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FACTORS ASSOCIATED WITH SCABIES AMONG STUDENTS OF AN ISLAMIC BOARDING SCHOOL IN THE TIRTAYASA PUBLIC HEALTH CENTER AREA: A CROSS-SECTIONAL STUDY

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ABSTRACT
Scabies is an infectious dermatological condition resulting from infestation by Sarcoptes scabiei var. hominis. The disease commonly occurs in settings characterized by dense living conditions and suboptimal hygiene behaviors. Indonesia remains among the countries with a high scabies burden worldwide. Previous investigations have reported a substantial prevalence of scabies in Islamic boarding schools, including a prevalence rate of 76.9% documented in Bogor. This study aimed to examine factors associated with scabies occurrence among students residing in Islamic boarding school within the service area of the Tirtayasa Public Health Center. An analytical observational study using a cross-sectional design was carried out involving 90 participants selected through total sampling. Data were analyzed using the Chi-square statistical test to determine associations between variables and scabies incidence. Scabies was diagnosed in half of the study population (50.0%). Male students constituted 52.2% of respondents. Adequate knowledge regarding scabies was observed in 36.7% of participants, while 66.7% demonstrated good personal hygiene practices. Statistical analysis revealed significant associations between scabies incidence and gender ($p = 0.02$), level of knowledge ($p = 0.002$), and personal hygiene status ($p < 0.001$). Lower levels of knowledge were associated with a higher proportion of scabies cases, likely reflecting insufficient understanding of transmission mechanisms and preventive measures. Poor personal hygiene was also identified as a key factor facilitating mite infestation and increasing the risk of disease spread through direct or indirect contact. Scabies incidence among students in Islamic boarding school within the Tirtayasa Public Health Center area was significantly associated with gender, knowledge level, and personal hygiene practices.

KEYWORDS: Gender, Level of knowledge, Personal hygiene, Scabies, Boarding school.

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1. INTRODUCTION

Scabies is a communicable skin disorder resulting from infestation by the parasitic mite Sarcoptes scabiei var. hominis (Widaty et al., 2023). The mites burrow into the superficial layers of the skin, triggering inflammatory responses that manifest as intense pruritus and characteristic skin lesions (Gunardi et al., 2022). Internationally, scabies has been described using various traditional terms, including the itch, sky-bees, uncle itch, and seven-year itch (Widaty et al., 2024). In Indonesia, the condition is widely recognized under local names such as kudis, gudik, or buduk (Widaty et al., 2019). The continued presence of scabies in low-and middle-income countries is closely associated with socioeconomic challenges, crowded living environments, and inadequate hygiene behaviors (May et al., 2019).

Clinically, scabies commonly presents with erythematous papules or small vesicular lesions, particularly involving the interdigital spaces, flexor surfaces of the wrists, elbows, and knees, as well as the genital area, breasts, shoulders, and other covered regions of the body (Siddig & Hay, 2022). Patients often experience severe itching that becomes more pronounced at night, corresponding to heightened mite activity during this period (WHO, 2008). Persistent scratching may damage the integrity of the skin, thereby increasing the risk of secondary bacterial infections and other complications (Ong & Vasanwala, 2018).

Indonesia is considered one of the countries with the highest scabies burden worldwide (Osti et al., 2019). National surveillance data show that scabies consistently ranks among the top three of the twelve most commonly reported skin diseases in the country and remains an ongoing infectious disease concern (Puspita et al., 2021). Reflecting its global distribution and public health impact, scabies was officially classified as a neglected tropical disease (NTD) in 2017 (van der Linden et al., 2019). Environments that involve frequent close contact and high residential density, such as Islamic boarding schools, provide favorable conditions for scabies transmission (Ulya, 2023).

Numerous studies have documented the high prevalence of scabies among students living in Islamic boarding schools. Research conducted in Bogor reported a prevalence of 76.9% among boarding school residents (Hasti et al., 2024). In Tasikmalaya Regency, Ina Ratna (2013) found that 27.21% of students at Sukahideng Islamic Boarding School developed scabies within one year (Azzahra et al., 2024). Similarly, a study by Hani Nurfitriza in East Bandung City in 2015 identified scabies in 45.45% of boarding school students (Widaty et al., 2022). These findings highlight the substantial vulnerability of boarding school settings to scabies transmission and outbreaks.

Primary health care facilities have a crucial role in scabies prevention and control, including early diagnosis, appropriate treatment, and the implementation of health education programs aimed at reducing disease transmission (Wahdini et al., 2025). Scabies is primarily spread through prolonged direct skin-to-skin contact, particularly among individuals who share sleeping spaces or live in proximity, conditions commonly found in institutional and communal living environments (Oktarina et al., 2021).

The Tirtayasa Public Health Center is a rural primary care facility serving a population of 59,937 residents across 14 villages, including Wargasara Village (Tunda Island), which is classified as a remote area. According to the 2023 morbidity report, scabies ranked third among the ten most frequently diagnosed conditions at the Tirtayasa Public Health Center. Within its service area, six Islamic boarding schools are located. The persistently high incidence of scabies in the Tirtayasa District provided the rationale for this study, which aimed to analyze factors associated with scabies among students attending Islamic boarding school within the Tirtayasa Public Health Center area (Gupta et al., 2024).

2. LITERATURE REVIEW

2.1. Scabies

Scabies is a skin infection caused by the tiny mite Sarcoptes scabiei, which lives on the skin of sufferers. This mite, which is widespread worldwide, can be transmitted from animals to humans and vice versa. The mite measures 200-450 microns and is oval in shape, with a convex dorsal surface and a flat ventral surface. Scabies is also known as the itch, seven-year itch, Norwegian itch, gudikan, gudig, agogo itch, budukan, and Ampera disease (Fernando et al., 2024).

Scabies is an epidemic disease in many communities. It is most common in children and young adults, but it can affect people of all ages. Incidence is equal in men and women. The incidence of scabies in developing countries exhibits a fluctuating cycle that remains unexplained. The interval between the end of one epidemic and the beginning of the next is approximately 10-15 years. Several factors that can contribute to its spread include poverty, poor hygiene, sexual promiscuity,

misdiagnosis, demographics, ecology, and individual sensitivities (Hay et al., 2012). The incidence in Indonesia remains quite high, with the lowest in North Sulawesi and the highest in West Java. Furthermore, transmission can occur through sharing a bed, clothing, bedding, or other items. This is especially true in Islamic boarding school (pesantren). Most students share clothing, prayer items, and toiletries with their friends, making scabies highly contagious, given that poor hygiene is a key factor contributing to its spread (de Jong et al., 2018).

Scabies is caused by a tiny, eight-legged mite (Sarcoptes scabiei) and is contracted through close physical contact with an infected person. Prolonged hand-holding is a common cause of the disease (Fernando et al., 2024).

Skin lesions can be caused not only by the scabies mite but also by the sufferer themselves, through scratching. This scratching is caused by itching. The itching is caused by sensitization to the mite's secretions and excretions, which occurs approximately a month after infestation (Paray et al., 2025). At this point, the skin lesions resemble dermatitis, with papules, vesicles, urticaria, and other lesions. Scratching can lead to erosions, excoriations, crusting, and secondary infections (Pesqué et al., 2024).

Scabies is transmitted from one person to another through close, direct contact, for example, between family members or between children in orphanages who sleep together in the same bed (Zewude et al., 2024). Transmission is usually through fertilized female Sarcoptes scabiei mites or occasionally by larvae. Dogs and cats with scabies living indoors can be a significant source of infection for the families they care for (Kumar et al., 2024).

The parasite can be eradicated with 25% benzoate benzoate emulsion, 1% gamma benzene hexachloride, or 25% monosulfiram. Antibiotics are given if secondary bacterial infections occur, and antihistamines are given to treat the severe itching experienced by sufferers (Salle et al., 2024).

Mating in Sarcoptes scabiei mites occurs on the surface of the skin or in skin tunnels, following the tunnels created by the female mites. The mites burrow and feed on the skin epithelium and fluids from the skin cells; they burrow along the stratum corneum. The burrowing rate reaches 0.5 mm per day, while the average mite can walk at about 2.5 cm per minute (Thomson et al., 2023). The tunnels inhabited by the mites appear as lines under the skin, ranging from a few mm to a centimeter in length. The life cycle of Sarcoptes scabiei goes through four stages: egg, larva, nymph, and adult. Adult mites lay 1-3 eggs per day in the tunnels they create. The fertile period for a female mite is approximately two months (AO Elsaftawy et al., 2023).

Within 3-5 days, the eggs hatch into larvae with six legs, resembling adult mites. The larvae then emerge from the tunnels and reach the skin surface. When on the surface of the skin, many larvae do not survive; some that are still alive will re-enter the stratum corneum or hair follicles to create pockets where the larvae shed their skin (Brewer et al., 2025).

After 2-3 days, the larvae transform into protonymphs. The protonymphs then molt to become deutonymphs, and after a few days, the nymphs molt and become adult mites. Some adult mites mate in sacs created during the larval stage or migrate to the skin's surface and mate there. Mated, egg-bearing females immediately dig skin tunnels to lay their eggs. The life cycle from egg to adult is approximately 10-19 days. Female mites can live for up to a month on human skin, but when not on the skin, they only survive for 2-4 days (Jin et al., n.d.).

3. METHOD

This research adopted an analytical observational design using a cross-sectional framework. The study was carried out at Al-Hamra Islamic Boarding School, located within the service coverage of the Tirtayasa Public Health Center, from February to March 2024. The study population consisted of all male and female students residing at Al-Hamra Islamic Boarding School under the Tirtayasa Public Health Center jurisdiction. Eligible participants included students who lived in the boarding school environment, had a history of scabies, presented potential risk factors for scabies transmission, or were enrolled as part of routine monitoring following previous scabies cases. Students receiving ongoing scabies treatment during the data collection period were excluded to avoid bias related to therapeutic effects. A total sampling method was applied to determine the study sample (Anggina & Prameswarie, 2024). All students who met the inclusion criteria were recruited, yielding a total of 90 respondents for analysis.

4. RESULT AND DISCUSSION

4.1. Description of Research Subjects

Data were obtained through structured questionnaires and direct clinical examinations. The questionnaires assessed participants' knowledge of scabies and personal hygiene behaviors. Knowledge level was categorized as good when the total score reached or exceeded 50% and poor when the score

was below 50%. Personal hygiene status was classified using the same scoring threshold, with scores ≥50% indicating good hygiene and scores <50% indicating poor hygiene.

Scabies diagnosis was established through direct physical examination conducted by the researchers, based on the presence of the four cardinal clinical signs of scabies (Azzahra et al., 2024). A participant was considered to have scabies if at least two of these cardinal signs were identified during examination (Hasti et al., 2024). Statistical analysis was performed using the Chi-square test to evaluate associations between scabies occurrence and the independent variables examined in this study. Table 1 presents the distribution of respondents by gender and their association with the incidence of scabies.

Table 1: Gender Characteristics and the Association Between Gender and Scabies Incidence

Gender	Scabies		Total (Percentage)	*Chi Square*
	Yes n (%)	No n (%)	n (%)	0.02
Female	16 (35.6%)	27 (60%)	43 (47.8%)	
Male	29 (64.4%)	18 (40%)	47 (52.2%)	
Total	45 (100%)	45 (100%)	90 (100%)	

Table 2 presents the distribution of respondents according to level of knowledge and its association with scabies incidence.

Table 2: Level of Knowledge Characteristics and the Association Between Level of Knowledge and Scabies Incidence

Level Of Knowledge	Scabies		Total (Percentage)	Chi Square
	Yes n (%)	No n (%)	n (%)	0.002
Good	9 (20%)	24 (53.3%)	33 (36.7%)	
Poor	36 (80%)	21 (46.7%)	57 (63.3%)	
Total	45 (100%)	45 (100%)	90 (100%)	

Table 3 presents the distribution of respondents according to personal hygiene and its association with scabies incidence.

Table 3: Personal Hygiene Characteristics and the Association Between Personal Hygiene and Scabies Incidence

Personal Hygiene	Scabies		Total (Percentage)	Chi Square
	Yes n (%)	No n (%)	n (%)	0.000
Good	16 (35.6%)	44 (97.8%)	60 (66.7%)	
Poor	29 (64.4%)	1 (2.2%)	30 (33.3%)	
Total	45 (100%)	45 (100%)	90 100%)	

5. DISCUSSION

A total of 90 students participated in this study. Among respondents diagnosed with scabies, male students constituted a slightly higher proportion, with 47 cases (52.2%), while female students accounted for 43 cases (47.8%). Analysis using the Chi-square test indicated a statistically significant association between sex and scabies occurrence ($p = 0.02$; $p < 0.05$), suggesting that gender was significantly related to the incidence of scabies (Table 1).

Scabies diagnosis in this study was determined based on the presence of at least two of the four established cardinal signs. These clinical indicators include intense nocturnal itching; the presence of similar symptoms among individuals living in close contact, such as household members, community residents, or dormitory occupants; characteristic skin lesions—including burrows, papules, vesicles, or pustules—located in typical predilection sites such as the interdigital spaces, wrists, extensor surfaces of the elbows, anterior axillary folds, areola mammae in females, umbilical area, buttocks, external genitalia in males, and the lower abdomen; as well as the detection of mites (Anggina & Prameswarie, 2024).

With regard to knowledge level, the majority of respondents demonstrated limited understanding of scabies (63.3%), while only 36.7% were classified as having good knowledge. Among the 45 participants diagnosed with scabies, a substantial proportion (80.0%) had poor knowledge, whereas only 20.0% exhibited good knowledge. The Chi-square analysis showed a significant association between knowledge

level and scabies incidence ($p = 0.002$; $p < 0.05$), as shown in Table 2. These results indicate that inadequate knowledge may contribute to insufficient preventive practices and delayed identification of scabies symptoms.

Assessment of personal hygiene revealed that most respondents were categorized as having good hygiene practices (66.7%), while 33.3% were classified as having poor hygiene. In contrast, among participants with scabies, poor personal hygiene was more prevalent (64.4%) compared with good hygiene practices (35.6%). Statistical testing demonstrated a strong and significant relationship between personal hygiene status and scabies occurrence ($p < 0.001$), underscoring the critical role of hygiene in scabies transmission (Table 3).

Scabies is a parasitic skin infestation caused by Sarcoptes scabiei (Engelman et al., 2020). The disease spreads primarily through prolonged direct skin-to-skin contact, such as sharing sleeping areas or close physical interaction with an infected individual. Indirect transmission may also occur through contact with contaminated personal items, including bedding, clothing, or towels (Walker et al., 2020). These modes of transmission help explain the heightened susceptibility of individuals living in communal settings, such as Islamic boarding school, where close contact and shared facilities are common.

5.1. Gender

The results of this study demonstrated a statistically significant relationship between gender and the occurrence of scabies among students residing in Islamic boarding school within the Tirtayasa Public Health Center service area ($p = 0.02$). This finding indicates that gender may play a role in influencing the risk of scabies transmission in boarding school settings.

These findings are in line with research conducted by Al Audhah, which reported that males had a substantially higher likelihood—up to 24 times—of developing scabies compared to females (Tsoi et al., 2021). This elevated risk among male students may be attributed to overcrowded living arrangements commonly found in male dormitories. An imbalance between the number of occupants and available sleeping spaces increases population density, thereby facilitating frequent close contact and enhancing opportunities for scabies transmission (Matthewman et al., 2020).

In contrast, the results of this study differ from those reported by Upriyatul Ulya. Her cross-sectional quantitative study conducted at the Daarul Ilmi Cengklong Islamic Boarding School in December 2022 found no significant association between gender and scabies incidence (Ulya, 2023). The study involved 72 respondents selected through total sampling and utilized structured questionnaires for data collection. Although the proportion of male students affected by scabies (53.8%) was slightly higher than that of female students (48.5%), statistical analysis using the Chi-square test showed no meaningful association between gender and scabies occurrence ($p = 0.828$).

Variations in findings across studies may be explained by differences in environmental conditions, dormitory capacity, hygiene standards, and behavioral practices among students. These factors underscore the context-dependent nature of scabies transmission in communal living environments such as Islamic boarding school.

5.2. Level of Knowledge

The findings of this study revealed a statistically significant association between students' level of knowledge and the incidence of scabies in Islamic boarding school within the Tirtayasa Public Health Center service area ($p = 0.002$). This result indicates that knowledge is a crucial factor influencing scabies occurrence. Many students, both male and female, still have a limited understanding of scabies transmission mechanisms and appropriate control measures, which may contribute to the persistently high number of cases observed in boarding school environments. Individuals with inadequate knowledge are more likely to experience scabies due to insufficient information that hinders the adoption of effective preventive behaviors (Leung et al., 2020).

These results reinforce the role of knowledge as a key determinant in scabies prevention. Limited awareness is often associated with higher disease prevalence, whereas improved knowledge has been shown to contribute to a reduction in scabies cases (Al-Dabbagh et al., 2023). According to Notoatmodjo, higher levels of formal education generally facilitate the comprehension and acceptance of health-related information. However, knowledge acquisition is not solely dependent on educational attainment, as factors such as motivation, perceived information needs, personal experiences, and peer influence also substantially shape an individual's level of understanding (Richards, 2021).

The present findings are consistent with those reported by Widaty et al. (2025), who demonstrated a significant increase in participants' scabies-related knowledge following an educational intervention ($p < 0.001$). In their study, 85% of participants showed improved post-test scores compared to pre-test assessments. Correct responses increased in 11 out of 12 knowledge domains, particularly regarding

scabies symptoms and clinical manifestations, where post-test accuracy reached 100%. Nevertheless, knowledge related to mite eradication from fomites and preventive strategies showed less improvement, highlighting specific gaps that should be addressed in future health education initiatives.

Furthermore, Widaty et al. emphasized the effectiveness of scabies training programs delivered to non-medical personnel (NMP), particularly senior students designated as health cadres within boarding school communities. Younger individuals were selected due to their close peer interactions, which facilitated information dissemination, early case identification, and environmental management. Previous studies assessing the diagnostic performance of non-expert examiners reported a sensitivity of 55.3% and a specificity of 89.9%, with higher accuracy observed in moderate to severe scabies cases. This task-shifting strategy has also been endorsed by the World Health Organization as an approach to optimize human resources through the redistribution of specific healthcare tasks (WHO, 2008).

Overall, strengthening scabies-related knowledge through structured education and targeted training programs has been shown to improve early detection and support prevention efforts. Health education interventions implemented in Islamic boarding schools have resulted in substantial improvements in students' knowledge levels, with one study reporting an increase in the proportion of students with good knowledge from 7.67% to 73.1% following educational activities, accompanied by a marked decline in poor knowledge levels (Ong & Vasanwala, 2018). These findings suggest that enhancing knowledge among students and non-medical personnel can play a pivotal role in reducing scabies transmission and supporting sustainable disease control in boarding school settings.

5.3. Personal Hygiene

The present study found a statistically significant association between personal hygiene and scabies incidence among students in Islamic boarding school within the Tirtayasa Public Health Center service area ($p < 0.001$). Personal hygiene has long been recognized as a major risk factor for scabies transmission (Iyengar et al., 2024). Inadequate hygiene practices create favorable conditions for Sarcoptes scabiei infestation, thereby increasing the risk of both direct and indirect transmission.

Students with poor personal hygiene are more vulnerable to scabies, particularly when exposed to infected individuals or to fomites contaminated with scabies mites. Insufficient hygiene practices allow mites to persist on the skin and personal belongings, facilitating infestation. Conversely, students who maintain good personal hygiene—such as bathing regularly with soap, changing clothes daily, washing and ironing garments, and keeping personal items clean—are less likely to experience mite infestation, as these practices help eliminate mites from the skin and fomites. Thus, personal hygiene plays a fundamental role in preserving health, promoting well-being, and preventing communicable skin diseases.

The findings of this study are consistent with research conducted by Anggina (2024), which reported a significant relationship between personal hygiene behaviors and scabies incidence among female students in an Islamic boarding school in Tasikmalaya Regency ($p = 0.015$) (Anggina & Prameswarie, 2024). That cross-sectional study, involving 59 respondents selected through random sampling, demonstrated that inadequate hygiene practices were associated with an increased risk of scabies. These results highlight the importance of strengthening hygiene behaviors as a preventive strategy in boarding school settings.

Similarly, a study by Ulya (2022) conducted at the Daarul Ilmi Cengklong Islamic Boarding School identified a significant association between personal hygiene and scabies occurrence ($p = 0.034$) (van der Linden et al., 2019). Comparable findings were also reported by Majid, Ratna, and Susan (2020), who observed that a larger proportion of students exhibited poor hygiene compared to good hygiene, and that personal hygiene was significantly related to scabies incidence ($p = 0.042$). Collectively, these studies emphasize that inadequate personal hygiene remains a key contributor to scabies transmission in communal living environments.

Additional evidence is provided by Abrar Ghifari et al. (2024), who demonstrated significant associations between multiple components of personal hygiene—including skin, hand, nail, clothing, and towel hygiene—and scabies incidence among junior high school students ($p < 0.05$). Their findings underscore the need to improve both personal hygiene practices and environmental sanitation as early preventive measures against scabies.

In contrast, a study by Aliffiani and Mustakim (2020) conducted at the Ar-Rofi'i Islamic Boarding School reported no significant association between personal hygiene and scabies incidence ($p = 1.000$), despite a higher proportion of scabies cases occurring among students categorized as having good personal hygiene (van der Linden et al., 2019). Differences in

study outcomes may be attributed to variations in study settings, hygiene assessment instruments, measurement methods, and environmental sanitation conditions.

Although this study was limited by a relatively small sample size, the number of participants was comparable to that of several previous studies conducted in similar boarding school environments. Future studies with larger sample sizes and more comprehensive evaluations of hygiene behaviors and environmental factors are recommended to further clarify the role of personal hygiene in scabies transmission.

6. CONCLUSION

This study demonstrated that gender, level of knowledge, and personal hygiene were significantly associated with scabies incidence among students residing in Islamic boarding school within the Tirtayasa Public Health Center service area in 2024. These findings indicate that scabies transmission in boarding school settings is influenced by modifiable behavioral and demographic factors. Strengthening school-based health education, promoting consistent personal hygiene practices, and optimizing the role of primary health care services are essential to reducing scabies transmission. The Tirtayasa Public Health Center is encouraged to implement targeted prevention and control strategies, including routine screening, health promotion activities, and collaboration with boarding school administrators, to support sustainable scabies control in Islamic boarding school environments.

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