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Enhancing scabies knowledge among Indonesian boarding school students through a *Wayang* video

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Ethics approval: this study adhered to the ethical principles of research, including anonymity, confidentiality, and beneficence. Approval from both the students and the school principal was obtained through voluntarily completed informed consent forms. Ethical approval for the study was also granted by the Research Ethics Committee of the Faculty of Medicine, Andalas University, with No. 076/KEP/FK/2020.

Availability of data and materials: the datasets generated during and analyzed during the current study are available from the corresponding author upon reasonable request.

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Abstract

Skin diseases, such as scabies, present a significant global health concern, particularly among Indonesian boarding school students, resulting in complications, disruptions to daily life, and academic hindrances. To effectively address this issue, a health education approach utilizing *Wayang* videos was implemented, leveraging cultural elements for enhanced outcomes. Our research aimed to assess the impact of a *Wayang* educational video on scabies knowledge among Indonesian boarding school students. This study, conducted from October 2019 to October 2020, involved 447 students. Pre- and post-tests were administered to measure knowledge levels. Our findings demonstrate a significant improvement in scabies knowledge among students following the *Wayang* video education intervention. The bivariate Wilcoxon test identified a significant difference ($p < 0.05$) in average scores before and after the educational intervention. Knowledge scores increased from 76.75 in the pre-test to 83.09 in the post-test, marking an 8.27% improvement. This study underscores the efficacy of *Wayang* educational video in augmenting scabies knowledge among Indonesian boarding school students, with a particular emphasis on the impact of a video titled "Malin and the Mite". This innovative cultural approach holds promise as a potential model for analogous regions, contributing to scabies prevention and advancing public health objectives.

Introduction

Skin diseases are a significant global health concern, ranking fourth among the leading causes of non-fatal diseases worldwide.^{1,2} These diseases encompass both infectious and non-infectious conditions, with skin infections caused by various agents, including bacteria, viruses, fungi, and parasites. Among parasitic skin infections, scabies stand out, caused by infestation

with *Sarcoptes scabiei* var. *hominis* mites (Arachnida class, Acarina order, Sarcoptidae family).² Scabies have been reported from various parts of the world, and the incidence is high, especially in developing countries.³ Scabies are particularly prevalent in tropical regions like Southeast Asia, where the World Health Organization (WHO) estimates that approximately 200 million individuals are affected.^{4,5}

According to a cross-sectional analysis of the 2015 Global Burden of Disease Study, Indonesia is among the top five nations with the highest scabies load, followed by China, Timor-Leste, Vanuatu, and Fiji.⁶ In each country, the prevalence of scabies ranges from 0.2 to 71%. In Indonesia, scabies remain a persistent public health challenge, with a prevalence rate of 6% reported in 2017, highlighting its ongoing significance as an infectious disease in the country.⁷ Scabies was the third most common skin illness in Indonesia, according to information from community health facilities known as 'Puskesmas'.⁸ Scabies were found more commonly in children than in adults.⁷ In Indonesia, home to the largest Muslim population globally, there are 14,798 Islamic boarding schools. Students often hail from socioeconomically disadvantaged families unable to cover educational and living expenses. Consequently, these Pesantren are densely populated with limited resources. Accommodations meant for 30-50 students lack adequate facilities and hygiene standards, facilitating the rapid spread and challenging eradication of scabies.⁷⁻⁹

Scabies are known as an emerging or re-emerging parasitic condition.¹⁰ Colloquially referred to as "*gudig*" or "the itch," scabies are characterized by intense itching (pruritus), often worse at night, and the presence of white linear patches (burrows or "*kunikulus*") on the skin surface. This typically occurs in the folds of thin, warm, and moist skin, with pruritic papules classically found in the webs of the fingers, the flexor of the wrists, the extensor of the elbows, the periumbilical skin, the buttocks, the ankles, the penis in males, and the periareolar region in females.¹¹ However, it is considered uncommon due to the relative host specificity of the

mites.¹² Sensitization to mite secretions and excreta results in itching, while the white linear patches represent the tunnels formed by these mites. The condition of scabies can manifest as widespread hyperkeratotic crusted lesions.¹³ Individuals with a weakened immune system may develop a severe form of scabies called crusted scabies.¹⁴ Despite being perceived as non-lethal, scabies can lead to serious complications due to skin tissue damage and secondary bacterial infections.^{2,9,15} The gold standard technique for diagnosis is microscopic examination, which requires experienced experts to identify mites, primarily in ordinary scabies.¹⁶

Several risk factors contribute to scabies transmission, including poverty, overcrowding, low education levels, limited access to clean water, and poor hygiene practices. Household overcrowding, as observed in boarding schools, plays a dominant role, facilitating mite transmission through close physical interactions and shared living spaces. Suboptimal hygiene behaviors, such as infrequent bed cleaning, clothes swapping, and sharing personal items among dormitory students, exacerbate the problem.^{2,15}

The incessant itching associated with scabies infestations disrupts the sleep patterns of affected students, leading to fatigue, lethargy, and difficulties in concentration. Research has highlighted a meaningful association between scabies, students' concentration levels, and academic performance in boarding schools.^{17,18} The adoption of clean and healthy living behaviors is closely linked to knowledge about a particular health issue. Several studies have demonstrated a significant correlation between the level of knowledge and the incidence of scabies among boarding school students.^{19,20} For instance, research conducted by Ramadhan *et al.* revealed that 71.4% of boarding school students had a low level of knowledge regarding scabies, corresponding with a high incidence rate of the condition.¹⁹ This finding is corroborated by Nindrya *et al.*'s study, which found that 67.9% of boarding school students had a low level of knowledge about scabies.²⁰ Both studies concluded that knowledge levels influence the incidence of scabies in boarding schools. Thus, comprehensive health education

on scabies, covering their causes, transmission modes, preventive measures, and treatment options, is crucial within the boarding school environment.

Health education can take various forms, including visual, audio, and audiovisual media. Notably, audiovisual tools like videos engage both visual and auditory senses, facilitating knowledge absorption. Combining multiple sensory inputs enhances knowledge transfer effectiveness.²¹ Another intriguing educational medium is the traditional Indonesian art form of "*Wayang*," which includes puppetry and shadow play. *Wayang* is deeply rooted in Indonesian culture and offers a unique and engaging platform for educational content delivery. Its cultural significance, rich storytelling tradition, and entertainment value make it a compelling choice for imparting knowledge.^{22,23}

In this research, we utilize *Wayang* story videos as a medium for health education on scabies. The research aims to explore the impact of education delivered through the *Wayang* video "Malin and the Mite" on the knowledge of scabies among boarding school students in Indonesia. This choice is motivated by the cultural significance of *Wayang* and its potential to enhance the learning experience by making it more captivating and culturally relevant. This study has the potential to significantly impact scabies prevention and education efforts, not only in Indonesia but also in regions facing similar health challenges. Leveraging the culturally relevant medium of *Wayang* can enhance awareness of scabies among Indonesian students, leading to early detection and treatment. This, in turn, can reduce scabies transmission within schools and communities and trigger positive behavioral changes, fostering healthier hygiene practices.

Furthermore, the research's innovative approach to incorporating cultural elements into health education can serve as a model for other regions with rich cultural traditions. It highlights the effectiveness of aligning educational materials with cultural practices, potentially inspiring similar initiatives globally. The aim of this study is to determine the effectiveness of scabies

awareness using video *Wayang* media on the knowledge level of boarding school students. Ultimately, the study's success in reducing scabies incidence among students and communities contributes to broader public health goals, improving overall well-being.

Materials and Methods

Research design

This research employs an experimental design with a pre-post test design involving a single group. Participants were selected through a simple random sampling method. The dependent variable for this research is the level of knowledge about scabies among boarding students in Indonesia, while the independent variable is health education about scabies through the *Wayang* video. The research was conducted from January to October 2020. The sample size was determined using a modified Lemeshow formula based on a single-sample estimate of the proportion of a population and dropouts, resulting in a minimum sample size of 440. The study enrolled 447 participants who met the inclusion and exclusion criteria.

The inclusion criteria for this study are as follows: respondents must be confirmed as boarding school students, verified by their boarding school identification card or other identification; willing to sign the informed consent form as a requirement for participating in the interview; actively engaged in the research from its commencement to its conclusion (beginning with the pre-test, *Wayang* education, post-test); and completing both the pre-test and post-test questionnaires. These participants were students from eight schools located in dormitories across Indonesia, comprising six schools from Java, one from Sumatra, and one from Sulawesi. Students who followed the research process were determined by the school related to managing licensing by previous researchers.

Research instrument and implementation

Researchers first prepared a *Wayang* story video for educational media titled "Malin and the Mite" / "Malin dan Si Tungau" (in the Indonesian language). The questionnaire used to assess the level of boarding school students' knowledge about scabies was adapted from Fitriyani, N.'s questionnaire (2017), which has been declared valid and reliable.²⁴ Researchers have obtained permission from these previous researchers.

The research process consisted of several stages. In the initial stage, respondents completed questionnaires containing general information and knowledge about scabies disease in a pre-test. The general information included details such as age, gender, grade/class, information, experience with scabies infection, risky behavior for scabies transmission, affected areas of the body, family/friend history of scabies, environmental conditions conducive to scabies transmission, and treatment. The knowledge about scabies disease encompassed factors related to scabies transmission, causes of scabies, signs and symptoms, mite development, treatment, environmental factors, scabies incidence, and control measures.

Subsequently, in the following stage, respondents watched a *Wayang* education video on scabies disease, which lasted approximately 14 minutes; the intervention was conducted only once. The *Wayang* video, titled "Malin and the Mite," covered topics including definitions, causes, risk factors, clinical manifestations, treatment, prevention, and scabies incidence. The final stage involved a post-test, during which respondents completed a questionnaire with content identical to that of the pre-test. The allocated time for completing both the pre-test and post-test questionnaires was 10 minutes each.

Statistical analysis

Data processing and analysis are carried out to determine respondents' knowledge level before and after being given *Wayang* video education and to understand the influence of *Wayang* video education on increasing respondents' knowledge after the education. Knowledge

measurement results can be grouped into three categories, namely: good (76%-100%), enough (56%-75%), and less (<56%).²⁵ The analysis of the difference in respondents' average grades was conducted using the Wilcoxon test. This stage is done using MS Excel and SPSS 16.0 for Windows software.

Ethics statement

This study adhered to ethical research principles, including anonymity, confidentiality, and beneficence. Approval from both the students and the school principal was obtained through voluntarily completed informed consent forms. The Research Ethics Committee of the Faculty of Medicine, Andalas University, with No. 076/KEP/FK/2020, also granted ethical approval for the study.

Results

Demographic characteristics of respondents

Demographic characteristics of the study respondents can be seen in the tables below, outlining the following features of the respondents. According to Table 1, the average age of the studied respondents was 15.82 years old, with a standard deviation of 1.39. The median age of the respondents is 16 years, with the youngest being 13 years old and the oldest 18 years old. The majority of respondents (55%) were female. Regarding the academic year, Grade X had the highest representation at 32%, followed by Grades XI, XII, and IX. Approximately 67% of the respondents had previously experienced a scabies infection, with the majority of them being male.

Another factor influencing knowledge is the source of information.²⁶ Table 1 shows a total of 447 respondents studied; 225 (50.3%) claimed to have been informed about scabies before.

This aligns with the level of knowledge of some boarding students falling into the "good" category in the pre-test (Figure 1).

Respondents' knowledge

Differences in students' knowledge before and after being given health education about scabies with *Wayang* video media can be observed in the table below.

Based on Table 2, the average knowledge of boarding students before receiving health education about scabies with *Wayang* video media is 76.75, with a Standard Deviation (SD) of 13.28. The standard deviation informs about how far the data varies from its average value. The smaller the standard deviation value compared to the average value, the better the average value represents the data as a whole. The respondent's median pretest value is 77.27, with a minimum value of 31.82 and a maximum value of 100.

After receiving health education about scabies with *Wayang* video media, the average value increased to 83.09, with a standard deviation of 11.19. The median post-test value is 86.36, with a minimum value of 9.09 and a maximum of 100.

Analysis of differences in average pre-test and post-test knowledge

The average difference analysis in this study used the Wilcoxon non-parametric test. The test aims to determine if there is a significant difference between the average value of pre-test knowledge and the post-test of the respondents. A significant difference is observed when the p-value obtained is <0.05 , indicating a relationship between variables.

The results of the analysis of different average values of pre-test and post-test knowledge can be seen in the following table.

Based on Table 3, it is known that the average knowledge value in the pre-test is 76.75, and in the post-test is 83.09. From the data, there is an increase in the average value in the post-test

compared to the average pre-test value of 6.34. The table also presents Wilcoxon test results with a significance value of 0.001 ($p < 0.05$), indicating a meaningful difference between the average pre-test and post-test values. From the data, it can be concluded that the education of *Wayang* video about scabies has an effect on increasing the knowledge of respondents' students about scabies.

Discussion

In this study, the majority of respondents were in the 13-18 years age range, corresponding to school age. Other research has also indicated that scabies are most prevalent among school-aged individuals.²⁷ This is supported by the book "Evidence-Based Dermatology," which suggests that the highest number of scabies cases occurs among adolescents and schoolchildren.²⁸ Research conducted in a hospital further explains that scabies are most common among individuals aged 11-20 years.²⁹ In the study by Yulfi *et al.*, it was also reported that the age range of the participants was 10-18 years, with the most common range being 10-14 years.³⁰ Consequently, the study has focused on this age range for health education regarding scabies. Additionally, it's worth noting that the ability to comprehend a person's perspective on a subject tends to improve with age, leading to better knowledge acquisition. This implies that age is one of the factors influencing an individual's knowledge.

The study also investigated the sources of information about scabies among the respondents. It was discovered that 50.3% of the students reported having received information about scabies before the intervention, while 49.7% had not received prior information. This distribution implies that there was some baseline knowledge about scabies among the students, although it varied. Interestingly, students who had prior information were more likely to possess a good level of knowledge about scabies in the pre-test, supporting the idea that prior exposure to information can influence baseline knowledge.^{17,31} Regardless of past experience, the *Wayang*

video instruction functioned as a standardized source of information for all participants. This uniformity in educational content most likely contributed to the post-test's significant gain in knowledge levels. The findings highlight the need for providing accurate and freely accessible health information so that anyone, regardless of past knowledge, can improve their awareness of health-related topics.¹⁷

The findings of this study demonstrate a significant improvement in scabies knowledge among boarding school students in Indonesia following the implementation of health education through *Wayang* video media. Prior to the intervention, the average knowledge score of the students was 76.75, indicating a fair level of knowledge about scabies. After receiving *Wayang* video education, the average knowledge score increased to 83.09. The substantial increase in knowledge levels post-intervention aligns with previous research highlighting the effectiveness of audiovisual educational tools. Videos, as a medium, engage both visual and auditory senses, making the educational content more accessible and memorable.^{22,32} Increased knowledge is gained from the sensing of a particular object in the form of facts, information, descriptions, or skills. Each sense used has a different influence on a person's learning outcomes; a good way to learn something is to utilize more than one sense. The absorption of a person's learning, according to the use of his senses, is 1% through taste, 2% by touch, 3% through the senses of tying, 11% through hearing, and 83% by sight.^{21,22,33}

This study uses audiovisual media (video) to introduce educational material, in which respondent students will utilize their sense of vision and hearing to obtain the material. Using images in educational media can increase one's focus, interest, and passion while learning. Material received through audiovisual media can last longer and be better retained in memory. The results of this study are consistent with Siddiq's (2021) findings, indicating that audiovisual media effectively increases motivation to quit smoking among Santri students in Indonesia.³⁴ Additionally, Fitriani *et al.*'s research (2017) demonstrated a significant positive impact of

nutritional anemia counseling through audiovisual motion video media on increasing the knowledge of young women.³⁴ Similarly, Meidiana *et al.* (2018) found that education using audiovisual media positively influenced the knowledge of overweight teens.³⁵ Furthermore, Purwadi *et al.*'s study (2019), which utilized a different educational medium, namely game media, also showed significant differences in elementary school students' knowledge, with an average score increase after education on the prevention of Acute Respiratory Tract Infection (ISPA) disease.³⁶

The study shows that using culturally relevant *Wayang* videos improves scabies' knowledge, leading to better hygiene, symptom recognition, and timely treatment in boarding schools, where close living quarters heighten transmission risks. The educational video used in this research employs *Wayang* art to build the story, drawing inspiration from the tale of Malin Kundang from West Sumatra. The aim is to utilize the element of national cultural wealth in innovating activities to produce an educational video work and convey the message of a norm of life: listening to the advice of the mother. In addition to the message of educational materials itself, this adds a special value to the video. Both innovations are also intended to make the video more interesting to watch. The results of this research align with several studies that examine the benefits of *Wayang* art for counseling and education media. A study by Utami *et al.* (2020) stated the influence of nutrition counseling using *Wayang* media on balanced nutrition knowledge in elementary school children.^{37,38} Research by Desi *et al.* (2018) reported an increase in vegetable and fruit consumption in kindergarten children after receiving nutrition education with *Wayang* games.^{35,38,39}

The findings of this study have several implications for scabies prevention and health education in Indonesian boarding schools and similar settings. Firstly, the effectiveness of *Wayang* video teaching suggests that incorporating culturally relevant media can enhance health education efforts.^{24,34,35,40,41} Cultural resonance can capture students' interest and engagement, making

the learning experience more enjoyable and memorable.^{16,26,27,32} Secondly, the study underscores the importance of standardized health education in contexts where the risk of disease transmission is elevated due to close living quarters. Boarding schools provide a unique environment where students live and learn in close proximity, making disease prevention strategies crucial.^{37,38}

Health education via *Wayang* videos can enable students to protect their health, suggesting further research on its long-term effects on scabies control and hygiene, with potential application to other health issues and cultural settings. Although the results showed meaning and are in line with some other studies, this study still has some limitations. The first limitation is that the situation of online data retrieval leads to maximum supervision of respondents when filling out questionnaires and watching videos. Researchers could only monitor respondents from the screen of a Zoom app that only showed parts of the face and part of the respondent's body.

The second limitation is the number of respondents who did not fill in the questionnaire's general data about their experience with scabies disease. This resulted in some available data information on the questionnaire that could not be used as material for univariate analysis. The information used for univariate analysis in this study includes age data and statements providing information about previous scabies experiences. Based on the study, the author intends to provide advice that may be useful for certain parties. The researchers advise the schools the respondents are from to use the educational video *Wayang* "Malin and the Mite" as a medium for health education about scabies disease for all students in the dormitory.

Researchers are recommended to evaluate knowledge and attitudes 6 months after using "Malin and the Mite," ensuring a conducive environment for data collection and a team to secure complete, rule-abiding questionnaire responses.

Conclusions

The study finds that Wayang video-based health education significantly improves Indonesian boarding school students' knowledge of scabies. This highlights the effectiveness of culturally appropriate teaching tools and the importance of health education in high-risk environments. The audiovisual method aids understanding and can enhance scabies prevention and hygiene practices, contributing to wider public health goals.

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Table 1. Demographic characteristics of respondents.

	%	n
Sex		
Female	55	248
Male	45	199
Age		
13	11	48
14	3	15
15	21	95
16	32	144
17	23	101
18	10	44
Academic Year (Grade)		
IX	15	63
X	32	246
XI	29	129
XII	24	109
Information		
Have received information	50,3	225
Have not received information	49,7	222
Have had scabies infection		
Have had	67	298
Have not had	33	149

Table 2. Overview of average knowledge scores for pre-test and post-test of respondents.

	N	Mean	Standard. Deviation	Median	Minimum	Maximum
Pre-test	447	76.75	13.28	77.27	31.82	100
Post-test	447	83.09	11.19	86.36	9.09	100

Table 3. Mean difference analysis of pre-test and post-test knowledge scores.

	Number of data values	Mean value	p-value
Pre-test scores	447	76,75	0,001
Post-test scores	447	83,09	

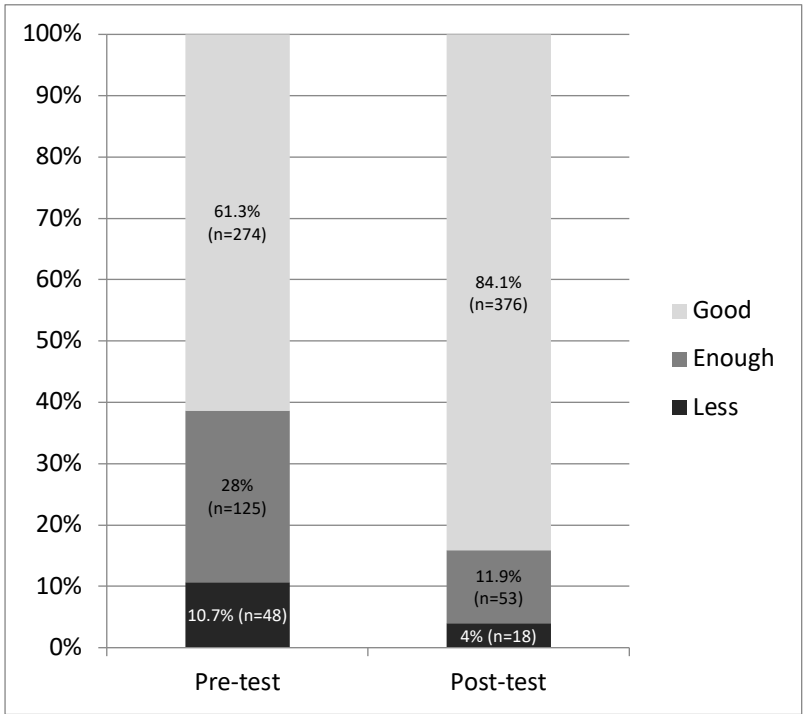


Figure 1. Overview of respondent knowledge levels during pre-test and post-test.

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