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RESEARCH ARTICLE

Risk Factors For Scabies In Female Boarding School Ummul Mukminin Makassar, Indonesia: A Case Control Study

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ABSTRACT

Skin diseases are one of the health problems that still exist around the world, including in Indonesia. These diseases can be caused by various factors such as fungi, viruses, bacteria, parasites, and animals. One type of skin disease commonly found in Indonesia is scabies, which is caused by parasites. This study aims to determine the risk factors for the incidence of scabies in ummul mukminin Islamic boarding school. This study is quantitative research using case-control study. The factors most associated with the incidence of scabies were personal hygiene (OR=0.32; 95%CI=0.14-0.71; p=0.002), occupancy density (OR=4; 95%CI=1.65-10.1; p=0.001), and length of stay (OR=2.16; 95%CI=1.03-4.54; p=0.026). Conclusion. Personal hygiene, occupancy density and length of stay are risk factors associated with the incidence of scabies in ummul mukminin Islamic boarding school. It is recommended to santriwati that increasing awareness of personal hygiene needs to be implemented at home, to provide early education on the importance of maintaining personal hygiene, such as regular bathing, washing hands with soap, and maintaining the cleanliness of clothes and the home environment and need to ensure santriwati bring enough personal equipment, such as towels, clean clothes, soap, and other hygiene equipment, so they do not need to share items with roommates, which can increase the risk of scabies transmission.

INTRODUCTION

Skin diseases are still a common health problem worldwide, including in Indonesia. These diseases are caused by various factors such as fungi, viruses, bacteria, parasites, and other organisms (1). One of the common skin diseases in Indonesia is scabies, which is caused by parasites. Scabies is caused by the infestation of Sarcoptes scabiei var hominis mites that enter into the skin layers of the host. Sarcoptes scabiei is considered a significant public health problem as it is a human-dependent parasite (2).

Scabies is a global problem that affects people of almost all ages, ethnicities, and socioeconomic levels. Scabies infestations pose a public health problem in low-income countries and tropical regions such as Africa, Egypt, Central America, South America, northern and central Australia, India, and Southeast Asia (3). According to

the WHO, approximately 300 million cases of scabies occur worldwide each year. In total, more than 130 million people are affected by the disease, with incidence rates ranging from 0.3% to 46%, as reported by the International Alliance for the Control of Scabies (IACS) (4).

According to WHO, more than 200 million people worldwide are infected with scabies, with a 56% higher prevalence among women than men. This is believed to be due to several factors, for example, women tend to spend more time indoors and have closer and longer contact with others, thus making them more susceptible to scabies, including children. Despite the high incidence of scabies, the disease is often overlooked as it is not considered fatal. This neglect leads to scabies treatment not being a top priority, potentially leading to serious complications such as septicemia, undetected acute kidney disease that can develop into chronic conditions in adulthood, and heart disease (4).

According to the Indonesian Ministry of Health, the national prevalence of scabies in Indonesia ranged from 5.60% to 12.96% in 2008, between 4.90% and 12.95% in 2009, and was 2.9% in 2011. In 2012, the rate was 3.6%, in 2013 it ranged from 3.9% to 6%, and in 2014 it fluctuated between 7.4% and 12.9%. Based on data from the Ministry of Health of the Republic of Indonesia, the prevalence of scabies was recorded at 4.60% to 12.95% in 2016, 10.60% to 12.96% in 2017, and 6.95% to 4.95% in 2019. Based on these data, it can be concluded that Indonesia is still facing the problem of scabies, which is an infectious disease that is ranked third out of the 12 most common diseases in the country (18).

The results of the initial survey show that the case of scabies in pesantren needs special attention because of its high transmission rate. This can interfere with the concentration of students while studying and interfere with comfort during rest, especially during night sleep. The increased activity of scabies mites at night causes itching that is very disturbing, so that students cannot concentrate while studying and cannot sleep well. Based on data from the Health Unit of Ummul Mukminin Islamic Boarding School, in 2021 there were 250 students diagnosed with scabies. This number increased to 315 people in 2022 and increased again to 410 people in 2023. The students who are most affected by scabies are MTS and SMP Ummul Mukminin students. The incidence rate is still high every year and continues to increase.

METHODOLOGY

Research Design: This type of research is

quantitative using a case-control study

design.

Population and Sample: The population in this study were all MTS and Ummul Mukminin Junior High School students, namely 348 students.

Research Variables: The dependent variable in this study was the incidence of scabies in female students. The independent variables in this study were personal hygiene, occupancy density, environmental sanitation, socioeconomics, age and length of stay.

Data Analysis: Data processing and analysis in this study used the Stata version 14 program. The relationship and magnitude of risk factors between dependent and independent variables were analyzed using the chi-square test. Multivariate analysis used was logistic regression test with 95% confidence level ($\alpha = 0.05$).

Ethical Approval

This study was approved by the Health Research Ethics Committee of Hasanuddin University with a recommendation for ethical approval number 2949/UN4.14.1/TP.01.02/2024 dated October 8, 2024.

RESULTS

General Characteristics of Variables

Table 3.1 Distribution of Respondents Based on the Characteristics of Female Students at the Ummul Mukminin Islamic Boarding School in 2024

Characteristics	Case		Control	
	n	%	n	%
Class				
SMP	34	41,98	47	58,02
MTS	36	61,02	23	38,98
Age				
>15 year	36	62,02	22	37,93
<15 year	34	41,46	48	58,54

Source: Primary Data

Table 3.1 shows that the proportion of respondents at the junior high school level is greater who have students who do not have scabies (58.02) and the respondents who have the highest scabies students are at the MTS class level (61.02). And in terms of age characteristics, most respondents with an age level >15 years have more students with scabies (62.02) while respondents with an age <15 years have more students who do not have scabies (58.54).

Characteristics of Research Variables

Table 3.2 Distribution of Respondents Based on Research Variables on Female Students at Ummul Mukminin Islamic Boarding School in 2024

Variables	Case		Control	
	n	%	n	%
Personal Hygiene				
Good	38	40,8	55	59,1
Less	32	68,0	15	31,9
Residential Density				
Good	28	73,6	10	26,3
Less	42	41,1	60	58,8
Environmental Sanitation				
Good	44	49,4	45	50,5
Less	26	50,9	25	49,0
Socioeconomic				
Good	54	46,9	61	53,0
Less	16	64,0	9	36,0
Age				
>15 year	36	62,0	22	37,9
<15 year	34	41,4	48	58,5
Length of stay				
>1 tahun	36	61,0	23	38,9
<1 tahun-	34	41,9	47	58,0

Source: Secondary Data

Table 3.2 shows that in the personal hygiene variable, some of the case groups have good criteria as many as 38 respondents (40.86) as well as in the control group who have good criteria as many as 55 respondents (59.14%). In the housing density variable, some of the case groups have less criteria as many as 42 respondents (41.18%) as well as in the control group who have less criteria as many as 60 respondents (58.82%). In the environmental sanitation variable, some of the case groups have good criteria as many as 44 respondents (49.44%) as well as in the control group who have good criteria as many as 45 respondents (50.56%). In the variable age > 15 years, some of the case groups have good criteria as many as 36 respondents (62.02%) different from the control group which has less criteria as many as 48 respondents (58.54%) at age <15 years. And in the variable length of residence > 1 year, some of the case groups have good criteria as many as 36 respondents (61.02%) different from the control group which has less criteria as many as 47 respondents (58.02%) at length of stay <1 year.

Bivariate Analysis

Personal Hygiene Risk on Scabies Incidence in Female Students

Table 3.3 Distribution of Personal Hygiene Risk Factors on Scabies Incidence in Female Students at Ummul Mukminin Islamic Boarding School in 2024

Personal Hygiene	Scabies Incidence				P Value	Odds Ratio (95%Cl)
	Case		Control			
	n	%	n	%		
Less	15	21,43	32	45,71	0,002*	0,32
Good	55	78,57	38	54,29		(0,14-0,71)
Total	70	100	70	100		

Source: Secondary Data

Based on Table 3.3, it shows that poor personal hygiene has a lower risk (68% lower) of getting scabies compared to individuals with good personal hygiene, with an OR value of 0.32, 95% Confidence Interval (CI) of (0.14-0.71) Lower Limit and Upper Limit (LL-UL) because the OR value is less than 1 indicates a protective relationship and indicates that the relationship between personal hygiene and scabies is statistically significant with a p value of 0.002 indicating a high level of significance.

Risk of Residential Density on the Incidence of Scabies in Female Students

Table 3.4 Distribution of Risk Factors for Residential Density on the Incidence of Scabies in Female Students at the Ummul Mukminin Islamic Boarding School in 2024

Residential Density	Scabies Incidence				P Value	Odds Ratio (95%Cl)
	Case		Control			
	n	%	n	%		
Less	60	85,71	42	60,00	0,001*	4
Good	10	14,29	28	40,00		(1,65-10,1)
Total	70	100	70	100		

Source: Secondary Data

Based on Table 3.4, it shows that residential density has an Odds Ratio (OR) value of 4, meaning that residential density can experience scabies 4 times more than individuals living in low-density residential environments, seen from the 95% Confidence Interval (CI) value of (1.65-10.1) with the Lower Limit and Upper Limit (LL-UL) values not including the value of 1 so that the OR value obtained is statistically significant that there is sufficient evidence from data analysis to conclude that residential density is indeed significantly related to the risk of scabies.

Sanitation Risks on Scabies Incidence in Female Students

Table 3.5 Distribution of Environmental Sanitation Risk Factors on Scabies Incidence in Female Students at Ummul Mukminin Islamic Boarding School in 2024

Environmental Sanitation	Scabies Incidence				P Value	Odds Ratio (95%Cl)
	Case		Control			
	n	%	n	%		
Less	25	35,71	26	37,14	0,861	0,94
Good	45	64,29	44	62,86		(0,45-1,98)
Total	70	100	70	100		

Source: Secondary Data

Based on Table 3.5, it shows that good environmental sanitation has a slightly lower value for experiencing scabies compared to individuals who live in an environment with poor sanitation. OR 0.94, Because the 95% CI includes a value of 1, this relationship is considered statistically insignificant. The 95% Confidence Interval (CI) is (0.45-1.98) with the Lower Limit and Upper Limit (LL-UL) values covering a value of 1 so that the OR value obtained is not statistically significant.

Santriwati Socioeconomic Risks for Scabies Incidence in Female Students

Table 3.6 Distribution of Socioeconomic Risk Factors for Scabies Incidence in Female Students at Ummul Mukminin Islamic Boarding School in 2024

Socioeconomic	Scabies Incidence				P Value	Odds Ratio (95%Cl)
	Case		Control			
	n	%	n	%		
Less	9	12,86	16	22.86	0,122	0,49
Good	61	87,14	54	77,14		(0,17-1,21)
Total	115	82,14	25	17,86		

Source: Secondary Data

Based on Table 3.6, it shows that individuals with higher socioeconomic status are 0.49 times less likely to experience scabies. An OR of less than 1 indicates that higher socioeconomic status acts as a protective factor against scabies. However, the 95% Confidence Interval (CI) for this OR is (0.17-1.21) with the Lower Limit and Upper Limit (LL-UL) values.covering a value of 1, so the OR value is not statistically significant.

Santriwati Risk of Length of Stay on Scabies Incidence in Female Students

Table 3.7 Distribution of Risk Factors for Length of Stay on Scabies Incidence in Female Students at Ummul Mukminin Islamic Boarding School in 2024

Length of Stay	Scabies Incidence				P Value	Odds Ratio (95%CI)
	Case		Control			
	n	%	n	%		
Less	47	67,14	34	48,57	0,026*	2,1
Good	23	32,86	36	51,43		(1,03-4,54)
Total	70	100	70	100		

Source: Secondary Data

Based on Table 3.7, it shows that length of residence has an Odds Ratio (OR) value of 2.1, meaning that those with a long residence can experience scabies 2.1 times greater than those with shorter stays, seen from the 95% Confidence Interval (CI) value of (1.03-4.54) with Lower Limit and Upper Limit (LL-UL) values so that they do not include a value of 1, it can be ascertained that length of residence is a risk factor for scabies so that the OR value obtained is statistically significant.

Multivariate Analysis

Table 3.8 Results of Multiple Logistic Regression Analysis of Scabies Incidence in Female Students at Ummul Mukminin Islamic Boarding School in 2024

Research variables	Coef	P value	Odds Ratio (OR)	95%CI for EXP(B)	
				Lower	Upper
Personal Hygiene	-,9266002	,020	,39	,18	,86
Residential density	1,405862	,001	4,07	1,72	9,66
Length of stay	,8292862	,029	2,29	1,08	4,81
Constant	,9090129		,90	,41	2,00

Based on the results of the multivariate analysis in table 3.8 using logistic regression analysis, three variables were obtained with a p value <0.05, namely the personal hygiene variable p = 0.002, the residential density variable p = 0.001, and the length of stay variable p = 0.026. This means that the three variables are related to the incidence of scabies in female students. Based on the OR value of the three variables, residential density is the variable that is the greatest risk factor with an OR value of 4.07 and the 95% CI LL-UL value of 1.72-9.66 does not include the number 1 so that the OR value obtained is significant. This means that students who live with overly dense residential density are at risk of 4.07 times experiencing scabies compared to students who do not live with dense residential density.

According to the results of the previous analysis, the variables that influence the incidence of scabies in female students are personal hygiene, housing density and length of residence. So the regression equation is:

Y = 0,90901 + (4,079043 x 1) + (0,3958974 x 1) + (2,291682 x 1)

= 7,6756324

After obtaining the Y value, the probability of subjects with high-risk characteristics experiencing scabies is obtained using the formula:

$P = 1/ (1 + \exp^{(-y)})$

$P = 1 / (1 + \exp^{(-7,6756324)})$

$= 0,99953592$

This shows that if female students have high-risk personal hygiene, high-risk housing density, and high-risk length of residence, they will experience a probability or risk of experiencing scabies of 100%.

DISCUSSION

Personal Hygiene

Behavior includes all human activities that can be observed directly or indirectly by outsiders. Personal hygiene involves actions to minimize the spread of disease, particularly those caused by poor personal hygiene. Poor personal hygiene increases the chances of the body being susceptible to various skin diseases such as scabies. Conscious personal hygiene plays an important role in determining one's overall health by helping to maintain good health and prevent diseases, particularly skin-related diseases (5).

In practicing personal hygiene, special attention should be paid to hands and nails as they are susceptible to various types of infections. Proper hand and nail care is essential for individuals of all ages and at all times. Keeping hands and nails clean is essential as poor hand hygiene and long nails on patients can lead to scratching of infected skin, which triggers the spread of skin diseases. Ensuring towel hygiene involves regular washing with soap and water to keep them fresh. In addition, basking in the sun and choosing the right mattress also play an important role in determining the quality of one's sleep. To keep the mattress clean and free from germs, it is important to dry the mattress once a week. This is because mattresses can unwittingly become damp due to frequent lying down and erratic room temperatures. Most of the individuals studied were grade 8 students who had poor personal hygiene habits, only a few of whom were grade 9 students, making them more susceptible to scabies than students who had good personal hygiene. Not doing the habit of washing hands regularly, bathing in an improper way, and often sharing personal items such as towels, clothes, or bed linen are significant risk factors (6).

The results of the analysis obtained statistically obtained an OR value = 0.32 (95% Cl: 0.14-0.71), and shows the OR value because it is less than 1, the personal hygiene variable is said to show a protective relationship and shows that the relationship between personal hygiene and scabies is statistically significant with a p value of 0.002 indicating a high level of significance and including risk factors for scabies. In the case group, the distribution of respondents had good personal hygiene compared to the control group who had poor personal hygiene. This is in line with research conducted by Novitasari in 2021 at the As-Syafi'iyyah Islamic Boarding School in Sidoarjo. There is a relationship between personal hygiene, skin hygiene, hand and nail hygiene, foot hygiene, clothing hygiene, and towel hygiene with the incidence of scabies, because poor personal hygiene will affect the disease. Scabies can be transmitted indirectly through blankets, clothing, towels and other personal items. The cleanliness of the tools used daily is closely related to a person's personal hygiene status (7).

Personal hygiene is also influenced by a person's social values and cultural factors, particularly their knowledge and perception of personal hygiene. During the research process of distributing questionnaires, the researcher also provided a gentle consultation on personal hygiene so that students experienced changes in knowledge and habits after the consultation. This shows that improving personal hygiene has a positive impact in encouraging positive changes in self-care behavior and can help reduce the incidence of scabies (8).

Residential Density

One of the factors leading to the high prevalence of scabies in developing countries associated with poverty is housing density. The spread of scabies mites is more likely to occur in close-knit communities or densely populated neighborhoods such as dormitories, school groups, among family members in crowded houses, and even between villages (9).

High housing density not only increases the risk of scabies transmission but also restricts space and worsens ventilation within the home. When residents live close together, physical contact between individuals becomes difficult to avoid, increasing the risk of transmission. Lack of proper ventilation due to overcrowding leads to a humid environment that favors the survival of scabies mites. In densely populated areas with poor air circulation, mites can survive longer on various surfaces, increasing the risk of transmission even without direct contact. High housing density is often accompanied by limited access to adequate sanitation facilities. In many densely populated areas, communal sanitation facilities such as bathrooms and toilets are commonly shared by many people, making it difficult to maintain personal hygiene. This increases the risk of scabies disease transmission in the community, especially if good and regular hygiene management is not carried out (9).

The results of statistical analysis showed an odds ratio value of 4 (95% CI: 1.65-10.1), which means that the odds ratio value is not more than 1. Thus, the variable of student occupancy density is considered significant, so this variable is a risk factor for scabies disease. The average occupancy density of students at Ummul Mukminin Islamic Boarding School is more than 8 m2 per person, with each room occupied by more than 2 people. High occupancy occurs when the number of students occupying one room exceeds its capacity, resulting in a cramped room and inadequate air ventilation. This situation increases the risk of disease transmission, especially infectious diseases through direct contact, such as scabies caused by Sarcoptes scabiei mites (10).

When shelters are overcrowded, physical contact between animals increases, both through daily interaction with fellow animals and through the shared use of personal items. In densely populated areas, scabies is more easily transmitted through skin-to-skin contact or sharing items such as blankets, towels and clothing. In addition, maintaining environmental cleanliness proves more difficult in crowded places that often hinder optimal cleaning routines, making it difficult for schoolgirls to maintain personal hygiene.

This is in line with research conducted by Purba in Lubuk Pakam Subdistrict on school-age children that most of the scabies sufferers surveyed lived in rooms with inappropriate living conditions. The results showed that of the 51 participants in the case group, 37 people (72.5%) lived in rooms with inadequate housing density, while 14 people (27.5%) lived in rooms with adequate housing density. Similarly, research conducted by Audhah at Darul Hijah Islamic Boarding School revealed a significant relationship between population density and the incidence of scabies,

with an odds ratio of 3.6. High population density increases the risk of scabies by 3.6 times compared to low population density. This is due to the high occupancy rate, especially in dormitories, causing increased direct contact between students, thus facilitating the spread of scabies from one student to another (7).

High occupancy density not only increases the risk of scabies transmission but also limits movement space and worsens ventilation in the house. When residents live in tight spaces, physical contact between individuals becomes difficult to avoid, increasing the risk of transmission. The lack of ventilation due to overcrowding creates damp conditions, which favor the survival of scabies mites. Dense environments without good airflow allow mites to survive longer on various surfaces, so the risk of transmission remains even without direct contact.

Housing density is also often associated with limited access to proper sanitation facilities. In many areas with a high number of residents, hygiene facilities such as bathrooms and washing stations are usually shared by many people, which makes personal hygiene difficult to maintain. This increases the risk of scabies spreading between residents, especially if there is no adequate and regular hygiene management (13).

Environmental Sanitation

Environmental sanitation is an effort to control factors that can affect or potentially affect human health and survival. Environmental sanitation in this study includes PHBS standards to create a healthy environment. According to Notoatmodjo, environmental sanitation is an effort to improve or optimize the environment where people live, so as to create an atmosphere conducive to achieving an optimal degree of health for its inhabitants. Efforts to improve the environment have been made from time to time, ranging from simple efforts to modern efforts. (9).

Poor environmental hygiene and sanitation can lead to the spread and transmission of infectious diseases, including scabies. The mites that cause scabies can survive for several days in an unclean and dirty environment, and are easily spread through direct contact with infected individuals (11). Environmental sanitation also includes the management of the physical, biological, social and economic environment. Negative behaviors change the ecosystem and cause environmental sanitation problems that can lead to various diseases, especially scabies (12).

Poor sanitation also results in an unhealthy lifestyle and makes female santri vulnerable to various diseases, such as scabies, tuberculosis, and even HIV/AIDS. PHBS is a healthy behavior that involves knowledge, attitudes, and proactive actions to maintain and prevent disease risks, protect themselves from disease threats, and actively participate in maintaining health. PHBS practices are carried out in various locations frequented by people, such as homes, schools, offices, and public places (such as tourist attractions, mosques, markets, terminals, train stations, ports, orphanages, prisons, and especially pesantren) (13).

The results of the statistical analysis showed an odds ratio value of 0.94, which is very close to 1, meaning that the risk difference is minimal. However, with a value of 1 (95% CI: 0.45-1.98), which indicates OR > 1, the environmental sanitation variable in students is considered insignificant. Therefore, it can be concluded that this variable is not a risk factor for scabies.

Environmental sanitation conditions in this study were good. To achieve a positive environment, it is necessary to adopt healthy living behaviors such as maintaining one's own health. Environmental health efforts aim to improve and optimize the

environment where people live, so as to create an atmosphere conducive to achieving optimal health status for the people who live in it (7).

This study is not in line with research conducted by Ayu Wulandari on the relationship between personal and environmental hygiene with the incidence of scabies disease in students of Ulumul Quran Islamic Boarding School, Bebesen District, Central Aceh Regency, which found a significant relationship. The incidence of scabies disease at the Ulumul Qur'an Islamic Boarding School in Bebesen District, Central Aceh Regency is related to personal hygiene and environmental cleanliness. Most respondents showed sufficient personal hygiene, namely as many as 25 respondents (73.5%), while environmental hygiene was less than standard, namely as many as 43 respondents (68.3%) (14).

Socio-economics

Socio-economics in pesantren encompasses various factors that affect the daily lives of the santri, such as access to facilities, hygiene, and interaction patterns in the dormitory environment. In pesantren, santri's diverse socioeconomic backgrounds often affect various aspects of their lives, such as the availability of personal items, hygiene habits, and consumption patterns and lifestyles. These differences can have an impact on santri health, including the risk of contracting infectious diseases such as scabies. By understanding the socioeconomic influences on health and behavior within pesantren, pesantren administrators can effectively implement preventive measures and create a safe and healthy environment for all students (4).

The results of the statistical analysis showed an odds ratio of 0.49, indicating that individuals with higher socioeconomic status are 0.49 times less likely to get scabies compared to those with lower socioeconomic status. In other words, higher socioeconomic status seems to have a protective effect against the occurrence of scabies. However, with a 95% confidence interval ranging from 0.17 to 1.21, it contains a value of 1 which indicates an odds ratio greater than 1. Therefore, the variable of santri population density is considered insignificant and it can be concluded that the variable is not a risk factor for the occurrence of scabies.

In this study, respondents with low socioeconomic status were found to have scabies, while respondents with high socioeconomic status were found not to have scabies. This is due to the respondents' lack of awareness of personal hygiene, sanitation, and education about personal hygiene, which are crucial factors in disease prevention. Such restrictions can result in decreased habits of maintaining personal and environmental hygiene, thus increasing the risk of exposure to scabies mites. In contrast, individuals with high socioeconomic status generally have better access to health facilities and information. They usually have the ability to purchase necessary hygiene products and have a better understanding of how to prevent infections. Access to health education and disease prevention allows individuals to adopt healthy lifestyle habits such as personal hygiene, washing clothes regularly, and using personal items exclusively, all of which contribute to reducing the risk of developing skin infections (15).

This is in line with Adhi's research which shows that one of the factors causing scabies is low socioeconomic status. Another study consistent with Furwanto's research stated that families with low socioeconomic status had a 2.188 times higher risk of scabies compared to families with high socioeconomic status due to better adherence to healthy living behaviors (16).

The respondents' low economic status causes them to be unable to afford self-care products such as shampoo and soap, which indirectly triggers the occurrence of scabies due to their socioeconomic status. Individuals from low socioeconomic

backgrounds face challenges in meeting their personal sanitation and hygiene needs. It can be challenging for students to fulfill these needs, leading them to borrow or use items such as soap, towels and clothes from their classmates. Therefore, one's socioeconomic status can influence the occurrence of scabies transmission among students. The majority of respondents in this study showed a strong economic status and tended to pursue higher levels of education, allowing them to equip themselves with insights and awareness about the importance of personal and environmental hygiene. Maintaining personal and environmental hygiene can help reduce the risk of various infectious diseases, including scabies (4).

Age

A person's age significantly affects their level of knowledge, attitude and behavior, particularly when it comes to health and prevention of diseases such as scabies. Older people usually have a deeper understanding of health information due to the experience and knowledge accumulated over the years. As they age, they tend to become more receptive to information and realize the importance of maintaining personal hygiene and environmental cleanliness to prevent the spread of diseases. In addition, they are more likely to accept and implement preventive measures compared to younger generations (17).

Cognitively, the ability to think critically and analyze health risks, including the risk of scabies, usually increases with age. Adults have the ability to consider information from multiple perspectives, allowing them to make more accurate health decisions. They tend to understand the importance of staying healthy, taking preventative measures, and avoiding habits that may increase the risk of disease transmission. Their abilities allow them to be more proactive in avoiding dangerous situations, such as sharing personal items or having close physical contact (18).

Adults' attitudes and behaviors usually show more discipline and focus in taking preventive measures. Typically, they prioritize personal hygiene and environmental cleanliness as they are aware of the impact it has on their quality of life. By gaining a better understanding of the risks of infectious diseases such as scabies, older adults are often more encouraged to prioritize their own health and that of those around them. Therefore, age not only affects one's ability to understand health information but also shapes attitudes and habits towards healthy and preventive lifestyles in daily life (1).

In this study, it was found that most respondents with age levels >15 years had more students affected by scabies, namely 36 respondents (62.02) while respondents with ages <15 years had more students who were not affected by scabies, namely 48 respondents (58.54), which means that the age of the students themselves does not determine whether someone is more or less susceptible to scabies and vice versa, this infection is more related to the intensity of physical contact and the quality of personal hygiene that applies in the environment. It is also related to the crowded living conditions that affect all age groups equally. In a dormitory environment, for example, students with various age ranges have the same risk of developing scabies because they live and interact in the same environment. Thus, the difference in prevalence of scabies seen in the <15 years and >15 years age groups is more likely to be caused by environmental factors and not by age itself.

This study is in line with Ibadurrahmi's research which states that there is no relationship between age and the incidence of scabies in students at the Qotrun Nada Islamic Boarding School (8). And not in line with research conducted at the Darul Qur'an Al-Imam Islamic Boarding School which has scabies prevention behavior in early adolescent age category students (11-16 years) is still not good.

This is because in early and middle adolescence a person's maturity level is immature, resulting in a lack of awareness of health. In addition, they are also not able to sort and process the information obtained properly. Another factor that influences the relationship between the age characteristics of female students and the prevention behavior of scabies at the Darul Qur'an Al-Imam Yogyakarta Islamic Boarding School is access to obtain or obtain information easily accessible by students. This is because students at the boarding school are allowed to bring cellphones to the boarding school which can be used during free time or holidays, so that students can easily obtain information related to scabies. However, students with early adolescence are not yet able to process the information obtained properly, so that the information is only taken for granted and not practiced into behavior (4).

Similar to the results of this study, research conducted by Naftassa et al. in 2018 which is not in line with this study, that 96.8% of respondents with junior high school education experienced scabies and 57.9% of respondents with high school education experienced scabies, which means that respondents with junior high school education tend to experience more scabies than those with high school education (17).

Length of Stay

Scabies is a skin disease caused by the Sarcoptes scabiei mite that can easily spread in crowded and closed environments. In environments such as dormitories, Islamic boarding schools, orphanages, and correctional institutions, many residents live close together so that scabies is more easily transmitted. These mites can be transmitted from one person to another through direct contact or by sharing personal items, such as towels, blankets, and clothes. In densely populated areas, frequent physical contact between residents is the main factor that accelerates the spread of this disease (15).

In densely populated and confined environments, scabies can easily spread because residents often share places for activities and sleeping. Lack of hygiene and sanitation in these places also increases the risk of transmission. Almost unavoidable physical contact triggers a chain of transmission that is difficult to stop, especially if prevention and treatment efforts are inadequate. Sharing personal items without adequate disinfection allows mites to survive and continue to spread among residents, increasing the risk of infection (19).

The longer a person lives in a densely populated environment such as a dormitory or Islamic boarding school, the higher the risk of being exposed to scabies. Living for a long period of time will increase the possibility of a person coming into contact with other residents who may be infected. If left untreated, the initial scabies mite infection can continue to grow and spread, causing small outbreaks that are difficult to control. Therefore, maintaining personal hygiene, environmental cleanliness, and early detection and treatment in densely populated areas are very important to prevent the spread of scabies (9). The results of the statistical analysis showed an odds ratio value of 0.94 (95% CI: 0.45-1.98), which means that the odds ratio value does not include the value 1. Therefore, the density variable of student dormitories is considered significant, so it becomes a risk factor for scabies. In this study, it was found that students who had been residents of Islamic boarding schools for more than 1 year had a higher risk of contracting scabies compared to students who had lived in Islamic boarding schools for less than 1 year. This is because most of the students who contract scabies are those who have not adapted to the environment and do not fully understand the lifestyle in the Islamic boarding school, which has an impact on the students' poor health.

Because they are more often exposed to friends who may already be infected and have long physical contact, sharing personal items, and living in the same environment for a long period of time. Close physical contact and sharing items such as clothes, towels, or blankets are the main factors in the spread of scabies. In addition, the longer students live in a dense environment such as an Islamic boarding school, the higher the risk of contracting scabies again, especially if they have not received complete treatment. Limited access to health facilities further exacerbates this situation. Residents of the Islamic boarding school who have been living there for a long time may be accustomed to minimal hygiene standards, increasing the risk of transmission. If the Islamic boarding school does not have consistent prevention procedures, then students who have lived there for more than a year will be more susceptible to scabies.

The results of this study are in line with research showing that students who have lived in Islamic boarding schools for 2 years are more likely to contract scabies. The longer you live in an Islamic boarding school, the higher the risk of transmitting scabies through shared activities such as bathing together, exchanging clothes, towels, and other methods that can cause scabies transmission (4).

These results are not in line with the results of Kuspriyanto's study which showed an Odds Ratio value of 0.302. This means that students who have lived in the environment for ≤1 year have a 3.5 times greater risk of contracting scabies compared to students who have lived in the environment for >1 year. This can be explained that new students who live in Islamic boarding schools are likely to encounter new experiences and are expected to face quite significant differences compared to living with their parents or elsewhere. Therefore, these students need to adapt to their new environment. The speed of new students adapting to life in Islamic boarding schools is slower than the speed of the spread of various health problems such as scabies. Therefore, scabies is not identical to Islamic boarding schools because its transmission can actually be prevented by increasing students' awareness to behave in a clean and healthy way. Old residents

CONCLUSION

Personal hygiene, residential density and length of stay are risk factors associated with the incidence of scabies in the Ummul Mukminin Islamic boarding school. The most influential risk factor is density of housing. It is recommended for female students to reduce activities in one room that exceeds capacity, causing higher physical contact between female students, thus accelerating the transmission of scabies through direct contact and sharing personal items.

AUTHORS' CONTRIBUTION

Conceptualized and designed the study, drafted the manuscript, and performed data analysis.

Collected and curated the data, contributed to the literature review, and assisted in manuscript preparation.

Provided critical revisions, supervised the research process, and approved the final version of the manuscript.

Reviewed the statistical methods, interpreted the results, and contributed to the discussion section.

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