SMART CLASS INNOVATION USING TES DUGA TO ACCELERATE STUNTING PREVENTION IN AGRICULTURAL AREAS

Musviro[1*], Nurul Hayati[1], Iis Rahmawati[2]
[1]Faculty of Nursing, Universitas of Jember, Jember
[2]Faculty of Nursing, Universitas of Jember, Jember
Email: musviro@unej.ac.id

ABSTRACT

Breaking the chain of stunting by increasing parental understanding is necessary. This study aims to analyze the effectiveness of the Smart Class innovation using the 'Tes Duga' Snakes and Ladders game in improving parental knowledge to accelerate stunting prevention and reduction in agricultural areas. This study employed a pre-experimental one-group pre-test-post-test design. This study used a sample of 107 parents who have toddlers. Data collection was carried out using a questionnaire. The data obtained were analyzed using the Wilcoxon signed-rank test. The analysis indicated a statistically significant improvement in parental knowledge and attitudes, with a p-value of 0.000 ($p < 0.05$). These results show that the innovation of the Smart Class Program through the Guess Test game effectively increases parents' knowledge about preventing and reducing stunting. As an educational method, the Smart Class Program has the advantages of being interactive and fun for learning parents in agronursing areas, preventing stunting, and having an average increase in parental knowledge before the intervention of 73.36. After the intervention, the average increased significantly, namely 87.01. This innovative approach has the potential to be applied more widely as part of national efforts to overcome the problem of stunting in Indonesia.

Keywords: *Stunting Prevention, Smart Class, Agronursing, Educational Games*

INTRODUCTION

Stunting is a chronic nutritional problem that significantly impacts the physical and cognitive development of children (World Health Organisation, 2015).

Stunting remains a global issue. The World Health Organization (WHO) estimates that the incidence of stunting in 2022 is estimated to reach 22.3% of the entire population of children under five years old (UNICEF, WHO, & World Bank, 2023). In the same year, Indonesia ranked as the country with the fifth highest stunting rate in Asia. In the 2022 Indonesia Nutrition Status Survey (SSGI), stunting incidence reached 21.6% of the total population of children under five in Indonesia. East Java Province is estimated to reach 19.2% and Lumajang Regency is the 10th district with the highest stunting incidence in East Java with 23.8% of the entire population of children under five years old (Kemenkes, 2022).

Parental knowledge is also one of the significant causes of stunting in children (Mulyaningsih et al., 2021). Parents' knowledge plays an important role in stunting prevention efforts (Aprilina et al., 2021). Therefore, the need to improve effective health promotion and education focuses on knowledge related to stunting, especially in rural areas (Hall et al., 2018; Starkweather et al., 2020) the level of parental knowledge about nutrition in rural areas is lower, which makes the potential for stunting higher (Alim et al., 2019; Kartini et al., 2019).

Lumajang Regency is a region where the majority of the population is employed in the agricultural sector, and most residents have a low level of education. (Badan Pusat Statistik Lumajang, 2016). Nutritional issues are closely linked to agricultural areas in Indonesia (Susanto et al., 2021).

The role of nurses as educators and motivators is indispensable to overcome this stunting problem (Nengsih et al. , 2023). The setting of the farm and the role of nurses make the agronursing approach very effective in overcoming this (Maisyaroh, 2019).

 Received 25-07-2024, Accepted 20-03-2025, Published online 31-05-2025.

The agronursing approach combines health and agriculture as a practical approach. According to local wisdom, agricultural products in agricultural areas are used as educational materials for the Duga test to prevent stunting problems. Tes Duga (Guessing Stunting with Snakes and Ladders) is an interactive educational media that uses snakes and ladders games to teach important concepts about stunting, including the definition of stunting, the difference between stunting and dwarfism, signs and symptoms, causes and prevention of stunting, and foods to prevent stunting with local wisdom such as the use of complementary foods for breast milk from plants found around the agricultural environment. One of them is the use of Moringa in efforts to prevent stunting (Musviro et al., 2024). This game is designed to make the learning process more fun and effective, so that it can increase parents' knowledge about the importance of balanced nutrition and good feeding practices.

This study aims to analyze the effectiveness of the Smart Class innovation through Tes Duga game (Guessing Stunting with Snakes and Ladders) on increasing parental knowledge as an effort to accelerate prevention and reduce stunting in the agronursing area. In this case, the researcher identified the significance of the difference in the average parental knowledge before Tes Duga with the average parental knowledge after Tes Duga. The use of this intervention is expected to create positive behavior changes among parents, so that the stunting rate can be significantly reduced.

METHODS

This study uses a pre-experimental design approach with one-group pretest-posttest to analyze the effectiveness of Smart Class innovations through the game "Test Duga" in increasing parents' knowledge regarding stunting prevention efforts before and after the intervention (Creswell & Creswell, 2018). Innovative classes are held every month in 3 sessions. The research was carried out in February – May 2024 in Karangsari Village, Sukodono District, Lumajang Regency

The research was carried out in several stages. In the pre-intervention stage, a Smart Class for parents was established, and a pretest was carried out to assess initial knowledge and attitudes about stunting. The intervention stage is carried out in three main stages, including the first stage, FGD (Focus Group Discussion). According to Wahyuningsih et al. (2024), community support, health workers, and the government can increase efforts to successfully increase knowledge, namely cadres, so that the FGD in this study involved parents, cadres, health workers, and the village government. The moderator opened the FGD, and a discussion session was held for 45 minutes to share information and experiences regarding stunting. The second stage is the core stage, namely education using the interactive game Guessing Stunting with Snakes and Ladders; in this education, each session takes approximately 30-45 minutes, and each session consists of a small group of 15-20 parents so that in this study it took six Tes Duga sessions at the Posyandu in the agronursing area. The third stage is a demonstration of making complementary foods for breast milk. At the post-intervention stage, a posttest was conducted to measure changes in parental knowledge regarding preventing and reducing stunting.

The subjects of this study were 107 respondents who were selected using the purposive sampling method with inclusion criteria. These parents were in the integrated health post with the highest percentage of stunting, namely 107 parents, and all were taken to become research subjects, all of whom had children under five years of age and agreed to become respondents. Primary data were collected using knowledge questionnaires. The questionnaire is in the form of multiple choice with 15 questions. The questionnaire has been tested for validity and reliability before use. The gathered data were analyzed using the Wilcoxon signed-rank test with SPSS version 25.0 to identify significant differences between pre- and post-intervention scores. (Sofiyetti et al., 2023). The test was chosen because the data used was on an ordinal scale. This research has been approved by the Health Research Ethics Committee of the Faculty of Nursing, University of Jember with ethical approval number 267/UN25.1.14/KEPK/2024.

RESULTS AND DISCUSSIONS

This study analyzed the effectiveness of the Tes Duga game in improving parents' knowledge and attitudes regarding stunting prevention in Lumajang Regency. The data analyzed were collected through pre-tests and post-tests involving 107 parents. The data were analyzed based on respondent characteristics, followed by analysis using the Wilcoxon signed-rank test.

Table 1 describes the characteristics of the respondents. The majority of the respondents were aged between 25-39 years, comprising 72 (67.3%) parents. This result indicates that most of the respondents fall within the middle years age range, which is considered optimal for parenting as it is a mature age (Hermanto & Pranita, 2019). This aligns with the study's results, which showed increased parental knowledge after the intervention. The respondents are more receptive to the type of media used. In this study, respondents of this age tend to be more cooperative and enthusiastic in sharing education through the Tes Duga. The education level of the respondents varied widely, with the majority having a high school education, accounting for 47 parents (43.9%). One of the factors that can increase the risk of stunting is the education level and knowledge of the parents (Mulyaningsih et al., 2021; Rachman et al., 2021). The level of education of respondents is in line with the results of this study; most respondents with a high school education level were able to accept the intervention carried out well.

Table 1. Respondent Characteristics

Variable	n	(%)
Parental Age		
<18 years	2	1.9
18 - 24 years	21	19.6
25 - 39 years	72	67.3
>40 years	12	11.2
Parental Education		
Elementary School (SD)	24	22.4
Middle School (SMP)	15	14.0
High School (SMA)	47	43.9
Diploma	4	3.7
Bachelor's Degree	16	15.0
Master's Degree	1	0.9

Source : Primary Data, 2024

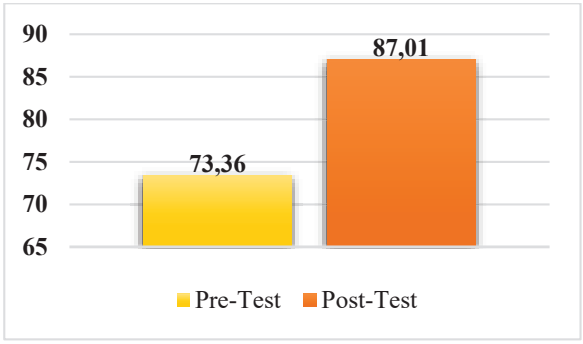

Figure 1. Increase in Average Scores from Pre-test to Post-test

Figure 1 presents the questionnaire scores before and after the intervention. The average score before the Tes Duga education was 73.36, which significantly increased to 87.01 after the intervention.

Table 2 shows the results of the Wilcoxon signed-rank test based on the distribution of the increase in questionnaire scores regarding parents' knowledge and attitudes toward stunting prevention before and after Tes Duga, It can be explained that all respondents who took Tes Duga did not experience a decrease in value from the pre-test to the post-test, with details of 88 parents showing an increase in value from the pre-test to the post-test. Implementing Tes Duga gave significant results on the difference in value before and after the intervention was provided. Tes Duga that was carried out gave significant results because this media was by the agronursing community at the integrated health post; every parent at the integrated health post brought their child so that the mother could receive the material presented well because the respondent's child could also play, and education was fun, not tense. Nineteen parents had the same value on the posttest and pretest; this was likely due to several factors, including when the implementation in a small part of Tes Duga session was carried

Table 2. Wilcoxon Signed-Rank Test Results

	Mean Rank	Sum of Rank	n
Post-Test < Pre-Test	.00	.00	0
Post-Test > Pre-Test	44.50	3916.00	88
Post-Test = Pre-Test	-	-	19
Total	-	-	107

Source : Primary Data, 2024

Table 3. Wilcoxon Signed-Rank Test Statistics

	Score Post-Test - Score Pre-Test
Z	-8.333
p-value	0.000

Source : Primary Data, 2024

out in a place that was not spacious enough, the atmosphere was a little crowded and a small proportion of respondents with young age and high education were a little indifferent to the intervention.

Table 3 shows the statistical results of the Wilcoxon signed-rank test used to assess the changes in post-test and pre-test scores after the intervention with Tes Duga. The results indicate a significance value (p-value) of 0.000. The results reveal a highly significant difference between pre-test and post-test scores, proving that Tes Duga effectively enhances parents' knowledge regarding stunting prevention.

These findings are consistent with other research related to game-based education. Game-based education is increasingly used worldwide and is considered effective for various types of disease education (Sharifzadeh et al., 2020). Another study on game-based education using card games proved effective in stunting prevention strategies. In this study, educational games can be developed to overcome stunting (Pambudi Karuniawaty et al., 2020).

The smart class innovation using play techniques with the Guess Test made and developed by researchers has a stunting delivery and sharing process that is not boring. This game contains 13 columns in the shape of the letter "Z," where each column contains pictures and questions about stunting that must be answered by parents and fathers. When the player cannot answer they will remain at the number. In the game, there is also a column containing an image of a ladder as an ascending symbol and a column containing a snake as a descending symbol so that it can add to the excitement.

Game-based education in this study uses snakes and ladders media, which the researcher developed. Similar research (Pambudi Karuniawaty et al., 2020) has been conducted on developing board games as educational media

Figure 2. Tes Duga

about stunting and MPASI and assessing their effectiveness in improving parents' knowledge, attitudes, and practices (KAP). The difference with previous research is the educational media of the game. This study uses Snakes and Ladders media compiled by researchers from various sources and packaged as a Snakes and Ladders game that respondents can guess. Respondents consider this game to provide a pleasant atmosphere that is easy to understand. Non-monotonous methods, full involvement of respondents, and 2-way discussions can provide interest in using this media. The significant increase in knowledge after the intervention reflects that the educational approach with the Tes Duga can be well-accepted by the community in the agronursing area, especially at the Posyandu, so that parents' motivation to learn increases and apply the information obtained. The limitation of this study is the lack of a control group. The study can be developed in the broader area both (in the highland agricultural area) and (tribes and cultural customs) that are different with different local wisdom and in a more extended period of time to see the long-term impact.

CONCLUSION

There is a significant difference between the pre-test and post-test scores of the Tes Duga intervention (Guessing Stunting with Snakes and Ladders). Tes Duga has improved parental knowledge and attitudes to prevent stunting in the agricultural region. This game-based education can create a fun, non-boring, non-tense, and easy-to-understand learning atmosphere, thus increasing parental motivation to learn and apply the knowledge gained. Smart Class Innovation with Tes Duga is expected to be adopted as an educational medium to reduce stunting in Indonesia. Suggestions for further research can be tested on different target groups and with a control group.

ACKNOWLEDGMENT

We want to thank the Institute for Research and Community Service, University of Jember, and the Faculty of Nursing, University of Jember, for the support and opportunity given to conduct the research. This research is financially supported by Grant Hibah Dosen Pemula (PDP), Institute for Research and Community Cervice, University of Jember. We would also like to thank the student research team, Indah Arum, Yulianti Nursiyah, Yovie Puspitasari, Putri Ayu Agustini, and Erika Ratna Puspasari for their research cooperation. We would also like to thank the Luamjang District Health Office and respondents who have cooperated and are willing to participate in this research.

REFERENCES

Alim, K. Y., Rosidi, A., & Suhartono, S. (2019). Birth length, maternal height and pesticide exposure were predictors of child stunting in agricultural area. *Jurnal Gizi dan Dietetik Indonesia (Indonesian Journal of Nutrition and Dietetics)*, *6*(3), 89. https://doi.org/10.21927/ijnd.2018.6(3).89-98

Aprilina, H. D., Nurkhasanah, S., & Hisbulloh, L. (2021). Mother's nutritional knowledge and behavior to stunting prevalence among children under two years old: case-control. *Bali Medical Journal*, *10*(3 Special Issue), 1211–1215. https://doi.org/10.15562/bmj.v10i3.2868

Badan Pusat Statistik Lumajang. (2016). *Statistik Daerah Lumajang 2017* (Nomor 0). Badan Pusat Statistik Kabupaten Lumajang.

Creswell, J. W., & Creswell, J. D. (2018). *Research Design : Qualitative, Quantitative, and Mixed Methods Approaches* (5th edn). SAGE Publications, Inc.

Hall, C., Bennett, C., Crookston, B., Dearden, K., Hasan, M., Linehan, M., Syafiq, A., West, S., & West, J. (2018). Maternal Knowledge of Stunting in Rural Indonesia. *International Journal of Child Health and Nutrition*, *7*(4), 139–145. https://doi.org/10.6000/1929-4247.2018.07.04.2

Kartini, A., Subagio, H. W., Hadisaputro, S., Kartasurya, M. I., Suhartono, S., & Budiyono, B. (2019). Pesticide exposure and stunting among children in agricultural areas. *International Journal of Occupational and Environmental Medicine*, *10*(1), 17–29. https://doi.org/10.15171/IJOEM.2019.1428

Livana, P.H;, Hermanto, H., & Pranita, P. (2019). KARAKTERISTIK ORANG TUA DAN PERKEMBANGAN PSIKOSOSIAL INFANT. *Jurnal Kesehatan*, *12*(1), 1–13. https://doi.org/10.24252/kesehatan.v12i1.6669

Maisyaroh, A. (2019). *BUKU AJAR AGRONURSING*. KHD Production.

Mulyaningsih, T., Mohanty, I., Widyaningsih, V., Gebremedhin, T. A., Miranti, R., & Wiyono, V. H. (2021). Beyond personal factors: Multilevel determinants of childhood stunting in Indonesia. *PLoS ONE*, *16*(11 November), 1–19. https://doi.org/10.1371/journal.pone.0260265

Musviro, Hayati, N., & Wahyuningsih, S. (2024). Innovation of Moringa Based Food Processing as An Effort to Prevent Stunting. *AgroNurse Kesehatan (Jurnal Pengabdian Masyarakat*, 122–126.

Nengsih, N. A., Sudirman, R. M., & Khamaludin, K. (2023). Peran Perawat Educator Dan Motivator Pada Balita Stunting Di Kabupaten Kuningan Tahun 2023. *National Nursing Conference*, *1*(2), 138–150. https://doi.org/10.34305/nnc.v1i2.867

Pambudi Karuniawaty, T., Silvana Sari, L., Wiweko, A., & Karmila, I. (2020). Implementation of Educative Boardgame to Improve Knowledge, Attitude and Practice of Complementary Feeding in Stunting Locus at Central Lombok. *American Journal of Pediatrics*, *6*(3), 172. https://doi.org/10.11648/j.ajp.20200603.12

Rachman, R. Y., Nanda, S. A., Larassasti, N. P. A., Rachsanzani, M., & Amalia, R. (2021). Hubungan Pendidikan Orang Tua Terhadap Risiko Stunting Pada Balita: a Systematic Review. *Jurnal Kesehatan Tambusai*, *2*(2), 61–70. https://doi.org/10.31004/jkt.v2i2.1790

Sharifzadeh, N., Kharrazi, H., Nazari, E., Tabesh, H., Khodabandeh, M. E., Heidari, S., & Tara, M. (2020). Health education serious games targeting health care providers, patients, and public health users: Scoping review. *JMIR Serious Games*, *8*(1), 1–16. https://doi.org/10.2196/13459

Sofiyetti, Mustafa, Restuning, S., Nurmawi, Y., Muliani, Dwisetyo, B., Nuradji, S., Razi, P., Lewa, A. F., Christine, Utami, U., Nadirawat, Riu, S. D. M., & Robert, D. (2023). *BUNGA RAMPAI STATISTIK KESEHATAN*. Pena Persada Kerta Utama.

Starkweather, C., Guarino, A., Bennion, N., Cottam, M., McGhie, J., Dearden, K. A., Santika, O., Jusril, H., Hall, C., Crookston, B. T., Linehan, M., Torres, S., Bennett, C., & West, J. H. (2020). An interpersonal nutrition campaign and maternal knowledge and childhood feeding practices: A case study from mothers in rural Indonesia. *Archives of Public Health*, *78*(1), 1–6. https://doi.org/10.1186/s13690-020-00444-9

Susanto, T., Rasni, H., & Susumaningrum, L. A. (2021). Prevalence of malnutrition and stunting among under-five children: A cross-sectional study family of quality of life in agricultural areas of Indonesia. *Mediterranean Journal of Nutrition and Metabolism*, *14*, 147–161. https://doi.org/10.3233/MNM-200492

UNICEF, WHO, & WORLD BANK. (2023). Level and trend in child malnutrition. In World Health Organization. New York. https://www.who.int/publications/i/item/9789240073791

Wahyuningsih, S., Musviro, M., Hayati, N., & Susanti, I. A. (2024). The Success of Empowering Cadres in The Prevention of Acute Hepatitis Among Children in Agronursing Areas. *Healthcare in Low-Resource Settings*, *12*(1), 21–24. https://doi.org/10.4081/hls.2024.11771

World Health Organisation. (2015). Stunting in a nutshell. https://www.who.int/news/item/19-11-2015-stunting-in-a-nutshell