

ORIGINAL ARTICLE

The Role of Personal Hygiene in Preventing Scabies in Islamic Boarding Schools

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ABSTRACT

Introduction: The prevalence of scabies is still high in Indonesia, especially in Islamic boarding schools. Scabies can spread quickly in crowded conditions where people have skin contact with each other. This study aims to evaluate the specific personal hygiene factors that contribute to preventing scabies. **Materials and methods:** We included all 541 students in a cross-sectional descriptive-analytical study whose ages ranged from 11 to 19 years. Scabies were diagnosed based on an interview and physical examination using the Deskab form. Data on risk factors were collected using a set of questionnaires and observation. Data were analyzed using bivariate and multivariate analysis with the Chi-square test ($p < 0,25$) for a candidate for logistic regression. Risk factors associated with scabies are indicated by $p < 0,05$. **Results:** We found a high prevalence of scabies in Islamic boarding schools, i.e., 187 students (34.6%). Risk factors for scabies in Islamic boarding schools are duration of stay at Islamic boarding schools ($p = 0.000$, OR = 0,495), bathing habits ($p = 0.003$, OR = 3,016), using shared towels ($p = 0.042$, OR = 1,603), improper soap usage ($p = 0.024$, OR = 2,157), and knowledge ($p = 0.002$, OR = 0,371). **Conclusion:** Poor bathing habits, improper soap usage, and the habit of sharing towels significantly increase the risk of developing scabies. The duration of stay at the boarding school plays a role in reducing the likelihood of contracting scabies, where the longer the stay, the lower the risk of scabies. Good knowledge of personal hygiene also serves as a protective factor, significantly reducing the risk of scabies.

Malaysian Journal of Medicine and Health Sciences (2025) 21(SUPP7): 58-64. doi:10.47836/mjmhs.21.s7.8

Keywords: Personal hygiene, Prevention, Scabies, Islamic boarding school

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INTRODUCTION

The incidence and prevalence of scabies are still high in Indonesia, especially in Islamic boarding schools. Scabies are often found in orphanages and Islamic boarding schools. Scabies can spread quickly in crowded conditions where people have skin contact with each other (1). The incidence of scabies remains high in developing countries, including Indonesia. Several studies have found a significant prevalence of scabies in Indonesian boarding schools. Research by

Sembodo et al. (2) in boarding schools in Kendal and Demak revealed a scabies prevalence rate of 53.30%. Similarly, a study conducted in a boarding school in Surabaya found a scabies prevalence of 46.5% (3). Ma'rufi et al. (4) in 2012, found that scabies prevalence in Islamic boarding schools in Lamongan Regency was reported to be 64,2%.

Islamic boarding schools are a common institution for Islamic religious education in Indonesia (5). The large population of students, who come from various regions with different customs, will likely influence hygiene and health behaviors among them. The results of sanitation inspections in Islamic boarding schools in 2006 - 2013 showed that 50% were classified into the "medium" category, meaning 40% -95% of risk factors cause

health problems. Diseases commonly found in Islamic boarding schools include skin diseases, diarrhea, dengue fever, malaria, ISPA, and tuberculosis. The risk factors in Islamic boarding schools are sanitation, room and building issues, as well as community behavior in Islamic boarding schools (6).

One of the common skin conditions found in Islamic boarding schools is scabies, which is caused by scabies mite (*Sarcoptes scabiei*). The itching and skin rash result from an allergic reaction to the mites' tunnels, feces, and saliva. Scabies are transmitted through direct skin contact (approximately five minutes) with an infected person. Mites can also spread via clothing, towels, and bedding, as they can survive for two to three days outside the human body (7).

In addition to personal hygiene, environmental sanitation in Islamic boarding schools also plays a role in the spread of diseases. The boarding school's environmental factors include housing density, ventilation, water availability, air temperature, and others. A study conducted at the Sunan Drajat Paciran Islamic Boarding School found a significant correlation (r -value = 0,792) between environmental sanitation and the incidence of scabies (8). Another study indicates that the environmental sanitation factor with the greatest impact on the incidence of scabies at the Qomaruddin Bungah Gresik Islamic boarding school is the shared water storage facility, such as a large tub or basin, which is used by more than one bathroom (9). The provision of clean water is crucial for maintaining public health. In addition to being linked to the spread of infectious diseases like scabies, the availability of clean water also has a significant impact on other health issues, such as stunting. Access to clean water is essential for preventing malnutrition and promoting overall well-being in communities (10).

A study conducted at an Islamic boarding school in Kendari City found that 27 out of 71 respondents (38%) exhibited symptoms of scabies. The presence of scabies symptoms was linked to three factors: knowledge, personal hygiene, and residential density (11). Other research in Padang also stated that the incidence of scabies was related to students' personal hygiene factors. The prevalence of scabies found in this study was highest at the age of 13 years and predominantly affects male students (12). Other studies also mention that risk factors for scabies include age and gender (13). These factors can contribute to the likelihood of contracting scabies, with certain age groups and genders being more susceptible due to various environmental, behavioral, or physiological reasons.

The impact of scabies is considerable, one of which is the deterioration in the quality of sleep among students, which in turn affects their academic performance. The study by Azzahra et al. (14) indicates a significant

relationship between scabies and the poor sleep quality of students at a boarding school in Cianjur, Indonesia ($p=0.000$ with a 95% CI). Similarly, the research by Widasmara et al. (15) demonstrates a connection between scabies and a decline in academic performance ($p=0.000$).

Based on the background, the researcher aims to investigate the Role of Personal Hygiene in Preventing Scabies in Islamic Boarding Schools. The research hypothesis is that personal hygiene and knowledge impact scabies in Islamic boarding schools. The results of this research could provide valuable insights for developing effective scabies prevention strategies in Islamic boarding schools.

MATERIALS AND METHODS

This cross-sectional descriptive-analytical study aimed to examine the prevalence and personal hygiene associated with scabies infestation in a boarding school in Lamongan, Indonesia. The study involved 541 students, consisting of 233 males and 308 females, aged between 11 and 19 years, from ten (10) boarding schools. The sample size was determined using the Lameshow formula (16), which calculated a minimum of 354 respondents. The researcher set the sample size to be twice the minimum sample size and obtained a response rate of 76.5%. Stratified random sampling was employed as the sampling method. Scabies diagnosis using the Deskab form (17). Personal hygiene includes students' bathing habits, habits of wearing clothes together, using towels together, using soap when bathing, and knowledge related to scabies and personal hygiene. The knowledge of the santri was measured through a questionnaire with 12 questions about scabies in general, the symptoms/signs of scabies, and the factors that influence scabies. Each question has a value of 8.3. The final knowledge score is categorized as "Good" if the total score is ≥ 75 and "Bad" if the total score is < 75 . The content validity of the questionnaire was evaluated by experts in the field of public health and hygiene to ensure that the items accurately reflect the key aspects of personal hygiene and the student's knowledge in this area. The questionnaire was then pilot tested on a small group of students to assess its reliability. The data were analyzed using the SPSS statistical software for Windows version 25.0 (IBM Corp., Armonk, NY). Bivariate analysis between each independent variable and the dependent variable was conducted using the Chi-square test. Independent variables with a P -value less than 0.25 were included in the multivariable analysis and subjected to binary logistic regression using the backward elimination method to assess the strength of the association. The variables remaining in the final model were identified as predictor variables, and the strength of the association (odds ratio or OR) and the 95% confidence interval (CI) were reported in the results. In the multiple logistic regression test, it has been

ensured that there is no multicollinearity between the independent variables, as evidenced by a VIF value < 10 or a Tolerance value > 0.01. This research has received ethical approval from the Faculty of Public Health Ethics Commission, Universitas Airlangga, number 187/EA/KEPK/2024.

RESULTS

This research involved 541 students consisting of 233 male students and 308 female students. Table I presents the demographic characteristics of the studied population, divided into several main categories. According to the data, the research sample consists of two age groups: 47.5% are aged 11-14 years, while 52.5% are aged 15-19 years. In terms of gender, the majority of participants are female (56.9%), while 43.1% are male. The table also shows the distribution of participants by grade level, with 51.4% from grades 7-9 and 48.6% from grades 10-12. Regarding scabies status, 34.6% of participants are suspected of scabies, with a 95% confidence interval between 30.56% and 38.57%. Additionally, knowledge of personal hygiene among participants was also analyzed, with 90% having good knowledge of personal hygiene, while the remaining 10% have poor knowledge.

Table I: Characteristics of study population (n=541)

Characteristics	n (%)
Age	
11-14	257 (47,5%)
15-19	284 (52,5%)
Gender	
Male	233 (43,1%)
Female	308 (56,9%)
Class Level	
7-9	278 (51,4%)
10-12	263 (48,6%)
Scabies	
Suspected	187 (34,6%)
Non scabies	354 (65,4%)
Knowledge of personal hygiene	
Bad	54 (10%)
Good	487 (90%)

The examination of students for suspected scabies using the Deskab form revealed that 187 students (34.6%) were suspected of scabies. The results of observations related to scabies are shown in Figures 1 and Figure 2.

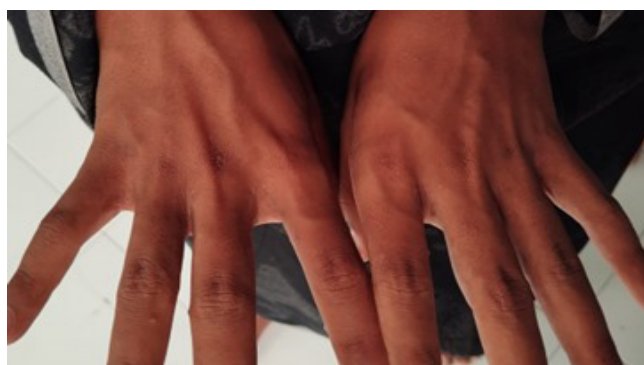


Figure 1 : Scabies between the fingers



Figure 2: Scabies on the stomach

Table II shows the results of bivariate statistical tests, which produce candidate variables that can be tested for multiple logistic regression (<0.25). The table shows the variables Age, Gender, Class Level, Duration of living at Islamic Boarding School, bathing habits, the habit of wearing clothes together, the habit of using towels together, the habit of using bath soap, and Knowledge of personal hygiene are candidates in the test multiple logistic regression.

Table II: Bivariate analysis of risk factors in the study population (n=541)

Variables	Scabies		P
	Yes, n (%)	No, n (%)	
Age			
11-14	106 (41,2%)	151 (58,8%)	0,054
15-19	81 (28,5%)	203 (71,5%)	
Gender			
Male	87 (37,3%)	146 (62,7%)	0,238
Female	100 (32,5%)	208 (67,5%)	
Class Level			
7-9	120 (43,2%)	150 (56,8%)	0,000
10-12	67 (25,5%)	196 (74,5%)	
Duration of living at Islamic Boarding School			
< 6 months	64 (57,1%)	48 (42,9%)	0,000
≥ 6 months - < 1 years	65 (39,6%)	99 (60,4%)	
≥ 1 years - < 2 years	39 (31,5%)	85 (68,5%)	
≥ 2 years - < 3 years	9 (9,6%)	85 (90,4%)	
≥ 3 years	10 (21,3%)	37 (78,7%)	
Bathing habits			
Poor	24 (58,5%)	17 (41,5%)	0,001
Good	163 (32,6%)	337 (67,4%)	
Habit of wearing clothes together			
Poor	72 (40,7%)	105 (59,3%)	0,037
Good	115 (31,6%)	249 (68,4%)	
Habit of changing clothes every day			
Poor	27 (37,5%)	45 (62,5%)	0,574
Good	160 (34,1%)	309 (65,9%)	
Habit of drying bedding			
Poor	54 (37,0%)	92 (63,0%)	0,472
Good	133 (33,7%)	262 (66,3%)	
Habit of cutting nails			
Poor	14 (32,6%)	29 (67,4%)	0,773
Good	173 (34,7%)	325 (65,3%)	

CONTINUE

Table II: Bivariate analysis of risk factors in the study population (n=541) (CONT.)

Variables	Scabies		P
	Yes, n (%)	No, n (%)	
Scratching habit			
Poor	142 (34,7%)	267 (65,3%)	0,895
Good	45 (34,1%)	87 (65,9%)	
The habit of using towels together			
Poor	59 (47,6%)	65 (52,4%)	0,001
Good	128 (30,7%)	289 (60,3%)	
Habit of using bath soap			
Poor	24 (54,5%)	20 (45,5%)	0,004
Good	163 (32,8%)	334 (67,2%)	
Habit of washing hands			
Poor	27 (34,2%)	52 (65,8%)	0,937
Good	160 (34,6%)	302 (65,4%)	
Knowledge of personal hygiene			
Bad	30 (55,6%)	24 (44,4%)	0,001
Good	157 (32,2%)	330 (67,8%)	

Based on the results of the logistic regression analysis in Table III, poor bathing habits, improper soap usage, and the habit of sharing towels were found to have a significant impact on the increased risk of scabies, with odds ratios of 3.016, 2.157, and 1.603, respectively. This means these bad habits significantly increase the likelihood of contracting scabies. The duration of stay at the boarding school also had an effect, but in the opposite direction; the longer someone stays, the lower their chance of getting scabies, with an odds ratio of 0.495. Additionally, good knowledge about personal hygiene is a protective factor, reducing the risk of scabies (odds ratio 0.371). On the other hand, variables such as gender, age, and grade level did not significantly affect the prevalence of scabies in this study.

Table III: Multivariate analysis of risk factors in the study population (n=541)

Variables	P	Exp(B)	95% CI
Age	0,694	1,062	0,787 – 1,432
Gender	0,332	1,241	0,821 – 1,795
Class Level	0,069	1,137	0,990 – 1,305
Duration of living at Islamic Boarding School	0,000	0,495	0,399 – 0,614
bathing habits	0,003	3,016	1,455 – 6,250
habit of wearing clothes together	0,078	0,692	0,459 – 1,042
the habit of using towels together	0,042	1,603	1,018 – 2,525
habit of using bath soap	0,024	2,157	1,105 – 4,211
Knowledge of personal hygiene	0,002	0,371	0,201 – 0,686

DISCUSSION

Scabies is classified as a neglected tropical disease, which is addressed in the WHO's 2021-2030 roadmap. This classification is supported by the Neglected Tropical Diseases (NTDs) criteria, which indicates that scabies can lead to significant morbidity and mortality, particularly among impoverished populations. Furthermore, it adversely impacts the lives of individuals residing in tropical and sub-tropical regions. There

is an urgent need to control, eliminate, or eradicate this disease, which has been relatively overlooked in research efforts. Additionally, one of the contributing factors to the prevalence of scabies is inadequate personal hygiene among students. (18). A contributing risk factor for scabies is inadequate personal hygiene (19,20). This research examines the personal hygiene practices of students, which can serve as a foundation for preventing scabies within Islamic boarding schools.

This research was conducted in 10 Islamic boarding schools located in Paciran District, Lamongan Regency, East Java, Indonesia. This research shows that in Islamic boarding schools, there is still a high prevalence of scabies; it was found that 34.6% of students were suspected of having scabies. The incidence of scabies observed in this study was notably elevated. Similar findings have been reported in various countries, indicating a concerning prevalence of scabies in boarding schools. For instance, research conducted in a Madrasah in Bangladesh revealed a prevalence rate of 34% among residential children, with 73.5% of cases classified as mild, 24.9% as moderate, and 1.6% as severe (21). Additionally, a study in a boarding school in Cameroon reported a prevalence rate of 17.8%, with 338 out of 1,902 students affected (22). Furthermore, a study at As'ad Islamic Boarding School in Jambi, Indonesia, identified an alarming scabies rate of 60.7% (23). Other research in Medan, Indonesia, found a prevalence of 36.8% (24). In comparison, 47% of students at an Islamic boarding school in Bogor, Indonesia, were diagnosed with scabies (25). These findings underscore the persistent high prevalence of scabies, particularly in developing countries, highlighting the need for targeted interventions and increased awareness.

This study shows that the personal hygiene factors influencing scabies are bathing habits (p=0.003, OR = 3.016, 95% CI 1.455 – 6.250), the habit of sharing towels (p=0.042, OR = 1.603, 95% CI 1.018 – 2.525), and improper use of soap (p=0.024, OR = 2.157, 95% CI 1.105 – 4.211). Students with poor bathing habits have a threefold increased risk of scabies compared to those with good bathing habits. Good bathing habits are defined as bathing at least twice a day. This indicates that irregular or incomplete bathing can elevate the risk of scabies infection due to insufficient body hygiene, which creates an opportunity for the scabies mites to thrive. Bathing is an essential hygienic practice to maintain a healthy body. Using soap while bathing helps preserve body cleanliness and skin health. The skin acts as the body's first line of defense against dirt, bacteria, and diseases, including scabies mites (26). The findings of this study indicate a significant correlation between the improper use of soap and the prevalence of scabies among students. It has been observed that many students either neglect to use soap during bathing or fail to apply it adequately across their bodies. Those who do not utilise soap correctly are at a 2.157 times greater risk

of scabies than their peers who use soap appropriately. Research conducted at a boarding school in Cameroon further supports this, revealing that the use of bath soap serves as a protective factor against the transmission of scabies, with a statistical significance indicated by a p-value of 0.0001 (22).

Students who share towels with friends have a 1.603 times greater risk of being infected with scabies. Many studies show that sharing personal stuff increases the transmission of scabies (27,28). Widuri et al. (29) found that sharing towels increased 3.4 times the risk of scabies. Research in Cameroonian boarding schools shows a significant relationship between the use of clothes/toilet items together ($p < 0.0001$) (22). The tendency of students to share personal items such as clothing, towels, and other belongings with their peers reflects the values promoted within Islamic boarding schools. This behaviour embodies the principle of simplicity, which many students embrace as part of their commitment to Sufi attitudes (30). However, this is not in line with health principles. The alternating use of towels without exposure to sunlight can increase the activity of *Sarcoptes scabiei* mites on the towels. This allows mites from the towels of students infected with scabies to transfer to healthy students. Towels are one of the items that can transmit scabies through indirect contact (31). Therefore, additional health measures are recommended in several scabies prevention guidelines, including the 2016 German Guidelines for the Diagnosis and Treatment of Scabies. These include the possible treatment of healthy individuals who have had contact with infected persons, clothing, linen, or other potentially contaminated items (32).

This study suggests that, besides students' personal hygiene, other factors contribute to the incidence of scabies in boarding schools, such as the duration of stay at the Islamic boarding school and the level of knowledge. The research revealed that the duration of stay at the boarding school has an inverse relationship with the likelihood of contracting scabies: the longer a student stays, the less likely they are to develop the condition. The study by Widuri et al. (29) shows that students who have been at the boarding school for one year are 1.4 times more likely to contract scabies than those who have been there for two years. Most students suffering from scabies are newcomers who have not been at the boarding school for long. These new students often struggle to adapt to the boarding school environment and the habits of other students. Additionally, good knowledge about personal hygiene is a protective factor, reducing the risk of scabies (odds ratio 0.371). The research by Fauziah and Suparmi (23) found a significant relationship between scabies symptoms in students and their knowledge ($P = 0.000$). Knowledge about scabies and personal hygiene is crucial in preventing transmission, implementing effective prevention measures, and taking prompt action

if infected. Improving this knowledge can help reduce the spread of scabies within the community.

CONCLUSION

Personal hygiene habits have a significant impact on the occurrence of scabies. Poor bathing habits, improper soap usage, and the habit of sharing towels significantly increase the risk of developing scabies. In addition, the duration of stay at the boarding school plays a role in reducing the likelihood of contracting scabies, where the longer the stay, the lower the risk of scabies. Good knowledge of personal hygiene also serves as a protective factor, significantly reducing the risk of scabies. On the other hand, factors such as gender, age, and grade level did not significantly affect the prevalence of scabies in this study. Therefore, efforts to prevent scabies should focus on improving personal hygiene habits and better management of the environment, especially concerning bathing habits, soap use, and the shared use of facilities such as towels.

The limitations of this study are notable, particularly the reliance on a Deskab form for assessing scabies symptoms, which did not incorporate clinical examinations. Furthermore, there is a gap in research concerning the impact of scabies on students. It is advisable for future researchers to undertake clinical evaluations of scabies in collaboration with a dermatologist and to explore the effects of scabies on the student population.

ACKNOWLEDGEMENT

The researcher wishes to thank the Faculty of Public Health at Universitas Airlangga for their financial support of this study (Research Contract for the 2024 Universitas Airlangga, Penelitian Dasar Unggulan (PDU) Scheme Number: 2012/UN3.FKM/PT.01.03/2024). Special thanks are also extended to all the boarding schools in Lamongan for granting permission for this research and to all the management of the boarding schools and the research respondents.

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