



## Multivariate Analysis of Personal Hygiene, Residential Density, Socioeconomic Status, and Knowledge Toward Scabies Prevalence at the Serang City Islamic Boarding School

Reggi First Trasia,<sup>1\*</sup> Azzam Faruqi<sup>2</sup>, Rawina Winita<sup>3</sup>, Sakura Muhammad Tola<sup>4</sup>, Intan Keumala Dewi<sup>4</sup>

<sup>1</sup>Division Parasitology, Faculty of Medicine, University of Sultan Ageng Tirtayasa, Serang, Indonesia

<sup>2</sup>Faculty of Medicine, University of Sultan Ageng Tirtayasa, Serang, Indonesia

<sup>3</sup>Parasitology Department, Faculty of Medicine, Universitas Indonesia, Jakarta, Indonesia

<sup>4</sup>Faculty of Medicine, Universitas YARSI, Jakarta, Indonesia

\*Corresponding Author: [reggi.first@untirta.ac.id](mailto:reggi.first@untirta.ac.id)

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### ABSTRACT

**Introduction:** Scabies is an infectious disease of the skin caused by the mite *Sarcoptes scabiei* var. *hominis*. This disease is often ignored because it is not life-threatening, but the itching that occurs can interfere with daily life. Scabies is often found in densely populated environments such as Islamic boarding schools, places where students study. Borrowing each other's personal items, living in rooms with high occupancy rates, and having poor habits regarding personal hygiene are risk factors for contracting scabies among students.

**Objective:** Through this background, this research aims to determine the relationship between the level of personal hygiene, housing density, socioeconomic status, and the level of knowledge about scabies among students at the Islamic Boarding School, Serang, Banten.

**Methods:** The research was carried out at the Islamic Boarding School, Serang, Banten with a sample size of 167 respondents. The research design used was a cross-sectional analytical design with a sampling technique using the simple random sampling method. Univariate analysis was carried out by assessing frequencies and percentages. Bivariate analysis of variables was carried out using the chi-square test. Multivariate analysis was performed using multiple linear regression.

**Results:** Respondents in this study totaled 167 respondents. The results of the analysis show that the prevalence of scabies in Islamic boarding schools in Serang City is 47.3%. There is no significant relationship between personal hygiene and scabies prevalence ( $P = 0.603$ ), and there is a significant relationship between housing density ( $P = 0.018$ ), socioeconomic status ( $P = 0.002$ ), and level of knowledge ( $P = 0.035$ ) on scabies prevalence. at the Serang City Islamic Boarding School. Based on multivariate analysis, a relationship was found between residential density, socioeconomic status, and level of knowledge on scabies prevalence simultaneously.

**Conclusions:** These research results show that factors such as housing density, socioeconomic status, and level of knowledge play an important role in the spread of scabies in Islamic boarding schools even though the students show good results in personal hygiene.

## Introduction

Scabies is a very common dermatological condition, occupying a large proportion of skin diseases that occur in developing countries. Scabies is caused by infestation with the parasitic mite *Sarcoptes scabiei* var. *hominis* with symptoms in the form of unbearable itching with various types of severity of skin lesions that arise. Scabies often do not receive attention because it is not life-threatening, but the result is that itching can cause discomfort in sufferers (Tri H, et al. 2017). Scabies can easily spread through direct skin-to-skin contact with infested individuals and also indirectly through the use of shared items such as clothing, towels, bedding, and sheets (Casulli A, 2021).

Scabies spread globally, estimated to reach a population of 200 million with a prevalence ranging from 0.2% to 71%. The spread of scabies is most common in countries with hot tropical climates, densely populated environments such as schools, orphanages and Islamic boarding schools, areas with low socioeconomic conditions, and areas with limited health resources (WHO, 2020). In Indonesia, scabies is still commonly found because Indonesia is a country with a tropical climate. According to the Indonesian Ministry of Health, the prevalence of scabies in Indonesia has decreased from

5.60% - 12.96% in 2008 to 4.9% - 12.95% in 2009 (Ridwan AR, et al. 2017). The prevalence of scabies in Serang City is still not fully known.

Banten is the province with the second-largest number of Islamic boarding schools in Indonesia. The densely populated environment in Islamic boarding schools makes it a risk factor for disease transmission, such as scabies, which can spread quickly from one individual to another through direct means, such as shaking hands with sufferers, or indirectly related to poor personal hygiene. such as exchanging or borrowing clothes, sarongs, towels, and even exchanging pillows, bolsters, and mattresses with fellow friends. Students also often ignore unhealthy behavior such as hanging clothes in their rooms, not immediately washing clothes that have been worn, and rarely drying mattresses or other sleeping equipment below the sun (Krisdiyanto G, et al. 2019).

Based on previous research regarding the relationship between the level of knowledge, personal sanitation, and residential density on scabies symptoms at the Darul Muklisin Islamic Boarding School, Kendari, the results showed that there was no relationship between the level of knowledge and scabies symptoms, but there was a relationship between self-sanitation and residential density and

symptoms of scabies (Ridwan AR, et al. 2017). Another study regarding risk factors for individual *santri* (students at Islamic boarding school) hygiene on the incidence of scabies skin disease in Islamic boarding schools, found that there was a relationship between poor personal sanitation, such as not paying attention to the cleanliness of hands, nails, skin, and genitals, on the incidence of scabies (Parman et al. 2017). Regarding socioeconomic status, there is research on the relationship between socioeconomic status and the prevalence of scabies, and the results show that there is a relationship between low socioeconomic status and the prevalence of scabies, which is caused by the activity of borrowing personal items from fellow friends due to a lack of adequate personal hygiene facilities and infrastructure (Afriani B. 2017).

Based on preliminary observations carried out by researchers in one of the student rooms at the Serang City Islamic Boarding School, Banten, it was observed that as many as 27 students occupied a room measuring 7.5 m x 7.5 m with the habit of spreading mattresses on the floor at night to sleep and stacking mattresses on top of them in the middle of the room during the day. In these observations, the author saw several things related to risk factors for transmitting scabies, such as the habit of sharing mattresses and high housing density, so this encouraged

researchers to conduct research on the relationship between personal hygiene, housing density, socioeconomic status, and level of knowledge on the prevalence of scabies in students of the Islamic Boarding School, Serang City, Banten.

## Methods

This research uses an observational analytical method with a cross-sectional research design, namely a one-time data collection technique using a research instrument in the form of a questionnaire. This research measures the relationship between personal hygiene factors, residential density, socioeconomic status, and level of knowledge on the prevalence of scabies in Serang City Islamic Boarding School, Banten. This research was carried out in August–December 2023. The population covered in this study were all MA-level students at the Serang City Islamic Boarding School who met the inclusion criteria.

The research sample was obtained using the Slovin formula because the population of Serang City Islamic Boarding School MA-level students who met the inclusion criteria was known for certain, namely 167 respondents. The sampling technique used in this research is simple random sampling, which is a technique for taking random samples from members of the population using a random method or lottery. In this

research, the lottery was determined using a list of student attendance numbers in each class, and the lottery was carried out using a random sampling lottery page.

The research tool used in this study was a questionnaire consisting of a scabies diagnosis status sheet (Engelman D, et al. 2020) personal hygiene, a socioeconomic status questionnaire, and a knowledge level questionnaire regarding scabies that had been tested for validity in previous research (Wandira NA. 2022) as well as an observation sheet regarding residential density adapted from Minister of Health Decree no. 829 of 1999 (Mar'ati F. 2018). Research material was obtained from the results of a questionnaire survey on students and direct observation at the Serang City Islamic Boarding School. Details of the materials used for this research are primary data obtained from a questionnaire survey among students related to personal hygiene, socioeconomic status, and level of knowledge. Primary data for occupancy density was obtained by directly observing the size of the respondent's room relative to the population in that room. Secondary data is data used to support research, namely in the form of the number of students in the Serang City Islamic Boarding School in the 2023/2024 academic year, Islamic boarding school profiles, as well as data on dormitory facilities and infrastructure

obtained from the Islamic boarding school management.

The researcher will explain the purpose and benefits of the research to respondents and provide instructions for completing the questionnaire directly to respondents who have agreed to be research samples using an informed consent sheet with the help of the homeroom teacher as a guide. Next, the researcher will randomize each class by drawing lots using the randomization page, and after that the researcher will distribute questionnaire sheets to respondents and give a deadline for filling in the questionnaire sheet. The researcher will accompany the respondent while filling out the questionnaire to help the respondent if they experience difficulties when filling it out. Respondents who have filled out the questionnaire will then be examined by a doctor to see whether the respondent has clinical symptoms that lead to scabies. The data obtained will be collected, entered into SPSS, given a score, then categorized into groups according to the measurement results.

Univariate analysis in the study was used to measure the prevalence of scabies as the dependent variable and the level of personal hygiene, housing density, socioeconomic status, and level of knowledge about scabies as independent variables using a frequency distribution table for each variable and its percentage.

In this study, bivariate analysis was used to determine whether there was a relationship between independent factors, namely level of personal hygiene, housing density, socioeconomic status, and level of knowledge on the dependent variable, namely scabies prevalence.

This cross-sectional study was answered by a total of 167 respondents. In multivariate analysis, significant associations were observed regarding residential density (p-value 0.018), socioeconomic status (p-value 0.002), and also knowledge level (p-value 0.035),

about the prevalence of scabies. The multivariate analysis used is multiple linear regression.

## Result and Discussion

The number of respondents in this study was 167 respondents. Discussion of the characteristics of respondents is used to find out a general description of respondents based on gender, age classification, classes, and incidence of scabies. The characteristics of respondents based on gender can be seen in Table 1 as follows.

**Table 1.** Characteristics of respondents at Islamic Boarding School, Serang City, Banten

| No                        | Respondent Characteristic | Frequencies (N) | Percentage (%) |
|---------------------------|---------------------------|-----------------|----------------|
| <b>Gender</b>             |                           |                 |                |
| 1                         | Boys                      | 92              | 55.1           |
| 2                         | Girls                     | 75              | 44.9           |
| <b>Age Classification</b> |                           |                 |                |
| 1                         | 14-15 y.o                 | 10              | 6.0            |
| 2                         | 16-17 y.o                 | 95              | 56.9           |
| 3                         | 18-19 y.o                 | 62              | 37.1           |
| <b>Grade</b>              |                           |                 |                |
| 1                         | Class of X                | 21              | 12.6           |
| 2                         | Class of XI               | 61              | 36.5           |
| 3                         | Class of XII              | 85              | 50.9           |

In this study it was found that male students who experience scabies more than female students. These results are in line with Samosir's research in 2020, which concluded that male students often do not pay attention to their personal hygiene and

environment well, in contrast to women who tend to be more concerned about personal hygiene (Samosir K, et al. 2020). The incidence of scabies is more common in 11th grade and 12th grade students, which may be related to the sense of

solidarity that arises after living together for more than 2 years with the same fate. The students have eliminated awkwardness among their fellow friends, so borrowing personal items such as clothing, towels, worship tools, and beds has become a habit carried out by the students (Aliffiani S, et al. 2020).

An overview of scabies prevalence, personal hygiene, housing density,

socioeconomic status, and level of knowledge at the Islamic Boarding School, Serang, Banten was obtained from the results of interviews and skin examinations of respondents. The results obtained regarding the prevalence of scabies, personal hygiene, housing density, socioeconomic status, and level of knowledge at the Islamic Boarding School, Serang, Banten can be seen in Table 2.

**Table 2.** Prevalence of scabies, personal hygiene, residential density, socioeconomic status and knowledge level in Islamic Boarding Schools, Serang City, Banten

| No                           | Characteristic | Frequencies (N) | Percentage (%) |
|------------------------------|----------------|-----------------|----------------|
| <b>Prevalence of Scabies</b> |                |                 |                |
| 1                            | Non Scabies    | 88              | 52.7           |
| 2                            | Scabies        | 79              | 47.3           |
| <b>Personal Hygiene</b>      |                |                 |                |
| 1                            | Good           | 164             | 98.2           |
| 2                            | Bad            | 3               | 1.8            |
| <b>Residential Density</b>   |                |                 |                |
| 1                            | Proper         | 11              | 6.6            |
| 2                            | Not proper     | 156             | 93.4           |
| <b>Socioeconomic Status</b>  |                |                 |                |
| 1                            | High           | 47              | 28.1           |
| 2                            | Moderate       | 82              | 49.1           |
| 3                            | Low            | 38              | 22.8           |
| <b>Level of Knowledge</b>    |                |                 |                |
| 1                            | Good           | 82              | 49.1           |
| 2                            | Bad            | 85              | 50.9           |

The results of bivariate analysis using the Fisher's Exact Test show that personal hygiene has no significant relationship to the prevalence of scabies in the Al-Rahmah Walantaka Islamic Boarding School ( $p = 0.603$ ), of which 77 students with good personal hygiene (47%) experience scabies

and 2 students with poor personal hygiene (66.7%) experiences scabies. This result is not in line with research conducted by Ridhwan et al. in 2017 which shows that 80% of students with bad personal habits experience scabies, so it was concluded that there was a significant relationship

between poor personal hygiene and scabies events in Islamic boarding school (Ridhwan et al. 2017). Lack of maintaining personal hygiene, such as bathing once a day, using a private toiletry such as a towel

alternately, and using sleeping utensils such as pillows, bolsters, or mattresses simultaneously with fellow friends, is the cause of students experiencing scabies (Table 3).

**Table 3.** The relationship between personal hygiene and the prevalence of scabies at the Islamic Boarding School, Serang City, Banten

| Personal hygiene | Prevalence of Skabies |       |             |       | Total |      | P-Value |
|------------------|-----------------------|-------|-------------|-------|-------|------|---------|
|                  | Scabies               |       | Non Scabies |       |       |      |         |
|                  | N                     | %     | N           | %     | N     | %    |         |
| Bad              | 2                     | 66.7% | 1           | 33.3% | 3     | 100% | 0.603   |
| Good             | 77                    | 47%   | 87          | 53%   | 164   | 100% |         |
| Total            | 79                    | 47.3% | 88          | 52.7% | 167   | 100% |         |

The same research was conducted by Aliffiani, et al in 2020 and the results obtained were that 51% of students who maintain their personal hygiene well experience scabies, with the results of the value of  $P = 1$ , so it was concluded that there was no significant relationship between personal hygiene to the prevalence of scabies in the Islamic boarding school. This happens even though students have maintained their personal hygiene well, there are other factors such as the attitudes and knowledge of students who are lacking in scabies (Aliffiani, et al. 2020).

Personal hygiene is one of the most important factors in the transmission of scabies. The level of personal hygiene reflects a person's health condition consciously. Personal hygiene consists of

skin hygiene, hand cleanliness and nails, cleanliness of clothing and towels, as well as the cleanliness of the bed (Nasution SA, et al. 2022). In this study, the indicator of skin cleanliness was found that almost all students have maintained the cleanliness of their skin well, namely by bathing twice a day using soap and bathing after exercising or activities, although it is found that there are still many who do the activity of borrowing soap from their friend.

Furthermore, on indicators of cleanliness of towels and clothing, it was found that there are still many students who wear towels that are not their own, wearing towels in a humid state, and not drying towels that have been used to bath in the hot sun, but only hung in the bedroom. Some students also have bad habits related to the cleanliness of clothing, namely not

changing clothes that have been used all day and not changing clothes after sweating. This is in line with research conducted by Afriani (2017) that there is a significant relationship between the cleanliness of towels and clothing to the prevalence of scabies in boarding schools. Towels and clothing are one way of indirect transmission of scabies. Towels and clothing that are left in humid conditions can increase the life span of scabies mites outside the host, and with the borrowing activity of towels or clothing, the risk of transmission of scabies will be higher (Sungkar S. 2016). These results are also in line with the results of the Efendi et al research that concluded that risk factors for transmission of scabies in the form of exchanging clothes and towels and not paying attention to the cleanliness of the bed are still habits that are often done by students (Efendi R, et al. 2020).

In addition, the mattress cleaning indicator found that some students did not sleep in their own beds, did not dry the

mattress every 2 weeks, and had a habit of piling up a mattress in the middle of the room in the morning. This is in line with research conducted by Indriani et al which states that there is a significant relationship between the cleanliness of the mattress and the prevalence of scabies (Indriani F, et al. 2021). The mattress that is not dried in at least 2 weeks can cause a buildup of dust in the mattress and become a place to breed organisms such as mites that can cause scabies. Mattresses that are not routinely dried can also increase the humidity of the mattress, which is an ideal condition for the mites of scabies living outside the host. Scabies can last longer in furniture such as humid mattresses (Sungkar S, 2016). This is also strengthened by research conducted by Parman et al that students who do not maintain the cleanliness of the mattress and bed linen have a risk of 13.9 times higher of suffering from scabies compared to students who maintain the cleanliness of the mattress and bed linen well (Parman, et al. 2017).

**Table 4.** The relationship between residential density and the prevalence of scabies in the Serang City Islamic Boarding School, Banten

| Residential density | Prevalence of Skabies |       |             |       | Total |      | P-Value |
|---------------------|-----------------------|-------|-------------|-------|-------|------|---------|
|                     | Scabies               |       | Non Scabies |       |       |      |         |
|                     | N                     | %     | N           | %     | N     | %    |         |
| Not proper          | 70                    | 44.9% | 86          | 55.1% | 156   | 100% | 0.018   |
| Proper              | 9                     | 81.8% | 2           | 18.2% | 11    | 100% |         |
| Total               | 79                    | 47.3% | 88          | 52.7% | 167   | 100% |         |

Based on the results of bivariate analysis regarding the density of lifelong with the prevalence of scabies, the P value was obtained of 0.018 which shows that there is a significant relationship between the density of lower and the prevalence of scabies in the Islamic Boarding School. In this study it was known that 70 students (44.9%) who lived in a room with a density of lure did not meet the requirements of experiencing scabies, and 9 students (81.8%) who lived in a room with habitation density that met the requirements to experience scabies.

These results are in line with research conducted by delicating, which shows that the density of life lives has a significant effect on the incidence of scabies in boarding schools, with a value of  $p = 0.031.51$  referring to the Ministry of Health

NO. 829 of 1999, the ideal room area is  $> 8 \text{ m}^2$  for 2 people. High density in a room can facilitate the spread of disease to each of its residents.

In this study, it is known that the students live in each room with an average area of  $36 \text{ m}^2$  rooms and are inhabited by 20 to 30 students. The relatively small room causes students to sleep closely with their roommates, which is one of the scabies transmission methods from one student to another. Students who slept close together and shared mattresses with fellow friends in their rooms allowed scabies to spread in direct contact from one student to another. It takes 15-20 minutes for scabies to move from one student to another when the students sleep on the same mattress as his friend who experienced scabies (Sungkar S, 2016).

**Table 5.** The relationship between socioeconomic status and the prevalence of scabies at the Islamic Boarding School, Serang City, Banten

| Socioeconomic status | Prevalence of Scabies |       |             |       | Total | P-value |       |
|----------------------|-----------------------|-------|-------------|-------|-------|---------|-------|
|                      | Scabies               |       | Non scabies |       |       |         |       |
|                      | N                     | %     | N           | %     | N     | %       |       |
| Low                  | 27                    | 71.1% | 11          | 28.9% | 38    | 100%    | 0.002 |
| Moderate             | 30                    | 36.6% | 52          | 63.4% | 82    | 100%    |       |
| High                 | 22                    | 46.8% | 25          | 53.2% | 47    | 100%    |       |
| Total                | 79                    | 47.3% | 88          | 52.7% | 167   | 100%    |       |

Based on the results of bivariate analysis of the relationship between the socioeconomic status variable and the prevalence of scabies, the P value was 0.002, which showed that there was a significant relationship between socioeconomic status and the prevalence of scabies. These results are in line with the research conducted by Afriani et al which concluded that there is a significant

relationship between the socioeconomic status and the prevalence of scabies in the boarding school (Afriani B., 2017). Students with low socioeconomic status tend to experience scabies because of the lack of meeting the needs of personal hygiene facilities and infrastructure, so students often borrow towels, clothing, as well as toiletries from their friends.

**Table 6.** Relationship between knowledge level and prevalence of scabies at the Islamic Boarding School, Serang City, Banten

| Level of Knowledge | Prevalence of Scabies |       |             |       | Total |      | P-value |
|--------------------|-----------------------|-------|-------------|-------|-------|------|---------|
|                    | Scabies               |       | Non scabies |       |       |      |         |
|                    | N                     | %     | N           | %     | N     | %    |         |
| Bad                | 47                    | 55.3% | 38          | 44.7% | 85    | 100% |         |
| Good               | 32                    | 39.0% | 50          | 61%   | 82    | 100% | 0.035   |
| Total              | 79                    | 47.3% | 88          | 52.7% | 167   | 100% |         |

Based on the results of bivariate analysis regarding the level of knowledge with the prevalence of scabies, a P value of 0.035 was obtained, which shows that there is a significant relationship between the variable level of knowledge and the prevalence of scabies in the Islamic Boarding School. In this study it was found that 47 students with less knowledge levels (55.3%) experienced scabies and 32 respondents with good levels of knowledge (39%) experienced scabies.

These results are in line with Nisa et al (2019) research, which concludes that there is a significant relationship between the level of knowledge and the prevalence of scabies. Students with low levels of knowledge tend to suffer from scabies because of their ignorance of scabies, what causes scabies, and how to overcome them. This is also strengthened by research conducted by Sari et al (2017) that the incidence of scabies in Islamic boarding schools can occur due to student's lack of knowledge regarding scabies transmission,

so that students are ignorant of exchanging clothes with their friends. The higher the knowledge of students regarding personal hygiene, the higher the possibility of students in preventing various diseases, one of which is scabies (Sungkar S, 2016).

In this study, it is known that many students still consider that scabies disease is caused by germs, and students still do not understand how to break the chain of scabies transmission in Islamic boarding school, which may be the reason why scabies transmission continues to occur within the boarding school environment.

While students who have good knowledge about scabies but are still infected with scabies allegedly due to high-density factors in one room, because scabies are community diseases that cannot only be individually prevented (Sungkar S. 2016).

After a bivariate analysis, multivariate analysis is performed on variables with p-values  $< 0.05$ . Of all the variables assessed, there are 3 variables that can be analyzed by multivariate analysis, namely residential density, socioeconomic status, and level of knowledge.

**Table 7.** Multivariate analysis results of scabies risk factors

| Variable             | p-value  | Exp B (OR) | 95% CI     |
|----------------------|----------|------------|------------|
| Residential density  | $<0.001$ | 1.2        | 2.5 – 10.7 |
| Socioeconomic status | 0.002    | 1.5        | 3.4 – 11.5 |
| Knowledge            | 0.034    | 1.7        | 1.7 – 9.9  |

After a multivariate test with multiple linear regression, the value of p-value is obtained for residential density variables, socioeconomic status, and the level of knowledge  $<0.05$ . This means that the three variables have statistically meaningful relationships. Student knowledge increases 1.7 times greater for the occurrence of scabies cases in Islamic boarding schools with CI values that do not cut the number 1.

## Conclusion

Based on the results of observations and data analysis, it was concluded that the prevalence of scabies in Islamic boarding schools in Serang City, Banten was 47.3%. This research results conclude that factors such as housing density, socioeconomic status, and level of knowledge play an important role in the spread of scabies in Islamic boarding schools even though the students show good results in personal hygiene.

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