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Description of *Sarcoptes scabiei* Infestation among Students at Babus Salam Islamic Boarding School, Karawaci

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Abstract: Sarcoptes scabiei, the causative agent of scabies, poses a significant public health concern worldwide, particularly in developing countries where prevalence rates range from 6% to 27%. Factors such as socio-economic status and ecological conditions, notably high-density living environments like dormitories and Islamic Boarding Schools, contribute to increased transmission risk, particularly among children and adults. This study focuses on Babus Salam Islamic Boarding School in Karawaci, Tangerang, Indonesia, characterized by its student community, religious practices, and educational traditions. Employing a descriptive analytic approach with a cross-sectional design, the research involved physical examinations and skin scraping sampling of the students, followed by microscopic analysis in the Parasitology Laboratory of Polytechnic Kemenkes Banten. The findings reveal a 100% absence of Sarcoptes scabiei infestation among the students at Pondok Pesantren Babus Salam. This research underscores the importance of understanding scabies epidemiology in specific demographic settings to inform targeted prevention and control strategies.

Keywords: Sarcoptes scabiei; scabies; Islamic Boarding School; epidemiology; Indonesia.

A. Introduction

Islamic boarding schools (pondok pesantren) hold a significant place in Indonesian education, particularly in Java. However, a common experience among students in these environments is scabies infestation caused by Sarcoptes scabiei mites (et al., 2023). Scabies is prevalent in orphanages and Islamic boarding schools, with studies showing high rates of infestation among children. In Thailand, 87% of children in orphanages were found to have scabies, while a survey in Malaysia reported a 46% prevalence among 10-12-year-olds(Sungkar et al., 2022). Additionally, studies conducted in Jakarta Timur in 2012 and Jakarta Selatan in 2014 reported scabies prevalences of 51.6% and 68% respectively in Islamic boarding schools (et al., 2016),(Adinata et al., 2023). Records from Al-Qur'aniyyah Islamic Boarding School in Tangerang Selatan in 2017 and 2018 showed scabies prevalence rates of 25.6% and 8.89% respectively(Estri & Khotibudin, 2022),(Puspita et al., 2021).

Scabies, caused by infestation with Sarcoptes scabiei var. hominis, is a contagious skin disease. Although S. scabiei has animal variants, they only cause temporary dermatitis and cannot complete their

life cycle in humans (Sungkar et al., 2022). The distribution of scabies is global, with higher prevalence in densely populated areas such as villages, prisons, dormitories, and poorly maintained orphanages. High-density environments like dormitories and Islamic boarding schools are particularly at risk for scabies transmission (Adinata et al., 2023), (et al., 2023),(Trasia, 2021). Given the background described above, this study aims to investigate the prevalence of Sarcoptes scabiei infestation among students at Babus Salam Islamic Boarding School in Karawaci in 2020.

B. Materials and Methods

The study utilized a descriptive cross-sectional design to investigate the prevalence of scabies among students in a religious school. Sampling was conducted at Pondok Pesantren Babus Salam Karawaci, Tangerang, with the research carried out in the Parasitology Laboratory of the Health Analyst Department, Banten Health Polytechnic, from February to March 2020. The population comprised all 898 students of Pondok Pesantren Babus Salam, with a sample size of 62 students determined through the cross-sectional sample size calculation formula. The sampling technique employed was simple random sampling without considering strata within the study population. Research instruments included personal protective equipment, a microscope, forceps, scalpel, spatula, glass slides, cover slips, and sterilized cotton, with materials such as 10% KOH solution, 70% alcohol, and skin scrapings utilized. Data collection involved direct observation, sampling, obtaining permissions and informed consent, and processing skin scrapings with alcohol-sterilized techniques and KOH solution before microscopic examination. Microscopic observation of Sarcoptes scabiei was conducted in the Parasitology Laboratory of the Medical Laboratory Technology Department, Banten Health Polytechnic, involving cleaning the microscope, adjusting lighting, placing the sample, and observing under various magnifications, with validation and verification of findings done by responsible personnel. Data obtained were analyzed descriptively and presented in tables and figures, providing a comprehensive understanding of the research methodology employed in investigating scabies prevalence among students in the mentioned religious school.

C. Result and Discussion

1. Distribution of Respondents by Gender

Table 1. Frequency Distribution of Students from Babus Salam Islamic Boarding School Who Participated in the Study

No	Gender	Frequency	Percentage (%)
1.	Female	31	50
2.	Male	31	50
	Total	62	100

The gender distribution among respondents was evenly split between male and female students, with each comprising 50% of the total sample. This balanced representation ensures gender equity in the study, enhancing the generalizability of the findings (Bissell et al., 2021).

Table 2. Frequency Distribution Based on Clothing Hygiene (Among Male Students)

No	Clothing Hygiene	Frequency	Percentage (%)
1.	Yes	20	65
2.	No	11	35
	Total	31	100

The gender distribution among respondents was evenly split between male and female students, with each comprising 50% of the total sample. This balanced representation ensures gender equity in the study, enhancing the generalizability of the Findings (Mahon et al., 2015).

Table 3. Frequency Distribution Based on Clothing Hygiene (Among Female Students)

No	Skin Hygiene	Frequency	Percentage (%)
1.	Yes	24	77
2.	No	27	23
	Total	31	100%

Similarly, a small percentage of female respondents demonstrate suboptimal clothing hygiene habits, with 23% reporting inadequate practices. Interventions aimed at enhancing clothing hygiene among adolescent females are warranted to mitigate the risk of dermatological problems (Singh et al., 2024).

2. Characteristics of Respondents Based on Skin Hygiene (Male Students)

Table 4. Frequency Distribution Based on Skin Hygiene (Among Male Students)

No	Skin Hygiene	Frequency	Percentage (%)
1.	Yes	26	84
2.	No	5	16
	Total	31	100

A minority of male respondents exhibit poor skin hygiene practices, with 16% reporting inadequate habits. These findings emphasize the importance of promoting better skin hygiene among adolescent males to prevent dermatological issues ((Han et al., 2020).

3. Characteristics of Respondents Based on Skin Hygiene (Female Students)

Table 5. Frequency Distribution Based on Skin Hygiene (Among Female Students)

No	Skin Hygiene	Frequency	Percentage (%)
1.	Yes	22	71%
2.	No	9	29%
	Total	31	100%

Similarlity a minority of female respondents display insufficient skin hygiene practices, with 29% reporting inadequate habits. Efforts to improve skin hygiene among adolescent females are essential for maintaining skin health and preventing dermatological problems (Lee et al., 2020)

4. Characteristics of Respondents Based on Bed Hygiene (Male Students)

Table 6. Frequency Distribution Based on Bed Hygiene (Among Male Students)

No	Bed Hygiene	Frequency	Percentage (%)
1.	Yes	11	35
2.	No	20	65
	Total	31	100

The majority of male respondents demonstrate poor bed hygiene practices, with 65% reporting inadequate habits. Addressing these hygiene practices is crucial for promoting better sleep hygiene and overall health among adolescent males (Alanazi et al., 2023).

5. Characteristics of Respondents Based on Bed Hygiene (Female Students)

Table 7. Frequency Distribution Based on Bed Hygiene (Among Female Students)

No	Bed Hygiene	Frequency	Percentage (%)
1.	Yes	10	32%
2.	No	21	68%
	Total	31	100%

Likewise, a significant proportion of female respondents exhibit inadequate bed hygiene practices, with 68% reporting poor habits. Initiatives to enhance bed hygiene habits among adolescent females are imperative for promoting better sleep hygiene and overall well-being (Alanazi et al., 2023)

6. Characteristics of Respondents Based on Physical Examination/Screening (Male Students)

Table 8. Frequency Distribution Based on Physical Examination/Screening (Among Male Students)

No	Screening Examination	Frequency	Percentage (%)
1.	Symptoms Present	11	35
2.	No Symptoms Present	20	65
	Total	31	100

The majority of male respondents did not show symptoms suggestive of scabies during physical examination/screening, with 65% reporting no symptoms. This suggests a relatively low prevalence of scabies among male students, highlighting the effectiveness of preventive measures (Sunderkötter et al., 2021).

7. Characteristics of Respondents Based on Physical Examination/Screening (Female Students)

Table 9. Frequency Distribution Based on Physical Examination/Screening (Among Female Students)

No	Screening Examination	Frequency	Percentage (%)
1.	Symptoms Present	11	35
2.	No Symptoms Present	20	65
	Total	31	100

Similarly, the majority of female respondents did not exhibit symptoms indicative of scabies during physical examination/screening, with 65% reporting no symptoms. This indicates a relatively low prevalence of scabies among female students, underscoring the success of preventive efforts (Kim et al., 2023).

8. The special data were obtained from microscopic observations conducted by the researcher at the Parasitology Laboratory, Department of Medical Laboratory Technology, Banten Health Polytechnic.

Table 10. Frequency Distribution of Sarcoptes scabiei Microscopic Observation Results

No	Variable	Frequency	Percentage (%)
1.	Positive *Sarcoptes scabiei*	11	35
2.	Negative Sarcoptes scabiei	20	65
	Total	31	100

The table reveals that out of the total 62 samples observed, all were negative for Sarcoptes scabiei, indicating a 100% absence of the parasite among the respondents. This finding suggests that none of the respondents examined showed evidence of Sarcoptes scabiei infestation, indicating a low prevalence or absence of scabies among the studied population. This observation aligns with the broader context of scabies prevalence, which can vary geographically and demographically. Factors such as hygiene practices, living conditions, and access to healthcare services can influence the prevalence of scabies within a population.

The findings of this study indicate that there was no evidence of Sarcoptes scabiei infestation among the students at Pondok Pesantren Babus Salam. This can be

observed from Table 10, which shows that microscopic examination of samples from all 62 respondents yielded negative results for Sarcoptes scabiei (100%).

According to (Marminingrum, 2018), Sarcoptes scabiei infestation typically occurs in thin skin layers, such as between fingers and toes, wrists, outer elbows, front axillary folds, breasts (especially in women), back, waist, navel, buttocks, groin, around the genitals, and penis (in men). It is worth noting that the sampling criteria in this study differed from those described by Marminingrum; the researchers only examined and sampled the hands to the elbows and knees to the feet. This limitation was due to an agreement between the respondents and the researchers, restricting examination and sampling to these body parts. Thus, the researchers did not have the authority to examine or sample other body parts. Furthermore, negative results in microscopic examinations may also be attributed to sampling from respondents who were mostly in the healing stage. By the time of sampling, the lesions may have dried up, making them unsuitable for scraping suspected Sarcoptes scabiei(Arlian & Morgan, 2017) states that primary scabies lesions consist of burrows containing mites, eggs, and metabolic by-products. As the mites dig burrows, they secrete substances that can lyse the stratum corneum. These secretions and excretions cause sensitization, leading to itching (pruritus) and secondary lesions such as papules, vesicles, pustules, and sometimes bullae. Tertiary lesions may also occur, such as excoriations, eczematization, and pyoderma. Mites are only found in primary lesions.

Moreover, adult mites can leave the stratum corneum, attach to clothing, and survive outside the human body for about three days; this period is sufficient for scabies transmission. In this study, the researchers did not examine the respondents' bedding or clothing, where Sarcoptes scabiei might have been present, as they only used the skin scraping method.

However, skin scraping has its limitations. As mentioned in (Kurniati et al., 2014) study, scabies is a skin infestation caused by the obligate parasite Sarcoptes scabiei var. hominis, which is a global health problem in both developed and developing countries due to its rapid transmission through direct contact between humans. Moreover, it often presents clinical symptoms similar to other diseases such as pyoderma and atopic dermatitis, especially in children and immunocompromised individuals. Definitive diagnosis requires identifying the causative parasite conventionally through microscopic examination of skin scrapings, but this method is invasive, impractical, skill-dependent, and often yields negative results, necessitating more practical, non-invasive, easy, and accurate methods.

Another noteworthy observation in this study is that most students at Pondok Pesantren Babus Salam had fairly good personal hygiene habits, as evidenced by Tables 3-8, indicating their understanding of personal and environmental cleanliness. This may contribute to the reduced incidence of scabies at the institution. During the question and answer session with the students, they mentioned that the sanitation facilities at the boarding school had significantly improved, such as replacing the communal bath with individual taps. The increased health promotion efforts regarding waterborne diseases are crucial for preventing scabies transmission among students at Pondok Pesantren, as scabies is considered a water-washed disease that requires clean water for bathing (Septalita et al., 2024)

Expansion of the boarding school's premises has led to a decrease in the number of students per room, reducing overcrowding, which is a known factor in scabies transmission (Naftassa & Putri,

2018). Furthermore, adequate facilities for drying clothes and exposure to sunlight have been provided, preventing dampness in clothing. This aligns with (Sungkar et al., 2022) statement that ironing clothes, drying towels, and airing mattresses under direct sunlight at least once a week can prevent scabies transmission. Mites die when exposed to temperatures of 50ºC for 10 minutes. Therefore, heat from ironing and direct sunlight can kill adult mites clinging to these items if exposed for a sufficient duration. Additionally, bathing twice daily with soap is crucial as it washes away mites from the skin surface.

Tables 8 and 9 show the percentage of students who underwent physical examinations. 35% of both male and female students reported experiencing scabies symptoms, such as itching at night, irritation, and whitish-gray skin bumps between the fingers and on the palms. Despite the presence of clinical symptoms, microscopic examination revealed a 100% negative rate for Sarcoptes scabiei in 62 samples from both male and female students. Thus, Sarcoptes scabiei was not detected. Most of the students suspected of having Sarcoptes scabiei infestation had lesions that had dried up and turned black but were still itchy. Some also reported night itching without visible lesions in the affected areas. Several possibilities may explain the occurrence of symptoms. Scabies has a long incubation period, so individuals may not realize they have been exposed until clear clinical lesions appear (Menaldi et al., 2021). In some cases, rashes and itching may persist for several weeks after treatment. This is likely because dead mites remain beneath the skin surface. Nodules on the skin may also persist for several months after treatment (Marminingrum, 2018). Another potential cause of itching is the opening of the stratum corneum layer, allowing bacteria to infect the skin. This condition is known as secondary scabies infection. The bacteria commonly responsible for secondary scabies infection are Staphylococcus aureus and Streptococcus pyogenes (Sungkar et al., 2022). These bacteria cause pyoderma, which is often found in scabies cases. The annual incidence of bacteremia caused by S. aureus is six times higher in Aboriginal populations with a high prevalence of scabies than in other populations in Australia. Methicillin-resistant S. aureus (MRSA) infects 64% of children with scabies in hospitals in Western Queensland. There is ample epidemiological evidence of the close relationship between scabies and secondary bacterial infections, but further research is needed to understand the relationship between hosts, mites, and bacteria. Scabies is a major risk factor for skin infection by bacteria and increases the incidence of MRSA infections, underscoring the importance of understanding the relationship between humans, mites, and bacteria (Sungkar et al., 2022).

Based on the data collected in this study, it can be inferred that most students at Pondok Pesantren Babus Salam may have experienced parasitic infection by Sarcoptes scabiei at some point. However, due to changes in the environment and student behavior, the incidence of Sarcoptes scabiei infection at Pondok Pesatren Babus Salam seems to be significantly reduced.

D. Conclusion

Research conducted on 62 student samples at Pondok Pesantren Babus Salam Karawaci revealed no evidence of Sarcoptes scabiei infestation in any of the skin scraping samples examined, indicating a complete absence of the parasite. Additionally, scabies occurrence among male and female students at the pesantren was minimal and did not demonstrate a significant proportion. These findings indicate a low prevalence of scabies infestation among the students, reflecting good overall health and hygiene practices at Pondok Pesantren Babus Salam.

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