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Comparison of the Effectiveness of PHBS Counseling Using Powerpoint Media and AI Animation Videos on Knowledge and Attitudes on Scabies Prevention at Sa'adatuddaren Islamic Boarding School

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Abstract

Scabies remains a public health concern in Islamic boarding schools, where shared living environments and close interpersonal contact facilitate transmission. Health education plays an important role in improving students' knowledge of scabies prevention and promoting positive preventive attitudes. This study compared the outcomes of Clean and Healthy Living Behavior (Perilaku Hidup Bersih dan Sehat, PHBS) counseling delivered through an artificial intelligence (AI)-assisted animated video and a PowerPoint presentation at Sa'adatuddaren Islamic Boarding School, Jambi City, Indonesia. A quasi-experimental study with a two-group pretest–posttest design was conducted involving 140 male junior high school students, with 70 participants assigned to each intervention group. Both educational media were developed using the same instructional content framework covering scabies prevention in the boarding school environment. Data on students' knowledge and attitudes were collected using structured questionnaires administered before and immediately after the counseling sessions. Statistical analyses were performed using the Wilcoxon signed-rank test and Mann–Whitney U test. The results demonstrated statistically significant improvements in knowledge and attitude scores in both intervention groups ($p < 0.001$ for all within-group comparisons). However, the between-group comparisons revealed no statistically significant differences in knowledge ($p = 0.884$) or attitudes ($p = 0.965$). These findings indicated that both educational media were associated with comparable short-term improvements in students' knowledge and attitudes toward scabies prevention. The similarity in outcomes may have been attributable to the use of equivalent educational content across both interventions. Nevertheless, the immediate post-intervention assessment limited the ability to evaluate long-term knowledge retention and behavioral changes. The study concluded that AI-assisted animated videos and PowerPoint presentations were both viable educational media for scabies prevention counseling in Islamic boarding schools. Further research involving longer follow-up periods is needed to determine the sustainability of these improvements and their translation into actual preventive practices.

INTRODUCTION

Scabies is a contagious skin infestation caused by the human itch mite, Sarcoptes scabiei var. hominis, which triggers an inflammatory and hypersensitivity reaction in the skin (Yotsu et al., 2023). Transmission occurs primarily through prolonged direct skin-to-skin contact, including close physical contact, sharing sleeping spaces, and sexual contact. Although transmission through contaminated clothing or bedding can occur, particularly in cases of

crusted scabies, direct contact remains the principal route. Scabies transmission is associated with overcrowded living conditions, frequent interpersonal contact, and limited access to appropriate hygiene and healthcare facilities. Consequently, communal environments such as dormitories, prisons, and residential educational institutions may facilitate the spread of scabies (Jauhari et al., 2025; Setiawan et al., 2024).

In 2017, the World Health Organization (WHO) formally recognized scabies as a neglected tropical disease (NTD) (El-Moamly, 2021; Mitchell et al., 2024). According to WHO estimates (World Health Organization [WHO], 2023), more than 200 million people worldwide were affected by scabies at any given time, with approximately 400 million cases occurring annually. In resource-constrained communities, the reported prevalence among children ranged from 5% to 50%. In Indonesia, Ministry of Health data from 2023 indicated that approximately 1.5 million individuals were affected by scabies, representing an estimated 0.5%–0.6% of the national population. At the regional level, the Jambi City Health Office recorded 3,028 scabies cases in 2022, with the catchment area of Tahtul Yaman Community Health Center identified among the areas with a relatively high burden of reported cases (Ghaza, 2026; Lestari et al., 2025).

Islamic boarding schools, locally known as pesantren, represent environments with an increased risk of scabies transmission because students frequently share sleeping quarters, personal facilities, and communal living spaces (Mawardi et al., 2024; Rakhmawati et al., 2025; Sugiarto & Song, 2024). Similar concerns have been reported in boarding school communities, including those in Sukasari Village, Air Periukan District, Seluma Regency (Salwa et al., 2025). Limited knowledge of scabies transmission and prevention may further contribute to the persistence of infection in these environments. Strengthening preventive measures through structured health education is therefore important for reducing transmission risks. Indonesia's Clean and Healthy Living Behavior (Perilaku Hidup Bersih dan Sehat, PHBS) program provides a framework for promoting personal hygiene, environmental cleanliness, and preventive health practices among individuals and communities (Wilantika et al., 2020; Yulendasari & Afsani, 2022).

The implementation of PHBS in educational settings can be supported through targeted health education and promotion activities, particularly among adolescents living in communal environments. Effective health education depends on several interconnected factors, including the relevance and accuracy of instructional content, the suitability of educational media, the methods used to deliver information, and the communication competencies of educators and healthcare professionals. Educational approaches that accommodate students' learning characteristics and everyday experiences may improve their understanding of health risks and encourage positive attitudes toward preventive behaviors.

The selection of appropriate educational media is an important consideration in improving the delivery of health promotion programs. PowerPoint presentations and animated videos offer different approaches to communicating health information. PowerPoint presentations organize educational material through structured text and visual illustrations, whereas animated videos integrate moving images, narration, and visual demonstrations to explain health concepts. Artificial intelligence (AI)-assisted animation may further support the development of visually engaging educational materials. Previous educational research has suggested that both presentation-based and animation-based instruction can facilitate

understanding, although their relative effectiveness may vary according to the learning objectives, content, and characteristics of the target population (Diba et al., 2025; Maryam, 2024; Salma & Suharto, 2024).

Scabies remains a significant public health concern because infestation with Sarcoptes scabiei var. hominis can cause intense pruritus, sleep disturbances, and secondary bacterial skin infections. The World Health Organization (WHO, 2023) estimated that more than 200 million individuals were affected by scabies at any given time and that more than 400 million cases occurred annually. In resource-constrained settings, reported prevalence among children ranged from 5% to 50%. WHO guidance published in 2026 emphasized coordinated scabies control through surveillance, timely diagnosis, appropriate treatment, and community-level interventions. Within this broader framework, school-based health education can support early recognition of symptoms, timely reporting, and improved awareness of preventive measures, although education alone cannot replace appropriate clinical management and transmission control.

In Indonesia, Islamic boarding schools (pesantren) are particularly relevant settings for scabies prevention because students share sleeping facilities and engage in daily activities involving frequent close contact. In a cross-sectional study involving 178 students at As'ad Islamic Boarding School in Jambi City, Fauzah and Suparmi (2023) reported that 60.7% of respondents exhibited symptoms consistent with scabies, 70.8% had inadequate scabies-related knowledge, and 94.4% lived in overcrowded conditions. The study also identified associations between scabies symptoms and several factors, including knowledge, personal hygiene, previous contact with affected individuals, and room occupancy density. These findings highlighted the coexistence of educational deficiencies and environmental conditions that may facilitate scabies transmission within communal educational settings.

These educational and environmental challenges underscore the importance of targeted scabies prevention counseling in Islamic boarding schools. At Sa'adatuddaren Islamic Boarding School in Jambi City, the present study focused on male students in Grades 1–3 of Madrasah Tsanawiyah (Islamic junior secondary school). The PHBS framework was used to structure educational messages concerning scabies transmission, personal hygiene, environmental cleanliness, and preventive practices. The primary educational objective was to improve students' understanding of scabies prevention and encourage positive attitudes toward preventive behaviors within their daily dormitory routines. The method of delivering these messages was considered important because different educational media may influence students' attention, comprehension, and engagement with the instructional content.

Previous research conducted in a comparable boarding school setting provided preliminary support for animation-based scabies prevention education. Irfan et al. (2022) evaluated an animated educational video involving 30 students at Darul Ikhwan Islamic Boarding School in Batang Hari Regency, Jambi Province. The study reported a 14.67% increase in mean knowledge scores following the intervention ($p = 0.002$). However, its single-group pretest–posttest design and exclusive focus on knowledge limited conclusions regarding the comparative effectiveness of animated videos and their potential influence on students' attitudes. Consequently, further research was needed to determine whether animated educational materials produced different learning outcomes from alternative instructional media in comparable school environments.

Comparative evidence from adolescent health education also supported investigating differences between instructional formats. Hanifah et al. (2021) compared animated video and PowerPoint-based education among 32 female adolescents receiving information about menarche. Knowledge scores improved in both intervention groups, with significantly greater improvements reported in the animated-video group ($p = 0.006$). Evidence from broader health education research further indicated that the effectiveness of animation could differ across learning outcomes. In a systematic review published in Frontiers in Digital Health, Moe-Byrne et al. (2022) reported that animation favored knowledge outcomes in 19 of 30 studies, whereas favorable effects on attitudes or cognitive outcomes were identified in six of 21 studies. These findings suggested that improvements in knowledge did not necessarily correspond to equivalent changes in attitudes, highlighting the importance of evaluating these outcomes separately when comparing health education media.

Despite the growing use of audiovisual materials in health education, a specific research gap remained regarding the comparative effectiveness of educational media for scabies prevention among Islamic boarding school students. The study by Irfan et al. (2022) examined animated-video education in a comparable pesantren setting but did not include an alternative instructional format. Meanwhile, Hanifah et al. (2021) directly compared animation and PowerPoint presentations but focused on a different health topic and target population. Consequently, limited evidence was available regarding whether PHBS counseling delivered through AI-assisted animated videos produced different short-term improvements in scabies prevention knowledge and attitudes compared with PowerPoint-based counseling among male boarding school students. Addressing this gap was relevant to educational institutions seeking effective and practical approaches to recurring health promotion activities.

The novelty of this study lay in its direct comparison of AI-assisted animated videos and PowerPoint presentations developed using the same PHBS educational content framework. The PowerPoint intervention presented scabies prevention information through a structured sequence of slides, whereas the AI-assisted animated-video intervention incorporated moving visual elements and narration to communicate equivalent core messages. Standardizing the educational content across both interventions was intended to reduce differences arising from the information presented, thereby allowing a more focused examination of the instructional delivery formats. AI was used as a tool in producing the animated educational material rather than as an independent intervention or an adaptive learning system.

This study aimed to compare the short-term educational outcomes of PHBS counseling delivered through AI-assisted animated videos and PowerPoint presentations at Sa'adatuddaren Islamic Boarding School in Jambi City, Indonesia. A quasi-experimental, two-group pretest–posttest design involving 140 male junior secondary school students was employed. The study had two specific objectives: to assess changes in students' scabies prevention knowledge and attitudes before and immediately after counseling within each intervention group, and to compare the outcomes between groups to determine whether the instructional formats differed in their immediate educational effects.

This study contributed to school-based health promotion research by examining knowledge and attitudes as distinct outcomes in a direct comparison of two active educational interventions. This distinction was important because improvements in students' understanding of scabies prevention did not necessarily indicate corresponding changes in their attitudes or

subsequent preventive behaviors. By documenting students' immediate responses to AI-assisted animated videos and PowerPoint presentations within a boarding school setting, the study provided empirical evidence concerning the short-term outcomes of both educational approaches. However, the immediate post-intervention assessment did not establish sustained knowledge retention or behavioral changes. Further investigations involving longer follow-up periods would therefore be necessary to evaluate whether improvements in knowledge and attitudes translated into consistent scabies prevention practices.

For Islamic boarding school administrators, teachers, and local health promotion teams, the findings could inform the selection of appropriate educational media for routine PHBS counseling activities. Decisions regarding instructional formats should consider not only observed improvements in knowledge and attitudes but also practical factors such as equipment availability, preparation requirements, implementation costs, facilitator competencies, and the potential for repeated use. The findings could also support the development of follow-up educational activities tailored to students' daily routines and communal living conditions. Integrating appropriate educational media with environmental hygiene measures, early identification of suspected scabies cases, and access to healthcare services may contribute to more comprehensive scabies prevention efforts in Islamic boarding schools.

METHOD

This study employed a quantitative approach with a quasi-experimental, nonequivalent two-group pretest–posttest design. The research was conducted at Sa'adatuddaren Islamic Boarding School in Jambi City, Indonesia, on August 9, 2026.

The study involved 140 male students in Grades 1–3 of Madrasah Tsanawiyah (MTs), an Islamic junior secondary school. Participants were selected using simple random sampling and allocated equally to two intervention groups, with 70 students in each group. The sample size included a 10% allowance for potential participant attrition. Eligible participants were actively enrolled students, regardless of whether they exhibited scabies symptoms, who agreed to participate and provided written informed consent.

Data were collected using structured pretest and posttest questionnaires designed to assess students' knowledge and attitudes toward scabies prevention within the Clean and Healthy Living Behavior (Perilaku Hidup Bersih dan Sehat, PHBS) framework. The PowerPoint presentation was developed using Canva, while the artificial intelligence (AI)-assisted animated video was created using instructional content derived from the same educational framework, with ChatGPT assisting in content and prompt development. The video subsequently underwent editing using video-editing software. All questionnaire items underwent validity and reliability testing before data collection.

Data collection began with the administration of pretest questionnaires to both intervention groups. Group I received PHBS counseling through an AI-assisted animated video, whereas Group II received counseling using a PowerPoint presentation. Both interventions covered the same core educational content related to scabies prevention. Immediately after the counseling sessions, posttest questionnaires were administered to assess changes in students' knowledge and attitudes.

Pretest and posttest data were compiled using Microsoft Excel and subsequently analyzed using statistical software. Normality testing indicated that the data deviated significantly from

a normal distribution ($p < 0.05$). Therefore, nonparametric statistical methods were applied. The Wilcoxon signed-rank test was used to evaluate within-group differences in knowledge and attitude scores between the pretest and posttest assessments, while the Mann–Whitney U test was used to compare outcomes between the AI-assisted animated-video and PowerPoint groups. Ethical approval was obtained from the Research Ethics Committee of the Faculty of Medicine and Health Sciences, University of Jambi (Approval No. 308//DST/UN21.8.9/PT.01.04/2026). Participation was voluntary and based on informed consent, and all collected data were handled in accordance with the ethical principles of confidentiality, anonymity, and equitable treatment.

RESULTS AND DISCUSSION

The total number of respondents in this study was 140 respondents, with 70 respondents per group. The distribution of respondent characteristics is shown in the following table

Table 1. Distribution of Respondent Characteristics

Characteristics	AI Animated Video Group (n=70)	PowerPoint groups (n=70)
Gender		
Male (%)	70 (100%)	70 (100%)
Female (%)	0 (0%)	0 (0%)
Classes		
1	24 (34,3%)	39 (55,7%)
2	23 (32,9%)	15 (21,4%)
3	23 (32,9%)	16 (22,9%)
Age		
12	15 (21,4%)	23 (32,9%)
13	26 (37,1%)	25 (35,7%)
14	12 (17,1%)	13 (18,6%)
15	15 (21,4%)	9 (12,9%)
17	1 (1,4%)	0 (0%)
18	1 (1,4%)	0 (0%)

Based on table 1. The distribution of respondent characteristics was found that the respondents were dominated by men. This is because the research was conducted on male dormitories. For class characteristics, it was found that the AI animation video group and the PowerPoint group were both dominated by class 1 MTs where in the AI animation video group there were 24 respondents (34.3%) and the PowerPoint group as many as 39 respondents (55.7%). For age characteristics, it was found that the AI animation video group and PowerPoint were both dominated by the age of 13 years where in the AI animation video group there were 26 respondents (37.1%) and the PowerPoint group as many as 25 respondents (35.7%).

The results of univariate analysis on two variables, attitude and knowledge, were tested in the AI animated video group and the PowerPoint group.

Table 2. Univariate Analysis

Variable	Groups	Pretest (Median)	Posttest (Median)
Knowledge	AI Animation Videos	76,9	92,3
	PowerPoint	61,5	84,6
Attitude	AI Animation Videos	86,0	89,0
	PowerPoint	83,0	88,0

Based on Table 2, the results of the descriptive analysis showed an increase in the median score of knowledge and attitude in both intervention groups. In the AI animated video group, the median value of knowledge increased by 15.40% (from 76.9 to 92.30%), while the PowerPoint group increased by 23.10% (from 61.50% to 84.60%). In the attitude variable, the AI animation video group increased by 3 scores, from 86.00. In the PowerPoint group, there was an increase of 5 scores from 83.00 to 88.00 in the PowerPoint group. The results of the normality test confirmed that the data was distributed abnormally, so hypothesis testing continued using non-parametric statistics, namely the Wilcoxon and Mann-Whitney tests.

The bivariate analysis stage begins with assessing the change in scores before and after the intervention in the same group (paired groups). The Wilcoxon test is used to prove whether there is a significant difference in the increase in knowledge and attitude scores. The results of the Wilcoxon test in both groups are attached in table 3.

Table 3. Wilcoxon Test

Variable	Groups	Increase	Downward	Fixed	p value
Knowledge	AI Animation Videos	54	0	16	<0.001
	PowerPoint	49	3	18	<0.001
Attitude	AI Animation Videos	57	6	7	<0.001
	PowerPoint	48	18	4	<0.001

The results of the Wilcoxon test in table 3 show that the provision of health promotion interventions for Clean and Healthy Living Behaviors, both using AI-based animation video media and PowerPoint, have a significant influence on improving the knowledge and attitudes of students ($p<0.001$).

The increase in knowledge in the AI animation video group is in line with the theory of knowledge formation which states that the cognitive domain is formed through the process of sensing, especially the senses of sight and hearing. AI animation videos integrate interesting visual elements, audio narratives, and dynamic movements that are able to optimize the audience's memory and understanding efficiently. In the attitude variable, AI video intervention also succeeded in forming a tendency for students' positive responses to the prevention of scabies. This finding is in line with the research of Devi and Sholikhah (2026) who reported a significant change in attitude after animation media intervention ($p=0.000$).

On the other hand, the PowerPoint intervention group also showed a significant increase in knowledge and attitudes ($p<0.001$). PowerPoint media has the advantage of facilitating the visualization of text and graphics that are familiar to students in the school environment, so it is effective as health communication advice. These results support the findings of Hanifah et al. (2021) regarding the effectiveness of PowerPoint in improving respondents' understanding,

as well as Devi and Sholikhah's (2026) research that confirms the effectiveness of PowerPoint in directing positive attitude changes.

To determine which learning media is more effective, further analysis was carried out using the Mann-Whitney test. The results of the Mann-Whitney test are attached in table 4.

Table 4. Mann-Whitney Test

Variable	Groups	N	Red	Mann-Whitney	p-value
Knowledge	AI Animation Videos	70	70,01	2415,000	0,884
	PowerPoint	70	70,99		
Attitude	AI Animation Videos	70	70,65	2439,500	0,965
	PowerPoint	70	70,35		

Based on the results of the Mann-Whitney test, a value of p=0.884 was obtained for the knowledge variable and p=0.965 for the attitude variable. This figure confirms that there is no significant difference in effectiveness between the use of AI and PowerPoint animated video media in improving students' knowledge and attitudes regarding PHBS skabies (p>0.05). The two health promotion media have proven to have equal abilities in educating students in the pesantren environment.

The findings on this knowledge variable are different from the research of Hanifah et al. (2021) which reported a significant difference in effectiveness (p=0.006), where animated video media was proven to be superior to PowerPoint. Likewise, in the attitude variable, the results of this study are not in line with the findings of Devi and Sholikhah (2026) who stated that animated videos are significantly more effective than PowerPoint. This difference is allegedly influenced by the level of balanced visual and textual information acceptance in students, so that health messages can be conveyed both through structured slide media (PowerPoint) and dynamic animation (AI animation videos).

Overall, it can be concluded that the provision of health promotion education, both through AI and PowerPoint animation videos, from the Wilcoxon test has been proven to significantly increase students' knowledge and attitudes about PHBS skabies (p<0.001). However, in the differences between media (Mann-Whitney test) no significant changes were found in these twostudy media. The absence of significant differences between the two groups is due to several main factors, ranging from the similarity of the content of the material sourced from the same PowerPoint, taking an instant posttest that makes the students' short-term memory still strong, and the high initial score of the students since the pretest (ceiling effect), the inequality of group conditions at the beginning, until the implementation of counseling on the same day with uniform environmental conditions.

CONCLUSION

The findings indicated that Clean and Healthy Living Behavior (Perilaku Hidup Bersih dan Sehat, PHBS) counseling delivered through artificial intelligence (AI)-assisted animated videos and PowerPoint presentations was associated with statistically significant improvements in students' knowledge and attitudes toward scabies prevention at Sa'adatuddaren Islamic Boarding School ($p < 0.001$). Descriptively, the number of students

classified as having good knowledge increased from 36 to 60 in the AI-assisted animated-video group and from 27 to 46 in the PowerPoint group. Similarly, the number of students demonstrating positive attitudes increased from 42 to 56 in the AI-assisted animated-video group and from 32 to 56 in the PowerPoint group. Although both interventions produced statistically significant within-group improvements, between-group comparisons revealed no statistically significant differences in knowledge ($p = 0.884$) or attitudes ($p = 0.307$). These findings suggested that both educational formats were associated with comparable short-term improvements in students' knowledge and attitudes toward scabies prevention. However, the absence of statistically significant differences did not establish equivalence between the interventions, and the immediate post-intervention assessment limited conclusions regarding long-term effectiveness and behavioral changes.

Based on these findings, healthcare institutions and educational organizations should consider incorporating audiovisual educational materials into routine health promotion activities to improve the accessibility and engagement of preventive health messages. Sa'adatuddaren Islamic Boarding School is encouraged to integrate PHBS education into regular student activities while strengthening environmental sanitation, personal hygiene practices, early identification of suspected scabies cases, and access to appropriate treatment to reduce transmission risks. Future studies should employ longitudinal or randomized controlled designs with extended follow-up periods to evaluate knowledge retention, sustained attitudinal changes, and actual preventive behaviors. Further research should also include larger and more diverse student populations, compare additional interactive digital educational formats, and assess the practical feasibility and cost-effectiveness of different interventions in Islamic boarding school settings.

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