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## Effectiveness of Serang Sundanese Song-Based Health Education Compared with Leaflets in Improving Community Health Workers' Knowledge of Stunting Prevention

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### ABSTRACT

Stunting is a public health issue that requires prevention through effective education tailored to the cultural context of the community. This study aims to analyse the effectiveness of an educational medium—a song in the Serang Sundanese language in improving health cadres' knowledge regarding the prevention and control of stunting. The study employed a quasi-experimental design using a *pre-test-post-test control group* approach. The study was conducted in Cilayang Guha Village, Cikeusal Sub-district, Serang Regency, Banten, from January to November 2025. A total of 30 health cadres were selected using *purposive sampling* and divided into an intervention group (n=15) and a control group (n=15). The intervention group received education through a song in the Serang Sundanese language entitled "Ibu Hebat Anak Sehat" (Great Mum, Healthy Child), whilst the control group received the same educational material via a leaflet. Knowledge was assessed before and after the two-month intervention using a structured questionnaire. Analysis was performed using the Wilcoxon *Signed-Rank* test and the Mann-Whitney U test, as the data were not normally distributed. The results showed an increase in knowledge scores in the intervention group from 72.67 to 94.00, with an average increase of 21.33 ( $p=0.001$ ), whilst the control group increased from 74.67 to 92.00, with an average increase of 17.33 ( $p=0.001$ ). The difference in the increase between the two groups was significant ( $p=0.016$ ) with a moderate effect size ( $r=0.42$ ). Education through songs in the Serang Sundanese language was effective in improving health cadres' knowledge of the prevention and control of stunting.

**Keywords:** Community Health Workers; Educational Songs; Health Education; Serang Sundanese Language; Stunting.

### INTRODUCTION

Stunting remains one of the most significant public health issues in Indonesia. This condition not only reflects impaired linear growth in children, but is also associated with consequences for cognitive development, long-term health and future productivity. The complexity of the causes of stunting indicates that its occurrence cannot be explained solely by nutritional intake factors, but is the result of the interaction of various factors at the levels of the child, the mother, the household, the environment and society. A systematic review and meta-analysis of risk factors for stunting in Indonesia indicate that low birth weight, preterm birth, maternal characteristics, food insecurity, unsafe drinking water sources and inadequate sanitation are among the factors associated with the prevalence of stunting (Gusnedi et al., 2023).

Environmental factors also play a significant role in the occurrence of stunting. Inadequate sanitation, the use of unsafe water sources, poor hand-washing practices, and the consumption of unsafe drinking water can

increase the risk of health problems and infections, which may ultimately affect a child's growth. A systematic review and meta-analysis of environmental factors in Indonesia indicates that access to substandard latrines is one of the environmental factors most consistently associated with stunting, alongside poor hand-washing practices, unsuitable water sources and the consumption of unsafe drinking water (Hasyim et al., 2025). The findings regarding these various determinants reinforce the view that the prevention of stunting requires a comprehensive approach that takes into account health, environmental, behavioural and social factors within the community (Sihotang et al., 2023).

In the Indonesian context, a community-based approach is becoming increasingly important because the majority of promotional and preventive activities are carried out through community-level health services. Health cadres, or *community health workers*, play a strategic role in efforts to prevent stunting, as they are involved in monitoring children's growth, disseminating

health information, providing counselling, and acting as a link between families and health services. In Indonesia, *community health workers* are a key component in the implementation of stunting prevention programmes and are involved in growth monitoring and community health counselling through Posyandu (Miranda et al., 2023).

The strategic role of these community health workers needs to be underpinned by adequate knowledge and skills. Research into community health workers in Indonesia indicates that there are still gaps in their knowledge and skills regarding the prevention of stunting. In a mixed-methods study involving 193 community health workers in several villages identified as stunting hotspots, more than half of the workers had low to very low levels of knowledge, whilst observations of their anthropometric skills also revealed inaccuracies in measurements (Widiasih et al., 2025). These findings indicate that enhancing the capacity of community health workers through structured education and training is essential to the success of stunting prevention programmes.

Health education is one of the strategies that can be used to improve the knowledge and capacity of community health workers. Several studies in Indonesia have shown that health education can improve community health workers' knowledge of stunting and early detection. An education programme for community health workers in Surakarta, for example, demonstrated an increase in knowledge following training on the concepts, causes, impacts, early detection and prevention of stunting (Irdawati, 2023). Other research has also shown that enhancing the capacity of community health workers through media-based education can lead to greater improvements in knowledge than education without the use of media (Irdawati et al., 2024). These findings indicate that the choice of media is a key element in the development of health education strategies for community health workers.

Nevertheless, the effectiveness of health education is determined not only by the material presented, but also by the characteristics of the media and its suitability for the target audience. Commonly used health education media include lectures, leaflets, posters, videos and various forms of audiovisual media. The development of media that are more engaging, memorable and suitable for repeated use is particularly important in the context of community education. Research into the factors influencing the knowledge and motivation of health volunteers in Indonesia also highlights the need for training that is more localised, delivered on an ongoing basis, and tailored to the needs of the volunteers and the conditions of the local community (Tampubolon, 2024).

One medium with potential for use in health education is music and songs. Songs can combine verbal messages with melody, rhythm, repetition and emotional engagement, thereby enabling health messages to be conveyed in a more engaging and memorable way. A systematic review on the use of songs for health education and promotion indicates that song-based programmes have the potential to improve health knowledge and

support behavioural change. The review also indicates that songs have several advantages as a medium for health promotion, including social and cultural relevance, ease of dissemination, relatively low cost, and their enjoyable nature (Sheffield & Irons, 2021).

The use of music as an educational tool is also supported by wider research into the relationship between music and cognitive function and health. Systematic reviews and meta-analyses indicate that active participation in music can benefit cognitive and psychosocial function, whilst simply listening to music primarily benefits the cognitive domain (Viola et al., 2023). These findings suggest that music not only serves as a form of entertainment, but also has the potential to support cognitive processes relevant to the reception and recall of health information.

The advantage of songs as a medium for health promotion is also linked to the ability to convey messages repeatedly. The repetition of lyrics allows people to receive health messages on several occasions without having to reread written material. In a systematic review by Sheffield and Irons, songs were assessed as having the potential to reach groups with varying levels of literacy and to provide opportunities for message repetition, thereby making the information easier to remember (Sheffield & Irons, 2021). Given these characteristics, songs have the potential to serve as an alternative to print media such as leaflets, the use of which depends heavily on the target audience's ability and willingness to reread the material provided.

In addition to the choice of media, cultural appropriateness is a key aspect of health communication. Health messages tailored to the cultural characteristics, language, values and experiences of a community can be more relevant to the target group. A systematic literature review on *cultural tailoring and targeting* indicates that adapting messages based on cultural characteristics is a vital part of developing health communication, although the form and depth of the *tailoring* process still vary considerably across previous studies (Lapinski et al., 2025). Other studies have also emphasised the importance of *cultural sensitivity* and *cultural tailoring* in health communication, as the relevance of a message to the cultural context can influence how it is received by the target group (Griffith et al., 2024).

In a society as linguistically and culturally diverse as Indonesia, the use of local languages can form part of a more contextually appropriate health communication strategy. Adapting community-based communication involves not only translating messages into local languages, but also tailoring them to align with the community's experiences, values, narratives and communication styles. The *community-based participatory research* approach to health communication development demonstrates that community involvement and the use of narratives that reflect people's experiences can make messages more authentic, relevant and readily accepted by the target group (Villar & Johnson, 2021). Therefore, the use of songs in regional languages has the potential to

be a relevant approach to integrating health messages with the social and cultural context of the community.

Although evidence regarding the use of songs as a medium for health education and promotion continues to grow, research specifically evaluating the use of songs based on local languages and cultures to improve community health workers' knowledge of stunting prevention remains limited. Previous studies have mostly evaluated community health worker training in general, the use of print or audiovisual media, or the use of songs for various other health topics (Sheffield & Irons, 2021). In the context of stunting prevention in Indonesia, several studies have shown that health education can improve the knowledge of community health workers (Irdawati et al., 2024; Tyarini et al., 2024). However, there is still insufficient evidence directly comparing songs in local languages with printed materials such as leaflets distributed to community health workers.

It is important to examine this gap because community health workers do not merely act as recipients of information, but also as conveyors of health messages to their families and the wider community. Recent research on community health workers in Indonesia indicates that improving their knowledge and skills remains a key requirement in supporting the prevention of stunting (Widiasih et al., 2025). Furthermore, research into capacity building for community leaders shows that the use of media in educational activities can lead to better learning outcomes than education without media (Irdawati et al., 2024). Therefore, the development of teaching materials that are simple, engaging, memorable, reusable and in line with the cultural characteristics of the community is one alternative that warrants further evaluation.

In light of this gap, this study aims to analyse the differences in the increase in health cadres' knowledge regarding the prevention and control of stunting between the group that received education through songs in the Serang Sundanese language and the group that received education through leaflets. The novelty of this study lies in the integration of a health communication approach based on local culture and language through songs in the Serang Sundanese language, which are specifically used as an educational medium for health cadres in the context of stunting prevention. This study also provides empirical evidence through a direct comparison between songs and leaflets as educational media in enhancing health cadres' knowledge. Consequently, this study is expected to offer an alternative form of health promotion that is contextually appropriate, readily accepted, and has the potential to be applied in community empowerment activities and community-based stunting prevention programmes in Indonesia.

## METHODS

### Study Design and Setting

This study employed a quasi-experimental pretest-posttest design with a control group to evaluate the

effectiveness of a local-language song as a health education medium for improving community health workers' knowledge of stunting prevention and control. The study was conducted in Cilayang Guha Village, Cikeusal Sub-district, Serang Regency, Banten, Indonesia, from January to November 2025.

### Participants and Sampling

The study population consisted of active community health workers in Cilayang Guha Village. Participants were selected using purposive sampling based on predetermined eligibility criteria. The inclusion criteria were community health workers who had been active for at least two years, were aged 25–35 years, actively participated in Posyandu activities, and were willing to participate and provide written informed consent. A total of 30 participants were included in the study and allocated into two groups, consisting of 15 participants in the intervention group and 15 participants in the control group.

### Intervention and Control Conditions

Before the intervention, both groups completed a pretest to assess their baseline knowledge regarding stunting prevention and control. The intervention group received health education through the song "*Ibu Hebat Anak Sehat*" (Great Mum, Healthy Child), which was developed in the Serang Sundanese language in collaboration with local musicians to ensure its cultural relevance. Participants in the intervention group learned and repeatedly sang the song throughout a two-month intervention period. The control group received health education using a leaflet containing the same stunting prevention and control materials. After completion of the two-month intervention period, both groups completed the same questionnaire as a posttest.

### Study Variables and Measurement

The independent variable was the health education medium, categorized as Serang Sundanese-language song-based education and leaflet-based education. The dependent variable was the participants' knowledge regarding stunting prevention and control. Knowledge was assessed using a structured questionnaire consisting of multiple-choice and true-false items covering the definition, causes, prevention, and management of stunting. The questionnaire had undergone content validation by health promotion experts. Its internal consistency was assessed using Cronbach's alpha, with a coefficient of  $\geq 0.70$  considered acceptable for reliability.

### Data Collection

Data collection consisted of several sequential stages. First, the researchers obtained permission from the relevant community health centre and village authorities and recruited participants according to the eligibility criteria. Second, the pretest was administered to both groups before the educational intervention. Third, the intervention was implemented for two months, during which the intervention group received the song-based educational intervention and the control group received the leaflet-based intervention. Finally, the same knowledge questionnaire was administered as a posttest

to both groups. The collected data were subsequently coded and prepared for statistical analysis.

**Statistical Analysis**

Statistical analysis was performed using SPSS. Descriptive analysis was used to summarize the participants' knowledge scores before and after the intervention. The distribution of the knowledge data was assessed using a normality test. Because the knowledge scores and change scores were not normally distributed ( $p < 0.05$ ), non-parametric tests were used. Within-group differences between pretest and posttest knowledge scores were assessed using the Wilcoxon signed-rank test. The change in knowledge score was calculated as the posttest score minus the pretest score for each participant. Differences in knowledge improvement between the intervention and control groups were then assessed using the Mann–Whitney U test. Statistical significance was determined at  $p < 0.05$  with a 95% confidence level. The effect size for the between-group comparison was expressed as  $r$ .

**Ethical Considerations**

The study received ethical approval from the Health Research Ethics Committee of the Banten Ministry of Health Polytechnic (Poltekkes Kemenkes Banten), Indonesia (ethical approval No. 1069/EA/F.XXIII.38/2025). Before participation, all respondents received information regarding the study objectives, procedures, potential benefits, and their rights

as participants. Written informed consent was obtained from all participants. The confidentiality of participant information and identities was maintained throughout data collection, analysis, and reporting.

**RESULTS AND DISCUSSION**

**Table 1.**  
**Results of the Test of Equivalence of Initial Knowledge Scores between the Intervention Group and the Control Group**

| Variable                                     | Intervention Group (n = 15) | Control Group (n = 15) | p-value |
|----------------------------------------------|-----------------------------|------------------------|---------|
| Pre-intervention knowledge score (Mean ± SD) | 72.67                       | 74.67                  | 0.179   |

The baseline knowledge scores were comparable between the intervention group (mean = 72.67) and the control group (mean = 74.67). Statistical analysis showed no significant difference between the two groups prior to the intervention ( $p = 0.179$ ), indicating that both groups had similar levels of knowledge at baseline. This finding suggests that the groups were homogeneous before the intervention, allowing any subsequent differences in post-intervention knowledge to be more confidently attributed to the intervention rather than to pre-existing differences

**Table 2.**  
**Normality Test Results for Knowledge Scores**

| Variable                                               | P-value | Data Distribution        | Statistical Test          |
|--------------------------------------------------------|---------|--------------------------|---------------------------|
| Pre-intervention knowledge score (Intervention group)  | 0.022   | Not normally distributed | Wilcoxon Signed-Rank Test |
| Post-intervention knowledge score (Intervention group) | <0.001  | Not normally distributed | Wilcoxon Signed-Rank Test |
| Pre-intervention knowledge score (Control group)       | <0.001  | Not normally distributed | Wilcoxon Signed-Rank Test |
| Post-intervention knowledge score (Control group)      | <0.001  | Not normally distributed | Wilcoxon Signed-Rank Test |
| Difference in knowledge scores (Posttest – Pretest)    | 0.012   | Not normally distributed | Mann–Whitney U Test       |

The normality test showed that all knowledge score variables were not normally distributed ( $p < 0.05$ ). Specifically, the pretest and posttest knowledge scores in the intervention group had p-values of 0.022 and <0.001, respectively, while both the pretest and posttest scores in the control group had p-values of <0.001. In addition, the difference in knowledge scores between the pretest and posttest was also not normally distributed ( $p = 0.012$ ). Therefore, non-parametric statistical tests were applied. The Wilcoxon Signed-Rank Test was used to compare pretest and posttest knowledge scores within each group, whereas the Mann–Whitney U Test was employed to compare the changes in knowledge scores between the intervention and control groups.

Table 3 shows that both groups experienced an increase in knowledge scores following the intervention. In the intervention group, the average knowledge score rose from 72.67 before the intervention to 94.00 after the intervention, whilst in the control group it rose from 74.67 to 92.00. The results of the Wilcoxon test indicate that the increase in knowledge scores in both groups was statistically significant ( $p = 0.001$ ). A comparison of the changes in knowledge scores between the groups revealed that the average increase in the intervention group (21.33 points) was greater than that in the control group (17.33 points). The results of the Mann–Whitney test showed that this difference in increase was statistically significant ( $p = 0.016$ ).

**Table 3.**  
**Changes in Knowledge Scores Before and After the Intervention, and a Comparison of Knowledge Gains between the Intervention Group and the Control Group**

| Group                               | Pre-intervention<br>(Mean ± SD) | Post-intervention<br>(Mean ± SD) | Mean<br>Increase | p-<br>value <sup>1</sup> | p-<br>value <sup>2</sup> | Effect<br>Size (r) |
|-------------------------------------|---------------------------------|----------------------------------|------------------|--------------------------|--------------------------|--------------------|
| Intervention (Song-based Education) | 72.67                           | 94.00                            | 21.33            | 0.001                    |                          |                    |
| Control (Leaflet)                   | 74.67                           | 92.00                            | 17.33            | 0.001                    | 0.016                    | 0.42               |

Furthermore, the effect size ( $r = 0.42$ ) indicated that the use of songs as an educational medium had a moderate effect on the increase in the health volunteers' knowledge compared to the use of leaflets. The results of this study show that, prior to the intervention, both groups had relatively comparable baseline knowledge levels; thus, the changes observed following the intervention can be interpreted as the result of the educational media used, rather than being caused by differences in the respondents' initial abilities. Equivalence of baseline conditions is a crucial aspect in quasi-experimental research as it enhances the internal validity of the study and strengthens the confidence that changes in knowledge are a consequence of the treatment administered. In health education intervention studies, balanced baseline conditions allow for a more objective evaluation of the effectiveness of educational media, ensuring that differences in outcomes at the end of the study truly reflect the media's ability to convey information to the target audience. These findings are consistent with the principles of quasi-experimental methodology, which state that equivalence of baseline characteristics is a key prerequisite for comparing the effectiveness of two different forms of educational intervention (Maciejewski, 2020); (Waddington et al., 2023); (Viola et al., 2023).

The increase in knowledge observed following the intervention in both groups indicates that the health education process—whether using songs or leaflets—is equally effective in enhancing community health workers' understanding of the prevention and control of stunting. These findings reinforce the concept that the systematic delivery of health information can enhance individuals' ability to understand risk factors, preventative measures, and the actions required to address a health issue. Health education works by enhancing cognitive capacity, enabling individuals to link new information with previous experiences, form a better understanding, and ultimately increase their readiness to adopt appropriate health behaviours. Various international studies indicate that increasing knowledge is a crucial initial step in the process of health behaviour change, as individuals are more likely to accept health innovations if they have an adequate understanding of the benefits of such interventions (Sedlander et al., 2021); (Rincón Uribe et al., 2021).

In the context of stunting prevention, enhancing the knowledge of community health workers is of great strategic importance, as they serve as the primary link between health workers and the community. Community

health workers are not only tasked with conveying health information, but also play a role in supporting families, monitoring the growth of young children, providing nutritional counselling, and identifying risk factors that may lead to growth impairment in children. Therefore, capacity building for community health workers through health education will have a broader impact than simply increasing the knowledge of the general public, as the information acquired by community health workers will be passed on to the community on an ongoing basis. Recent research in Indonesia has shown that community health workers with a high level of knowledge tend to be more active in conducting health education, more confident when counselling mothers of young children, and better able to identify families at risk of stunting compared to those with a lower level of knowledge (Widiasih et al., 2025).

Although both media equally improved the health workers' knowledge, this study shows that the Sundanese-Serang language song produced a greater increase in knowledge compared to the leaflet. These findings indicate that the delivery of health information through media that combines elements of music, the local language, and community culture is capable of providing a more effective learning experience than conventional print media. Songs not only convey information verbally but also engage auditory, emotional and affective elements, enabling information to be processed simultaneously through various cognitive pathways. This makes health messages easier to understand, more engaging and easier to remember over a longer period.

The advantages of songs as a medium can be explained by Paivio's Dual Coding Theory. This theory explains that information received through more than one sensory channel is more easily stored in long-term memory than information received through only one channel. In songs, respondents receive health messages through lyrics, intonation, rhythm and melody simultaneously, thereby strengthening the information encoding process. Conversely, leaflets rely more heavily on the ability to read and comprehend text, meaning their effectiveness is heavily influenced by an individual's literacy skills. Consequently, songs have greater potential to improve information retention, particularly amongst communities with varying levels of education. The results of a systematic review conducted by Sheffield and Irons (2021) indicate that songs are an effective medium for health promotion as they can improve memory, strengthen information retention, and increase individuals'

motivation to pay attention to the health messages conveyed (Sheffield & Irons, 2021).

In addition to the Dual Coding Theory, the findings of this study can also be explained through the Cognitive Theory of Multimedia Learning developed by Mayer. This theory states that learning will be more effective if information is conveyed through a combination of various complementary media forms. Songs are a simple form of multimedia that integrates elements of language, sound, rhythm and emotion, thereby reducing cognitive load and enhancing the effectiveness of information processing. When community health workers listened to the song repeatedly during the intervention period, they not only memorised the lyrics but also developed a conceptual understanding of the message contained within. This process of repetition strengthened memory consolidation, making information on stunting prevention easier to recall than if they had merely read a leaflet (Mayer, 2001).

The findings of this study also highlight the importance of a local cultural approach in health communication. The song used in the study was composed in the Serang Sundanese language, which is the everyday language of the local community. The use of the local language allows health messages to be conveyed in a more familiar form, thereby fostering a greater sense of connection between the medium and the recipients of the message. The local language is not merely a tool for communication, but also represents cultural identity, social values, and the way in which the community interprets various phenomena of life. When health messages are presented in a language that is close to people's everyday lives, the process of receiving information becomes more natural as it does not require a complex process of cultural translation. Therefore, the use of regional languages has the potential to enhance the effectiveness of health communication compared to the use of formal language, which may feel more rigid to rural communities (Kreuter et al., 2003).

Research on culturally-based health communication indicates that interventions tailored to the socio-cultural characteristics of a community are more likely to be accepted than universal approaches. A culturally-based approach fosters a sense of ownership of health messages, thereby encouraging individuals to understand, remember and apply the information received in their daily lives. In the context of Indonesia, with its linguistic and cultural diversity, the use of local languages is a highly relevant strategy for enhancing the effectiveness of community-based health promotion. Consequently, the success of the Sundanese Serang-language songs in this study demonstrates that the integration of local cultural elements can be a key innovation in the development of more contextual and sustainable health education media (Kreuter et al., 2003).

The findings of this study reinforce the evidence that health promotion media combining musical elements with educational messages are more effective than conventional print media in improving the knowledge of

the target audience. Music has the ability to foster stronger emotional engagement, so that individuals do not merely receive information passively, but also experience a more enjoyable learning process. This emotional engagement plays a role in enhancing attention, motivation to learn, and memory retention of the information received. Unlike leaflets, which are generally only read at specific times, songs can be played repeatedly without causing boredom, thereby increasing the frequency of exposure to the information. The repetition of messages through rhythm and lyrics allows information to be stored for longer in long-term memory and to be recalled more easily when needed in everyday practice. The results of a systematic review conducted by Sheffield and Irons (2021) indicate that songs are an effective health promotion medium for improving knowledge, strengthening memory, and supporting changes in health behaviour, as they combine educational and entertainment elements within a single medium that is readily accepted by the public (Sheffield & Irons, 2021).

The findings of this study are also consistent with the systematic review conducted by Viola et al. (2023), which concluded that music has a positive impact on health through improved cognitive function, psychological well-being, social engagement, and individuals' ability to understand health information. The study explains that music is capable of simultaneously activating various areas of the brain associated with attention, emotion, language and memory, thereby making the learning process more effective than the delivery of information through text alone. This mechanism explains why community health workers in the song-based media group demonstrated a better understanding of stunting prevention material compared to those who received education solely through leaflets (Viola et al., 2023).

The advantages of song-based media are further highlighted by the fact that the intervention in this study utilised the local Sundanese Serang dialect, which is the everyday language of the local community. Local languages foster an emotional connection with the community as they reflect cultural identity, social values and everyday life experiences. The use of familiar language makes health messages easier to understand, more readily accepted and more trusted than the use of formal language, which can sometimes feel distant from the community. In health communication, trust in the message is a key factor determining the success of the educational process. When people feel that messages are conveyed using their own language and culture, resistance to new information tends to decrease, allowing the process of knowledge internalisation to take place more effectively.

A culture-based communication approach has become one of the recommendations in various public health programmes in developing countries. International health organisations emphasise that health interventions will yield more optimal results if they take into account the socio-cultural characteristics of the target community. This is because health behaviour is influenced not only by

knowledge, but also by cultural norms, belief systems, language, and the social interactions that develop within a community. Consequently, the success of the Sundanese Serang-language songs in this study demonstrates that health promotion innovations should not only focus on the content of the material but also ensure that the medium is culturally appropriate for the communities targeted by the intervention.

The findings of this study also support the research by Okafor et al. (2025), who conducted a systematic review on the use of music as a strategy for implementing various health interventions in Africa. That study found that music is capable of increasing the reach of health programmes, improving public acceptance of health messages, boosting community participation, and facilitating the implementation of community-based health interventions. Music is considered capable of removing communication barriers that often arise due to low levels of education or limited literacy among the population, thereby ensuring that health information is received more evenly by various social groups (Okafor et al., 2025).

These findings are also consistent with the research by Omar et al. (2025) on the use of musical messaging to improve the uptake of child health services. That study demonstrated that health messages conveyed through songs can increase public attention to health information whilst encouraging behavioural change in the use of health services. The researchers explained that music creates an enjoyable learning experience, thereby encouraging individuals to listen to, remember and subsequently apply the information they receive. This mechanism likely also applied to the community health workers in this study, where the process of repeatedly listening to and singing songs reinforced their understanding of stunting prevention (Okafor et al., 2025).

In addition to being influenced by the characteristics of the medium, the increase in health cadres' knowledge cannot be separated from their role as agents of change within the primary healthcare system. Health cadres are the primary source of information for the community in various Posyandu activities; therefore, enhancing their capacity will have a multiplier effect on increasing the knowledge of target families. The knowledge possessed by community health workers does not remain confined to the individual workers themselves, but is passed on to pregnant women, breastfeeding mothers, parents of young children, and families at risk of stunting through health education, counselling and support activities. Therefore, investment in enhancing the capacity of community health workers is a highly effective strategy for accelerating the achievement of stunting reduction programme targets at the community level.

These research findings are supported by Widiasih et al. (2025), who reported that volunteers' knowledge and skills are key components in supporting the implementation of stunting prevention programmes at the community level. The study demonstrated that strengthening volunteers' capacity through continuous

training and education is necessary to enhance their competence in carrying out their promotive and preventive roles, including the dissemination of health information to families and the monitoring of toddlers' growth. Consequently, enhancing community health workers' knowledge through songs in local languages has the potential to strengthen their capacity to convey health messages more effectively, thereby supporting the success of stunting prevention efforts in the community (Widiasih et al., 2025).

From the perspective of modern health promotion, the success of an educational medium is not only measured by its ability to increase knowledge in the short term, but also by its potential to retain information and encourage sustainable behavioural change. Songs possess characteristics that allow health messages to be heard repeatedly in various situations, whether during Posyandu activities, community health worker meetings, or everyday community activities. These characteristics provide an opportunity for continuous memory reinforcement, ensuring that health messages are not easily forgotten. Conversely, leaflets tend to have limitations as they rely on individuals' interest in re-reading the material provided. Therefore, the use of songs in local languages can be viewed as a form of health communication innovation that is better adapted to the characteristics of rural communities where an oral culture remains strong.

The findings of this study make an important contribution to the development of community-based health promotion strategies, particularly in efforts to accelerate the prevention and control of stunting in Indonesia. To date, the educational media used in posyandu activities and community health worker training have been dominated by print media, such as leaflets, booklets and posters. Although these media are capable of conveying information systematically, their effectiveness is highly dependent on reading interest, literacy levels, and individuals' ability to understand the content. In contrast, songs can provide a more interactive learning experience as they engage the senses of hearing and emotion, and encourage active participation through repeated listening and singing. These characteristics make the learning process more enjoyable, so that health cadres not only acquire new knowledge but also have greater motivation to remember and apply health messages in their daily activities. Thus, songs in local languages can be regarded as an innovative form of health promotion capable of meeting the needs of rural communities that still maintain a strong culture of oral communication.

The results of this study also demonstrate that the success of health promotion is determined not only by the quality of the educational material but also by the suitability of the medium to the socio-cultural characteristics of the target community. From a health communication perspective, a message is more readily accepted when it is presented in accordance with the language, norms and cultural values already familiar to the community. The use of the Serang Sundanese language in

songs enables community health workers to understand stunting prevention material through terms that are already familiar in everyday life, so that the process of information reception occurs more naturally. This approach reinforces the concept of cultural tailoring, namely the adaptation of health interventions based on the cultural characteristics of the target audience so that the messages conveyed are highly relevant to people's lives. Various studies have shown that a culture-based communication approach can increase public trust in health messages, improve the quality of interaction between health workers and the community, and enhance the successful implementation of various community health programmes (Meher et al., 2023).

In addition to contributing to increased knowledge, the use of songs in local languages also has the potential to support the sustainability of health promotion programmes. Songs are a relatively inexpensive medium, easy to produce, and can be played repeatedly without requiring significant operational costs. Unlike face-to-face training, which requires the continuous presence of facilitators, songs can be utilised independently by community health workers and the public through various digital devices or community activities. These conditions present an opportunity for community health centres to develop educational media that is more efficient, easily replicable, and capable of reaching areas with limited health resources. Therefore, innovations in media based on local culture, such as those developed in this study, have the potential to be integrated into volunteer training programmes, antenatal classes, posyandu activities, and public health campaigns organised by local authorities.

Another implication of this study relates to strengthening the capacity of community health workers as the frontline of primary healthcare. The success of various public health programmes, including the accelerated reduction of stunting, depends heavily on the ability of community health workers to convey health information accurately and engagingly to the community. Health cadres with sound knowledge will be more confident in delivering health education, providing nutritional counselling, supporting families with toddlers at risk of stunting, and encouraging the community to make optimal use of health services. Therefore, investment in the development of effective educational media for health cadres is a vital part of any strategy to strengthen the public health system. Research by Thomas et al. (2025) shows that enhancing the capacity of health cadres through various forms of educational intervention contributes to improved performance in primary health care, increased coverage of preventive services, and an overall improvement in public health indicators (Thomas et al., 2025).

Nevertheless, the results of this study must be interpreted whilst taking several limitations into account. Firstly, the study employed a quasi-experimental design; consequently, the allocation of respondents to the intervention and control groups was not carried out

through a randomisation process. This means that external factors that could not be fully controlled—such as differences in learning motivation, the health cadres' experience, or exposure to health information from other sources during the study period—may still have been present. Although both groups had relatively comparable baseline conditions, the potential influence of confounding variables must still be taken into account when interpreting the study results.

Secondly, the relatively small number of respondents means that the study's ability to represent all health cadres across various regions remains limited. All respondents came from a single village with relatively homogeneous cultural characteristics; consequently, the study's findings cannot yet be directly generalised to other regions with different social, cultural or linguistic characteristics. A study with a larger sample size, involving several districts or provinces, would provide stronger scientific evidence regarding the effectiveness of locally-based song-based media in various Indonesian community contexts.

Thirdly, this study only assessed changes in health cadres' knowledge following the intervention without evaluating the long-term sustainability of the impact. Increased knowledge following the intervention does not necessarily translate fully into changes in the cadres' behaviour during health education sessions or into changes in the health behaviours of the target families. Therefore, a longitudinal study is required to evaluate knowledge retention several months after the intervention and to assess how this increased knowledge translates into changes in the cadres' behaviour during community health service activities.

Fourthly, this study has not yet evaluated the ultimate impact of the intervention on public health indicators, such as changes in infant and child feeding practices, increased visits to posyandu, family compliance with toddler growth monitoring, or a reduction in the prevalence of stunting. Yet the primary objective of health promotion is not merely to increase knowledge, but also to bring about behavioural changes that ultimately have an impact on the health status of the community. Therefore, future research needs to develop a more comprehensive evaluation model by measuring all stages of change, from increased knowledge, changes in attitude and behaviour, to changes in health outcomes.

Given these limitations, future research is advised to adopt a randomised controlled trial design to strengthen the study's internal validity. Research should also involve a larger sample size, covering both urban and rural areas, and include diverse ethnic groups and regional languages across Indonesia, so that the effectiveness of locally-based song-based media can be compared across various socio-cultural contexts. Furthermore, future research should conduct long-term evaluations to assess knowledge retention, changes in health cadres' behaviour, the quality of health education delivery, and the impact on families' behavioural changes regarding stunting prevention.

Research on B cost-effectivenessB is also essential to assess the feasibility of implementing song-based media as part of a national community-based health promotion policy.

## CONCLUSIONS

This study shows that education using either Serang Sundanese songs or leaflets equally improves health cadres' knowledge of the prevention and control of stunting. However, songs in the local language yield a greater increase in knowledge, and thus have the potential to serve as a contextual alternative for health promotion in communities with similar cultural characteristics. Nevertheless, these findings should be interpreted with caution as the study employed a quasi-experimental design, involved a limited sample size, and assessed only knowledge outcomes. Future research should employ a stronger experimental design, involve a broader population, and evaluate the impact on behavioural change and health outcomes.

## SUGGESTION

Based on the research findings, it is recommended that community-level health promotion programmes integrate songs in local languages as an innovative educational strategy to improve health workers' knowledge and participation in the prevention of stunting. Researchers should subsequently conduct studies with a more robust experimental design and a broader population coverage to strengthen the validity of the findings and assess the long-term impact on behavioural change and children's nutritional status. Furthermore, an evaluation of the cost-effectiveness, cultural relevance and sustainability of implementing songs in posyandu activities and volunteer training is essential so that this intervention can be adopted as national policy in efforts to accelerate the reduction of stunting in Indonesia.

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