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Health Promotion through a Digital Peer Education Platform for Teenage Pregnancy to Reduce Stunting

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ABSTRAK

Adolescents who experience early pregnancy before the age of 18–20 years are at greater risk of giving birth to low-birth-weight babies and experience limited ability to maintain ideal nutritional care. National data shows that the prevalence of stunting in Indonesia from local studies shows that children born to adolescent mothers have a risk of stunting of up to 44.4%, much higher than children of adult mothers. Peer education plays a role in the delivery of information carried out by peers who are considered more trustworthy and easier to accept. Health promotion interventions that use digital platforms are easily accessible, the digital media arena allows for the dissemination of information quickly, interestingly, and according to adolescent learning styles. The purpose of this study was to determine the influence of the Digital Peer Education Platform on adolescent pregnancy knowledge to reduce stunting. This study used a quasi-experimental design, using a pre-test-post-test control group design. Two groups were randomly selected and then given a pre-test to determine whether there were any differences between the experimental and control groups. Data analysis included paired t-tests and independent t-tests to determine differences in knowledge and attitude scores. The results of this study, based on the analysis of the Paired Sample T-Test, indicate that peer education has an effect on adolescents' knowledge levels with a p-value of 0.001 ($p<0.05$). Suggestions are expected for schools to implement peer education methods in future learning curricula.

INTRODUCTION

Stunting remains a major public health problem in Indonesia, with prevalence remaining high despite several intervention efforts. Research shows that approximately 20–24% of toddlers in Indonesia experience stunting, exceeding the threshold recommended by the World Health Organization (<20%) for a country to be free from stunting (Kementerian Kesehatan Republik, 2023). One of the determinants correlated with stunting is teenage pregnancy, where young mothers face greater biological and social risks that can negatively impact maternal nutritional status and fetal development (BPS, 2021), (Nirmalasari, 2020). Children born to teenage mothers are more likely to experience low birth weight and chronic growth disorders, resulting in a more than twofold increase in the risk of stunting compared to children born to mothers who give birth as young adults (Simbolon, L., 2024), (Irwansyah et al., 2016).

One of the causes of the high rate of teenage pregnancy is the low level of knowledge about reproductive health, family planning, and the risks of early pregnancy among teenagers, which is often caused by limited access to accurate and relevant information (Putri & Nurjannah, 2024). Health surveys show that most teenagers have not

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received adequate reproductive health education from reliable sources, so they do not understand the long-term health consequences such as growth disorders in children, including stunting (Fauzi, 2018), (Melani et al., 2024).

Digital platforms such as social media, health apps, educational websites, and instant messaging services provide a platform for appropriate, easily accessible, and engaging information for adolescents . Adolescents are a highly digitally active demographic, with over 90% of Indonesian adolescents using at least one social media platform daily to obtain information and interact with peers (Smith & Jones, 2021). Digital platforms provide opportunities to deliver health content more interactively through text, images, videos, and quizzes, which can increase user engagement and facilitate understanding of complex topics such as the risks of early pregnancy and its impact on stunting (Rahman & Sari, 2023).

Approach*peer education*in health promotion has been proven effective because the information is delivered by peers who have cultural and social closeness with the participants so it is more easily accepted (Mas' udah et al., 2024). Studies show that reproductive health education programs that use peer education have succeeded in increasing knowledge and behavior in preventing pregnancy among adolescents significantly compared to traditional approaches (Harahap et al., 2024),(Fiolentina & Ernawati, 2021). Peer education combined with digital platforms will create an education system that is not only interactive and flexible but also able to reach adolescents in remote areas or those that are not easily accessible to conventional health services (Lee et al., 2020), (Mas' udah et al., 2024). The results of this study are expected to provide empirical evidence for policy makers and health program stakeholders to develop more effective, efficient, and sustainable interventions in addressing the problem of adolescent pregnancy while reducing stunting rates in Indonesia (Bassi et al., 2025).

LITERATURE STUDY

Health promotion is a process that enables individuals and communities to increase control over factors that influence health, thereby improving their well-being. According to the World Health Organization, health promotion focuses not only on changing individual behavior but also on creating a supportive environment for health through education, empowerment, and advocacy. In the context of adolescent health, health promotion plays a crucial role in improving knowledge, attitudes, and behaviors related to reproductive health and preventing future health problems.

Pregnancy during adolescence is a risk factor for stunting. Pregnant adolescents generally have not yet reached optimal physical maturity and nutritional status, which increases the risk of giving birth to low birth weight (LBW) babies, premature babies, and babies at risk of stunting. Furthermore, adolescent mothers' limited knowledge about nutrition, reproductive health, and childcare can exacerbate these conditions.

Research on adolescent pregnancy prevention has focused largely on conventional reproductive health education delivered face-to-face in schools or health facilities. This method has been shown to increase knowledge, but still faces limitations in terms of reach, interactivity, and sustainability. With advances in information technology, various studies have begun to utilize digital media in health education, such as the use of apps, social media, and e-learning.

This research presents a novel approach by combining two complementary approaches: peer education and digital technology, into a single sustainable education model. Digital peer education not only presents information interactively through an online platform but also involves peer educators as active facilitators in discussions, quizzes, and digital campaigns. This model is expected to address the challenges of limited time and resources in conventional education, while simultaneously expanding the reach of education to adolescent communities beyond school. The research's novelty also lies in its sustainable approach, aimed at supporting national research priorities through empowering adolescents with digital literacy as an initial strategy for stunting reduction.

Research on teenage pregnancy focuses more on reproductive health education, counseling, and the use of digital media to improve adolescents' knowledge. For example, research by Widman et al (2018), found that digital technology-based sexual health interventions effectively improved adolescents' knowledge and reproductive risk prevention behaviors. Furthermore, Korkmaz Aslan et al., (2021), explained that a digital health approach can expand

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the reach of reproductive health education to adolescent groups difficult to reach through conventional methods. However, there is still very limited research specifically integrating digital peer education with adolescent pregnancy prevention efforts as an upstream strategy in stunting prevention. In fact, teenage pregnancy carries the risk of increasing the incidence of low birth weight, chronic malnutrition, and stunting due to the biological and psychosocial unpreparedness of young mothers. Therefore, the novelty of this research lies in shifting the focus of stunting interventions to the pre-conception phase of adolescents, rather than solely on pregnant women and toddlers. Integrating reproductive health promotion with stunting prevention positions adolescent pregnancy as a risk factor that needs to be prevented to break the intergenerational chain of stunting.

METHOD

This study used a quasi-experimental design, using a pre-test-post-test control group design. Two groups were randomly selected and then given a pre-test to determine whether there were any differences between the experimental and control groups. Location and Time of Research This research was conducted at SMK Swasta Nusantara Lubuk Pakam because the initial survey that had been conducted showed that many teenagers still do not know about reproductive health. The research implementation is planned for March 2026.

The population in this study was all adolescents in Grade XI Vocational High School at SMK Swasta Nusantara Lubuk Pakam, totaling 120 students. The sample in this study was 78 grade XI students with a random sampling technique. The materials and tools used in this study were Digital Peer Education and a questionnaire to collect data. The questionnaire consisted of respondent characteristics and questions about reproductive health knowledge. Questions were measured using closed-ended questions with 2 alternative answers, right and wrong, with a total of 30 questions. The score for each question is Wrong = 0; Right = 1 and Poor Score: 1-16 (<56%); Sufficient: 17-22 (56-75%); Good: 23-30 (76-100%)

The Digital Peer Education training in this study uses a pre-established reference. Three students participated in the training, consisting of one male and two females. These students were selected based on the recommendation of the homeroom teacher of XI with the criteria of ranking 1-3 in the class, and meeting the criteria attached. Data Collection Procedure.

Univariate analysis is the analysis of each variable from the research results, both independent variables and dependent variables, in the form of distribution and presentation of each variable. This univariate analysis was conducted to determine the effect of the Digital Peer Education method on adolescents' knowledge and attitudes towards pregnancy prevention. Bivariate analysis is an analysis to determine the interaction of two variables, whether comparative, associative, or correlative. This study used a paired sample t-test. Two sample groups are considered dependent if their samples are identical. The results of two measurements, the pre-test and post-test, yielded normally distributed data.

RESULTS

The results of the study were analyzed in two parts, namely univariate analysis using the average and frequency distribution, and bivariate analysis to determine the effect of Health Promotion through the Digital Peer Education Platform on Preventing Teenage Pregnancy as an Initial Strategy to Reduce Stunting.

Univariate Analysis

Table 1. Frequency distribution of adolescents by age (n=78)

Variables	Frequency	Presentation
17 years	41	52.6
16 years	35	44.3
18 years	2	3.1
Total	**78**	**100**

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Table 1 shows that of the 78 respondents, 41 people (52.6%) were 17 years old, 35 people (44.3%) were 16 years old and 18 people (3.1%) were 18 years old.

Table 2. Frequency distribution of adolescents by gender (n=78)

Variables	Frequency	Percentage
Woman	73	93.6
Man	5	6.4
Total	**78**	**100.0**

Table 2 shows that of the 78 respondents, 73 people (96.6%) were female and 5 people (6.4%) were male.

Table 3. Frequency distribution according to puberty status (n=78)

Variables	Frequency	Percentage
Already puberty	78	100
Not yet puberty	0	0
Total	**78**	**100.0**

Table 3 shows that all 78 respondents (100%) had experienced puberty.

Table 4. Frequency distribution of pre-test knowledge of the control group and intervention group (n=78)

Level of Knowledge (Pre-test)	Control Group		Intervention Group	
	Frequency	Percentage	Frequency	Percentage
Not enough	38	97.4	28	71.7
Enough	1	2.6	11	28.3
Good	0	0	0	0
Total	**39**	**100.0**	**39**	**100.0**

Based on table 4, the results of the pretest of knowledge about the health promotion through the digital peer education platform on preventing teenage pregnancy as an initial strategy to reduce stunting in the control group, the data obtained were the percentage value of knowledge <55% with the category of less knowledge as many as 38 students (97.4%) and the data of the percentage value of knowledge 56-75% with the category of sufficient knowledge as many as 1 student (2.6%). Meanwhile, in the Intervention group, the data obtained were the percentage value of knowledge <55% with the category of less knowledge as many as 28 students (and the data of the percentage value of 56-75% with the category of sufficient knowledge as many as 11 students.

Table 5. Frequency distribution of knowledge level (post test)

Level of Knowledge (Pre-test)	Control Group		Intervention Group	
	Frequency	Percentage	Frequency	Percentage
Not enough	38	97.4	9	23.0
Enough	1	2.6	28	71.7
Good	0	0	2	5.3
Total	**39**	**100.0**	**39**	**100.0**

Based on table 5, the results of the post-test on knowledge about the health promotion through the digital peer education platform on preventing teenage pregnancy as an initial strategy to reduce stunting in the control group, the data obtained were 38 students with a knowledge percentage of <55% with a poor knowledge category and 1 student with a knowledge percentage of 56-75% with a sufficient knowledge category. Meanwhile, in the intervention group,

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the data obtained were 9 students with a knowledge percentage of <55% with a poor knowledge category, 28 students with a knowledge percentage of 56-75% with a sufficient knowledge category and 2 students with a knowledge percentage of >76% with a good knowledge category.

Bivariate Analysis

Table 6 Health Promotion through Digital Peer Education Platforms in adolescents in the control and intervention groups

Knowledge about the Health Promotion through the Digital Peer Education Platform		N	Mean	Standard Deviation	*P Value*
Group Control	Pre-Test	39	8.67	2,216	0.618
	Post Test		8.79	1,735	
Group Intervention	Pre-Test	39	10.49	3,612	0.001
	Post Test		14.31	2,142	

Based on table 6, the test results for the control group that was not given peer education treatment showed that the average pre-test score for knowledge about the Health Promotion through the Digital Peer Education Platform on Preventing Teenage Pregnancy as an Initial Strategy to Reduce Stunting was 8.67 with a variation of 2.216 and the average post-test score was 8.79 with a variation of 1.735. The results of the statistical test on the pre-test and post-test on knowledge about the health promotion through the digital peer education platform on preventing teenage pregnancy as an initial strategy to reduce stunting obtained $p = 0.618 > \alpha = 0.05$. So Ha is rejected Ho is accepted, which means there is no effect of health education with the peer education method on the Health Promotion through the Digital Peer Education Platform on Preventing Teenage Pregnancy as an Initial Strategy to Reduce Stunting on knowledge in adolescents in the control and intervention groups. While in the intervention group that was given peer education treatment, the average pre-test score for knowledge about the Health Promotion through the Digital Peer Education Platform on Preventing Teenage Pregnancy as an Initial Strategy to Reduce Stunting was 10.49 with a variation of 3.612. While the average post-test score after being given peer education treatment was 14.31 with a variation of 2.142. The results of the statistical test on the pre-test and post-tests on knowledge about the Health Promotion through the Digital Peer Education Platform on Preventing Teenage Pregnancy as an Initial Strategy to Reduce Stunting obtained $p = 0.001 < \alpha = 0.05$. So Ho is rejected and Ha is accepted, which means there is an influence of health education using the peer education method on the Health Promotion through the Digital Peer Education Platform on Preventing Teenage Pregnancy as an Initial Strategy to Reduce Stunting on knowledge in adolescents in the control and intervention groups.

Table 7 Differences in Knowledge Levels About Teenage Pregnancy Prevention in the Control Group and Intervention Group for Teenagers

Knowledge about the Health Promotion through the Digital Peer Education Platform		N	Mean	Standard Deviation	*P Value*
Post Test	Control Group	39	8.79	1,735	0.001
	Intervention Group		14.31	2,142	

Based on the independent T-Test test between the post-test of the control group with an average value of 8.79 with a variation of 1.735 and the post-test in the intervention group with an average value of 14.31 with a variation of 2.142. The results of the independent T-Test test on the post-test of the control and intervention groups obtained $p = 0.01 < \alpha = 0.05$. So Ho is rejected Ha is accepted which means there is a difference in knowledge about the Health Promotion through the Digital Peer Education Platform on Preventing Teenage Pregnancy as an Initial Strategy to Reduce Stunting in the control group and the intervention group (peer education method) in adolescents.

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PEMBAHASAN

Based on the research results, the majority of respondents were 17 years old (41 people) (52.6%), followed by 16 years old (35 people) (44.3%), and 18 years old (2 people) (3.1%). This age is included in the middle adolescence category, which is a developmental phase with a high curiosity for various information, including reproductive health information. According to the theory of adolescent development proposed by Santrock, adolescence is a transitional period marked by biological, psychological, and social changes, thus requiring access to appropriate information to support healthy decision-making.

Based on gender, the majority of respondents were female (73 people) (93.6%), while only 5 were male (6.4%). The predominance of female respondents indicates that this study more closely represents the conditions of adolescent girls who are at direct risk of teenage pregnancy and its impact on stunting in the next generation. All respondents (100%) had entered puberty. This condition indicates that all study participants are in an active stage of reproductive development, making reproductive health education very important. According to the World Health Organization, reproductive health education starting from puberty can help adolescents understand the risks of unhealthy sexual behavior and prevent early pregnancy.

The pre-test results showed that in the control group, 38 respondents (97.4%) had insufficient knowledge and only 1 respondent (2.6%) had sufficient knowledge. In the intervention group, 28 respondents (71.7%) had insufficient knowledge and 11 respondents (28.3%) had sufficient knowledge. These findings indicate that before receiving health promotion, most adolescents still had low knowledge regarding reproductive health and preventing teenage pregnancy. This condition can be caused by a lack of access to correct information, limited communication with parents, and minimal reproductive health education in the school environment. According to the theory of knowledge proposed by Notoatmodjo, knowledge is the result of a person's sensory process towards an object which is influenced by the level of education, experience, information, and social environment. The more information a person receives, the better their level of knowledge.

The post-test results showed that the control group did not experience significant changes, remaining dominated by the poor knowledge category, with 38 respondents (97.4%). In contrast, the intervention group experienced a significant increase, with the number of respondents with poor knowledge decreasing to 9 (23.0%), those with sufficient knowledge increasing to 28 (71.7%), and those with good knowledge increasing to 2 (5.3%). This increase indicates that health promotion through digital platforms with a peer education approach can improve adolescents' understanding of reproductive health and teenage pregnancy prevention. The peer education method is considered effective because the information is delivered by peers who share relatively similar age, language, and experience characteristics, making it more easily accepted by adolescents.

This aligns with Albert Bandura's social learning theory, which states that individuals learn through observation, imitation, and interaction with their social environment. Peers have a strong influence on shaping adolescent attitudes and behavior, so health messages delivered by peers tend to be more effective than conventional lecture methods.

The results of the bivariate analysis showed that the control group obtained an average pre-test score of 8.67 and a post-test score of 8.79 with a p value = 0.618 ($p > 0.05$). These results indicate there was no significant change in knowledge in the group that did not receive the intervention. In contrast, the intervention group obtained an average pre-test score of 10.49 and increased to 14.31 after being given health promotion through a digital peer education platform with a p value = 0.001 ($p < 0.05$). These results indicate that there is a significant effect of the intervention on increasing adolescent knowledge.

This increase in knowledge can be explained through the health promotion theory put forward in the Ottawa Charter for Health Promotion, which emphasizes the importance of empowering individuals to control and improve their health (Windayanti, 2022). Digital platforms enable more flexible, engaging, and accessible information delivery for adolescents, thereby enhancing the learning process. Furthermore, the use of digital media aligns with the

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characteristics of today's generation of adolescents, who are closely connected to information technology (Pangestuti et al., 2019). Digitally delivered health materials can be accessed repeatedly, increasing information absorption and knowledge retention.

The results of the Independent T-Test showed that the average post-test score for the control group was 8.79, while the average post-test score for the intervention group was 14.31, with a p-value of 0.001 ($p < 0.05$). These results demonstrate a significant difference between the two groups after the intervention. These findings indicate that health promotion through digital peer education platforms is more effective than no intervention. Peer education can create a more open and comfortable learning environment, making it easier for adolescents to understand material related to reproductive health and pregnancy prevention.

CONCLUSION

The frequency distribution of adolescents' knowledge level before being given health education using the digital peer education method in the control group in this study was 38 people (97.4%) with the insufficient category and in the intervention group was 28 people (71.7%) with the insufficient category. The frequency distribution of adolescents' knowledge level after being given health education using the digital peer education method in the intervention group was 28 people (71.7%) with the sufficient category while in the control group was 38 people (97.4%) with the insufficient category. There was an effect of digital peer education on the level of knowledge in adolescents in the intervention group ($p = 0.001 < \alpha = 0.05$). There was a difference in the level of knowledge of Adolescent Pregnancy Prevention in the intervention group and the control group in adolescents ($p = 0.001 < \alpha = 0.05$). Based on the research results, it can be concluded that health promotion through a digital peer education platform significantly increased adolescent knowledge regarding preventing teenage pregnancy as an initial strategy to reduce stunting. The increase in knowledge in the intervention group indicates that the combination of digital media and peer approaches is an effective method in promoting adolescent reproductive health. These findings support health promotion theory, social learning theory, and various previous studies that suggest that digital-based health education and peer education can increase knowledge and encourage better health behaviors in adolescents.

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