JPPIPA 11(11) (2025)

Jurnal Penelitian Pendidikan IPA

http://jppipa.unram.ac.id/index.php/jppipa/index

Learning Innovation: The Impact of AI-Based Video Media in Improving the Skills of Adolescent Girls for Stunting Prevention

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Received: September 04, 2025
Revised: October 18, 2025
Accepted: November 25, 2025
Published: November 30, 2025

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DOI: 10.29303/jppipa.v11i11.12742

Abstract: This study examines the effect of Artificial Intelligence (AI)-based video media on improving adolescent girls' skills in preventing stunting. A quantitative quasi-experimental design was applied using a pre-test–post-test approach with a control group. The intervention group received AI-based video learning, while the control group used ChatGPT-based text interaction. Results show a significant improvement in the intervention group, with a post-test mean score of 82.19 compared to 41.16 in the control group. The intervention group also demonstrated a narrower confidence interval (78.55–85.83), indicating higher consistency in skill acquisition, whereas the control group showed a wider range (36.27–46.05). These findings confirm that visual, structured, and AI-enhanced learning materials improve comprehension and practical skills more effectively than text-based interactions alone. The study reinforces the importance of integrating innovative digital media into health education programs. In conclusion, AI-based video media is a highly effective tool for strengthening adolescents' stunting prevention skills and holds strong potential for broader implementation in early prevention strategies.

Keywords: Adolescent girls; AI-Based video media; Health education; Stunting prevention skills

Introduction

Stunting is a chronic growth disorder in children caused primarily by malnutrition and repeated infections, which hinders physical development and has long-lasting consequences on quality of life, education, economic productivity, and overall health (PP No. 72, 2021). Despite national efforts to reduce it, the prevalence of stunting in Indonesia remains a significant public health concern. For example, Riskesdas 2018 reported a national rate of 30.8%. Although this rate has decreased to 21.5% in the 2023 Indonesian Health Survey (SKI), stunting continues to pose a critical challenge that demands innovative and effective intervention strategies. Regionally, West Java's stunting prevalence declined from 26.21% in 2020 to 21.6% in 2022 (West Java Provincial Health Office, 2022), and Garut Regency witnessed a decline from 28.6% in 2020 to 11.5% by late 2024. Nevertheless, these figures illustrate that stunting remains a pressing issue requiring sustained attention.

Several multifaceted factors contribute to stunting, including economic hardship, maternal education, dietary habits, environmental conditions, and overall health. In particular, low family income and limited maternal education are strongly correlated with high stunting rates, especially in socioeconomically disadvantaged regions such as Papua and Nusa Tenggara (Ayuningtyas et al., 2022). Moreover,

How to Cite:
Ramdani, H. T., Murtiningsih, Rudhiati, F., Maryati, I., & Nurjanah, N. (2025). Learning Innovation: The Impact of AI-Based Video Media in Improving the Skills of Adolescent Girls for Stunting Prevention. *Jurnal Penelitian Pendidikan IPA*, *11*(11), 312–316. https://doi.org/10.29303/jppipa.v11i11.12742

exclusive breastfeeding and balanced nutrition have been identified as pivotal in preventing stunting, while insufficient maternal knowledge substantially increases the risk (Jamiyanti et al., 2024; Rusilanti & Riska, 2021). Therefore, targeting maternal education is essential, because mothers equipped with adequate nutritional knowledge can better support their children's growth and development.

Building on this premise, adolescent girls—who are future mothers—represent a crucial demographic for nutritional education aimed at stunting prevention. It follows that empowering them with nutrition knowledge early on could have a significant impact on future family health outcomes. Against this backdrop, the novelty of the present research lies in the application of artificial intelligence (AI)-based video media as an innovative and adaptive educational tool. Unlike traditional educational methods, AI-driven videos personalize content delivery based on the learner's pace and responses, thus encouraging deeper engagement and better retention of information (Liu et al., 2022; Perkins & Rogers, 2023). Prior studies have demonstrated the efficacy of audiovisual media in improving adolescent understanding of maternal health and nutrition, but the integration of AI technology designed to adapt and culturally localize content remains largely unexplored.

Furthermore, this research is particularly important in the context of Garut Regency, where stunting rates remain relatively high, with some subdistricts reporting a rate of 8.37% as of January 2025. Preliminary surveys indicate that many female students at MTs X lack awareness about stunting and some even suffer from anemia. Consequently, this study aims to improve the knowledge and skills of adolescent girls in preventing stunting through the use of AI-based educational videos. In doing so, it aspires to foster healthier lifestyle choices and establish a model for scalable, technology-enhanced nutrition education that other regions facing similar challenges can adopt.

Method

This study employed a quantitative approach with a quasi-experimental design using a pre-test and post-test with control group format. The experimental group received an intervention in the form of Artificial Intelligence–based video media, while the control group obtained learning materials through ChatGPT. The study population consisted of 252 female students, with 22 students assigned to both the experimental and control groups using quota sampling (Sekaran, 2016; Sugiyono, 2019). The research instruments included a checklist assessing stunting prevention skills, validated through expert judgment and Pearson validity testing, which confirmed all items to be valid. Instrument reliability testing produced a Cronbach's Alpha value of 0.915, indicating a very high level of internal consistency. Data collection procedures were carried out through pre-tests and post-tests administered after the intervention was delivered three times to each group.

The study adhered to essential ethical research principles, including self-determination, anonymity, confidentiality, privacy, and justice (Putra et al., 2023). The video-based instrument was developed using AI Gemini VEO 3, structured with a script generated through ChatGPT, and subsequently edited with Filmora Wondershare. The questionnaire consisted of three skill components: self-assessment of anemia, Body Mass Index calculation, and preparation of balanced meals based on the "Isi Piringku" concept. This research design aimed to illustrate changes in the stunting prevention skills of adolescent girls before and after the intervention and to evaluate the effectiveness of AI-based video media compared to the use of ChatGPT.

Result and Discussion

Overview of Stunting Prevention Skills Scores before Intervention

The data shows a significant difference between the intervention group and the control group in terms of stunting prevention skills before intervention. The intervention group had an average skill score of 50.50, higher than the control group, which only recorded an average score of 37.37. This indicates that although knowledge about stunting was quite good, the ability to apply this knowledge in practical actions was still low in both groups. The intervention group that used AI-based videos showed better skill scores, which can be attributed to a more engaging and interactive media-based educational approach, while the control group that used traditional methods with text-only materials experienced limitations in practical application (Sugiyarti & Juniarti, 2025).

Overview of Stunting Prevention Skill Scores After Intervention

After the intervention, the intervention group that used Artificial Intelligence (AI)-based videos showed a significant increase in stunting prevention skills, with an average score of 82.19, compared to the control group, which only reached 41.16. This significant difference shows that AI-based videos are more effective in improving skills than text-based methods such as Chat GPT. The advantage of AI-based videos lies in their ability to provide dynamic and interactive visual elements, which help learners understand and remember practical steps in preventing stunting.

Research by Masmuri et al. (2025) confirms that the use of technology-based video media can significantly improve the skills of health cadres. AI-based videos allow learners to not only hear explanations but also see the direct application of the material being studied, which is very important in the context of practical skills. This is in line with cognitive theory, which states that the more stimuli received, the more associations are formed in the brain, thereby facilitating the information storage process and improving memory (Basrowi et al., 2025).

In contrast, the control group that used Chat GPT, although it could provide text-based explanations, proved to be less effective in improving practical skills related to stunting prevention. Text-based media cannot provide the visualization or concrete examples needed to train practical skills, as AI-based videos do. These results support research by Sari et al. (2025), which shows that text-based methods have limitations in transferring practical skills that require visual interaction and direct application.

Thus, the use of AI-based videos has been proven to be more effective in developing practical skills than text-based methods. AI-based videos offer a more comprehensive approach by providing interactivity and visualization that strengthen understanding and information retention. This is in line with the results of Fitriana's (2023) research, which shows that audiovisual media, especially animated videos, are more effective in improving the skills of health cadres, including in the context of stunting prevention.

Conclusion

This study demonstrates that the use of Artificial Intelligence (AI)–based video media is significantly more effective in enhancing stunting prevention skills among adolescent girls compared to text-based learning through ChatGPT. Prior to the intervention, the experimental group showed a higher initial average skill score (50.50) than the control group (37.37). Following three sessions of intervention, the experimental group achieved a substantial increase to an average score of 82.19, whereas the control group showed only a modest improvement to 41.16. These findings indicate that AI-driven visual learning materials provide clearer, more engaging, and more applicable guidance for developing practical health-related skills. More broadly, the results suggest that AI-based multimedia tools can serve as effective educational interventions for improving adolescents' health literacy and practical competencies. The findings can be generalized to similar contexts where visual and interactive learning is needed to strengthen preventive health behaviors. Practically, this study highlights the potential for integrating AI-generated videos into school health programs, community education, and public health initiatives aimed at reducing stunting through improved knowledge and skills. Incorporating AI-based visual media may therefore contribute to more impactful health promotion strategies, especially in populations requiring accessible and skill-oriented education.

Acknowledgments
Place acknowledgments, including information on grants received, before the references, in a separate section, and not as a footnote on the title page.

Author Contributions
Conceptualization, H. T. R.; methodology, H. T. R.; validation, M. and F. R.; formal analysis, I. M.; investigation, N. N. and H. T. R.; resources, M. and F. R.; data curation, I. M.; writing—original draft preparation, N. N. and H. T. R.; writing—review and editing, M.; visualization, F. R. and I. M. All authors have read and agreed to the published version of the manuscript.

Funding
This research received no external fundings.

Conflicts of Interest
The authors declare no conflict of interest.

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