

## Original Research

# The Implementation of Health Education Using Snake & Ladders Game and Audiovisual Media to Improve Stunting Knowledge Level on Primigravida Mothers

M. Rifqi Rahmatullah<sup>1</sup>, Esme Anggeriyane<sup>1\*</sup>, Muhammad Anwari<sup>1</sup>

<sup>1</sup> Faculty of Nursing and Health Sciences, University of Muhammadiyah Banjarmasin, South Kalimantan, Indonesia

## ABSTRACT

**Background:** Stunting is the condition where a child's growth and development are disrupted due to chronic malnutrition and recurrent infections, especially in the first 1000 days of life. Increasing the mother's knowledge needs to be carried out with various health education media approaches.

**Objective:** To determine the different effects of health education using the Snakes & ladders game and audiovisual media on the stunting knowledge level of primigravida mothers at Pekauman Community Health Center of Banjarmasin.

**Method:** This research was quasi-experimental with a two-group pretest and posttest design with two kinds of interventions. The population was 67 primigravida mothers, purposive sampling with 60 primigravida mothers who came for antenatal care and bivariate analysis used independent sample T-test.

**Results:** There were differences average score of knowledge before health education using the snake and ladders game was 70.00, and the audiovisual media was 65.57. Then, after health education media using the game of snakes and ladders was 91.77, and audiovisual media was 89.33.

**Conclusions:** Health education using the snakes and ladders game had a higher value and was more effective than audiovisual media in improving the stunting knowledge level of primigravida mothers. Health workers can provide interesting health education about stunting to primigravida mothers.

## ARTICLE HISTORY

Received : November 21, 2023

Revised : March 21, 2024

Accepted : June 15, 2024

Available Online : August 12, 2024

Published Regularly: August 31, 2024

## KEYWORDS

Audiovisual; Knowledge; Media; Snake & Ladders Game; Stunting

## CONTACT



Esme Anggeriyane

[esmeanggeriyane@umbjm.ac.id](mailto:esmeanggeriyane@umbjm.ac.id)

Faculty of Nursing and Health Sciences,  
University of Muhammadiyah  
Banjarmasin, South Kalimantan, Indonesia

Cite this as: Anggeriyane, E., Rahmatullah, M. R., & Anwari, M. The Implementation of Health Education Using Snake & Ladders Game and Audiovisual Media to Improve Stunting Knowledge Level on Primigravida Mothers. *Gaster*, 22(2), 162-173. <https://doi.org/10.30787/gaster.v22i2.1344>

## INTRODUCTION

The first thousand days of life are the golden years, which are called "golden age". The thousand days consist of 270 days during pregnancy and the first 730 days after birth. At this time, a child will grow and develop optimally. Brain growth is very fast and this can determine the quality of children's lives in the future. However, if this period is disrupted, the child's survival and development will be affected. If the child's height is less than (Z-Score) -2 SD, then the length or size of the child is determined by his age. The child is said to be stunted (Agustina, 2022; Anggeriyane & Rahayu, 2022; Dhirah et al., 2020).

Stunting is a serious problem and needs to be faced because it can hinder the momentum of Indonesia's golden generation in 2045 (Kominfo, 2021). Stunting is currently seen as a severe public health issue. Stunting is a major global health concern, despite a decline in frequency. Stunting will affect approximately 149.2 million children under five, or 22% of them. By 2020, more than half of the world's stunted children under five will be from Asia (53%), while more than a third (41%) live in Africa (Gusnedi et al., 2023; Saleh et al., 2021; UNICEF et al., 2021). The Sustainable Development Goals (SDGs) make stunting a target in the 2<sup>nd</sup> sustainable development goal. With the aim of eliminating hunger and all forms of malnutrition by 2030 and achieving food security (Mario et al., 2023).

Based on data from the Asian Development Bank in 2022, the percentage of prevalence of stunting among children under 5 years of age in Indonesia is 31.8%. This number causes Indonesia to be in 10<sup>th</sup> place in the Southeast Asia region. Data from the Ministry of Health of the Republic of Indonesia for 2022 shows that Indonesia's stunting rate has decreased to 21.6% (Devina, 2023). South Kalimantan ranks the 6<sup>th</sup> highest stunting in Indonesia, with 30.0% in 2021. Banjarmasin is ranked 9<sup>th</sup> with a stunted percentage of 27.8% (Kemenkes RI, 2021). The percentage of stunting under five at the Pekauman Community Health Center of Banjarmasin with 155 toddlers (13.75%) (Dinkes Kota Banjarmasin, 2021).

Mothers are in a special position when it comes to caring for their children (Husnaniyah, Yulyanti, and Rudiansyah, 2020; Anggeriyane & Rahayu, 2022). Stunting prevention efforts cannot be separated from parents' knowledge of stunting. Knowledge of the symptoms of stunting, its consequences, and prevention methods can determine parents' attitudes and behavior. Parents can increase awareness about the importance of preventing stunting with the proper knowledge. Health behavior for preventing stunting includes consuming adequate nutrition for expectant mothers, nutrition for children, maintaining a healthy home and environment, and living a clean and healthy lifestyle (Rahmawati, Nurmawati, and Permata Sari, 2019). In line with research by Amaliah and Oktavianto (2019) there is a relationship between the nutritional knowledge of mothers under five with the incidence of stunting (p-value <0.05). Mothers with good nutrition knowledge will have more than 25 children who are not stunted (78.1%), and mothers with less knowledge of nutrition have stunted toddlers as many as three people (9.4%).

The importance of health education in increasing a person's knowledge of a problem faced. It is necessary to consider the success factors such as the media, methods and targets used in implementing health education (Aningsih, 2022).

The snake & ladders game of stunting is a medium developed by the Ministry of Health of the Republic of Indonesia to prevent stunted children. The game contains 36 columns measuring 3x3 meters. Column number 1 is the starting column at the start of the game, and column number 36 is the end of the game. Each column contains positive

and negative habits. The game has a "ladder" symbol as a sign of increasing positive daily activities. On the other hand, the snake symbol shows negative behavior in everyday life (Mulianingsih et al., 2021).

The snake & ladders stunting game simulation method increases mothers' knowledge about preventing stunting. In the research conducted by Zulfita et al. (2020) cadres and public health center officers received the snake & ladders stunting game media well because the mothers were very enthusiastic, and communication was two-way.

Pekauman Community Health Center of Banjarmasin is one of the first-level health services that provides services to all age levels, such as pregnant women. Providing education about stunting is carried out verbally without using health media and is carried out during health checks for pregnant women who have indications of health problems. Health education provided during visits to community health centers or integrated service posts. There was information about stunting at the community health center, such as in pregnancy examination books and posters on the walls. The important of informative, innovative and attractive media so that the target is interested in understanding about stunting and applying behavior to prevent stunting.

Health education can be done with audiovisual media to deliver information (Nuraini et al., 2021). In line with Rini (2020) her research found that the effectiveness of audiovisual media as a medium of health education on the level of mothers' knowledge about stunting at the Rawasari Public Health Center. In line with the research of Susilowati, Trisetiyaningsih, and Nursanti (2021) education using audiovisual media can increase mothers' knowledge, as indicated by the evaluation results increase after being given health education. Audiovisual media is the choice of media that can attract attention and improve understanding. During the activity, the participants were enthusiastic and cooperative by asking some questions to the servants. Increasing parental knowledge is expected to be the basis for preventing stunting and having maximum growth and development.

Based on data, the Pekauman Public Health Center is the health center with the highest number of primigravida mothers in Banjarmasin in 2022. So, primigravida mothers need to know about stunting to prepare optimally for the first 1000 days of life. A preliminary study conducted in February 2022 on five primigravida mothers' knowledge about stunting found that two primigravida mothers had less knowledge, one person had sufficient knowledge due to the lack of information, and two had good knowledge. Three respondents received information about stunting through health workers verbally and two respondents had not received information regarding stunting at that time.

The aimed of the study to determine the different Implementation of Health Education Using Snake & Ladders Game and Audiovisual Media to Improve Stunting Knowledge Level on Primigravida Mothers.

## MATERIALS AND METHOD

This type of research was quantitative research. The research design used a quasi-experiment design with two group pre and post-test designs. The first group was given a health education intervention using a snake & ladders game and the second group used an audiovisual media.

The population in this study was 67 primigravida mothers who visited at Pekauman Community Health Center of Banjarmasin from January to June 2022. This study used purposive sampling with 60 primigravida mothers who came for antenatal care, physically and mentally healthy and have never previously received the intervention that will be provided.

The type of instruments used in this research were the snake & ladders game which contains stunting knowledge issued by the Indonesian Ministry of Health which contains 36 boxes measuring 3x3 meters, audiovisual media made by the Midwifery Faculty of Medicine University Brawijaya with a duration of 9.45 minutes and knowledge level questionnaire consists of 15 questions used the Guttman Scale.

Researchers divided into two groups including 30 respondents for each group. One group intervention with snakes and ladders and one other group with audiovisual media.

This study gave interventions to two groups that had been divided, the group given the snake and ladders game and the group given audiovisual media about stunting. Those evaluated used a questionnaire on the level of knowledge of primigravida expectant mother on stunting

Data analysis used a paired t-test to determine each intervention's effect before and after. An independent t-test to compare between snake and ladders game and audiovisual media effect.

This research has received ethical approval from the Research Ethics Committee of the University of Muhammadiyah Banjarmasin with the number 127/UMB/KE/IV/2022.

## RESULTS

This study found 60 primigravida mothers as respondents and divided into two intervention group. The characteristics of respondents in the snake and ladder game group and the audiovisual group showed in table 1.

**Table 1.** Characteristic Respondent.

Characteristic	Category	n	%
Age	< 19 years old	4	6,7
	> 20 years old	56	93,3
Education	College	5	8,3
	High School	43	71,7
	Junior high School	12	20,0
Profession	Housewife's	53	88,3
	Self-employed	6	10,0
	Government employee	1	1,7

According to the data table above, as many as 56 respondents were over 20 years old (93,3%), 43 respondents were in high school (71,7%) and 53 respondents were

housewives (88.3%). According to respondent statistics based on occupation the homogeneity test of the respondents' characteristics showed that the two groups were homogeneous ( $P < 0.05$ ).

The bivariate analyze for the snake and ladder game group and the audiovisual group showed in table 2.

**Table 2.** The Average Knowledge Before and After Health Education, The Results of The Paired T-Test and Independent Sample T-Test

Variable	Category	F	%	Mean	P value <sup>1</sup>	P value <sup>2</sup>	
Pre-test Snake & Ladders Game	Good	11	37	70,00	<0,000	0,143	
	Sufficient	14	47				
	Less	5	16				
Post-test Snake & Ladders Game	Good	30	100	91,77			
Pre-test Audiovisual Media	Good	7	23	65,57	0,000		
	Sufficient	15	50				
	Less	8	27				
Post-test Audiovisual Media	Good	30	100	89,33			

<sup>1</sup>Paired Sample T Test

<sup>2</sup>Independent Sample T Test

Table 2 shows a change in the average knowledge in each group. The Paired sample T test revealed an increased intermediate knowledge of the snake and ladder group and the audiovisual media group ( $p < 0.000$ ). The Independent sample T test showed no significant difference in the mean between the snake and ladder group and the audiovisual media group after being given health education ( $p > 0.05$ ). In other words, health education and both media were equally effective in increasing knowledge about stunting. These results indicate that health education using snakes and ladders game had a higher value and more effective than audiovisual media to improve stunting knowledge level on primigravida mothers.

## DISCUSSION

The safe age for a woman to undergo healthy pregnancy is 20-35 years. Pregnancy at fewer than 20 years can lead to a high-risk pregnancy because the age of 20 years is biologically not optimal, tends to be emotionally unstable, and mentally immature, so it is easy to experience anxiety which results in pressure. Lack of attention to the fulfillment of nutrients during pregnancy (Rangkuti & Harahap, 2020). According to Rahayu, Suryani and Utami (2021) age affects a person's perception and mindset. The older she gets, the more information and experience she gets, so she will have a good level of knowledge, and a person will also develop his grasping power and mindset.

The education of the respondents in this study, the majority had a high school education level, as many as 43 respondents (71.7%). A person's level of education influences knowledge because education can improve thinking abilities and reception of

information. Research shows that the higher a person's level of education, the better the knowledge they have (Damayanti & Sofyan, 2022). According to Kusumawati, Budiarti and Susilawati (2021) maternal education has a relationship with the incidence of stunting. The lower the mother's education level, the greater the risk of toddlers experiencing stunting. According to Angraini et al., (2020) a person's education level will affect his knowledge. A mother's education is one of the factors that can cause stunting in children.

The profession of the respondents in this study, the majority based on data, was housewife, as many 53 respondents (88.3%). Working mothers have an impact on time in providing nutritional attention to their toddlers, and mothers who do not work are mothers who only serve as housewives who spend a lot of time just at home without being tied to work outside the home. Stunting children are more commonly found in toddlers who have mothers as housewives. Although homemakers have more time to care for children, if the parenting pattern is still not suitable (Yoga & Rokhaidah, 2020). According to Aryani, Indriyati and Linda (2021) mothers who do not work have a lot of free time. It can undoubtedly give mothers more information and knowledge to improve the health status of their families through various media. Besides that, it is also obtained through the social environment.

Before being given health education, were obtained the results from the snake and ladder group with the highest in the good category, as many as eleven respondents (37%), and the results from the audiovisual media group with the highest in the sufficient category as many as fourteen respondents (47%). Sources of information significantly affect one's knowledge, especially in the health sector. The development of technology makes the availability of various mass media in multiple forms such as television, radio, newspapers, magazines, and others as a means of communication which has a significant impact, especially in the health sector (Rahayu et al., 2021).

Knowledge is a very important factor in forming a person's actions especially primigravida mother. Knowledge-based on understanding will foster a positive attitude in efforts to prevent stunting. If the mother has high knowledge about the meaning, symptoms, consequences of occurrence stunting, and prevention at 1,000 days first life, then increasingly also good knowledge about efforts preventing stunting (Arnita et al., 2020).

According to Prabawati and Andriani (2021) research showed that there was a relationship between knowledge and the incidence of stunting. Respondents with less knowledge experience stunting more than respondents with good knowledge. For respondents who have less knowledge, this is due to the mother's minimal knowledge and mother's lack of care about nutrition. Higher education of the mother is not a guarantee of normal nutrition for the child. She must be able to apply the knowledge gained from his well-educated mother in everyday life. However, behavior is influenced not only by professional level but also by other factors such as socioeconomic, cultural and environmental factors. Studies have shown that education level can affect respondents' general knowledge about stunting, as education level can increase a person's health knowledge (Anggeriyane, 2019, 2023; Aryani et al., 2021). Maternal education, feeding habits, and environmental factors are the most crucial targets in avoiding stunting in children. Additionally, understanding the advantages of early-life exclusive breastfeeding is essential for ensuring toddler nutrition needs are met (Quamme & Iversen, 2022).

The results of this study indicate that the knowledge of expectant mothers about stunting at the pretest was still lacking. Most of the mothers still answered incorrectly on questions such as the definition of stunting, the characteristics of stunting, and the impact of stunting, factors causing stunting, and stunting prevention.

After being given health education with the snakes and ladders game, the study obtained 15 respondents (100%). With the results ( $P = 0.000 < (\alpha = 0.05)$ ), it means that giving the snake and ladder game has an influence on knowledge and experienced an increase in knowledge in the good category. Increasing in knowledge because respondents gained knowledge in a way that was not boring, and the process of receiving information using snakes and ladders had a high intensity to convey information compared to doing lectures. When the respondent plays, the mother uses her five senses because the five senses are the pathway for receiving information to the brain. The mother will read the questions and see the pictures contained in the snake and ladder. The more senses used, the more information will be received and stored. Snakes and ladders games can stimulate a person to develop cognitive, moral, mental, emotional, social, and psychomotor abilities (Mulianingsih et al., 2021; Sulistiyawati, 2021).

Snakes and Ladders game is one of the cooperative learning methods which provide opportunities for respondents to interact and participate actively during the activity so that they can develop independently through their thought processes in processing information, so the snake and ladder game method is very effective in increasing knowledge (Arini et al., 2020).

Health education influences the knowledge and attitudes of mothers in stunting prevention. Mothers who lack knowledge and attitudes of mothers who are not good can affect the behavior of mothers in consuming food during pregnancy which can be a factor that causes children to be at risk of stunting (Angraini et al., 2020).

Based on the study results, health education with snakes and ladders games can increase primigravida expectant mothers' knowledge about stunting. Information conveyed through the media for 30 minutes from the start of this game makes respondents more active in using all the five senses, which are the pathways for receiving information to the brain, because when respondents play snakes and ladders, they will read questions or commands and see pictures on the snake and ladder game so that more accessible for respondents to remember the information that has been obtained. The advantage of using the Snakes and Ladders game is that with exciting pictures and messages, it can make respondents accept the information conveyed without feeling bored because they can exchange information with other respondents. However, the snake and ladder game have a drawback need for a large area to put a snake and ladder carpet can make players feel bored when the game is too long. Still, this media can adapt to the conditions of the place by making it smaller and playing with pawns like a regular snake and ladder game.

The results of the study after being given health education with audiovisual media obtained by 15 respondents (100%) with the result ( $P=0.000 < (\alpha=0,05)$ ) means that the provision of audiovisual media has an influence on knowledge and is experienced as an increase in knowledge in the good category.

The development of technology will lead to a variety of media in various forms, one of which is audiovisual. Information sources significantly affect knowledge, especially in the health sector (Rahayu et al., 2021). According to Ramadhanty and Rokhaidah (2021) audiovisual can be an information tool in the form of images and

sounds that can be received by the senses of hearing and sight, as well as making it easier for respondents to digest and understand the content of information, and it will be interesting if the video is made interesting. In line with research by Purnamasari and Raharyani (2020) knowledge of primigravida mothers has increased because it is given. In line with research by Nuraini *et al.*, (2021) there was a significant change in knowledge after being given health education using audiovisual. Health education using audiovisual can increase not only knowledge but also improve attitudes. Education through video media is a media learning method that aims to improve cognitive and psychomotor abilities. In addition, it can affect attitudes and emotions because it uses various techniques and effects that can attract audience reactions.

Audiovisual media as a health education medium was well received by respondents because this media offers more exciting and not monotonous counseling, with audiovisuals displaying motion, images, and sound, so that can carry out this media health education effectively. There was an increase in respondents after being given education using audiovisual, and they saw that respondents watched the video until they seriously finished it. Increasing mothers' knowledge is also caused by the mother's willingness to know more about how to prevent stunting, and increasing respondents' knowledge is also influenced by the media used, such as audiovisual, which is used as educational media. Health, because audiovisuals attract more respondents' attention and make it easier for respondents to capture the information conveyed (Juniah *et al.*, 2020; Susilowati *et al.*, 2021).

Based on the results of the study, after given health education with audiovisual media, can see that the level of respondents' knowledge of stunting increases because the advantages of using audiovisuals can make it easier for someone to learn on their own, can be repeated, can display things in more detail, and can be accelerated or slowed down, with audiovisual media displayed with exciting videos, it will be easier to understand and convey information so that it will increase knowledge. But after being given health education, there are still messages in audiovisual media that have not been communicated clearly to the respondents, one of which is the factors that affect stunting, perhaps due to the respondent's lack of focus when watching.

Based on the results of statistical tests before and after being given health education using snake ladder media and audiovisual with Wilcoxon test using the SPSS program with a P-value = 0.000 if significant  $P < 0.05$ , then it can be concluded that there is an effect of providing health education using snake ladder media and audiovisual on the level of knowledge of primigravida expectant mothers toward stunting. Based on the calculation results of the n-gain score test, the average n-gain score of snakes and ladders media is 71.3204 in the quite effective category, with a minimum n-gain score of 35.00% and a maximum of 100%. While the average value of n-gain for audiovisual media is 67.8464, it is included in the quite effective category with a minimum value of 0% and a maximum of 100%. Thus, using the snake and ladder method is quite effective in increasing the knowledge of primigravida.

The Mann-Whitney test was used to see whether there was a difference in the effectiveness of snake and ladder media and audiovisual on the level of knowledge of primigravida mothers toward stunting in Pekauman Public Health Center of Banjarmasin. The independent sample t-test showed a P-value of  $0.143 > 0.05$ , so it can be said that there is no significant comparison in the effectiveness of health education using snakes & ladders game and audiovisual media on the increase in primigravida expectant mothers regarding stunting. The snakes and ladders game and audiovisual



media effectively increase mothers' knowledge about stunting in the Pekauman Public Health Center of Banjarmasin. The average pretest score of the snake and ladder game was 70.00 to 91.77. After being given a posttest, there was an increase in the score of 21.77 in the snake and ladders game group. Meanwhile, for the audiovisual group, the average knowledge level score in the audiovisual pretest was 65.57 to 89.33. After being given the posttest, there was an increase in the score of 23.76 in the audiovisual group.

Increased knowledge of primigravida expectant mother can be done by counseling using various media, for example, by playing snakes and ladders and audiovisual media, which have their respective advantages and are suitable for health education media so that respondents can receive health information quickly because the delivery of information is conveyed excitingly. The snakes and ladders game helps exchange ideas when answering questions in the snake and ladder box and can build cooperation when played in groups, so the snake and ladder game is suitable to be used as a medium of information and education to increase knowledge (Nurzihan et al., 2020).

Audiovisual media has several advantages, information can be given to the broader community, a large population, and does not require complicated equipment, and the information produced is in the form of sound and images that can be accepted by the senses of hearing and sight at the same time which will make respondents easier to get and understand. People can receive health education using smartphones, and the internet can help increase knowledge and information for the whole community anytime and anywhere (Ramadhanty & Rokhaidah, 2021). There were limitations in controlling the sample, such as the age of the respondent, the respondent's education, and the respondent's gestational age, to reduce the results of this study.

## CONCLUSION

The study findings reveal that both snakes and ladders games and audiovisual media effectively enhance knowledge about stunting among primigravida mothers. However, the snakes and ladders game demonstrated superior efficacy in improving stunting knowledge compared to audiovisual media. These results hold potential for informing future research on stunting prevention, particularly through the exploration of innovative and engaging media formats.

## ACKNOWLEDGEMENT

The authors would like to express their sincere gratitude to the Pekauman Community Health Center of Banjarmasin for providing access to the study population and necessary facilities. The cooperation and support of the primigravida mothers who participated in this study were invaluable to the success of this research.

Furthermore, the researchers would like to extend their appreciation to the Faculty of Nursing and Health Sciences, University of Muhammadiyah Banjarmasin, South Kalimantan, Indonesia, for providing the necessary facilities and support to complete this study.

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