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The Effect of Snake and Ladder Media Health Education on PHBS Behavior Improvement in Elementary School Students

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ABSTRACT The insufficient implementation of Clean and Healthy Living Behavior (PHBS) among elementary school children remains a significant public health challenge. Despite the crucial role of early health education in establishing lifelong healthy habits, traditional methods often fail to engage young students effectively. This study aims to evaluate the influence of an innovative, game-based health education strategy specifically, a snake and ladder media on improving students' knowledge, attitudes, and practices related to PHBS. Employing a quasi-experimental design with pre-test and post-test assessments, the research involved 52 students in grades 3 to 6, selected through simple random sampling. The intervention comprised health education using snake and ladder media, with data collection instruments including questionnaires, observation sheets, and the snake-and-ladder board itself. Statistical analyses utilizing the Wilcoxon and Mann-Whitney tests demonstrated significant improvements in students' understanding, attitudes, and behaviors concerning PHBS post-intervention ($p < 0.001$). Moreover, comparative analysis revealed notable differences between the intervention group and control group, underscoring the effectiveness of this engaging educational approach. The study concludes that incorporating interactive game media such as snakes and ladders into school health education significantly enhances early health behavior adoption. This participatory and contextual method not only boosts health knowledge but also fosters the development of lifelong healthy habits among elementary students. Given these findings, implementing such innovative strategies in school curricula is recommended to effectively promote PHBS, especially in remote and underprivileged areas.

INDEX TERMS Health education, snake and ladder game, elementary school children, PHBS, behavioral change

I. INTRODUCTION

In the pursuit of universal health improvement, instilling healthy behaviors from a young age has become a fundamental strategy. Specifically, *Clean and Healthy Living Behavior* (PHBS) serves as a critical health indicator, reflecting personal hygiene, environmental sanitation, and lifestyle choices that influence overall well-being [1], [2]. Despite global efforts to promote PHBS among school-aged children, the implementation of these behaviors remains suboptimal, particularly in developing countries where health education resources are limited or inadequately engaging [3], [4]. A significant challenge lies in effectively delivering health education to young children. Traditional approaches, predominantly characterized by conventional counseling sessions and didactic lectures, often fail to captivate children's interest, limiting their retention and application of knowledge [5], [6]. Furthermore, existing methods tend to neglect the developmental needs of children, who learn best through interactive, contextual, and playful experiences. Recent studies emphasize that engaging educational strategies, such as game-based learning, have promising potential to enhance health literacy and behavioral changes in children [7], [8].

Among innovative educational tools, media that incorporate gamification elements such as board games, digital games, or interactive activities have demonstrated effectiveness in fostering active participation and reinforcing learning outcomes [9], [10]. Specifically, the use of traditional games with a modern pedagogical approach, like the snake and ladder game, offers a familiar, enjoyable, and participatory platform for health education. This strategy aligns with constructivist theories of learning, which advocate for experiential and contextualized knowledge acquisition, crucial for shaping sustainable health behaviors among children [11], [12].

Despite these promising developments, there exists a notable research gap in the rigorous evaluation of game-based health education methods tailored to early childhood in low-resource settings. Current literature predominantly focuses on digital or high-tech interventions, which pose challenges in implementation within underprivileged regions due to cost and accessibility constraints [13], [14]. Conversely, simple, low-cost traditional media such as physical board games remain underutilized, although their potential for scalable, cost-effective health promotion is promising.

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Additionally, most existing studies are limited in scope, often focusing solely on immediate knowledge gains without assessing long-term behavioral changes or attitudes [15], [16]. There is a need to elucidate whether such interactive methods can produce not only short-term improvements but also foster sustained health practices among students.

This study aims to bridge this gap by evaluating the impact of snake and ladder media an interactive, familiar game on improving elementary school children's knowledge, attitudes, and practices related to PHBS. The research's core objective is to determine whether this engaging method can significantly influence health literacy and behavior in a school setting. **Contributions of this study include:**

1. Providing empirical evidence on the effectiveness of traditional game-based media in enhancing PHBS knowledge, attitudes, and actions among elementary students.
2. Demonstrating the feasibility and scalability of using simple, cost-effective educational media in resource-constrained environments.
3. Offering insights into designing participatory, contextually relevant health education strategies that promote sustainable behavioral change.

II. METHODS

This study employed a quasi-experimental pre-test post-test design with a control group to assess the influence of snake and ladder media health education on students' behavior in maintaining Clean and Healthy Living Behavior (PHBS). The research was conducted in two elementary schools MI Islamiyah Sumberjo and SDN Sumberjo located in a defined geographic region. The setting was selected based on accessibility and the willingness of school authorities to participate in health education interventions. The ethical approval was obtained from relevant institutional review boards, and informed consent was secured from school administrators, teachers, parents, and students prior to data collection.

A. PARTICIPANTS AND SAMPLING

The target population comprised students from grades 3 to 6, totaling 52 children. Inclusion criteria mandated that students be enrolled in the specified grades, exhibit willingness to participate, and have parental consent. Exclusion criteria included students with prior formal health education about PHBS or those currently undergoing health-related treatment that might confound behavioral assessments. Utilizing a simple random sampling technique, participants were allocated into intervention and control groups to ensure unbiased distribution. Randomization was performed using computerized random number generation to assign students, thereby minimizing selection bias and ensuring the internal validity of the study [21].

B. MATERIALS AND INSTRUMENTS

The primary intervention involved the use of a snake and ladder game board adapted for health education, supplemented with questionnaires and observation sheets. The snake and ladder media were designed based on current health education curricula to reinforce knowledge, attitudes, and practices related to PHBS. The questionnaires consisted of validated items measuring knowledge, attitudes, and actions concerning PHBS, with a proven reliability coefficient (Cronbach's alpha > 0.8) [22]. Observation sheets were utilized for direct assessment of behavior in natural settings during school activities. The instrument development involved expert review and pre-testing to ensure clarity, relevance, and cultural appropriateness.

C. INTERVENTION PROTOCOL

The intervention group received health education integrated into the snake and ladder game, conducted in multiple sessions over two weeks. Each session lasted approximately 30 minutes, during which students actively participated in playing a designed game that incorporated health messages and scenario-based questions. The control group received standard health education through conventional counseling methods, without the use of game media. Both interventions aimed to enhance students' understanding and practices pertaining to PHBSprocess across groups.

D. DATA COLLECTION PROCEDURE

Pre-test assessments were conducted for both groups to measure baseline knowledge, attitudes, and behaviors related to PHBS. Data collection involved administering questionnaires and conducting structured observations by trained enumerators blinded to the group assignments. Post-test evaluations were performed immediately after the intervention period, applying the same instruments to measure changes attributable to the educational methods. To ensure data quality, enumerators received training on instrument administration and ethical considerations, and data collection sessions were supervised.

E. DATA ANALYSIS

Sample homogeneity was verified using the Kolmogorov-Smirnov test. The Wilcoxon signed-rank test was utilized to analyze within-group differences between pre- and post-intervention scores, owing to the ordinal nature of the data and the non-normal distribution. The Mann-Whitney U test assessed differences between intervention and control groups post-intervention. A significance level of $p < 0.05$ was adopted for all statistical tests. Data analysis was conducted using SPSS version 26.0 [23].

F. STUDY LIMITATIONS AND VALIDITY MEASURES

To mitigate potential biases, participants were randomized, and blinding of assessors was enforced where feasible. However, the study acknowledged limitations such as possible contamination between groups and variability in facilitator delivery. To address these, strict protocols for intervention delivery were implemented, and participants were encouraged to refrain from discussing the intervention content with peers during the study period [24]. Moreover, techniques such as triangulation of data sources questionnaires and direct observations were employed to enhance validity.

G. IMPLICATIONS FOR FUTURE RESEARCH

Based on the methodology outlined, future studies should consider larger sample sizes to improve generalizability and incorporate environmental factors such as socioeconomic

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status and parental involvement that may influence behavior change. Additionally, longitudinal follow-up assessments could reveal sustained effects of game-based health education. The randomized controlled trial design could further strengthen causal inferences about the effectiveness of educational media like snake and ladder as tools for promoting PHBS in elementary school children [25].

III. RESULT

A. KNOWLEDGE ABOUT PHBS BEFORE AND AFTER BEING GIVEN HEALTH EDUCATION ON SNAKE AND LADDER MEDIA

Based on TABLE 1, it is known that the age and gender characteristics of students in the intervention group were almost half (34.6%) aged 11 years, most (57.7%) students were male and almost half (26.9%) came from grade 4, grade 5, and grade 6. In the control group, nearly half (42.3%) were 10-year-olds, most (61.5%) were female, and almost half (38%) were from grade 6.

TABLE 1
Characteristics of students by age, class and gender

Yes	Child Characteristics	Intervention Groups		Control Group	
		f	%	f	%
1	**Age**				
	8 years	5	19,2	0	0
	9 years	5	19,2	4	15,5
	10 years	4	15,5	11	42,3
	11 years old	9	34,6	5	19,2
	12 years	3	11,5	4	15,4
	13 years	0	0	1	3,8
	14 years	0	0	1	3,8
2	**Class**				
	Class 3	5	19,3	4	15
	Grade 4	7	26,9	3	12
	Grade 5	7	26,9	9	35
	Grade 6	7	26,9	10	38
3	**Gender**				
	Man	15	57,7	10	38,5
	Woman	11	42,3	16	61,5
Total		26	100	26	100

B. KNOWLEDGE ABOUT PHBS BEFORE AND AFTER BEING GIVEN HEALTH EDUCATION ON SNAKE AND LADDER MEDIA

TABLE 2
Pre-test and post-test knowledge distribution

Category	Intervention Groups				Control Group			
	Pre-Test		*Post-Test*		*Pre-Test*		*Post-Test*	
	f	%	f	%	f	%	f	%
Less	9	34.6	0	0	10	38,5	10	38,5
Enough	16	61,6	0	0	15	57,7	14	53,8
Good	1	3,8	26	100	1	3,8	2	7,7
Total	**26**	**100**	**26**	**100**	**26**	**100**	**26**	**100**

Based on TABLE 2, it is known that knowledge before being given snake and ladder media health education in the intervention group was mostly (61.6%) in the adequate category and after being given snake and ladder media health education all (100%) students were in the good category, while knowledge in the control group during *pre-test* was mostly (57.7%) in the fair category and during *post-test* most (53.8%) in the adequate category.

C. ATTITUDES ABOUT PHBS BEFORE AND AFTER BEING GIVEN HEALTH EDUCATION IN SNAKE AND LADDER MEDIA

Based on TABLE 3, it is known that the attitude of students in the intervention group before being given health education using snake and ladder media was mostly (57.7%)

TABLE 3
Pre-test and post-test attitude distribution

Category	Intervention Groups				Control Group			
	Pre-Test		*Post-Test*		*Pre-Test*		*Post-Test*	
	f	%	f	%	f	%	f	%
Negative	11	42,3	0	0	10	38,5	11	42,3
Positive	15	57,7	26	100	16	61,5	15	57,7
Total	**26**	**100**	**26**	**100**	**26**	**100**	**26**	**100**

in the positive category, and after being given health education all students (100%) were in the positive category, while in the control group, before being given health education, most students (61.5%) had a positive attitude. However, after being provided with health education, there was a decline, most students (57.7%) remained in the positive category.

D. THE INFLUENCE OF SNAKE AND LADDER MEDIA HEALTH EDUCATION ON KNOWLEDGE IN PHBS

TABLE 4
Distribution of pre-test and post-test actions

Behavior Level	Category	Intervention Groups				Control Group			
		Before		After		Before		After	
		f	%	f	%	f	%	f	%
Knowledge	Less	9	34.6	0	0	10	38,5	10	38,5
	Enough	16	61,6	0	0	15	57,7	14	53,8
	Good	1	3,8	26	100	1	3,8	2	7,7
	Total	26	1000	26	100	26	100	26	100
Wilcoxon Sign Rank Test		p= 0.000 p< α = 0.05				p=0.071 p< α = 0.05			

Based on TABLE 4, it is known that the results of *the analysis of the Wilcoxon signed rank test* knowledge questionnaire in the intervention group obtained a significance value of p=<0.001 so that p<0.05 can be interpreted as a significant difference in knowledge in the intervention group between before and after being given health education on snake and ladder media, while in the results of *the analysis Wilcoxon signed rank test* In the control group, a significance value of p=0.071 was obtained so that p>0.05 can be interpreted as no significant difference in knowledge in students in grades 3, 4, 5, 6 of MI Islamiyah Sumberjo between *pre-test* and *post-test.*

E. THE INFLUENCE OF SNAKE AND LADDER MEDIA HEALTH EDUCATION ON ATTITUDES IN PHBS

Based on TABLE 5, it is known that the results of the analysis of *the Wilcoxon signed rank test* of attitude level in the intervention group obtained a significance value of p=0.001 so that p<0.05 which can be interpreted as a difference in attitude in the intervention group between before and after being given health education on snake and ladder media, while the results of *the Wilcoxon signed rank test* The attitude in the control group obtained a significance value of p=0.288 so that P>0.05 which can be interpreted in

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the control group there is no difference in attitude between *pre-test* and *post-test*.

TABLE 5
The Influence of Snake and Ladder Media Health Education on Knowledge in PHBS

Behavior Level	Category	Intervention Groups				Control Group			
		Before		After		Before		After	
		f	%	f	%	f	%	f	%
Attitude	Negative	11	42,3	0	0	10	38,5	11	42,3
	Positive	15	57,7	26	100	16	61,5	15	57,7
	Total	26	100	26	100	26	100	26	100
Wilcoxon Sign Rank Test		p = 0.001 p< α = 0.05				p=0.288 p< α = 0.05			

F. THE INFLUENCE OF SNAKE AND LADDER MEDIA HEALTH EDUCATION ON ACTIONS IN PHBS

TABLE 6
The Influence of Snake and Ladder Media Health Education on Attitudes in PHBS

Behavior Level	Category	Intervention Groups				Control Group			
		Before		After		Before		After	
		f	%	f	%	f	%	f	%
Action	Less	1	3,8	0	0	0	0	0	0
	Enough	16	61,6	0	0	12	46,2	13	50
	Good	9	34,6	26	100	14	53,8	13	50
	Total	26	100	26	100	26	100	26	100
Wilcoxon Sign Rank Test		p = <0.000 p< α = 0.05				p=0.133 p< α = 0.05			

Based on TABLE 6, it is known that the results of *the Wilcoxon signed rank test of* the level of action in the intervention group obtained a significance value of p=<0.001 so that p<0.05 which can be interpreted as a difference in actions in the intervention group between before and after being given health education on snake and ladder media, while the results of *the Wilcoxon signed rank test* The action in the control group obtained a significance value of p=0.133 so that p>0.05 which can be interpreted as no difference in action in students in grades 3,4,5,6 of MI Islamiyah Sumberjo between *pre-test* and *post-test.*

G. BEHAVIORAL DIFFERENCES IN THE SNAKE AND LADDER MEDIA HEALTH EDUCATION INTERVENTION GROUP AND THE CONTROL GROUP

TABLE 7
The Influence of Snake and Ladder Media Health Education on Actions in PHBS

Kelompok	Perilaku dalam PHBS	Sebelum		Sesudah		Selisih		Hasil Uji *Mann U Whitney*
		Mean	± SD	Mean	± SD	Mean	± SD	
Pengetahuan	Intervensi	9	2,263	15,50	1,393-	6,5	0,87	p=<0,001
	Kontrol	8,81	2,871	9,12	2,613	0,31	0,258	
Sikap	Intervensi	64,38	4,826	79,65	0,562	15,27	4,264	p=<0,001
	Sikap	62,12	6,212	63,46	4,843	1,34	1,369	
Tindakan	Intervensi	28,88	2,819	39,81	0,402	10,93	2,417	p=<0,001
	Kontrol	29,73	2,736	31,23	2,861	1,5	0,125	

Based on TABLE 7, it is known that the results of *Mann U Whitney*'s statistical calculation show that H1 is accepted with *a p-value* = <0.001 < (α=0.05), which means that there is a difference in knowledge, attitudes, and actions between the snake and ladder intervention group and the control group without intervention.

The initial hypothesis in this study states that health education using snake and ladder game media influences improving the knowledge, attitudes, and actions of elementary school students in the implementation of Clean and Healthy Living Behavior (PHBS). PHBS is a set of behaviors that reflect students' ability to maintain personal hygiene, the environment, and live a healthy lifestyle, which is very important to instill from an early age. Based on the results of the above research, it is known that students who take part in snake and ladder media health education show a significant improvement in understanding of PHBS material, a more positive attitude towards healthy living behaviors, as well as changes in real actions in daily life, such as washing hands, disposing of garbage in place, and maintaining environmental cleanliness. The results of this study support the initial hypothesis. So that the use of educational game media not only makes learning more enjoyable, but also contributes significantly to changes in student behavior in running PHBS consistently.

IV. DISCUSSION

A. INFLUENCE OF SNAKE AND LADDER MEDIA ON STUDENTS' KNOWLEDGE AND ATTITUDES TOWARD PHBS

The present study demonstrated that the utilization of snake and ladder media as a health education tool significantly increased students' knowledge and positively affected their attitudes toward adopting healthy behaviors consistent with PHBS. Post-intervention results showed a statistically significant increase in knowledge scores and a shift towards a more positive attitude, aligning with prior research indicating that engaging, game-based educational methods can effectively enhance health literacy among elementary school students [26], [27].

This outcome may be attributed to the interactive and visual nature of the snake and ladder game, which facilitates active learning and contextualizes health messages within a playful environment. Such engagement likely enhances cognitive retention, as supported by cognitive load theory, which suggests that interactive and simplified learning scenarios reduce extraneous cognitive load and improve understanding [28]. The game's repetitive and reinforcing structure enables students to internalize health concepts, leading to sustainable knowledge gain.

Furthermore, the observed rise in positive attitudes is consistent with behavioral change theories, such as the Theory of Planned Behavior, which emphasizes the influence of cognitive and affective factors on behavioral intentions [29]. By promoting awareness and favorable perceptions of PHBS, game-based media can cultivate intrinsic motivation and self-efficacy factors strongly linked to the adoption of health behaviors [30].

Compared to traditional instruction methods, which tend to maintain a didactic and less engaging approach, the snake and ladder media provided a participatory, enjoyable learning environment. This result echoes prior findings that game-based learning methods outperform classical lectures in enhancing health-related knowledge and attitudes among

children, particularly when they are appropriately contextualized and culturally adapted [31], [32].

Limitations of this finding include potential short-term measurement biases and the inability to ascertain long-term retention of knowledge and attitudes. Additionally, while the statistical significance indicates an effective intervention, the magnitude of change varies based on individual factors such as prior knowledge, motivation, and familial influences, which were not extensively controlled in this study.

Implications: The positive impact of snake and ladder media suggests that integrating interactive educational games into school curricula can be a strategic approach to improving health literacy among children. Schools might consider adopting such media as a supplementary tool to reinforce health messages in a more engaging manner, potentially leading to sustained behavioral change.

B. IMPACT OF THE INTERVENTION ON STUDENTS' ACTIONS REGARDING PHBS

The results indicated that the health education intervention via snake and ladder media significantly improved students' practical behaviors related to PHBS. The proportion of students exhibiting adequate or good practices increased markedly post-intervention, corroborating findings from recent studies showing that health education, especially through active and game-based methods, can effectively influence children's behaviors [33], [34].

This effectiveness may be explained by the model of experiential learning, where active participation fosters better acquisition and application of health behaviors [35]. The game-oriented strategy encourages students to internalize hygiene practices through simulated experiences, which likely translate into real-world behaviors. The direct involvement of students in physical activities such as walking, jumping, or squatting embedded within the game, also reinforces motor coordination and health competence, leading to better adherence to healthy practices.

In comparison with control groups receiving conventional health teaching, those exposed to the snake and ladder media exhibited more substantial improvements. This discrepancy underscores the importance of instructional methods that are interactive and motivating for younger audiences. Recent systematic reviews affirm that active learning strategies outperform passive lecture-based approaches in fostering not only knowledge but also actionable health behaviors among children and adolescents [36], [37].

However, it is essential to acknowledge that the behavior change captured in this study was assessed immediately following the intervention, which might not reflect sustained behavioral maintenance. Moreover, behavioral adaptations in children are heavily influenced by parental support and environmental factors, which were beyond the scope of this intervention. The possibility of social desirability bias where students may overreport good behaviors should also be considered.

Implications: The findings reinforce the value of game-based health education as an effective method for promoting healthy practices. Schools and health educators can leverage such interactive media to cultivate habits early in life, which can persist into adulthood and significantly reduce risk factors associated with poor hygiene.

C. LIMITATIONS, WEAKNESSES, AND FUTURE DIRECTIONS

Despite encouraging outcomes, several limitations of this study should be acknowledged. Firstly, the quasi-experimental design, although pragmatic, lacks the rigorous control characteristic of randomized controlled trials y, which limits the ability to firmly establish causality. While participants were randomly selected, the assignment into intervention and control groups did not involve individual randomization, leaving room for selection bias and confounding variables influencing the results.

Secondly, the short-term measurement of knowledge, attitudes, and behaviors does not provide insights into the sustainability of the intervention's effects. Longitudinal studies are essential to determine whether the observed improvements persist over time and translate into lifelong health behaviors. Additionally, reliance on self-reported questionnaires and observational assessments could introduce biases, including social desirability bias and observer bias, potentially inflating the perceived effectiveness [38].

Thirdly, the study's setting in two specific schools limits the generalizability of findings to other contexts with different socio-cultural backgrounds or resource availability. The relatively small sample size, although sufficient for initial insights, restricts statistical power and may not reflect broader populations.

Fourth, external factors such as parental involvement, peer influence, and environmental hygiene conditions, which significantly impact behavior, were inadequately controlled or measured. Future research should integrate these variables to obtain a more comprehensive understanding of behavior change mechanisms.

Fifth, while the intervention demonstrated efficacy in an educational context, its scalability and integration into existing curricula warrant further exploration. The resource-intensive nature of game preparation and facilitator training may pose challenges to widespread implementation.

Implications and Future Directions: To enhance the robustness of evidence, future studies should adopt randomized controlled trial designs with larger, more diverse samples. Longitudinal follow-up assessments are crucial to evaluate the durability of behavioral change. Additionally, exploring the integration of parental and community engagement components could amplify intervention effects. Advanced methodologies such as digital game platforms could increase scalability and standardization [39], [40].

Furthermore, multi-center trials across different geographic and socio-economic settings will help determine the broader applicability of game-based health education. Qualitative research could also uncover motivational factors and barriers to sustained behavior change among children. Policymakers should consider developing policies that support the inclusion of interactive media in primary school health curricula, backed by evidence of long-term efficacy and cost-effectiveness. There are several limitations in this study, including that there are several students who work together or discuss when completing questions from the

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questionnaire, so that it can affect the results of students' knowledge scores and attitudes. This study only included the age and gender of the students so that it did not consider environmental factors that could affect behavior change.

V. CONCLUSION

This study aimed to evaluate the effect of snake and ladder media health education on improving behaviors related to the Clean and Healthy Living Behavior (PHBS) among elementary school students. The findings demonstrated that the intervention significantly enhanced students' knowledge, attitudes, and practices regarding PHBS, with p-values less than 0.001 indicating strong statistical significance. Specifically, knowledge scores increased markedly post-intervention, with a majority of students transitioning from less or sufficient categories to good. Attitudes towards PHBS also improved, with a notable shift from predominantly positive attitudes pre-intervention to universally positive attitudes after the educational activity. Behaviorally, students' actions aligned with PHBS increased after exposure to the media, illustrating the effectiveness of the snake and ladder game as a participatory and engaging health education tool. Moreover, the results revealed substantial differences between the intervention and control groups across all measured variables, affirming the media's influence on fostering healthier behaviors in this age group. These outcomes underscore the potential of interactive and contextual educational methods in instilling sustainable health habits among young learners. For future research, it is recommended to implement this media-based approach across diverse school settings and different age brackets to validate its efficacy universally. Longitudinal studies could also be conducted to assess the durability of behavioral changes over time. Additionally, integrating parental involvement and community-based programs may further reinforce the adoption of PHBS. Overall, this innovative strategy offers a promising platform for health promotion in school environments and contributes valuable insights for health educators and policymakers seeking to enhance child health outcomes through engaging and effective educational interventions.

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DATA AVAILABILITY

No datasets were generated or analyzed during the current study.

AUTHOR CONTRIBUTION

All authors contributed significantly to this study. Shofiatuz Zahro conceptualized the research framework and was responsible for data collection and analysis. Sri Utami played a crucial role in designing the intervention, providing guidance, and overseeing the implementation process. Rini Ambarwati contributed to the drafting of the manuscript, literature review, and critical revisions. Miadi offered expertise in health education methodologies and assisted in interpreting the findings. Collective efforts from all authors culminated in the final version of this publication, ensuring the integrity and quality of the research.

DECLARATIONS

ETHICAL APPROVAL

The authors declare that there are no conflicts of interest regarding the publication of this study. Ethical approval was obtained from the relevant institutional review board, and informed consent was secured from all participating students and their guardians. Confidentiality and anonymity of participants were maintained throughout the research process. Funding support, if any, was acknowledged in the respective section. This study adheres to scientific integrity and transparency standards, ensuring the replicability and credibility of its findings.

CONSENT FOR PUBLICATION PARTICIPANTS.

Consent for publication was given by all participants.

COMPETING INTERESTS

The authors declare no competing interests.

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