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Scabies Risk Factor Analysis in Students at Islamic Boarding School

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ABSTRACT

Background: Scabies is a highly contagious skin disease that often occurs in densely populated settings, especially among children, including those in boarding schools. **Purpose:** We aimed to investigate the risk factors for scabies infestation in boarding schools. **Methods**: This crosssectional analytic research was conducted at the Imam Syuhodo Modern Islamic Boarding School. This study consisted of four main steps: survey questionnaires, a pre-test, one-on-one doctor examination, and a brief discussion. The collected data was analyzed using the ChiSquare test and bivariate analysis. Additional multivariate analysis was performed to determine the most influential risk factors. **Result:** The total sample for the study was 490 students (242 males and 248 females). The overall prevalence of scabies in the boarding school was 16.12%. Bivariate analysis showed a significant relationship between male sex, age (<14 years), history of itchiness, and sharing belongings. In the multivariate analysis, sex (OR 5.56, 95% CI 2.5911.93) and age (OR 2.09, 95% CI 1.23-3.56) turned out to be the most significant factor for scabies. Dermatology specific quality of life index assessment showed more severe negative effects on students with scabies ($p<0.001$). **Discussion:** Scabies prevalence was more common in younger males patients. The prevalence of male students was very disproportionate, which needs further attention when designing an intervention model. Students in boarding schools dealing with scabies have worse impacts on their daily lives, which could impede their academic progress.

Keywords*:* Scabies, Boarding school, Risk factors, students.

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BACKGROUND

Scabies is a skin infestation caused by *Sarcoptes scabiei var. hominis*, a parasitic mite. It affects 150-200 million people globally, with Indonesia being the most affected country. The World Health Organization recognizes scabies as a neglected tropical disease, promoting awareness, education, and research on diagnosis, treatment, and prevention. Indonesia is among the countries with the highest scabies burden.[1,2] The prevalence of scabies is high, especially in densely populated areas with poor hygiene. Subpopulations with increased skin-to-skin contact, such as immunocompromised individuals, the elderly, care facility residents, children, and those with low socioeconomic status, are at higher risk. Scabies prevalence mostly influenced by race, age, sex, and also by factors like poor hygiene, poverty, and crowded community conditions.[3-4] While scabies can affect individuals of all ages, certain demographic factors, such as age and sex, may contribute to the risk of infection due to the habit of individual in certain age and sex.[5]

Current treatments for scabies may not be effective due to the mite burden and population concentration. People in densely populated communities are at higher risk. In Indonesia, Islamic boarding schools provide intensive education, but the government's post-boarding school programs struggle with scabies infestation. These programs oversee the environment and student health on behalf of the Ministry of Religious Affairs.[6,7]

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Community health programs for scabies control have been tested in limited locations but not on a large scale. Emerging evidence suggests mass drug administration, including ivermectin, can significantly reduce scabies prevalence.[8–10] This research is crucial for understanding scabies risk factors and developing an elimination design. Understanding these results will facilitate cost-effectiveness evaluations of various regulations.

METHODS

We conducted cross-sectional analytic research at the Imam Syuhodo Modern Islamic Boarding School in Sukoharjo in 2023. We deployed purposive sampling and included all students who agreed to participate. The students who refused consent were the criteria for exclusion. This study consisted of four main steps: survey questionnaires, a pre-test, a one-onone doctor examination, and a brief discussion. All participants underwent all the processes.

Table 1 denotes the structured questionnaires cover demographic characteristics, health educators, parental education and occupation levels, family size, bathroom availability, water supply, and the dermatology-specific quality of life index (DLQI). A pre-test was given to gauge students' knowledge and understanding of scabies infestation, which will be later elaborated upon during the discussion (Table 1). Several points that were asked include the nature of scabies, scabies transmission, and the implication of personal hygiene. We used a clinical diagnosis for scabies. The diagnosis is established if they fulfill at least two of four criteria: nocturnal pruritus, communal occurrence, a finding of canaliculi, and the presence of scabies mite or egg. For the students who met the first three requirements, doctors conducted physical examinations, took their histories, and scraped their skin.

Statistical analysis was performed with SPSS version 22.0. We analyzed the relationships between sex, room occupancy, and personal hygiene related to scabies using Chi-Square tests and logistic regression to identify the most influential risk factors. This research has been reviewed by the Ethics Committee in the Health Research Ethics Committee at Dr. Moewardi General Hospital (Num. 2.212.B/V/HREC/2023).

Table 1. Pre-test questions

No.	Question
1	Scabies is a disease caused by the germs
2	In Indonesia, scabies is often referred to as "kudis" and people in Java often call it "gudik"
3	Scabies can only be transmitted by female *Sarcoptes scabiei* mites
4	Scabies can only be transmitted through the alternating use of prayer tools
5	Shaking hands can transmit scabies
6	Scabies spread easily in family environments, dense neighborhoods, and dormitories
7	Scabies can be transmitted by using towels interchangeably
8	People who maintain their personal hygiene can get scabies
9	Scabies can be cured by regularly showering with soap
10	Rooms lacking sunlight can facilitate the spread of scabies
11	The *Sarcoptes scabiei* mite, which causes scabies, cannot live in humid places
12	Rooms with no or poor ventilation can facilitate the proliferation of *Sarcoptes scabiei* mites
13	Scabies has no relation to environmental hygiene
14	The breeding ground for Sarcoptes scabiei mites is only in dirty water
15	Clothes or towels that are not dried in the sun can be breeding grounds for *Sarcoptes scabiei* mites
16	Scattered litter can transmit scabies
17	*Sarcoptes scabiei* mites can survive on the floor of a room or house
18	Water is the main source of scabies transmission
19	Poor environmental conditions can cause Scabies
20	Treatment of scabies can be done with the application of anti-itch powder alone

RESULT

A particular class served as our sample, consisting of 490 students ranging from seventh to eleventh grade. They were all adolescents aged 11 to 18, with an average age of 14.59 and a median of 14 years old. The sex distribution was almost even in both categories, but age was predominated by younger students (<14 years old), as shown in Table 2.

Table 2. Patient characteristics and bivariate analysis of scabies risk factors

Variable		Total (n=490)	Scabies (n=79)	Normal (n=411)	ORs (95% CI)	*p*-value
		n (%)				
Sex	Male	242 (49.4)	69 (87.3)	173 (42.1)	9.49 (4.75-18.95)	<0.001*
	Female	248 (50.6)	10 (12.7)	238 (57.9)		
Age	<14 years	174 (35.5)	42 (53.2)	132 (32.1)	2.40 (1.47-3.91)	<0.001*
	≥14 years	316 (64.5)	37 (46.8)	279 (67.9)		
History of itchiness	Present	270 (55.1)	68 (86.1)	202 (49.1)	6.40 (3.29-12.45)	<0.001*
	N/A	220 (44.9)	11 (13.9)	209 (50.9)		
Knowledge	Inadequate	135 (27.6)	23 (29.1)	112 (27.3)		0.734
	Adequate	355 (72.4)	56 (70.9)	299 (72.7)		
Sharing belongings	Yes	85 (17.3)	23 (29.1)	62 (15.1)	2.31 (1.33-4.03)	0.003*
	No	405 (82.7)	56 (70.9)	349 (84.9)		
Sharing towel						
	Yes	65 (13.3)	10 (12.7)	55 (13.4)		0.862
	No	425 (86.7)	69 (87.3)	356 (86.6)		
Sleeping in cramped						
	Yes	47 (9.6)	10 (12.7)	37 (9.0)		0.312
bed	No	443 (90.4)	69 (87.3)	374 (91.0)		

Note: Chi-square test; *significant if $p<0.05$

A history of itchiness was present in 54% of the students, but this was not specific to scabies. The students generally have good knowledge of scabies, in which they scored a minimum of 12 points out of 20 points. The trend of sharing clothes and prayer tools was minimal, along with sharing beds.

Table 3 shows bivariate analysis of the variables for scabies. Age, sex, a history of itchiness, and the act of sharing belongings have significant relationships with scabies.

Knowledge, sharing towels, and sleeping in cramped beds did not significantly correlate with scabies, according to the analysis. There is a considerable risk difference between male and female students, with males having 9.49 times (95% CI 4.75-18.95) greater risk of having scabies. It was the strongest compared to other variables.

Younger students possessed a 2.40 (95%CI 1.47-3.91) times increased risk of scabies compared to the older ones. History of itchiness (6.40, 95%CI 3.29-12.45) also placed the students at higher risk. Students who shared personal belongings had more than twice the risk of scabies (95% CI 1.33-4.03).

Table 3. Multivariate analysis of risk factors

Variable	ORs (95% CI)	*p*-value
Age	2.09 (1.23, 3.56)	0.006*
Sex	5.56 (2.59, 11.93)	0.000*
History of itchiness	1.61(0.67, 3.87)	0.284
Sharing belongings	0.99 (0.54, 1.84)	0.985

Note: Logistic regression; *significant if $p<0.05$

Multivariate analysis showed that age and sex were the dominant risk factors among other variables (Table 3). Male sex was the most influential factor that contributed to the increased risk of scabies by 5.56 times (95% CI 2.59-11.93), followed by the presence of skin complaints and older age

Table 4. Quality of life in scabies patients

DLQI	Scabies (n=79)		Normal (n=411)		*p*-value	OR
	n	%	n	%		
Mild	37	46.8	279	67.9	<0.001*	5.26 (2.94, 9.41)
Severe	42	53.2	132	32.1		

Note: Chi-square test; *significant if $p<0.05$

Table 4 shows the overall DLQI score comparison between participants with and without scabies. Based on the original interpretation of DLQI, there are five classification results: no impact (0-1), small impact (2-5), moderate impact (6-10), very large impact (11-20), and extreme large impact (21-30). We simplified the rating into mild and severe using the cut-off of five. There was a higher percentage of students with scabies who experienced severe effects (53.2%) on their quality of life (QoL) than the healthy subjects (32.1%). The odd risk of poor QoL was 5.26 times (95% CI 2.94-9.41).

DISCUSSION

Scabies infestation has been a long-standing issue in boarding schools in Indonesia. Scabies transmission occurs through prolonged skin contact with infected individuals or items. This process is usually facilitated by close contact between people in the same household.[11] Scabies infection can affect people of any age, sex, or social status, although it may affect certain groups disproportionately.

In this study, we found a total of 79 students (16.12%) infested with scabies. Male students were more prevalent compared to females (6.9:1), despite having a similar proportion in the sample. Sex differences have been recognized as an important risk factor in dermatological disease. This could be attributed to biological differences and sociological differences. Males carry more sebum content and sweat, while females are graced with a better immune response from hormonal differences.[11] Socially, males often exhibit poor hygiene, while females are tied with stricter hygiene norms that they have to obey.[13] However, females are usually more vocal and comfortable with a physical touch that, in this context, allows skinto-skin contact to transmit scabies. Previous studies have also noted this sex tendency, although we can't really point out which inherent character is responsible.[14]

In this study, both bivariate and multivariate analyses consider age as an important risk factor. Younger students were twice as likely to have scabies as older students. Biological factors related to age may not differ that much since they are all adolescents. Similar studies conducted at boarding schools showed that younger students, specifically age 13-15 or below, have the highest incidence of scabies occurrence.[15,16] Widyantari et al. hypothesize that this can be due to a lack of awareness about the importance of personal hygiene.[14] Additionally, these numbers can show the difference in time since they first entered the school. Understanding how common scabies are in boarding school, senior students may have adapted to the situation. More than half the students had stated a history of itch at some point.

In general, the students in our study have adequate knowledge of scabies. This study found that the relationship between knowledge and scabies occurrence was not significant. Theoretically, having a decent understanding of a disease can equip someone from contracting it. Even so, behavioral changes require extra effort. A small cross-sectional study by Damayanti et al. showed both the level of knowledge and the level of clean and healthy living behavior were significantly associated with the incidence of scabies.[17] Alunpah et al. found an association between knowledge and scabies incidence.[18]

Scabies mites can live outside the human body for up to three days at room temperature and normal humidity. This allows indirect transmission through inanimate objects like bedsheets or clothes. Sharing personal belongings (clothes and prayer tools) posed a significant risk factor for transmission between individuals (OR 3.1 95% CI 1.33-4.03). However, the correlation was absent for towels (p = 0.862). This finding is in contrast to a study carried out in southeast

Iran's primary schools, which discovered that students who shared any personal items—such as clothes and towels—had a higher prevalence of scabies.[19] In this study, we purposely separated towels from other items because they provide enough humidity and an appropriate environment for scabies if not dried properly.

A crowded environment is a known environmental factor for scabies, along with high humidity, minimal ventilation, and light exposure.[20] Yet, our result shows otherwise. Sleeping in a cramped bed was not associated with scabies infestation (p = 0.312). This result should be interpreted carefully.

The present study showed that sex was the most influential risk factor for scabies. Multivariate analysis revealed that when all factors, such as the history of itchiness and sharing personal belongings, were combined, they were insignificant. Sex and age were, unfortunately, nonmodifiable factors. Nevertheless, the nuance behind them should be taken into account.

In boarding schools, scabies infestations cause greater issues than itchiness alone. Students with scabies reported poor sleep quality, which can affect their academic performance.[21] A mixed-method study using a DLQI questionnaire and interview found that scabies interrupt social relationships, the quality of learning and sleep. The study notes that even with mild DLQI, the pruritus can still negatively affect the patient's daily activity.[22] In this study, we found higher odds of severe DLQI scores in students with scabies.

There are several limitations to this study. First, the study was only conducted at one educational institution, in the future researchers suggest conducting research in several different locations at once. Second, this research is a cross-sectional study so it cannot directly explain the causal relationship between various factors in this study, therefore in the future it is recommended to conduct case control or cohort research.

Based on this study, we identified sex (male), younger age, history of itch, and sharing personal belongings as risk factors for scabies incidence in boarding school. The significant risk factors in the multivariate analysis were age and sex. Students with scabies experienced more severe effects on their quality of life.

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