videos with a practical demonstration than before it. The change was substantial: the median knowledge category rose from poor to good, the mean category score increased by 1.58 points on a three-point scale, the effect size was large ($r = 0.87$), the proportion of mothers with good knowledge rose from none to 86.1%, and no mother remained in, or moved to, the poor category. In practical terms, most mothers who initially could not correctly answer questions on the causes, consequences and prevention of stunting were able to do so after the intervention, which is a precondition for, although not a guarantee of, improved feeding practices. This finding answers the research question and reflects a meaningful improvement in maternal knowledge during the intervention period.

This finding is consistent with the cognitive theory of multimedia learning, which proposes that people learn more deeply from words and pictures presented together than from words alone, because verbal and visual information are processed through separate channels and then integrated into a single mental representation

(14). Presenting information through both channels can support attention, comprehension and recall, and the opportunity to re-watch the videos on WhatsApp allows repetition, which may strengthen retention. Social cognitive theory further suggests that observing a modelled behaviour and practising it increases self-efficacy (28), which provides a rationale for the demonstration component. Because attention, repetition, retention and self-efficacy were not measured directly, these mechanisms are presented as theoretical explanations.

Several characteristics of the intervention may have contributed to the observed change. The videos were short (3–4 minutes each), each focused on a limited number of concrete messages, and were narrated in the mothers' everyday language. Their content corresponded directly to the knowledge domains measured, and the demonstration showed mothers how to apply the messages when preparing complementary food. Short, focused videos may also be more engaging than conventional lectures, posters or flipcharts, an aspect that future studies could explore by measuring engagement and acceptability.

The direction of our finding is consistent with earlier video-based studies, but comparisons must take differences in design and context into account. In the Philani MOVIE cluster-randomised trial in South Africa, 1,502 pregnant women received short animated videos delivered by community health workers; maternal knowledge improved modestly at one month but not at five months, and exclusive breastfeeding did not differ from standard face-to-face counselling (29). That trial used a randomised controlled design, a different population (pregnant women in general rather than mothers of stunted children), different content (breastfeeding) and longer-term behavioural outcomes, whereas the present study measured short-term knowledge without a control group. Because of these differences, the magnitude of change in the two studies cannot be compared directly; the larger change in the present study may partly reflect the participants' low baseline knowledge, which left considerable room for improvement, and the short interval before the posttest.

Taken together, the wider literature suggests that video-based nutrition education tends to improve caregivers' knowledge and some feeding practices, whereas effects on growth outcomes are less consistent and depend on intervention intensity and the presence of complementary components. In the UPAVAN trial in Odisha, India, 32 months of fortnightly women's group meetings using participatory videos improved child and maternal dietary diversity when nutrition-specific content was included, but did not reduce child wasting (30). Compared with this intensive, long-term programme evaluated in a randomised trial, the package in the present study was brief (face-to-face education followed by one week of video re-viewing), which makes it practical to integrate into routine Puskesmas and Posyandu activities. The present study extends this literature by showing that a brief, low-cost package delivered in a local language and supplemented by a demonstration is feasible and is associated with higher knowledge among mothers of stunted toddlers, a population that has rarely been targeted specifically.

The second explanation concerns cultural and linguistic appropriateness, which is conceptually distinct from the audiovisual format. Communication barriers arise when the language, terms and symbols used by educators differ from those of the audience, so that messages must be decoded before they can be understood. Delivering the content in Ambonese Malay, the language mothers use at home and in the community (23), may

have reduced this barrier and made the messages feel familiar. Evidence from other health topics is consistent with this reasoning: health education in regional languages improved knowledge among patients with hypertension (19) and among patients with diabetes mellitus regarding foot care (20). These studies involved different populations and conditions; they therefore show that regional-language education can improve health knowledge in general, not that Ambonese Malay audiovisual education is effective for mothers of stunted toddlers specifically.

The use of regional languages in health education also respects local customs and culture, which may encourage a positive response to the information conveyed (21), and a regional-language educational video increased women's knowledge about antibiotic use (22). To our knowledge, this is the first study in Maluku to combine audiovisual education, Ambonese Malay narration and practical demonstration specifically for mothers of stunted toddlers. Future studies could build on this by formally assessing the acceptability and implementation fidelity of the culturally adapted materials and by comparing the same content delivered in Bahasa Indonesia and in Ambonese Malay to determine the specific contribution of the local language.

This study has several strengths. To our knowledge, it is the first study in Maluku to evaluate a culturally and linguistically adapted education package for mothers of stunted toddlers; all eligible mothers were included and none were lost to follow-up; and the intervention used a language and materials that are familiar to the community. Some limitations should also be considered. The one-group design without a control group limits causal inference, and the sample was drawn from a single Puskesmas. The posttest was conducted one week after the intervention, and the outcome was knowledge, analysed as ordinal categories. The three intervention components were delivered together, and home re-watching of the videos was not monitored. These aspects provide clear directions for future research, including controlled designs, longer follow-up and measurement of feeding practices and child growth.

CONCLUSIONS AND RECOMMENDATIONS

Among mothers of stunted toddlers in Ambon City, knowledge about stunting was higher after an education package combining Ambonese Malay audiovisual videos with a practical demonstration: the median knowledge category rose from poor to good, no mother moved to a lower category, and the proportion of mothers with good knowledge rose from 0% to 86.1% ($Z = -5.25$, $p < 0.001$, $r = 0.87$). These findings provide promising preliminary evidence that culturally and linguistically adapted audiovisual education combined with demonstration is associated with improved maternal knowledge about stunting.

This approach is brief, low-cost, and feasible, and the Ambon City Health Office and Puskesmas may consider it as a supplementary tool within existing stunting education activities. To support wider implementation, controlled or randomized studies with larger samples and longer follow-up are recommended, including measurement of feeding practices and child growth and examination of the separate contributions of the local language, the video format, and the demonstration.

ACKNOWLEDGEMENT

Thanks are extended to the Research Institute of the Indonesian Christian University of Maluku for providing financial assistance and support throughout this research until its completion, and to the staff of the Laha-Tawiri Community Health Centre and all participating mothers.

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