

**Prevalence and Risk Factors of Scabies: Observational Study in Nurul Ilmi Darunnajah 14 Islamic Boarding School Students in Serang, Banten, Indonesia****Hans Sugiarto<sup>1</sup>, Chrismerry Song<sup>1\*</sup>**<sup>1</sup>Faculty of Medicine, Universitas Tarumanagara, Jakarta, Indonesia**ARTICLE INFO****Keywords:**

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**ABSTRACT**

Scabies is a contagious skin condition triggered by *Sarcoptes scabiei varietas hominis*. It is prevalent globally, particularly in tropical regions with low economic resources. The condition is commonly observed in densely populated environments characterized by close physical contact, such as Islamic boarding schools. This cross-sectional research was conducted in December 2023 at the Nurul Ilmi Darunnajah 14 Islamic Boarding School. This research involved 120 students who met the inclusion criteria. The questionnaire contains informed consent, personal identity, 15 questions to assess the level of personal hygiene, 15 questions to assess the respondent's level of knowledge, 8 statements, and 2 inspection points related to scabies diagnostic criteria. The data obtained will then be analyzed and researched according to the diagnostic criteria of the 2020 International Alliance for the Control of scabies consensus criteria for the diagnosis of scabies. The prevalence of scabies in this Islamic boarding school is 22.5% (27/120), with the risk factor for scabies being the level of personal hygiene, which includes individual cleanliness, environmental cleanliness, direct contact, ventilation, and humidity of the bedroom.

**1. Introduction**

Scabies is an infectious skin disease caused by the mite *Sarcoptes scabiei varietas hominis*.<sup>1-3</sup> This disease can be found throughout the world, especially in tropical countries with low economic levels. Even though it can affect individuals of all ages, people in the age range of children and the elderly have a higher risk of being infected.<sup>4-6</sup> This disease is often found in densely populated areas with close physical contact, such as prisons, refugee camps, nursing homes, orphanages, dormitories, and Islamic boarding schools.<sup>1,7</sup>

According to the World Health Organization (WHO), around 100 – 200 million people in the world are infected with scabies every year.<sup>8</sup> Based on a systematic review by Romani et al. (2015), it is known that the prevalence of scabies in the world is 0.2 – 71.4%.<sup>4,9</sup> Prevalence in some regions, especially the

Pacific, is 20 – 30% and in children, it is more than 50%.<sup>8</sup> In Indonesia, scabies are ranked third as the most common skin disease out of 12 commonly encountered skin diseases.<sup>10,11</sup> Its prevalence reached 5.6 – 12.9% in 2008.<sup>1</sup> According to research by Nurdianti et al. (2021), the prevalence of scabies in West Java reached 20.5%. Studies on the prevalence of scabies in children in various countries show that the highest prevalence rate is found in school children living in dormitories in Indonesia, reaching 76.9% (81/105).<sup>4</sup> Several studies on Islamic boarding schools on the island of Java also found varying prevalence. Research by Wibianto et al. (2020) shows that the prevalence of scabies in the Ciwidey Community Health Center is 20.5% (354/1,725).<sup>12</sup> According to Saad (2008), the prevalence of scabies in the An-Najach Islamic Boarding School Magelang is 43% (43/100).<sup>13</sup> According to Ma' Rufi et al. (2012), the

prevalence of scabies in Islamic boarding schools in Lamongan is 64.2% (217/338).<sup>14</sup>

This disease is often ignored because the initial symptoms are only itching, especially at night, and the presence of typical lesions in the form of small tunnels, which can be accompanied by various efflorescences such as papules, vesicles, pustules, and nodules.<sup>1,3,5,15</sup> The lightness of the symptoms means that patients often self-treat the disease, so they often come to the doctor for treatment in advanced conditions, even having experienced secondary infections.<sup>16</sup> These secondary infections are usually caused by bacteria that generally live on the surface of human skin, such as group A Streptococcus, *Staphylococcus aureus*, and *Staphylococcus pyogenes*. These bacteria can enter the body through wounds that appear due to scratching infected skin.<sup>1,3</sup> This infection can lead to various complications, such as impetigo, sepsis, glomerulonephritis, and rheumatic heart disease.<sup>1,3,6,17</sup>

## 2. Methods

This research uses a descriptive observational approach with a cross-sectional method. The research was conducted in December 2023 at the Nurul Ilmi Darunnajah 14 Islamic Boarding School. This research involved 120 students who met the inclusion criteria, namely males. This research will be carried out with anamnesis and inspection carried out by the researcher, accompanied by the doctor in charge, and questionnaires filled out by respondents who meet the inclusion criteria and are willing to participate, accompanied by the researcher and the team. The questionnaire contains informed consent, personal identity, 15 questions to assess the level of personal hygiene, 15 questions to assess the respondent's level of knowledge, and 8 statements and 2 inspection points related to scabies diagnostic criteria. The questionnaire for assessing the level of personal hygiene consists of answers always (SL), often (SR), sometimes (KD), and never (TD), while the questionnaire for assessing the level of knowledge consists of right and wrong answers. After completing

the questionnaire, all of the respondents' skin will be inspected except for the skin in the genital area because it is related to permits and norms that apply at the Islamic boarding school, and the part of the skin containing lesions will be photographed. The data obtained will then be analyzed and researched according to the diagnostic criteria of the 2020 International Alliance for the control of scabies consensus criteria for the diagnosis of scabies.

## 3. Results and Discussion

The respondents who participated in this research were 120 male students, with the youngest age being 12 years and the oldest being 18 years, and having an average age of 13.38 ( $\pm 1,348$ ) years. The majority of respondents came from the Madrasah Tsanawiyah/JHS education level, namely 90.0% (108/120). Respondents who had previously been infected with scabies were 26.7% (32/120). Further characteristics of respondents can be seen in Table 1.

The criteria for diagnosing scabies are only based on lesions, history of contact, and symptoms of itching experienced by male students. Students who experienced complaints of itching, especially at night, were 13.3% (16/120). As many as 22.5% (27/120) of students had lesions on their skin. Some students have more than one lesion distributed in several parts of the body. The distribution of the locations of lesions found in students, in sequence, starting from the largest being in the area between the fingers, namely 33.3% (9/27) students; back of hand 14.8% (4/27) students; back of the hand and between the fingers for 11.2% (3/27) students; wrist for 7.4% (2/27) students; while other locations, such as the back of the hands, arms, chest, stomach, legs; armpit; back of hands and arms; palm; hand; thigh; buttocks, thighs, knees; genitals; and ankles were found respectively in 3.7% (1/27) of students. Most of the students have a habit of close contact with other residents, namely 65% (78/120).

In this study, 22.5% (27/120) of students diagnosed as positive for scabies had a reinfection incidence of 40.6% (13/32). 66.7% (18/27) of students

had received scabies treatment from a doctor. The prevalence of scabies among male students at the Nurul Ilmi Darunnajah 14 Islamic Boarding School can be seen in Table 2.

Based on the level of personal hygiene indicators obtained, 78.3% (94/120) of respondents had a good level of personal hygiene regarding scabies, and 21.7% (26/120) had a poor level of personal hygiene regarding scabies. An overview of the respondents' level of personal hygiene can be seen in Table 3.

Based on the level of knowledge indicators obtained, 95.8% (115/120) of respondents had good knowledge about scabies, and 4.2% (5/120) had poor knowledge about scabies. An overview of respondents' level of knowledge can be seen in Table 4.

A total of 13 bedrooms were checked for humidity levels and room temperature. The average humidity level for all bedrooms is 76.69 ( $\pm 2.393$ )%, with the lowest humidity level being 73% and the highest being 81%. A total of 23.1% (3/13) of bedrooms had the same humidity level, namely 77%. The average temperature of all bedrooms is 29.66 ( $\pm 0.144$ )°C, with the lowest temperature being 29.5°C and the highest being 29.9°C. As many as 38.5% (5/13) of sleeping rooms had temperatures as high as 29.5°C. An overview of the humidity level and bedroom temperature of the Nurul Ilmi Darunnajah 14 Islamic Boarding School can be seen in Table 5.

The average humidity level in the city of Serang, Banten, is ideal for the survival of *S. scabiei var. hominis*, which is around 77.30 – 82.18%, while the average temperature of Serang city, which ranges between 27.02 – 28.12°C is less than ideal for the survival of *S. scabiei var. hominis*. Nevertheless, *S. scabiei var. hominis* can still live and develop, although not as well as in ideal temperature conditions (21°C). The residential density of students' sleeping rooms at the Nurul Ilmi Darunnajah 14 Islamic Boarding School has exceeded the limit, where the students' sleeping rooms, which are only  $\pm 64$  m<sup>2</sup>, are occupied by 20

students. This is not in accordance with government recommendations stated in Minister of Health Regulation Number 2 of 2023 concerning Implementing Regulations of Government Regulation Number 66 of 2014 concerning Environmental Health, namely the need for building and land area covering the head of a family with three people, namely 21.6 m<sup>2</sup> to with 28.8 m<sup>2</sup>, and coverage for the head of a family with four people, namely 28.8 m<sup>2</sup> to 36 m<sup>2</sup>. This inappropriate proportion of occupants and room area can facilitate the transmission of *S. scabiei var. hominis*.

Cleanliness of the room, in this case, the bedroom, is one factor that can contribute to reducing the possibility of indirect transmission of scabies. The level of cleanliness of each student's room at the Nurul Ilmi Darunnajah 14 Islamic Boarding School may be different due to the lack of standards for how to clean the room and the furniture in it. When collecting data in the bedrooms, researchers observed that several bedrooms looked dirty, so the researchers suspected that this cleanliness factor was one of the indirect causes of transmission of *S. scabiei var. hominis*.

One measure to prevent scabies is to dry sleeping equipment, such as mattresses, pillows, and bolsters, in the sun for 5 hours once a week. *S. scabiei var. hominis* will die if exposed to temperatures of 49°C for 10 minutes and/or 47.5°C for 30 minutes.<sup>18</sup> This action has been carried out by students at the Nurul Ilmi Darunnajah 14 Islamic Boarding School, but if the weather is cloudy, overcast, or rainy, then this activity is postponed until the following week. If the sleeping equipment is covered with sheets, pillowcases, and bolsters, then activities to maintain the cleanliness of the sleeping equipment can still be done by changing the sheets, pillowcases, and bolsters regularly. This activity is difficult for students who do not use sheets, pillowcases, and bolsters, as researchers observed, so these students have a higher risk of suffering from scabies.

Table 1. Respondent characteristics (n = 120).

Category	Total (%)	Mean ( $\pm$ SD) (years)	Minimum (years)	Maximum (years)
<b>Age (years)</b>		13.38 ( $\pm$ 1.348)	12	18
12-13	75 (62.5)			
14-15	34 (28.4)			
16-17	10 (8.4)			
18-19	1 (0.8)			
<b>Level of education</b>				
Junior high school	108 (90.0)			
Senior high school	12 (10.0)			
<b>History of scabies</b>				
Yes	32 (26.7)			
No	88 (73.3)			

Table 2. Prevalence of scabies in male students at Nurul Ilmi Darunnajah 14 Islamic Boarding School (n = 120).

Category	Yes (%)	No (%)
Scabies	27 (22.5)	93 (77.5)
Itching especially at night	16 (13.3)	104 (86.7)
Lesion	27 (22.5)	93 (77.5)
Contact history	78 (65.0)	42 (35.0)

Table 3. Level of personal hygiene of male students at Nurul Ilmi Darunnajah 14 Islamic Boarding School (n = 120).

Category	f (%)
Good	94 (78.3)
Poor	26 (21.7)

Table 4. Level of knowledge of male students at Nurul Ilmi Darunnajah 14 Islamic Boarding School (n = 120).

Category	f (%)
Good	115 (95.8)
Poor	5 (4.2)

Table 5. Humidity level and bedroom temperature at Nurul Ilmi Darunnajah 14 Islamic Boarding School (n = 13).

Bedroom	Humidity (%)	Temperature ( $^{\circ}$ C)
Mekkah 101	74	29.8
Mekkah 102	73	29.7
Mekkah 103	74	29.5
Mekkah 104	75	29.5
Mekkah 105	76	29.5
Mekkah 106	77	29.5
Mekkah 107	78	29.5
Mekkah 108	80	29.7
Madinah 101	76	29.9
Madinah 102	77	29.8
Madinah 103	77	29.7
Madinah 104	79	29.7
Madinah 105	81	29.8

The students who tested positive for scabies all came from junior high school level. Researchers suspect that students with a higher level of education have better knowledge, in this case, knowledge regarding scabies prevention, so none of the students with a high school education level in this study were affected by scabies. In general, high school students are older than middle school students, so high school students tend to have more experience and have better attitudes, behavior, and knowledge. This is in line with the theory of Notoatmodjo (2014) in the community in Sumberan Sedayu Hamlet, Bantul; education has the greatest influence on a person's level of knowledge, where the higher the education, the higher the level of knowledge.<sup>19</sup> In research by Silahudin et al. (2021), it appears that students at Islamic boarding schools in Jember Regency are more likely to suffer from scabies at a younger age, namely 13 years, at 39.4% (63/160).<sup>20</sup> Savira's research (2020) on students at Islamic boarding schools in Greater Malang shows different things; of all students who have scabies, 51.1% (46/90) of students have a good level of knowledge.<sup>21</sup>

In addition, the ways and habits of junior high school students in socializing tend to have more frequent physical contact with their friends than high school students, thereby facilitating the transmission of *Sarcoptes* mites. Researchers also suspect that the level of knowledge can influence the formation of a person's behavior. This may be one of the reasons why the level of personal hygiene of junior high school students is not as good as that of high school students, although not all of them are like that. Apart from that, the level of personal hygiene also depends on the character of each individual; it is possible that someone has good knowledge but poor hygiene. Naftassa's (2018) research on students at the Qotrun Nada Islamic Boarding School shows that there is a significant relationship between the level of knowledge and the incidence of scabies. According to him, age has a big influence on attitudes, behavior, and knowledge.<sup>22</sup>

The prevalence of scabies in this Islamic boarding school is still quite high. Researchers suspect that this may be due to the student's lack of discipline in implementing scabies prevention measures, such as close contact between students in the room. Even though students sleep in their own beds at night, this does not rule out the possibility that students have a habit of sitting or lying on their friends' beds outside of bedtime. This habit can cause the transmission of scabies mites because the mites on the sufferer's body/clothing can move to their friend's bed. This is in line with research by Afraniza et al. (2011) on students at the Kyai Gading Islamic Boarding School; there is a significant relationship ( $p$ -value  $< 0.05$ ) between the frequency of practice of keeping beds clean and the incidence of scabies.<sup>23</sup> Research by Aulia et al. (2022) on students at the Thawalib Islamic Boarding School showed different things; there was no significant relationship ( $p$ -value  $> 0.129$ ) between the cleanliness of beds and sheets and the incidence of scabies.<sup>24</sup>

Nocturnal pruritus is one of the typical symptoms of scabies sufferers. These symptoms arise as a response to the body's immunity to the secretions and excreta of the scabies mite. In this study, not all students experienced complaints of itching. This is thought to be due to differences in the immune response produced by each individual,<sup>25</sup> the severity of the infestation,<sup>26</sup> and the use of scabies medication. This is in line with research by Silahudin et al. (2021) on students at Islamic boarding schools in Jember Regency; the intensity of nocturnal pruritus is influenced by the onset of scabies, intensity of scratching, hypersensitivity, history of atopy, and history of treatment.<sup>20</sup>

The distribution of lesions was mostly between the fingers at 33.3% (9/27). The skin between the fingers is the softest part of the hand, and the hand is the part of the body most often used for contact with other people. Researchers suspect that the hand-kissing culture carried out in Islamic boarding schools can facilitate the transmission of *S. scabiei var. hominis* directly between the fingers. This is in line with research by Paramita et al. (2015) on children in the

Skin and Venereology Outpatient Unit at RSUD Dr. Soetomo Surabaya, which shows that the distribution of scabies lesions is highest between the fingers at 36.8% (104/282) because the skin between the fingers tends to be softer compared to other locations.<sup>27</sup> Research by Ratnasari (2014) of students at Islamic Boarding School X in East Jakarta reveals that a notable distinction is the distribution of scabies lesions, which is mostly in the buttock area. In this research, the students often wore layers of trousers, namely underwear, shorts, trousers, and sarongs, which were worn repeatedly and not washed for 2-3 days. This condition causes poor hygiene, and the skin becomes moist, making it easier for *Sarcoptes* transmission.<sup>28</sup>

The incidence of reinfection of 40.6% (13/32) may be related to the source of infection remaining in the Islamic boarding school so that students who have recovered can be exposed again. In this study, it was found that there were nine students diagnosed positive for scabies who had not seen a doctor or received treatment as recommended, so researchers suspected that they could be a source of infection in the Islamic boarding school. There has never been any scabies prevention education provided at the Islamic boarding school, so it is possible that the student's knowledge about scabies, prevention methods, and treatment methods is still poor. Another factor that is thought to have played a role in this reinfection incident is the lack of discipline of the students in maintaining personal and environmental hygiene and using medication properly and correctly according to doctor's recommendations. Knowledge, discipline, and behavior factors play a major role in reducing the incidence of reinfection, so good health education is needed. This is in line with research by Paramita et al. (2015) on children in the Skin and Venereology Outpatient Unit at RSUD Dr. Soetomo Surabaya emphasized the importance of health education in reducing the incidence of reinfection and stopping the spread of scabies.<sup>27</sup>

The level of personal hygiene of students is still not good; this can be seen from the indicators of individual

cleanliness (55.6%), environmental cleanliness (25.5%), direct contact (32.5%), and ventilation of the residence (37.9%). The indicator for the use of shared personal tools is good (72.9%), meaning that students use their own personal tools. A person's level of personal hygiene really depends on a person's knowledge, attitudes, and behavior, which will ultimately form habits to maintain personal and environmental cleanliness. Researchers suspect that the students' poor hygiene habits are related to their lack of knowledge and clean living behavior, which may be caused by their family's upbringing and surroundings. The description of the individual hygiene of male students at Nurul Ilmi Darunnajah 14 Islamic Boarding School is not good (55.6%). The habit of students wearing dirty clothes and not changing them immediately can give time for scabies mites on dirty clothes to migrate to the host's skin. This is in line with research by Muafidah et al. (2017) on students at the Al Falah Putera Islamic Boarding School; it is more difficult for scabies mites to infect people who wear clean clothes and wash them frequently.<sup>29</sup>

Students' awareness of maintaining environmental cleanliness is also still not good; throwing rubbish inappropriately, not washing bed sheets when they are dirty, and hanging clothes in their rooms allow the growth and development of *S. scabiei var. hominis*. This is in line with research by Mayrona et al. (2018) on students at the Matholiul Huda Al Kautsar Islamic Boarding School; students with poor environmental hygiene were more susceptible to scabies infection compared to students with good environmental hygiene.<sup>30</sup>

Students' awareness of avoiding direct contact with scabies sufferers is still not good. This can be seen from the habit of shaking hands and sleeping together in the same bed with friends. This is in line with research by Shohib et al. (2019) on students at the Gading Mangu Perak Jombang Traditional Islamic Boarding School and the Surabaya Modern Student Islamic Boarding School, direct transmission of scabies can occur through shaking hands, sleeping

together, and sexual intercourse.<sup>31</sup>

The cleanliness and ventilation of the students' residences are also not good. Improper room ventilation can cause room conditions to become humid and ideal for the life of *Sarcoptes*. The students do not clean their rooms every day and dry their clothes/underwear in the room, which causes the room to become dirty and damp. A similar thing was found in research by Fariyah et al. (2017) on students at the Qomaruddin Islamic Boarding School; students who were infected with scabies were more likely to be found in students who lived in rooms with less than ideal ventilation compared to students who lived in rooms with ideal ventilation.<sup>32</sup>

The level of scabies knowledge of male students at Nurul Ilmi Darunnajah 14 Islamic Boarding School is good. Students have knowledge about the meaning of scabies, the causes of scabies, the clinical symptoms of scabies, how scabies are transmitted, and how to prevent scabies.

#### 4. Conclusion

In this study, it can be concluded that the prevalence of scabies at the Nurul Ilmi Darunnajah 14 Islamic Boarding School is 22.5% (27/120), and several risk factors for scabies at the Nurul Ilmi Darunnajah 14 Islamic Boarding School are the level of personal hygiene, including the individual cleanliness, environmental cleanliness, direct contact, ventilation of the residence, and humidity in the bedroom.

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