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Risk Factors for Scabies Incidence Among Students at Islamic Boarding Schools in Mamuju Regency, Indonesia

Faktor Risiko Kejadian Skabies pada Santri di Pondok Pesantren di Kabupaten Mamuju, Indonesia

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Abstract

Scabies remains a significant public health issue in Indonesia, with prevalence rates of 5.6-12.9%, ranking as the third most common skin disease. Poor personal hygiene and limited knowledge of prevention are key contributing factors. This study aimed to analyze the relationship between room occupancy density and personal hygiene with the incidence of scabies among students at Mts Raudhatut Tholibin Tohri Islamic Boarding School located in Mamuju Subdistrict, Mamuju Regency, Indonesia. An analytic observational study using a cross-sectional design was conducted with 109 respondents selected through purposive sampling. Data were collected via field observations and structured interviews, then analyzed using chi-square tests. Results showed significant associations between scabies and skin cleanliness ($p=0.001$), nail hygiene ($p=0.001$), clothing cleanliness ($p=0.001$), mattress hygiene ($p=0.001$), pillow cleanliness ($p=0.001$), bedsheet hygiene ($p=0.001$), and towel cleanliness ($p=0.001$). No significant association was found between scabies and prayer equipment cleanliness ($p=0.328$). All dormitories exceeded recommended occupancy standards. In conclusion, personal hygiene factors (particularly skin, clothing, and bedding cleanliness) significantly correlate with scabies incidence. In conclusion, reducing scabies prevalence in boarding schools requires targeted hygiene interventions, better room occupancy management, strengthened health education, and active collaboration with local health services to ensure long-term prevention.

Keywords: boarding school; overcrowding; personal hygiene; room occupancy density; scabies

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Abstrak

Skabies merupakan masalah kesehatan masyarakat yang signifikan di Indonesia, dengan angka prevalensi 5,6–12,9%, menjadikan skabies penyakit kulit ketiga yang paling umum. Kebersihan pribadi yang buruk dan pengetahuan yang terbatas tentang pencegahan merupakan faktor penyebab utama. Penelitian ini bertujuan untuk menganalisis hubungan antara kepadatan hunian kamar dan kebersihan pribadi dengan kejadian skabies pada santri di Pondok Pesantren Mts Raudhatut Tholibin Tohri yang terletak di Kecamatan Mamuju, Kabupaten Mamuju, Indonesia. Penelitian observasional analitik dengan desain potong lintang (*cross-sectional*) ini dilakukan terhadap 109 responden yang dipilih melalui teknik *purposive sampling*. Data dikumpulkan melalui observasi lapangan dan wawancara terstruktur, kemudian dianalisis menggunakan uji *chi-square*. Hasil penelitian menunjukkan adanya hubungan yang signifikan antara kejadian skabies dengan kebersihan kulit ($p=0.001$), kebersihan kuku ($p=0.001$), kebersihan pakaian ($p=0.001$), kebersihan kasur ($p=0.001$), kebersihan bantal ($p=0.001$), kebersihan seprai ($p=0.001$), dan kebersihan handuk ($p=0.001$). Tidak ditemukan hubungan yang signifikan antara kebersihan alat salat dengan kejadian skabies ($p=0,328$). Seluruh asrama melebihi standar kepadatan hunian yang direkomendasikan. Simpulan, faktor kebersihan pribadi berhubungan secara signifikan dengan kejadian skabies. Untuk menurunkan prevalensi skabies di lingkungan pondok pesantren, diperlukan intervensi kebersihan yang terarah, pengelolaan kepadatan kamar yang lebih baik, penguatan edukasi kesehatan, serta kolaborasi aktif dengan layanan kesehatan setempat guna memastikan pencegahan yang berkelanjutan.

Kata kunci: kebersihan pribadi; kepadatan hunian; pesantren; skabies

Introduction

Scabies is a highly contagious skin disease caused by the mite *Sarcoptes scabiei*, which spreads easily through direct physical contact. It affects individuals of all ages and genders equally.¹ Globally, scabies remains a persistent public health issue, with an estimated 100 to 300 million cases annually.²

The World Health Organization (WHO) reports that scabies affects over 200 million people at any given time, with prevalence rates ranging from 0.2% to 71% depending on geographic and socioeconomic contexts. In 2017, scabies and other ectoparasitic infestations were officially classified as Neglected Tropical Diseases (NTDs), underscoring their impact on vulnerable populations.³ In Indonesia, the Ministry of Health reported that scabies ranks third among the 12 most common skin diseases, with prevalence rates ranging from 5.6% to 12.9%.⁴

The disease is particularly prevalent in environments with high population density and close physical contact, such as Islamic boarding schools.⁵ Prior studies have documented high scabies incidence rates in these settings, ranging from 36.6% to 72.2%.^{6,7} Factors such as poor environmental sanitation and inadequate personal hygiene have been identified as significant contributors to the transmission of scabies. Scabies infection is highly contagious and leads to considerable morbidity.⁸

Preliminary data from Mts Raudhatut Tholibin Tohri Islamic Boarding School recorded

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60 scabies cases between January and December 2022, with an increasing trend over the past three years. However, no previous research has investigated specific risk factors for scabies in this setting. Therefore, this study aims to analyze the relationship between room occupancy density and personal hygiene with the incidence of scabies among students at Mts Raudhatut Tholibin Tohri Islamic Boarding School in Mamuju Subdistrict, Mamuju Regency, Indonesia.

Methods

This study employed an analytical observational design with a quantitative approach, using a cross-sectional study framework. The study population consisted of 109 male and female students enrolled at Mts Raudhatut Tholibin Tohri Islamic Boarding School located in Mamuju Subdistrict, Mamuju Regency, Indonesia. A total population sampling technique was applied, whereby all students meeting the inclusion criteria were included as research participants.

Data were collected through structured interviews using validated questionnaires, as well as direct observation with standardized observation checklists. Occupancy density compared with Regulation of the Minister of Health of the Republic of Indonesia Number 2 of 2023 on Implementing Regulations of Government Regulation Number 66 of 2014 Concerning Environmental Health. Before data collection, informed consent was obtained from all respondents to ensure they fully understood the purpose, procedures, and potential risks and benefits of the study. Participants were also informed of their right to decline or withdraw from the study at any time without consequence.

The study was conducted over a period of two months, from May to June 2023. Data were analyzed using the chi-square test to determine the statistical association between independent variables and the incidence of scabies.

Results

Based on the conducted study, several important results were obtained. The data were carefully analyzed to identify key findings related to the research objectives. The following section presents a detailed summary of these results. Based on Table 1 it is known that all the variables studied have a significant relationship with scabies incidence, except for the prayer equipment cleanliness variable (p-value = 0.328).

Based on Table 2 it is known that all student rooms at the Islamic boarding school have occupancy density levels that do not meet the criteria. Room occupancy density variables could not be statistically tested because the room occupancy density variable has homogeneous data, in

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which all respondents live in rooms with occupancy density conditions that do not meet the criteria.

Table 1 Chi-square Test Results of Personal Hygiene with Scabies Incidence in Students at the Islamic Boarding School

Variable	Criteria	Scabies Incidence		Total	p-Value
		Not Scabies	Scabies		
Skin Cleanliness	Poor	3 (6.82%)	41 (93.18%)	44 (40.37%)	0.001
	Good	64 (98.47%)	1 (1.53%)	65 (59.63%)	
Hand, Nail, and Foot Cleanliness	Poor	2 (10.52%)	17 (89.48%)	19 (17.43%)	0.001
	Good	65 (72.22%)	25 (27.78%)	90 (82.57%)	
Clothing Cleanliness	Poor	35 (46.67%)	40 (53.33%)	75 (68.81%)	0.001
	Good	32 (94.11%)	2 (5.89%)	34 (31.19%)	
Prayer Equipment Cleanliness*	Poor	35 (79.54%)	9 (20.46%)	44 (86.27%)	0.328
	Good	7 (100%)	0 (0%)	7 (13.73%)	
Mattress Cleanliness	Poor	41 (49.40%)	42 (50.60%)	83 (76.15%)	0.001
	Good	26 (100%)	0 (0%)	26 (23.85%)	
Pillow Cleanliness	Poor	14 (25.92%)	40 (74.08%)	54 (49.54%)	0.001
	Good	53 (96.37%)	2 (3.63%)	55 (50.46%)	
Bedsheet Cleanliness	Poor	17 (30.90%)	38 (69.10%)	55 (50.46%)	0.001
	Good	50 (92.60%)	4 (7.40%)	54 (49.54%)	
Towel Cleanliness	Poor	9 (21.42%)	33 (78.58%)	42 (38.53%)	0.001
	Good	58 (86.57%)	9 (13.43%)	67 (61.47%)	

*Prayer equipment cleanliness was assessed only among female students.

Table 2 Results of Room Occupancy Density Measurement of Students' Rooms at the Islamic Boarding School

Room		Room Size (m ²)	Number of Occupants	Occupancy Density	Eligibility
Female students	01	20m ²	16	1.25m ² /person	Not eligible
	02	20m ²	14	1.42m ² / person	Not eligible
	03	16m ²	11	1.45m ² / person	Not eligible
	04	15m ²	10	1.5m ² / person	Not eligible
Male students	01	35m ²	20	1.75m ² / person	Not eligible
	02	35m ²	20	1.75m ² / person	Not eligible
	03	35m ²	18	1.94m ² / person	Not eligible

*The qualified occupancy density standard is 9m²/ person

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Discussion

The data analysis results indicate a relationship between skin cleanliness and scabies incidence among students at Mts Raudhatut Tholibin Tohri. This study aligns with previous studies which state that there is a significant relationship between skin cleanliness and scabies.⁹ Poor self-care practices leading to negative or inadequate personal hygiene behaviors make students more susceptible to skin diseases, including scabies.¹⁰ Maintaining skin cleanliness and health from conditions that can increase the risk of diseases significantly affects a person's quality of personal hygiene. It is essential for maintaining health because dirty skin facilitates insect breeding, affecting health, especially skin diseases.⁹⁻¹¹

The condition of unclean skin is partly due to improper bathing habits; inadequate frequency of bathing will make scabies easier to infect, especially in areas such as the fingers, groin folds, and others. Therefore, it is important to maintain skin hygiene to prevent skin diseases caused by mites.^{9,12-14} Maintaining the cleanliness and health of the skin from conditions that can increase the risk of developing diseases will greatly affect a person's personal hygiene quality.^{11,15,16}

Based on the interview results, there are several students with long nails who do not regularly trim them. This study's findings align with previous research indicating a lack of awareness among respondents in maintaining hand, nail, and foot hygiene. Respondents still have poor habits such as not trimming nails at least once a week.¹² For scabies sufferers, mites can attach under the nails when scratching, resulting in poor hand and nail hygiene, which greatly facilitates the spread of *Sarcoptes scabiei* mites to other parts of the body and can also transmit them to others through direct contact. This transmission can be reduced by trimming nails once a week.¹³

Based on the results of the chi-square test, there is a relationship between clothing cleanliness and the occurrence of scabies in students of Mts Raudhatut Tholibin Tohri. Based on interviews, clothing cleanliness is indicated by students who often engage in poor habits such as piling up clothes, not washing clothes with soap, and not changing clothes when sweating.¹¹ This study aligns with previous studies which state that there is a relationship between clothing cleanliness and the occurrence of scabies in students.¹⁵ Clothes absorb sweat and dirt from the body, and if used continuously, can cause unpleasant odors and discomfort due to feeling damp. Therefore, it is necessary to change into clean clothes every day. Clothes come into direct contact with the skin, so if they are wet with sweat, they can become breeding grounds for mites or insects.¹⁶

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Maintaining good clothing hygiene can reduce the risk of students contracting scabies. Thus clothing plays a crucial role in the transmission of scabies mites through direct contact, thereby affecting the occurrence of scabies. For students, it is hoped that they always maintain personal hygiene such as keeping clothes clean, avoiding sharing clothes with other students, and changing clothes when sweating to prevent skin diseases or scabies.¹⁷

Based on the results of the chi-square test, there is no significant relationship between the cleanliness of prayer tools and the occurrence of scabies in students of Mts Raudhatut Tholibin Tohri. This study aligns with previous studies which state that there is no relationship between the cleanliness of prayer tools and the occurrence of scabies.¹⁸ This is because most of the students' prayer tools are in good condition, and female students use their own prayer tools. Moreover, after using prayer tools, most students hang them in clean places and do not place them anywhere. If prayer tools are kept clean, mites will have a harder time infesting individuals because mites can be eliminated by regularly washing prayer tools with detergent, drying/hanging them after use, and avoiding sharing prayer tools.^{18, 19}

Based on bivariate analysis using the chi-square test, there is a relationship between mattress cleanliness and symptoms of scabies. This finding aligns with several previous studies which state that there is a correlation between mattress cleanliness and the occurrence of scabies.²⁰ This can be observed from the frequency distribution, where most students exhibit inadequate mattress hygiene behaviors. The interview results indicate that the majority of students do not sun-dry their mattresses at least once a week, and the mattresses used for sleeping are often stacked together with those of other students. Additionally, there are some students who share the same mattress.²¹⁻²⁴ Mattresses are a determining factor in sleep quality. To keep mattresses clean and prevent mite proliferation, it is necessary to sun-dry the mattresses at least once a week. Mattresses can become damp due to frequent lying down and fluctuating room temperatures. The habit of sun-drying mattresses under direct sunlight at least once a week can help prevent the transmission of scabies.^{16, 25, 26}

Based on the chi-square test results, there is a significant relationship between pillow cleanliness and the occurrence of scabies among the students of Mts Raudhatut Tholibin Tohri. This finding aligns with several previous studies which found a significant association between pillow cleanliness and scabies incidence.²⁷ According to the interviews, the majority of students do not sun-dry their pillows every two weeks. Failure to maintain pillows regularly can increase the risk of disease transmission, which can spread from object to object.²⁵ The *Sarcoptes scabiei* mite, which causes scabies, prefers to live and breed on bedding. Sun-drying pillows once a week and washing pillowcases at least once a week can reduce the occurrence of skin diseases.²⁶

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Based on bivariate analysis using the chi-square test, there is a relationship between bedsheet cleanliness and symptoms of scabies. This finding is consistent with several previous studies which indicated a correlation between bedsheet cleanliness and the occurrence of scabies, with bedsheet cleanliness being a risk factor for scabies incidence.²⁷⁻²⁹ The cleanliness of bedsheets can be a cause of scabies if it is not maintained properly, such as not washing the bedsheets at least once a week and consistently neglecting their cleanliness. This can trigger the proliferation of bacteria, including scabies mites. Scabies mites transmit during sleep when there is direct contact with the bedsheets, resulting in symptoms such as severe itching.²⁹ Regular maintenance of the bedroom and bedding can reduce the transmission of diseases that can spread from object to object. Therefore, it is recommended to always clean the bedsheets after and before sleeping, with the bedsheets ideally being washed 1 or 2 times a week.²⁵

Based on the chi-square test results, there is a significant relationship between towel cleanliness and the occurrence of scabies among the students of Mts Raudhatut Tholibin Tohri. This finding aligns with several previous studies which found a significant association between towel cleanliness and scabies incidence among students.⁹ This is because some respondents still do not routinely wash towels and do not sun-dry them after use. Towels are used to dry the body after bathing. During this process, residual bathwater and dead skin cells adhere to the towel. As a result, the towel becomes damp. This damp condition facilitates the nesting of insects, which can cause skin diseases. Therefore, it is necessary to maintain the cleanliness of towels used.³⁰ The easy attachment, proliferation, and transmission of scabies mites among students are primarily due to damp towels that are rarely sun-dried. Sharing towels interchangeably while they are damp and not sun-drying them can increase the activity of *Sarcoptes scabiei* mites on towels. Consequently, mites on towels used by students suffering from scabies can transfer to healthy students.⁹

Regarding the variable of room occupancy density, a chi-square test was not conducted to determine the relationship between room occupancy density and scabies due to its homogeneous nature, meaning that the entire room does not meet the criteria. However, room occupancy density can be a factor influencing the occurrence of scabies. This can be observed directly in two buildings at the Mts Raudhatut Tholibin Tohri Islamic boarding school, each consisting of 4 rooms for female students and 3 rooms for male students. It can be said that the room occupancy density for students does not meet health standards. This finding aligns with several previous studies which stated that room occupancy density does not meet the requirements because the students are in one room, each room only accommodated by a wardrobe, and each dwelling is very crowded, causing the room conditions to be stuffy and damp.²⁰

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The crowded conditions in a room will result in high direct contact among individuals. Such crowded conditions force students to sleep in cramped conditions. This situation undoubtedly facilitates scabies mites to move from one student to another.^{20, 31–34} The number of occupants in a house or room exceeding its capacity will increase the room temperature, caused by the increased body heat emissions, also increasing humidity. The room occupancy density variable has a very close relationship with the occurrence of scabies. If there is a scabies patient in one room, the likelihood of transmission is very high because direct contact among occupants is also very high. Efforts to prevent scabies transmission should involve adjusting the dormitory rooms for students according to the capacity of students living in that room.³⁵

Conclusion

This study demonstrates a significant relationship between personal hygiene factors including skin, nails, clothing, bedding, and towel cleanliness and the incidence of scabies among students at Mts Raudhatut Tholibin Tohri Islamic Boarding School. While the cleanliness of prayer equipment showed no significant association, the condition of overcrowded dormitory rooms presents a likely contributing factor to disease transmission. These findings emphasize the need for targeted hygiene interventions and improved room occupancy management to reduce scabies prevalence in boarding school settings. Strengthening health education, promoting individual responsibility for hygiene, and fostering collaboration with local health services are essential for sustainable prevention.

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