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Impact of Scabies on Sleep Quality

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ABSTRACT

Background: Scabies is an infectious skin condition that occurs due to an infestation of the small parasitic mite known as *Sarcoptes scabiei var. hominis*. It causes symptoms of itching, which usually worsen during the night and can interfere with sleep. **Purpose:** The aim of the study was to examine how the incidence of scabies relates to the sleep quality of students at Al Anshor Islamic Boarding School in 2022. **Methods:** In this study, a quantitative approach was used with a cross-sectional research design. Primary data was collected through the diagnosis of scabies and the use of the Pittsburgh Sleep Quality Index (PSQI) questionnaire to measure sleep quality. Bivariate analysis was conducted using the chi-square test for data analysis. The research sample was obtained through the stratified random sampling method. **Result:** According to the findings, out of 42 participants, 26 students (61.9%) had scabies, with 11 males and 15 females affected. Most of the scabies cases were found in 17-year-old students. The study also found that all scabies sufferers had poor quality sleep. Statistical analysis revealed a significant association between the incidence of scabies and sleep quality, with a p-value of 0.000 and a 95% confidence interval. **Conclusion:** In conclusion, the study suggests that there is a link between the occurrence of scabies and sleep quality. Therefore, it is important to raise awareness about personal hygiene practices to reduce the spread of scabies.

Keywords: Nighttime itching, Sleep Quality, *Sarcoptes scabiei var*. hominis, Scabies.

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BACKGROUND

Sleep quality refers to the extent to which an individual feels rested, rejuvenated, and alert upon waking up in the morning. Sleep quantity, on the other hand, is the amount of sleep time that a person requires based on their individual sleep needs. Factors such as fatigue and physical activity, psychological stress, medication, and habits related to consumption, age, environment, and lighting can influence both sleep quality and quantity.[1] It is plausible that the decline in sleep quality can be caused by illnesses that are not chronic in nature, such as scabies infestation.[2] Scabies is an infectious disease that is particularly prevalent and widespread in regions with tropical and subtropical climates. Globally, it is estimated that there are around 300 million cases of scabies annually.[3] Various factors, such as age, gender, inadequate personal hygiene, high levels of humidity, and population density, can have an impact on the prevalence of scabies.[4]

Crowded living conditions can be observed in different communities, such as correctional facilities, orphanages, and boarding schools. The incidence of scabies among inmates at Rantauprapat Correctional Facility in Labuhanbatu Regency is 33%.[5] In Muhammadiyah Bangkinang orphanage in Kampar Regency, the occurrence of scabies was 58.9%, whereas in Resource-Poor Communities in Nasarawa State, Nigeria, 65% of children were found to have scabies.[6] In Monrovia, Liberia, the incidence of scabies was 93%.[7]

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A distinctive symptom of scabies is nighttime itching, or nocturnal pruritus, which can disrupt the sleep of the person affected by the condition.[8,9] Nighttime itching (nocturnal pruritus) is strongly associated with changes in the circadian rhythm for sleep in a person.[10] Nocturnal pruritus activates waking-maintaining neurons so as to increase the activity of the cerebral cortex as a result of decreased production of inhibitory neurotransmitters such as Gamma aminobutyric acid (GABA) and guanine, so that sleep-promoting neurons become less active. Itching at night will create sleep disturbances, such as difficulty getting to sleep, waking up frequently at night due to high scratching stimulation, or waking up early in the morning. These sleep disturbance symptoms will lead to excessive fatigue and sleepiness during the day, resulting in a lack of energy and decreased concentration, which is especially common among school-age children. Ambon City has several boarding schools that are susceptible to scabies infestation due to low levels of environmental hygiene and a high population density. One of these schools is Al Anshor Islamic Boarding School, where the majority of students are from impoverished or orphaned backgrounds, leading to inadequate living conditions.

No prior research has been conducted on the correlation between scabies and sleep quality among students at Al Anshor Islamic Boarding School. Hence, the purpose of this study is to examine the connection between scabies prevalence and sleep quality among Al Anshor Islamic Boarding School students.

METHODS

This research is an analytical observational study with a cross-sectional design that was conducted in December 2022. The study aims to investigate the correlation between scabies incidence and sleep quality among Al Anshor Islamic Boarding School students. The scabies diagnosis was conducted by a dermatologist, and the sleep quality was measured using the Pittsburgh Sleep Quality Index (PSQI) questionnaire. The PSQI questionnaire is an international standard instrument and has been made in various language versions with validity ($r = 0.73$) and reliability (Cronbach's $\alpha = 0.83$). There are 7 assessment components used in calculating the PSQI score results. Each component has a score from 0 (no impairment) to 3 (severe impairment). All components are then summed and categorized as good or poor sleep quality. The lowest score is 0, and the highest is 21. The assessment components are subjective sleep quality, sleep latency, sleep duration, sleep habit efficiency, sleep disorders, sleep medication use, and daytime sleep dysfunction. The study employed a stratified random sampling technique, where the population was grouped by gender and the sample size of 42 was taken using the unpaired categorical analytic formula by observing several inclusion criteria, namely Students (santri) who live in Al Anshor Islamic Boarding School for > 6 months and Santri who are willing to be examined and sign the informed consent form. Respondents were excluded from the study if there were exclusion criteria, namely Santri who were on anti-scabies treatment; Santri who were suffering from other skin diseases with itching complaints; Santri who were sick with symptoms that interfere with sleep quality such as fever; and Santri who were taking antihistamine drugs.

The collected data, including demographic characteristics such as gender (male or emale) and age (12-18 years), were recorded in a recapitulation table, cleaned, edited, and coded. Al Anshor Islamic Boarding School is the boarding school with the most students in Ambon City. After a search of all students, it was found that only students with junior high and senior high school education levels who live in the boarding school are included in the age range of 12-18 years. Therefore, students under 12 years of age were not included in the study. Incomplete data were excluded, and the principle of anonymity was applied to the data processing. Statistical analysis was performed using the Statistical Analysis Software Package (SPSS) version 25.0, and the Chi-square or Fisher's test was used to analyze the relationship between sleep quality and scabies incidence. A p value less than 0.05 was considered statistically significant. This study was approved by the Ethics Committee of the Faculty of Medicine, Pattimura University Ambon, under No. 169/FK-KOM.ETIK/VIII/2022.

RESULT

This study analyzed data from 42 subjects, with an equal distribution of male and female participants aged 12 to 18 years (as shown in Table 1). The most common age among the subjects was 17 years old; out of a total population of 239,197 students who did not meet the inclusion criteria were excluded. After conducting an anamnesis and examining signs of scabies, it was found that scabies was most prevalent among 15 and 17-year-olds, with six cases each. Out of the 26 participants who tested positive for scabies, 15 were females and 11 were males, making up 61.90% of the total cases (as shown in Table 2). Based on the

results of the PSQI questionnaire, poor sleep quality was most common among 15-17 years-old, with seven participants each. Out of the 33 participants (78.57%) with poor sleep quality, 19 were females and 14 were males (as shown in Table 3). The statistical analysis using the Fisher Exact Test (due to not meeting the Chi-square requirements) showed a significant relationship between the incidence of scabies and sleep quality, with a p value of 0.000 ($p < 0.05$) (as shown in Table 4).

Table 1. Demographic Characteristics in Santri of Al Anshor Islamic Boarding School in Ambon City

Demographic Characteristics	n=42	%
Age (years old)		
• 12	3	7.14
• 13	2	4.76
• 14	5	11.90
• 15	8	19.05
• 16	8	19.05
• 17	11	26.19
• 18	5	11.90
Gender		
• Male	21	50
• Female	21	50

Table 2. Occurence of Scabies Based on Demographic Characteristics in Santri of Al Anshor Islamic Boarding School in Ambon City

Demographic Characteristics	Occurence of Scabies		Total
	Yes	No	
	n(%)	n(%)	n(%)
Age (years old)			
• 12	3(100)	0(0)	3(100)
• 13	2(100)	0(0)	2(100)
• 14	4(80)	1(20)	5(100)
• 15	6(75)	2(25)	8(100)
• 16	5(62.50)	3(37.50)	8(100)
• 17	6(54.544)	5(45.45)	11(100)
• 18	0(0)	5(100)	5(100)
Gender			
• Male	11(52.38)	10(47.62)	21(100)
• Female	15(71.43)	6(28.57)	21(100)

Table 3. Distribution of Sleep Quality Based on Demographic Characteristics in Santri of Al Anshor Islamic Boarding School in Ambon City

Demographic Characteristics	Sleep Quality		Total
	Good	Poor	
	n(%)	n(%)	n(%)
Age (years old)			
• 12	0(0)	3(100)	3(100)
• 13	0(0)	2(100)	2(100)
• 14	0(0)	5(100)	5(100)
• 15	1(12.50)	7(87.50)	8(100)
• 16	1(12.50)	7(87.50)	8(100)
• 17	4(36.36)	7(63.64)	11(100)
• 18	3(60)	2(40)	5(100)
Gender			
• Male	7(33.33)	14(66.67)	21(100)
• Female	2(9.52)	19(90.48)	21(100)

Table 4. Relationship between the Occurence of Scabies and the Quality of Sleep in Santri of Al Anshor Islamic Boarding School in Ambon City

Occurence of Scabies	Sleep Quality		Total	*p value*
	Good	Poor		
	n(%)	n(%)	n(%)	
Yes	0(0)	26(100)	26(61.90)	*p<0.005*
No	9(56.25)	7(43.75)	16(38.10)	

DISCUSSION

According to the findings of the scabies signs carried out at Al Anshor Islamic Boarding School, over 50% of the subjects were diagnosed with scabies. Similarly, in a study conducted by Kholilah at Madani Unggulan Islamic Boarding School in Bintan Regency, the incidence of scabies was reported to be 81.1%.[11] Another study conducted in Tebo Regency found that the occurrence of scabies was 71.4%.[12] In contrast to other studies, the incidence rate of scabies at Al Anshor Islamic Boarding School is relatively lower, even though it exceeds 50%. Several risk factors, such as insufficient ventilation and lighting, overcrowding with 15-25 students in a room, high humidity, poorly maintained kapok mattresses, and sharing clothing, have been observed by the researcher that can lead to scabies infestation. Therefore, joint interventions from local health centers and authorities are required to provide counseling and promote personal hygiene awareness among students.

According to previous research, the occurrence of scabies is higher in females compared to males. This

finding is consistent with a study conducted in Monrovia, Liberia in 2020, which found that scabies was mostly prevalent among female students, accounting for 96.2% of the cases.[7] Ibadurrahmi's research also found that scabies occurs more frequently in females. This is likely due to the higher occupancy density in female dormitories compared to male dormitories. However, a study conducted by Ejigu et al showed the opposite result, where the incidence of scabies was higher in men than in women.[13] This can be due to the fact that women tend to prefer to take care of themselves and maintain their appearance. Another study conducted in Ethipia found out that occurence of scabies dominantly in male (51.9) than female (48,1).[14,15] The higher occurence of scabies in male also found in Dagne's study et al.[16]

According to the study findings, the age group with the highest occurrence of scabies was between 15 and 17 years old. This is consistent with a 2021 study conducted by Nasir, which found that the highest prevalence of scabies was observed among students aged 15.[17] The findings are comparable to a study conducted in Pati Regency in 2018, where the highest occurrence of scabies was reported among individuals aged between 16 and 18 years old.[18] Another research study revealed that students in the age range of 14 years were the most susceptible group to developing scabies.[19] Younger age which is around 14 years old is a critical period for students who have recently arrived at the boarding school and are adjusting to life away from their families. As a result, their level of independence regarding personal and environmental hygiene is still relatively low.

Out of the 42 participants, 33 of them were identified as having poor sleep quality. The research also revealed that all 26 students affected by scabies had poor sleep quality. The finding on sleep quality in this study is similar to the study in Kulon Progo, where 34.8% of students were found to have poor sleep quality. Various factors can influence an individual's sleep quality, including bodily sickness, emotional strain, psychological conditions, the sleeping environment, such as temperature, ventilation, mattress firmness, sleeping posture, the ratio of room size to occupants, diet, medication, physical activity, sickness, and a way of living.[15,21] To minimize research bias, this study excluded several factors that can impact sleep quality.

Another study conducted in Padang revealed that boarding school students were susceptible to poor sleep quality, and the duration of sleep was the most significant factor, particularly for those who slept less than five hours per day.[22] The findings of the previous study are similar to the situation observed among students at Al Anshor Islamic Boarding School, where the average sleep duration is less than 5 hours. In boarding schools where school-aged children reside, inadequate sleep quality may be attributed to lifestyle factors such as a habit of sleeping late, emotional stress, and the living environment, as well as illnesses like scabies. Emotional stress may be caused by several factors, such as being unused to living in a crowded boarding school environment, separation from parents, fear of disappointing parents regarding academic grades, excessive memorization, and a busy daily schedule. Additionally, some students may cry at night due to fatigue from the boarding school experience. Environmental factors that may affect sleep quality include close and crowded sleeping quarters, uncomfortably high temperatures and humidity, and hard mattresses. The study results indicate that all respondents who were infected with scabies had poor sleep quality. Using the Fisher Exact Test, the study found a significant correlation between scabies incidence and sleep quality with a p-value of 0.000 ($p < 0.05$), as shown in Table 4. This finding is consistent with Refi's 2020 study,[22] which found a significant relationship between scabies incidence and sleep quality. Another study by Novyana in Bandar Lampung also reported a statistically significant relationship between scabies incidence and sleep quality. Although scabies is not a direct cause of sleep disturbance, it can contribute to poor sleep quality due to nocturnal pruritus or itching, especially at night. Pruritus refers to an itchy skin sensation that induces scratching.[23] In scabies patients, pruritus is classified as secondary pruritus with pruritoceptive pathophysiology, meaning that various inflammatory mediators activate the cutaneous nerve endings. Itching is caused by immune responses of type IV,[24] which are delayed in nature.[25]

Mites trigger an inflammatory reaction by releasing substances from their eggs, feces, excrement, saliva, and feet while digging tunnels.[26,27] Since mites are more active in tunneling at night, itching is more pronounced at night (referred to as nocturnal pruritus). Additionally, the immune system can be triggered by decomposing dead mites. Skin temperature and defense mechanisms also change at night, which can exacerbate itching, particularly at night.

Nocturnal itching (itching that occurs at night) is closely linked to disruptions in a person's sleep-wake cycle. This type of itching stimulates neurons that promote wakefulness, leading to increased

activity in the cerebral cortex due to a decrease in the production of inhibitory neurotransmitters like GABA and guanine. As a result, neurons that promote sleep become less active. Nocturnal itching can cause sleep disruptions, which include difficulty falling asleep, frequent waking up at night due to excessive scratching, or early awakening in the morning. Such symptoms can lead to excessive fatigue and drowsiness during the day, which may result in decreased concentration and energy, particularly in school-age children.[28] In summary, the study determined that there is a notable correlation between scabies incidence and sleep quality among students, with a p-value of less than 0.05.

The limitations of this study are that other factors that can interfere with sleep quality in the form of caffeine consumption habits were not recorded, which may be a confounding variable, and the anamnesis and physical examination were carried out by a female dermatologist, so that many of the male students who have entered adolescence feel reluctant to answer questions and show body parts that need to be examined during the examination for the diagnosis of scabies.

The study suggests that patients with scabies experience a decline in sleep quality, indicating a need for local community and boarding school health centers to play an active role in preventing, treating, and educating individuals on the significance of maintaining personal hygiene to reduce the spread of scabies.

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