An Idea Nursing Journal
https://ihj.ideajournal.id/index.php/INJ/index

INJ
E-ISSN: 2961-8592

Volume 5(2), 95-103
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https://doi.org/10.53690/inj.v5i02.788

Original Research

Digital Health Education Based on Huyula Gorontalo Local Wisdom for Stunting Prevention

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Abstract

Background: Stunting is a nutritional issue that can adversely affect physical growth, cognitive development, and long-term health outcomes. Adolescents and prospective brides represent a critical target group, as their knowledge and attitudes significantly influence maternal and child health

Objective: To evaluated the effectiveness of "Huyula Gorontalo," a digital transformation grounded in local wisdom, as an educational medium to improve knowledge and attitudes regarding stunting prevention among adolescents and prospective brides

Methods: A quantitative approach was employed, utilizing a quasi-experimental design with a pre-test and post-test one-group method. Data were collected using validated questionnaires measuring knowledge and attitudes related to stunting prevention. The sample comprised 67 adolescents and prospective brides, selected through accidental sampling in the Tilango Public Health Center area, Gorontalo. The intervention consisted of digital health education based on the local cultural concept of "Huyula," which emphasizes cooperation, collective responsibility, and community support.

Results: Indicated a significant improvement in participants' knowledge and attitudes following the intervention. The mean knowledge score increased from 2.3881 to 2.9403 ($p = 0.000$), and the proportion of participants with good knowledge rose from 44.8% to 94.0%. Attitudes also improved, with the mean score increasing from 1.8209 to 1.9701 ($p = 0.001$), and the percentage of respondents with positive attitudes rising from 82.1% to 97.0%.

Conclusion: The "Huyula Gorontalo" digital transformation approach effectively enhanced knowledge and attitudes toward stunting prevention. This strategy has the potential to support sustainable health education among adolescents and prospective brides.

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Article info :
Received: 20 Apr 2026 | Revised: 10 Jun 2026| Accepted: 22 Jun 2026

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Keywords
Stunting; E-Health; Education.

Background

Stunting is a form of chronic malnutrition caused by inadequate nutritional intake over a prolonged period, which may lead to future developmental problems, including difficulties in achieving optimal physical and cognitive development (1).

The United Nations Children's Fund (UNICEF) reported that the prevalence of stunting among children under five worldwide reached 21.9%. Approximately 148 million children under five years old globally suffer from stunting, with the highest number of cases occurring in Africa and Asia, including Indonesia (2). According to the 2023 Indonesian Health Survey published by the Ministry of Health, the current prevalence of stunting in Indonesia is 21.5%. This figure decreased by only 0.1% compared with the Indonesian Nutritional Status Survey in 2022, which reported a prevalence of 21.6%. Therefore, the achievement of the stunting reduction target of 14% by 2024 remains far from being met (3).

Based on data from the Gorontalo Provincial Health Office, the highest stunting prevalence in 2023 was recorded in Gorontalo Regency, reaching 34.7%. This prevalence increased from 28.3% in 2021 to 30.8% in 2022. Data from the Gorontalo Regency Health Office showed that 18 out of 23 districts had stunting prevalence, with the highest number of stunting cases found in Tilango District. In this area, the stunting prevalence reached 10.1%, with 117 children under five years old experiencing stunting.

Generally, stunting problems in Tilango District are caused by limited knowledge and awareness regarding stunting, as well as inadequate education and socialization regarding early detection and prevention. Adolescents and prospective brides are among the target groups in accelerating stunting reduction programs. Adolescence is often associated with emotional and social challenges, which may influence future life events and the quality of the next generation, making this period a critical phase (4).

The causes of stunting are multifactorial; however, one of the main contributing factors is the limited knowledge and understanding of adolescents and prospective brides regarding reproductive health, nutrition, and healthy marriage preparation. Effective and sustainable education for this group is essential because adolescence and the pre-marital period are crucial phases in determining the quality of future generations (5). Knowledge among adolescents as prospective brides regarding healthy pregnancy preparation remains limited. Adolescents generally understand that pregnancy occurs after marriage, and during pregnancy, important aspects include nutrition, physical activity, and avoiding excessive fatigue (6). This indicates the need for an educational approach that is targeted and appropriate to the population's characteristics. One strategy that can be implemented

is health education based on the local wisdom of "Huyula Gorontalo," adapted into a digital format to keep pace with current developments.

In Gorontalo, "Huyula" represents local culture and wisdom that emphasizes mutual cooperation and collaboration. Gotong royong is a social and cultural value in Indonesia that reflects togetherness, solidarity, and collective action among community members to achieve shared goals. Along with the development of information and communication technology, local cultural values have gradually declined. Young generations currently have less exposure to traditional cultural values, and the practice of "Huyula" is no longer commonly applied in daily life. The main challenge is changing the mindset of adolescents who tend to become more individualistic and less interested in collective activities. The influence of social media and lifestyle changes has accelerated the decline of this tradition among adolescents. Therefore, digital transformation becomes a strategic alternative for delivering health education to young people (7). Digitalization aligns with current adolescent trends and lifestyles, enabling information to be delivered more quickly, interactively, and accessibly, particularly for young generations who are more responsive to digital media. The use of digital media as an educational tool presents an opportunity that should be leveraged to support stunting prevention interventions.

Based on a systematic review of previous research, several media have been identified as interventions for stunting prevention among adolescents, including audiovisual media, Android applications, social media, leaflets, and booklets. Social media was found to be the most influential medium for adolescent stunting prevention, with greater differences between pre-test and post-test scores on TikTok (36.75%), Instagram (22.29%), Twitter (20.25%), YouTube (16.66%), and Facebook (12.61%). Audiovisual videos accompanied by explanations were also effective, as evidenced by an increase in knowledge from 50.9% to 76.6% compared with videos without explanations (8).

Other studies have also shown that effective health education media for improving knowledge include educational modules and videos. Research findings demonstrated differences in adolescent knowledge before and after receiving educational modules and video interventions (9). Based on several similar studies, digital media interventions have been shown to be effective in improving adolescents' understanding of stunting prevention. The dissemination of information to the community, particularly adolescents, is expected to utilize digital media to improve knowledge regarding stunting prevention more effectively and efficiently.

The digitalization of this program is expected to strengthen communication and education strategies, particularly in preventing stunting among adolescents and prospective brides. However, scientific studies examining the effectiveness of digital transformation in the Huyula program as a health education medium remain limited.

Methods

This study used a quantitative approach with a quasi-experimental one-group pre-test-post-test design. The population in this study consisted of 2,084 adolescents and

prospective brides in the working area of Tilango Public Health Center, Gorontalo. The sample consisted of 67 adolescents and prospective brides selected using an accidental sampling technique. This sampling method was chosen because respondents who met the inclusion criteria were available during the study period. The inclusion criteria were adolescents and prospective brides who lived within the working area of the Tilango Public Health Center, were willing to participate, were cooperative, and were able to read and write. The exclusion criteria were adolescents and prospective brides who did not attend the adolescent integrated health post.

Data collection was conducted in several stages. On the first day, respondents completed the pre-test questionnaire to assess their knowledge and attitudes regarding stunting prevention. The intervention was then implemented for five days using a digital educational poster based on the local wisdom concept of "Huyula Gorontalo." The educational poster contained information about the definition of stunting, risk factors, impacts, prevention strategies, nutrition, and preparation for healthy marriage. The Huyula values were incorporated into the educational content by emphasizing mutual cooperation, collective responsibility, and community support in preventing stunting. The intervention was delivered by the researcher through a group-based session, and respondents were instructed to share the educational poster through their social media platforms during the intervention period. After the intervention period, the post-test was conducted on the following day.

The knowledge and attitude instruments were questionnaires related to stunting prevention. The knowledge questionnaire consisted of questions regarding the definition, causes, impacts, and prevention efforts of stunting. The attitude questionnaire measured respondents' attitudes toward stunting prevention using an attitude scale. Both instruments had undergone validation to ensure their suitability as measurement tools. The digital educational media was also validated by an expert panel comprising lecturers with qualifications in stunting and by the Research and Community Service Institute (LPPM). Knowledge was categorized into three levels: good (score ≥76%), sufficient (score 56–75%), and poor (score ≤55%). Attitude was categorized into two levels: positive (score ≥ median) and negative (score < median).

Ethical approval was obtained from the Ethics Committee of the Faculty of Sports and Health, Universitas Negeri Gorontalo, with approval number 110A/UN47.B7/KE/2025 dated July 28, 2025. Participants provided informed consent before participating in the study, and confidentiality of participant information was maintained throughout the research process.

Result and Discussion

Demographic Characteristic of Participant

The demographic characteristics of respondents identified in this research activity include age, gender, religion, marital status, education level, and occupation.

Table 1. Respondent Characteristics (n =67)

Characteristics	Frequency	
	n	%
Age		
12-16 years (early adolescents)	53	79.1
17-25 years (late adolescents)	14	20.9
Sex		
Female	54	80.6
Male	13	19.4
Respondent Status		
Adolescent	53	79.1
Prospective bride and groom	14	20.9
Source of information		
Health workers	29	43.3
Internet	14	20.9
Parents	8	11.9
Friends	7	10.4
Self	5	7.5
Teachers	4	6

Bivariate Analysis

Analysis of knowledge scores

Bivariate analysis was conducted using the Paired Samples T-Test to compare the mean scores of the pre-test and post-test groups and to assess the significance of differences following the intervention.

Table 1 Analysis of Knowledge Scores Before and After the Intervention

Knowledge	N	Mean±SD	Mean Difference	*p-value*
Pre-test	67	2.3881 ± .60190	,5522	0,000
Post-test	67	2.9403 ± .23872		

The mean knowledge score increased from 2.3881 in the pre-test to 2.9403 in the post-test following the intervention.

Table 3. Paired Sampe T-Test

	Mean	t	df	Sig (2-tailed)
Pair 1 (Knowledge) Pretest-Posttest	-,55224	-7,125	66	0.000

Note: p-value was <0.001, which was lower than α = 0.05.

The data indicate a statistically significant difference in mean knowledge scores before and after the intervention. The mean post-test score (2.9403) exceeded the pre-test

score (2.3881), demonstrating that the intervention produced a positive and significant improvement in respondents' knowledge scores. (Table 3)

Table 4. Pre-test Knowledge Scores

Categories	Pre-Test		Post-Test	
	n	%	n	%
Poor	4	6.0	0	0
Sufficient	33	49.3	4	6.0
Good	30	44.8	63	94

Analysis of attitude

Table 5. Analysis of Attitude Scores Before and After the Intervention

Attitude	N	Mean±SD	Mean Difference	*p-value*
Pre-test Post-test	67 67	1.8209 ± .38633 1.9701 ± .17146	,1498	0.001

The mean attitude score increased from 1.8209 before the intervention (pre-test) to 1.9701 after the intervention (post-test).

Table 6. Paired Sampe T-Test

	Mean	t	df	Sig (2-tailed)
Pair 2 (Attitude) Pretest-Posttest	-,14925	-3,403	66	0.001

The p-value was 0.001, which is lower than $\alpha = 0.05$. This result demonstrates a statistically significant difference between the mean attitude scores before and after the intervention. The post-test mean score (1.9701) exceeded the pre-test mean score (1.8209), indicating that the intervention led to a significant improvement in respondents' attitudes toward stunting prevention.

Table 2 Pre-test Attitude Level

Categories	Pre-Test		Post-Test	
	n	%	n	%
Negative	12	17.9	65	97.0
Positive	55	82.1	2	3.0

An improvement was observed in the positive attitude category, rising from 82.1% on the pre-test to 97.0% on the post-test. Meanwhile, the percentage of respondents with negative attitudes decreased from 17.9% to 3.0%.

Overall, the analysis showed that the intervention significantly improved respondents' knowledge and attitudes regarding stunting prevention. The mean knowledge score increased significantly ($p < 0.001$), with the proportion of respondents in the good knowledge category increasing from 44.8% to 94.0%. Similarly, the mean attitude score improved significantly ($p = 0.001$), with the percentage of respondents with positive attitudes increasing from 82.1% to 97.0%.

The results of this study indicate that the "Huyula Gorontalo" local wisdom-based digital transformation, used as an educational medium, was effective in improving knowledge and attitudes toward stunting prevention among adolescents and prospective brides.

DISCUSSION

Knowledge

The effectiveness of the intervention targeting adolescents and prospective brides was shaped by both the quality of the educational material and the integration of the Huyula spirit, which emphasizes mutual cooperation and togetherness, throughout the educational process. The Huyula concept encouraged participants to share knowledge and reinforce collective commitment to addressing stunting, rather than receiving information solely on an individual basis. This approach reframed stunting prevention from an individual health responsibility to a collective responsibility supported by the broader social environment.

The significant increase in knowledge scores (from 2.3881 to 2.9403) demonstrates that participatory learning methods effectively enhanced participants' understanding. This result aligns with previous research (13), which found that health education significantly improved adolescents' knowledge. Within the Huyula framework, learning was facilitated through peer interaction, enabling participants who grasped the material more quickly to share information with others and promote equitable knowledge transfer. These findings indicate that health education interventions among adolescents can serve as effective preventive strategies.

For prospective brides and grooms, the observed increase in knowledge is supported by previous research (14), which reported that structured counseling significantly improved prospective brides' knowledge regarding stunting prevention ($p = 0.000$). Within the Huyula framework, prospective brides and grooms are regarded as future couples who share responsibility for family health. Consequently, increased knowledge serves as a collective resource in preparing for a healthy family, underscoring that pre-marital preparation is a shared responsibility.

Attitude

The local wisdom of Gorontalo, embodied in the Huyula principle, serves as a catalyst for social commitment. This is evidenced by the significant improvement in attitudes ($p = 0.001$), indicating that the intervention effectively fostered a sense of ownership and collective responsibility among participants. This improvement reflects

not only a shift in perception but also a strengthened commitment to adopting preventive behaviors.The increase in positive attitudes (97.0%) indicates the emergence of new social norms shared among adolescents and prospective brides and grooms. This finding is consistent with previous research (15), which identified a significant relationship between knowledge and attitudes among prospective brides regarding stunting prevention ($p < 0.001$). Positive attitudes are likely to develop when respondents feel supported by peers and their social environment, consistent with the Huyula principle that collective involvement reinforces positive actions.

The Huyula principle emphasizes togetherness and mutual support. This aligns with previous research (16), which confirmed that interventions involving women of reproductive age and prospective brides were effective in influencing attitudes by preparing participants within a supportive community environment. Group-based health education approaches can strengthen individual commitment to adopting healthy nutritional behaviors through social support and shared responsibility.

Conclusion

This study concluded that the intervention was not only statistically effective but also successfully incorporated the Huyula values into stunting prevention efforts. The improvement in knowledge and attitudes among adolescents and prospective brides demonstrates that health interventions may achieve greater impact when integrated with local cultural values, collective responsibility, and mutual cooperation.

Declaration of Conflict of Interest
No conflict of interest declare

Funding
This research was funded by Universitas Negeri Gorontalo (UNG) under the RAPN grant scheme with contract number 602/UN47.D1/PT.01.03/2025

Author Contributions
Writing – original draft, Visualization, Supervision : RDH. Methodology, Writing Review and Editing: DSH, ND. Investigation, Validation, Resource: ND. Data Curation, Formal analysis: DSH.

Data Availability Statement
The dataset generated and analysed during the current study is available from the corresponding author upon reasonable request.

Declaration of the Use of AI in Scientific Writing
There is nothing to declare.

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How to Cite This Article:
Hunawa RD, Hiola DS, Djamaluddin N. Digital Health Education Based on Huyula Gorontalo Local Wisdom for Stunting Prevention. *JAn Idea Health Journal*.2026; *5*(2), 95-103. https://doi.org/10.53690/inj.v5i02.788