Original Article

Analysis of the Scabies Incidence at As'ad Islamic Boarding School, Jambi City

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ABSTRACT

Scabies is an infectious disease. Based on preliminary observations, numerous scabies sufferers have been found among students living in As'ad Islamic Boarding School, Jambi City, Indonesia. Scabies disease develops in humans and can be influenced by both human factors and the environment. This study aims to identify factors associated with scabies incidence at the As'ad Islamic Boarding School. This analytical observational research was conducted using a cross-sectional study design. The variables measured were scabies symptoms, knowledge, personal hygiene, contact history, humidity, and room occupancy density. The research samples consisted of 178 students at the As'ad Islamic Boarding School in Jambi City, who were selected randomly. The required data were collected by questionnaires and analyzed by Chi-square test and logistic regression. Most of the students had crowded living conditions (94.4%), low room humidity (80.8%), poor personal hygiene (66.3%), a low level of knowledge about scabies (70.8%), contact with scabies sufferers (61.8%), and symptoms of scabies (60.7%). Symptoms of scabies were related to knowledge (P=0.000), personal hygiene (P=0.000), contact history (P=0.000), humidity (P=0.000), and room occupancy density (P=0.001). The incidence of scabies in students at the As'ad Islamic Boarding School was influenced by insufficient knowledge, poor personal hygiene, history of contact, low humidity, and overcrowding.

Keywords: Humidity, Knowledge, Occupational exposure, Scabies, Students

1. Introduction

The environment is one of the factors that influences health status in addition to behavioral factors, health services, and heredity. These environmental factors include physical, biological, and socio-cultural (1,2). Until now, most diseases are dominated by environmental health problems, such as dengue hemorrhagic fever, acute respiratory infection, tuberculosis, diarrhea, and skin diseases (3,4).

The high incidence of environment-based diseases is caused by poor sanitary conditions in the home environment, especially clean water and toilets, increased environmental pollution, less hygienic food processing methods, and low hygienic and healthy living behaviors (5-7). Humans must realize that their health is a gift from God Almighty that they should be grateful for and guard it. Health problems can threaten anyone, regardless of differences in gender, race, and social, economic, cultural, ethnical, and religious status (8,9).

The main problem developing countries such as Indonesia faces is that it is still dominated by infectious diseases, most of which are environmental-based (10). Scabies is found in all countries with varying prevalence rates. In some developing countries, the prevalence of scabies is around 6-27% of the general population and tends to be high in children and adolescents. According to the Ministry of Health of the Republic of Indonesia, the prevalence of scabies ranks third out of the 12 most common skin diseases (11).

Scabies is an infection or skin disease caused by a small mite (mite) *Sarcoptes* that lives in the skin of the affected person. Mites worldwide can be transmitted from human to human, animal to human, and vice versa (12,13). Recent reports on scabies cases in various Indonesian media are rare and difficult to find regardless of the causative factors. However, it cannot be denied that this skin disease still greatly interferes with daily life and work activities. In various parts of the world, reports of scabies cases are often found in conditions of low economic status. However, it does not rule out the possibility that people from the middle to upper socio-economic level may also contract this disease due to contagion from colleagues, limited knowledge, low education level, poor quality of personal hygiene, lack of sunlight, and inadequate provision of clean water (10,14).

Pesantren is a place of education where students live together and study under the guidance of teachers, better known as "Kyai", and has dormitories for students to stay. Santri is located in a complex that also provides a mosque for worship, space for study, and other religious activities. This complex is usually surrounded by a wall to monitor the entry and exit of the students under applicable regulations. Santri lives and does activities together. The possibility that Islamic boarding schools could be a medium for disease transmission cannot be ruled out (10,15). There are 12 Islamic boarding schools in the administrative area of Jambi City, with 4,578 students. Most Santri were living at the As'ad Islamic Boarding School, with 1,342 students.

Based on observations and interviews with several Santri at the As'ad Islamic Boarding School in Jambi City, it was found that students still lacked knowledge about scabies, personal hygiene, or necessary efforts to maintain personal hygiene. To elaborate, they did not wash their hands or take a shower after doing some activities, or they did not often change their clothes with the excuse that they did not want to add more laundry because they had to wait to do the laundry as there were lines.

1.2. Objectives

regarding this, the current research was conducted to analyze the factors associated with the incidence of scabies at the As'Ad Islamic Boarding School, Jambi City.

2. Materials and Methods

2.1. Study design

This analytic observational study was performed using a cross-sectional design to investigate the

correlation between risk factors with the approach of data collection at one time (16).

2.2. Participants

This research was carried out at the As'ad Islamic Boarding School, Jambi City, from February to October 2020. The samples involved 178 students who were randomly selected and were included based on inclusion criteria, such as having a minimum age of 10 years and having lived at the As'ad Islamic Boarding School for at least the last 3 months.

The sample size was determined based on the Slovin formula (17). According to this formula, the initial population was 320 individuals, which by considering d = 0.05, was finally obtained at 178 people.

Respondents were Islamic boarding school students, who were given a remarkably dynamic schedule of activities, and therefore, they sometimes pay little attention to personal hygiene.

2.3. Variables and data collection

The dependent variable in this study was a symptom of scabies, while the independent variables were knowledge, personal hygiene, a history of contact with sufferers, room humidity, and room occupancy density.

Incidence rates of scabies were assessed by observing clinical symptoms, including redness and pus, swelling in the affected area: between the fingers, on wrists, armpits, elbows, back, and genitals, and feeling very itchy, especially at night. The variables of knowledge, personal hygiene, a history of contact with sufferers, room humidity, and room occupancy density were assessed using a questionnaire. The variables knowledge and personal hygiene consisted of 10 questions with a score range of 1-10, while a contact history with sufferers was measured by 5 questions with a total score range of 1-10. The Guttman scale was used to answer the questionnaire. One important feature of the Guttman scale is that it is a cumulative scale and only measures one dimension of a multidimensional variable; therefore, this scale is dimensionless. The data obtained are interval data or dichotomous ratios (two alternatives) (18).

The room humidity variable was measured using a hygrometer with values of < 40% and > 80% representing good criteria and 40-80% indicating poor criteria. The variable room occupancy density was assessed using a meter, and the room was determined as dense if ≤ 1.5 m^2 per student and not dense if > 1.5 m^2 per student.

To collect data, two research assistants were trained by the researcher to complete questionnaires and explain strategies regarding the content to respondents before they filled it out. Informed consent was obtained from all respondents.

2.4. Statistical analysis

Data were presented as numbers and percentages for categorical variables. The Chi-square test was used for bivariate analysis and to determine the correlation between variables. After that, the logistic regression test was utilized to identify the most influential variable among all research variables. All tests with a p-value of < 0.05 were considered significant. Statistical analysis was performed using the SPSS software version 16.0.

2.5. Ethical Considerations

No economic incentives were offered or provided for participation in this study. The study was performed in accordance with the ethical considerations of the Helsinki Declaration. This study obtained ethical feasibility from the Health Research Ethics Commission of the Ministry of Health, Jambi, and was registered by the registration number: LB.02.06/2/113/2020.

3. Results

The frequency distribution of the research variables in this study is presented in table 1. According to table 1, students had crowded living conditions (94.4 %), poor room humidity (80.8%), low level of knowledge about scabies (70.8%), poor personal hygiene (66.3%), contact with scabies sufferers (61.8%), and dominant symptoms of scabies (60.7%).

Table 2 shows that all variables associated with scabies symptoms are statistically significant

Table 1. Distribution of research variables

Variable	N	%
Symptoms of scabies		
Presence	108	60.7
Absence	70	39.3
Knowledge		
Poor	126	70.8
Good	52	29.2
Personal Hygiene		
Poor	118	66.3
Good	60	33.7
Contact history		
Ever	110	61.8
Never	68	39.2
Occupancy density		
Crowded	168	94.4
Uncrowded	10	5.6
Room humidity		
Poor	144	80.9
Good	34	19.1

(P<0.05).

According to table 3, of several variables that are bivariate related to scabies symptoms, after being analyzed using the logistic regression test, it was revealed that the most related variable was a contact history with a Wald value = 30.020 (P<0.05).

Table 2. Analysis of the relationship between research variables

Independent variabel	Symptoms of scabies				p-value
	Presence		Absence		
	n	%	n	%	
Knowledge					
Poor	100	79.4	26	20.6	0.000
Good	8	15.4	44	84.8	
Personal hygiene					
Poor	99	83.2	20	16.8	0.000
Good	9	15.3	50	84.7	
Contact history					
Ever	101	91.8	9	8.2	0.000
Never	7	10.3	61	89.7	
occupancy density					
Crowded	107	63.7	61	36.3	0.001
Uncrowded	1	10	9	90	
Room humidity					
Poor	101	70.1	43	29.9	0.000
Good	7	20.6	27	79.4	

Table 3. Simultaneous analysis between variables (multivariate)

Variable	B	Wald	Sig.	Exp(B)
Knowledge	4.452	17.365	0.000	85.835
Personal hygiene	2.893	9.600	0.002	18.045
Contact history	5.359	30.020	0.000	212.537
Occupancy density	-2.745	1.263	0.261	0.064
Room humidity	-0.888	0.640	0.424	0.411
Constant	-13.877			

4. Discussion

Scabies is an itchy skin disease caused by overcrowding, humidity, and the neglect of personal hygiene. This disease can attack anyone, regardless of socioeconomic status, gender, and age. Several etiologies of scabies prompted researchers to conduct this study (4,16,19).

Field observation revealed that students at As'ad Islamic Boarding School, Jambi City, had dominant scabies symptoms as measured by the presence or absence of scabies symptoms (60.7%). The high proportion of the incidence of scabies, especially in Islamic boarding schools, is an indicator reflecting that there are still high-risk factors for students attending these schools.

The first risk factor was the student's knowledge of scabies. Since knowledge plays a large role in how a person acts, knowledge of scabies greatly affects the symptoms of the disease. The prevention of scabies is an effective method, but prevention methods are still poorly understood. So far, respondents have only used medication. Several factors can contribute to poor knowledge of scabies, such as insufficient information received by respondents about scabies. Low knowledge can affect the attitudes and behavior of students toward health, for instance, they may not observe good hygiene, pay attention to the humidity of the room, and avoid direct contact with students/other people with scabies (20). The Islamic boarding school community, especially students, should increase their knowledge by seeking information on how to prevent the disease so that the transmission of scabies can be avoided. Information can be obtained from various sources and health service locations in clinics. Local clinicians and health centers should be more proactive and promote education programs about scabies in Islamic boarding schools. Increasing knowledge will change the attitudes and behavior of students to maintain health, especially in preventing scabies.

The second factor is personal hygiene, which is assessed based on how students implement their personal hygiene habits or behaviors. The study results demonstrated that many students still needed to apply personal hygiene while living in the Islamic boarding school. The findings of this study were in line with those of previous research conducted by Nadiya et al. (21), showing that the prevalence of scabies was 48% in students with good personal hygiene, while it was 73.70% in students having poor personal hygiene. Supported by the results of a study by Middleton et al. (22), they reported that there was a correlation between bathing habits and the rate of scabies (P=0.000).

Poor self-cleaning habits can also cause scabies because the mite *Sarcoptes scabies* will more easily infect individuals with poor personal hygiene. This finding is consistent with the reports of a study (23), demonstrating that scabies can be transmitted through indirect contacts, such as bedding, clothes, and towels, making them an essential factor in the spread of scabies. Therefore, it can be interpreted that exchanging clothes, towels, and bedding has a large role in transmitting scabies. This infection can be transmitted directly from skin to skin and indirectly through clothing and bed sheets, environments that support the spread of scabies, overcrowding conditions, low socioeconomic status, and climate.

However, personal hygiene is the dominant factor that plays the most important role (24-26).

Research conducted by Karim et al. (20) in Bangladesh found that 74% of children suffering from scabies had poor hygiene, such as sharing towels, borrowing each other's clothes and sheets, and rarely bathing, even though 97% had to perform ablution. Disease severity and scabies reinfection were associated with rarely washing clothes ($P<0.001$), rarely bathing ($P<0.001$), and bathing with soap ($P<0.001$).

In this study, it can be seen that most respondents washed towels, changed sheets, and sun-dried the mattress for more than one week, exchanged clothes and towels with friends, and even two respondents only showered once a day. These can accelerate the development of scabies in the dormitory environment; therefore, it would be impossible to prevent the spread of scabies. Scabies should be prevented by bathing 2 times a day using soap and clean water, changing clothes 2 times a day, ironing clothes before wearing them, not borrowing clothes, towels, and blankets with other people, washing towels at least once a week, and washing bed sheets less than once a week. Aulia et al. (27) reported that ironing clothes, sheets, pillowcases, and bolsters at high temperatures could kill *Sarcoptes scabiei* mites because mites will die at temperatures > 50^{o}C.

The third factor is the contact history, which is measured based on the student's contact history with other students who have contracted this infection while living in Islamic boarding schools. The results showed that 61.8% had a history of contact with scabies sufferers. This study strengthens the results of research of Handari et al. (28) indicating that students who had had contact with scabies sufferers had a greater chance of developing scabies (96.2%), while students who had never had contact but suffered from scabies were 3.8%. History of contact with scabies sufferers is a factor that influences the incidence of scabies.

Karim et al. (20) stated that personal contact was a factor in the transmission of scabies in Bangladesh. This is supported by the findings of research by Raffi et al. (29), reporting the transmission of scabies is influenced by contact frequency and overcrowding. Similarly, the results of a study in Brazil (2) revealed that poor educational levels, low household income, poor housing, and sharing clothes and towels with other family members or persons were all determinant factors for infestation by scabies.

The results of this study confirm the finding presented by Wayangkau et al. (30) reporting that scabies is contracted by direct transmission. It can be seen from the history of contact with previous sufferers that the transmission of scabies can occur by direct contact between sufferers and other people, for example, by shaking hands and sleeping together.

Sarcoptes scabiei cannot fly or jump but crawls at a speed of 2.5 cm per minute on the skin, so the possibility of transmission occurs either by direct contact (contact with the patient's skin, for example, shaking hands, sleeping together, and sexual intercourse) or indirect contact (through objects that have been used by sufferers, such as clothing, towels, pillows, blankets, and others) (12,31,32).

The fourth factor is room humidity, which is measured using a hygrometer. It was found that the humidity in the students' rooms was in low level. The results are in agreement with those of research performed by Nuraini et al. (15) demonstrating that humidity affected the incidence of scabies in the Medan Class I Detention Center.

Scabies can spread in poor hygiene, poor sanitation, damp room conditions, and lack of direct sunlight because the activity of these mites is higher in warm temperatures and humid conditions. Humid room conditions will contribute to the transmission of the disease. Outside the skin, *Sarcoptes scabiei* can survive 2-3 days at room temperature and 40-80% humidity (12-14).

The average humidity of the respondents' rooms

during the study was mostly 40-80%, which was a high enough humidity for *Sarcoptes scabiei* mites to survive in that place. Based on the study results, 80.9% of respondents lived in rooms with poor humidity conditions, whereas 19.1% of the respondents were residing in good-humidity rooms.

The fifth factor is occupancy density, which is evaluated by measuring the house area per occupant of the pesantren. This value is obtained that the dominant room area per student is ≤ 1.5 m^2. This finding in the current research is consistent with those of a study conducted by Wahyudi (2008) at Islamic boarding schools in Kulon Progo, Yogyakarta, Indonesia. The factor of occupancy density was not related to the incidence of scabies ($P<0.001$). Overcrowding was a determining factor in the occurrence of scabies transmission. It was found that 94% of children who slept with sufferers were infected with scabies ($P<0.001$). In line with the study, Sanei et al. (32) reported that dense occupancy rates caused many cases of scabies.

Therefore, one of the factors that is related to scabies transmission is residential density. Scabies often develops in densely populated environments; in dense environments, the frequency of direct contact is very high, both during rest/sleep and other activities (23).

The incidence of scabies in students at the As'ad Islamic Boarding School, Jambi City, Indonesia, is influenced by insufficient knowledge, poor personal hygiene, history of contact, low humidity, and overcrowding. The results of this study will positively contribute to the prevention of scabies, especially in Islamic boarding schools. Therefore, it is hoped that the Islamic boarding schools will involve health workers to educate students about the risk factors for scabies.

Conflict of Interest

The writers declare to the fact that they have no conflict of interest.

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