

Analysis of Risk Factors for Scabies in Islamic Boarding Schools: A Literature Review

Nurfitriyani^{1*}, Sulistyawati¹, Fardhiasih Dwi Astuti¹

¹ Department of Environmental Health, Public Health Study Program, Postgraduate Program, Faculty of Public Health, Ahmad Dahlan University, Prof. DR. Soepomo, S.H., Warungboto Umbulharjo Street, Yogyakarta, 55164, Special Region Yogyakarta, Indonesia

*Corresponding Author, Email: nurfitriyani.kesmas@gmail.com

ABSTRACT

Scabies remains a significant public health problem in Indonesian Islamic boarding schools, where overcrowding and inadequate sanitation facilitate transmission. This systematic literature review aimed to synthesize evidence on personal and environmental risk factors associated with scabies in these settings. The review question was developed using the PIOT model. A systematic search was conducted through Publish or Perish across Scopus, Crossref, Google Scholar, and Semantic Scholar on April 21, 2025, applying Boolean operators and limiting results to English and Indonesian case-control studies with full-text availability. Study selection followed PRISMA procedures, yielding 11 eligible studies from 1,500 identified records. Screening, selection, and data extraction were performed manually by two independent reviewers. Risk of bias was assessed using the Newcastle–Ottawa Scale (NOS), and certainty of evidence was evaluated with the GRADE approach. Consistent determinants identified included personal hygiene, knowledge, environmental sanitation, crowding, attitudes, socioeconomic status, waste management, and age. NOS scores ranged from 6–8, indicating generally good quality, while GRADE showed mostly moderate certainty, downgraded primarily due to imprecision. Scabies risk is strongly shaped by hygiene behaviors and environmental conditions, highlighting the need for comprehensive prevention strategies.

Keywords: Islamic Boarding School; Personal Hygiene; Risk Factors; Scabies; Systematic Review

INTRODUCTION

Scabies is a contagious skin disease caused by infestation of the mite *Sarcoptes scabiei* var. *hominis*. Transmission occurs primarily through direct person to person contact, but it may also spread indirectly via contaminated objects such as clothing, blankets, and bed linens. This infection is commonly found in densely populated settings, including dormitories, orphanages, and Islamic boarding schools. *Sarcoptes scabiei* reproduces by burrowing into the skin's outer layer, where it lays eggs and leaves metabolic waste, which triggers severe skin irritation (CDC, 2024; Dita safira, 2023; WHO, 2023). Globally, scabies is estimated to affect between 200 and 400 million individuals each year, with the highest prevalence found in tropical regions. In Indonesia, data from the Ministry of Health (2016) indicate that approximately 4.60% to 12.95% of the population experiences scabies infection, making it one of the most common dermatological conditions in the country. The impact of scabies extends beyond skin-related discomfort and can lead to serious systemic complications, such as glomerulonephritis and cardiovascular disorders resulting from secondary bacterial infections (Currie, 2015; WHO, 2023).

Islamic boarding schools represent high-risk environments for scabies transmission due to intensive interpersonal interactions, suboptimal hygiene conditions, and overcrowded living arrangements. In Indonesia, more than 36,000 Islamic boarding schools accommodate

approximately 3.6 million students, with reported scabies prevalence reaching up to 69%, highlighting the need for comprehensive investigation of contributing risk factors (Kemenag RI, 2022; Nurmansyah et al., 2020). This study aims to identify and analyze risk factors associated with scabies incidence in Islamic boarding school environments, with findings expected to support evidence-based preventive strategies for administrators, healthcare professionals, and policymakers in controlling scabies outbreaks.

METHODS

Search Strategy

This systematic literature review (SLR) was conducted to identify the risk factors associated with scabies in Islamic boarding schools. The research question was formulated using the PIOT (Population, Issue, Outcome, Type of study) framework, which helped refine the search focus on the target population, specific risk factors, the outcome of scabies, and the relevant observational study design. A systematic search was performed using Publish or Perish connected to Scopus, Crossref, Google Scholar, and Semantic Scholar. All searches were conducted simultaneously on April 21, 2025, at 8:15 p.m. (WIB), using the terms “scabies” AND “Islamic boarding school” AND “risk factor,” along with their Indonesian equivalents, “analisis faktor risiko scabies” AND “pondok pesantren”.

Table 1. Research Question Based on the PIOT Model

PIOT Component	Description
Population (P)	Scabies patients residing in Islamic boarding schools
Issue (I)	Causative factors of scabies
Outcome (O)	Reported risk of scabies
Type of Study (T)	Case-control

Screening

Boolean operators were applied to ensure that all key concepts appeared simultaneously in each retrieved record, and the search was restricted to English or Indonesian language studies, case control designs, and full-text availability. Reference lists of eligible studies were also screened manually to capture additional relevant publications. Eligibility criteria included empirical studies that examined scabies risk factors within Islamic boarding schools, while studies focused on treatment, non-peer-reviewed publications, and duplicates were excluded. The selection process followed PRISMA steps, beginning with identification and title–abstract screening, followed by full-text assessment. Two independent reviewers conducted the entire process manually without automation tools, resolving disagreements through discussion. Data extraction was performed using a structured form collecting study identity, setting, design, population characteristics, sample size, main findings, and funding information. No original authors were contacted, and missing information was recorded as *not specified* without imputation.

The methodological quality of the included studies was assessed using the Newcastle–Ottawa Scale (NOS). Overall, most studies demonstrated adequate methodological quality, with scores indicating predominantly low to moderate risk of bias across selection, comparability, and exposure domains. Minor limitations were related to measurement methods and incomplete reporting in several studies. The certainty of evidence was evaluated using the GRADE approach and was generally rated as moderate, mainly due to the observational

design and imprecision of effect estimates. Overall, the included studies were considered sufficiently robust to support descriptive synthesis.

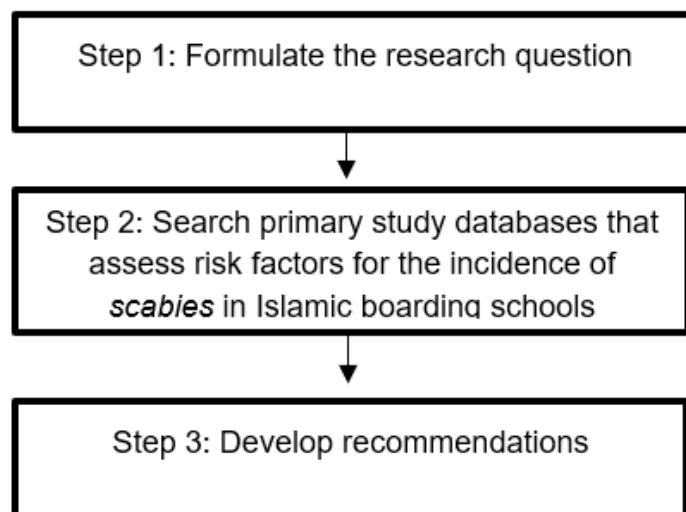


Figure 1. Research Step

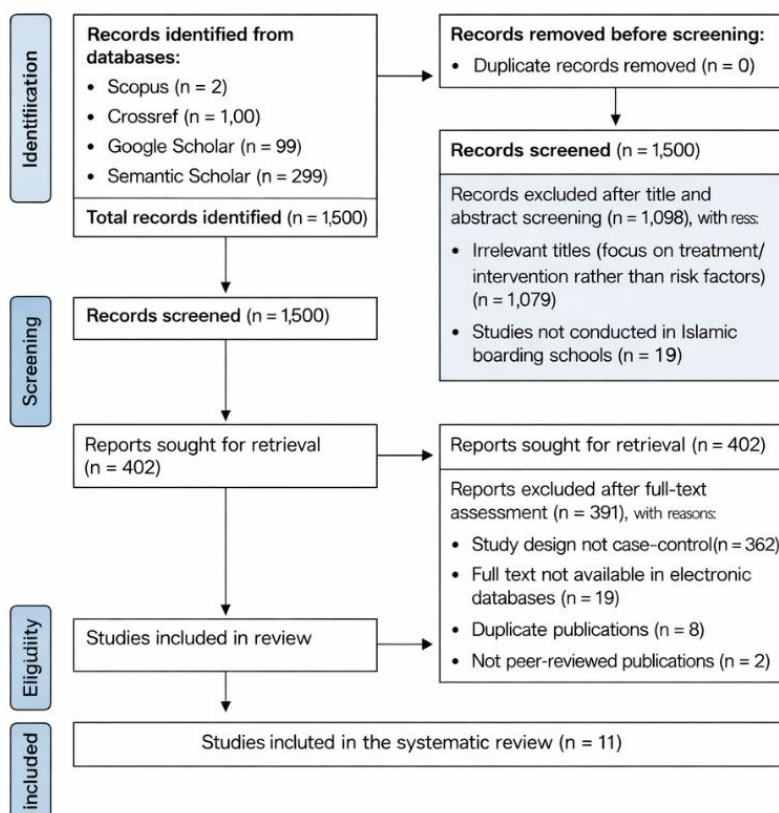


Figure 2. PISMA 2020 flow diagram of the study selection process

Table 2. Summary of Reviewed Articles

Author and country	Setting Study and Study Design	Objective	Population characteristics and sample size	Result	Funding Source
(Avidah et al., 2019) Indonesia	- Research Location: Wasilatul Huda Kendal Boarding School & Selamat Kendal Boarding School - Research period: not specified - Case control	To analyze risk determinants of scabies among students in conventional and modern boarding school	- This study involved a total of 190 students as research participants. - Their characteristics encompassed various personal hygiene and risk-related behaviors, including the habit of sharing clothing and prayer items, as well as the cleanliness of their skin and clothing and their level of knowledge about scabies. Overall, most participants demonstrated good skin and clothing hygiene, although many still engaged in practices such as sharing personal items and prayer equipment. - Data were collected using simple random sampling. - Behavioral variables were measured using a structured questionnaire, and scabies diagnosis was confirmed through direct clinical examination with a dermatoscope.	Poor bed hygiene increases scabies risk 3.5 times (OR=5.531, 95% CI= 2.214-13.822); poor skin hygiene 2.7 times increases scabies risk (OR=2.715, 95% CI=1.223-6.027), poor hand hygiene 2.4 times increases scabies risk (OR=2.499, 95% CI=1.296-4.812); age increases risk 5.5 times increases scabies risk (OR=3.519, 95% CI=1.538-8.052).	Self-funded
(M. Faza Azmi Nasrullah et al., 2023) Indonesia	- Research Location: Islamic boarding schools in East Java Province (boarding school D and boarding school T). - Research period: June to July 2021 - Case control	To explore contributing factors of scabies incidence among 90 students in East Java boarding school	- This study involved 90 participants, equally divided between the case and control groups. - The majority were male (51.11%) and aged between 18 and 23 years. The case group included participants with varying ages and educational levels (from junior high school to undergraduate), while all participants in the control group were undergraduate students. Overall, the study population was dominated by young individuals with moderate to high educational backgrounds. - A 'case' is a student in boarding	Result of Bivariate Analyses: Poor knowledge increases scabies risk (OR = 12.02), poor personal hygiene increases scabies risk (OR = 8), poor living sanitation increases scabies risk (OR = 4.34). Female students had better personal hygiene than males. CI=not specified.	Self-funded

Author and country	Setting Study and Study Design	Objective	Population characteristics and sample size	Result	Funding Source
			school D who had been diagnosed with scabies and proven by a clinician certificate. Meanwhile, a 'control' is a student in boarding school T who had not been diagnosed with scabies or had no prior history of scabies. - Behavioral variables were measured using a validated questionnaire - The sampling technique employed in this study was purposive sampling		
(Yudiasari & Setiyabudi, 2021) Indonesia	- Research Location: Nurul Islam Islamic Boarding School - Research period: Nophember 23rd–December 1st, 2019. - Case control	To understand factors contributing to scabies among students in Nurul Islam boarding school, Cilacap	- This study involved all students at the Nurul Islam Islamic Boarding School in Karangjati, with a total of 60 respondents. The sample consisted of 25 individuals in the case group (students diagnosed with scabies) and 35 individuals in the control group (students without scabies). - All participants were boarding students who shared comparable daily activities, living environments, and routine patterns, providing a relatively uniform context for the assessment - The sampling technique employed in this study was total sampling. - Primary data were collected using a structured questionnaire.	- Result of Bivariate Analyses Significant variables: poor knowledge increases scabies risk (OR = 6.417; (95% CI: 1,204-34,193), poor attitude (OR = 6.000; 95% CI: 1,897-18,980), poor personal hygiene increases scabies risk (OR = 8.500, 95% CI: 0,926-78,023), low economic status increases scabies risk (OR = 9.600; 95% CI: 1,140-80,829), gender (OR = 4.929; 95% CI:1,612-15,071). - Result of Multivariate Analyses: Negative attitude was the only significant factor associated with scabies occurrence (p = 0.008; OR = 6.835; 95% CI: 1.658–28.182). Other variables were not statistically significant, including poor knowledge (p = 0.210; OR = 3.583; 95% CI: 0.486–26.397), poor personal	Self-funded

Author and country	Setting Study and Study Design	Objective	Population characteristics and sample size	Result	Funding Source
				hygiene (p = 0.465; OR = 2.479; 95% CI: 0.217–28.262), low economic status <UMK (p = 0.093; OR = 10.446; 95% CI: 0.677–161.178), and male sex (p = 0.054; OR = 4.456; 95% CI: 1.122–17.700).	
(Ubaidillah, 2021) Indonesia	- Research Location: Madrasah Tsanawiyah Nurul Ummah Yogyakarta - Research period: not specified - Case control	To identify significant factors related to scabies at Madrasah Tsanawiyah Nurul Ummah, Yogyakarta	- This study included a total of 40 participants, consisting of 20 individuals in the case group and 20 in the control group. The respondents were students of the Islamic junior high school who resided as boarding students, characterized by their age, sex, personal hygiene behaviors, and level of knowledge related to scabies. - The sampling technique employed in this study was purposive sampling. - Primary data were collected using a structured questionnaire.	Poor bed hygiene increases the risk of scabies by approximately 2.67 times (95% CI: 0.03–0.924). High household density significantly elevates the risk up to 5.6 times (95% CI: 1.254–25.606). However, waste disposal facilities show no significant association with scabies occurrence (OR 0.273, 95% CI: 0.071–1.043).	Self-funded
(Putri Maharani Salsa Bilatussalama et al., 2025) Indonesia	- Research Location: Ngalah Pasuruan Islamic boarding school - Research period: August 2024 - Case control	To examine the link between sociodemographic factors (especially gender) and personal hygiene with scabies at Ngalah boarding school	- The population in this study consisted of all students residing in the boarding school who were enrolled at the junior and senior secondary education levels (SMP/MTs and SMA/MA). - This study involved 64 participants, comprising 32 cases and 32 controls. All respondents were boarding students, characterized by their age, sex, sociodemographic background, personal hygiene practices, and level of knowledge related to scabies. - The sampling procedure employed a simple random sampling technique.	Male respondents had a substantially higher risk of scabies compared to females (OR 10.71; 95% CI: 3.36–34.14). Poor personal hygiene similarly increased the likelihood of scabies by approximately elevenfold compared with good hygiene (OR 11.07; 95% CI: 3.36–34.14).	Self-funded

Author and country	Setting Study and Study Design	Objective	Population characteristics and sample size	Result	Funding Source
(Aulia et al., 2023) Indonesia	- Research Location: Dayah Terpadu Al-Muslimun Lhoksumawe Aceh - Research period: 4-10 December 2023 - Case control	To identify risk factors of scabies among male students in Aceh Utara	- Primary data were collected using a structured questionnaire.	Students with poor knowledge have a 3.22-times higher risk of developing scabies compared to those with good knowledge ($p = 0,024$, $OR = 3,215$). Negative attitudes also increase the risk of scabies by 4.88 times ($p = 0,003$, $OR = 4,879$). In addition, students with poor personal hygiene have a 5.22-times higher risk of scabies ($p = 0,002$, $OR = 5,220$). Poor environmental sanitation further increases the risk by 4.26 times ($p = 0,006$, $OR = 4,259$). Covidence Level 95%.	Self-funded
			- The sample in this study consisted of 64 respondents, comprising 32 cases and 32 controls, using a 1:1 ratio. - The population characteristics refer to male respondents residing in the Dayah Terpadu Al-Muslimun Islamic boarding school, located in Lhoksukon District, North Aceh. - Primary data were collected using a structured questionnaire.		
(Dwiyanti et al., 2024) Indonesia	- Research Location: Raudlatut Ta'allum Islamic Boarding School - Research period: not specified - Case control	To analyze the relationship between knowledge and personal hygiene practices with scabies incidence at Raudlatul Ulum Ta'allum Islamic Boarding School	- The case population consisted of boarding students who had experienced scabies within the past three months, totaling 59 individuals, while the control population comprised students who had not experienced scabies. - The sampling technique used was total sampling with a 1:1 ratio, resulting in a total sample of 118 participants. The collected data were then analyzed using the chi-square test with a significance level of alpha 0.05 - Primary data were collected using a structured questionnaire.	Students with lower levels of knowledge showed a higher likelihood of developing scabies ($OR = 1.543$; 95% CI 0.619–3.848), while those with moderate knowledge had a substantially greater risk ($OR = 5.700$; 95% CI 1.717–18.925). These findings indicate that lower knowledge levels significantly increase the risk of scabies, Students with poor personal hygiene had a higher risk of developing scabies, with an	Self-funded

Author and country	Setting Study and Study Design	Objective	Population characteristics and sample size	Result	Funding Source
				OR of 2.844 and a 95% CI of 1.345–6.012, indicating a significant association between personal hygiene practices and scabies occurrence.	
(Mauliza et al., 2023) Indonesia	- Research Location: Islamic boarding schools within the service area of the Peudada Community Health Center (Dayah Darul Aman Al-Aziziyah, Dayah Dhiaul Falah, and Dayah Nurul Islam) - Research period: 16-18 January 2023	To examine the relationship between PHBS and scabies at boarding school in Peudada health center region	- Most respondents were 14–15 years old, predominantly male (57.4%), and largely had a junior high school education (88.2%). The study population consisted of cases and controls selected in a 1:1 ratio. Cases were students diagnosed with scabies and receiving treatment at the Peudada Community Health Center, while controls were students without scabies. The total sample included 136 (68 case, 68 control). - The sampling technique used was purposive sampling. - Primary data were collected using a structured questionnaire	PHBS significantly associated scabies (OR = 2.000, p = 0.000), Confident level 95%	Self-funded
(Ubaidillah & Khoiriah, 2020) Indonesia	- Research Location: Binaul Ummah Islamic Boarding School, Bantul - Research period: not specified - Case control	To identify risk factors associated with scabies at Binaul Ummah boarding school, Bantul	- This study involved 100 students, consisting of 50 scabies cases and 50 controls. The population was drawn from Binaul Ummah Islamic Boarding School, where students live collectively in dormitory settings, placing them at increased risk of scabies transmission due to close physical contact, the habit of sharing personal items, and limited attention to personal hygiene. - The sampling technique used was purposive sampling. - Primary data were collected using a structured questionnaire	The analysis demonstrated that several factors influenced the occurrence of scabies. Clothing hygiene (p = 0.043), hand and nail hygiene (p = 0.010), and residential density (OR = 0.359, p = 0.019, 95% CI = 0.150–0.858) were significantly associated with scabies. In contrast, knowledge was not significantly related to scabies (OR = 0.691, p = 0.391, 95% CI = 0.297–1.610).	Self-funded

Author and country	Setting Study and Study Design	Objective	Population characteristics and sample size	Result	Funding Source
(Elita et al., 2023) Indonesia	- Research Location: Halsalakum Islamic Boarding School Bengkulu - Research period: August 2022 - Case control	To analyze the relationship between knowledge, attitudes, hygiene behavior and scabies in Halsalakum boarding school, Bengkulu	- The population in this study comprised male and female students of the Harsallakum Islamic boarding school. A total sample of 52 participants. The case group consisted of students diagnosed with scabies (26 participants), while the control group included students without scabies (26 participants). - The sampling technique used was simple random sampling. - Primary data were collected using a structured questionnaire	There is a significant relationship between Knowledge ($p = 0.026$, (95% CI: 1,836 – 20,315), hygiene and sanitation behavior ($p = 0.012$, 95% CI: 1,568 – 16,765) with the occurrence of scabies. And there is no relationship between attitude and the occurrence of scabies, ($p=0,052$, 95% CI: 1,138 – 11,185).	Self-funded
(Romadlon et al., 2017) Indonesia	- Research Location: Roudhotut Tholibin Sirau Kemranjen Kabupaten Banyumas. - Research period: April-June 2016 - Case control	To examine personal hygiene and environmental sanitation conditions related to scabies at Roudhotut Tholibin Sirau boarding school, Banyumas	- The total student population consisted of 84 students. The case sample was obtained through total sampling, involving 42 students from Roudhotut Tholibin Islamic Boarding School, Sirau, who were diagnosed with scabies. The control sample comprised 42 students from Roudhotul Qur'an Islamic Boarding School, Sirau, who did not have scabies. - The sampling technique employed in this study was total sampling. - Primary data were collected using a structured questionnaire	Significant factors: personal hygiene ($p = 0.025$), residential density ($p = 0.021$). CI=not specified	Self-funded

Table 3. Summary of Variables

No	Variable	Number of Articles	Findings	Articles (Author, Year)
1.	Personal Hygiene (specific)	6	$p = 0.00$; OR = 8 $p = 0.029$; OR = 8.500 $p = 0.004$; OR = 11.07 $p = 0.002$; OR = 5.220 $p = 0.012$	(M. Faza Azmi Nasrullah et al., 2023) (Yudiasari & Setiyabudi, 2021) (Putri Maharani Salsa Bilatussalama et al., 2025) (Aulia et al., 2023)

No	Variable	Number of Articles	Findings	Articles (Author, Year)
			p = 0.025	(Elita et al., 2023)
	Skin hygiene	1	OR = 2.715	(Romadlon et al., 2017) (Avidah et al., 2019)
	Hand and nail hygiene	1	OR = 2.499 p = 0.010	(Avidah et al., 2019) (Ubaidillah & Khoiriah, 2020)
	Bed hygiene	3	OR = 3.519 p = 0.032; OR = 2.67	(Avidah et al., 2019) (Ubaidillah, 2021)
	Clothing hygiene	1	p = 0.097 p = 0.043	(Ubaidillah & Khoiriah, 2020) (Ubaidillah & Khoiriah, 2020)
2.	Age	1	OR = 5.531	(Avidah et al., 2019)
3.	Knowledge	5	p = 0.00; OR = 12.02 p = 0.017; OR = 6.417 p = 0.024; OR = 3.215 p = 0.009; OR = 5.700 p = 0.026	(M. Faza Azmi Nasrullah et al., 2023) (Yudiasari & Setiyabudi, 2021) (Aulia et al., 2023) (Dwiyanti et al., 2024) (Elita et al., 2023)
4.	Sanitation	2	p = 0.003; OR = 4.34 p = 0.006; OR = 4.259	(M. Faza Azmi Nasrullah et al., 2023) (Aulia et al., 2023)
5.	Gender	3	p = 0.004; OR = 4.929 p = 0.001; OR = 10.71 Female students had better personal hygiene than males	(Yudiasari & Setiyabudi, 2021) (Putri Maharani Salsa Bilatussalama et al., 2025) (M. Faza Azmi Nasrullah et al., 2023)
6.	Attitude	2	p = 0.002; OR = 6.000 p = 0.003; OR = 4.879	(Yudiasari & Setiyabudi, 2021) (Aulia et al., 2023)
7.	Socioeconomic Status	1	p = 0.015; OR = 9.600	(Yudiasari & Setiyabudi, 2021)
8.	Residential Density	3	p = 0.020; OR = 5.6 p = 0.019 p = 0.021	(Ubaidillah, 2021) (Ubaidillah & Khoiriah, 2020) (Romadlon et al., 2017)
9.	Waste Disposal Facilities	1	p = 0.050; OR = 0.273	(Ubaidillah, 2021)
10.	Clean and Healthy Living Behavior (PHBS)	1	p = 0.000; OR = 2.000	(Mauliza et al., 2023)

RESULTS AND DISCUSSION

From the 1,500 articles initially identified through Publish or Perish across four major databases, 1,098 were excluded during the title and abstract screening due to lack of relevance to the research focus. Subsequent full-text assessment led to the exclusion of an additional 391 articles for reasons such as not employing a case–control design, lack of full-text availability, absence of empirical data on scabies risk factors in Islamic boarding schools, or duplication across databases. All excluded studies were reviewed carefully to ensure that no eligible publication was overlooked. The full selection process and reasons for exclusion are presented in the PRISMA Flow Diagram (Figure 2). A total of 11 studies met the eligibility criteria and were included in the final synthesis. Most of these studies examined personal hygiene as a key risk factor, followed by knowledge, gender, environmental sanitation, attitudes, residential density, socioeconomic status, clean and healthy lifestyle behavior, waste disposal facilities, and age. Detailed characteristics of each included study covering study objectives, design, population, and main findings are summarized in Table 2, while the distribution of investigated variables is presented in Table 3. Most articles reported odds ratios (ORs) and p-values to illustrate the strength and statistical significance of associations between the identified risk factors and scabies incidence.

Table 4. Newcastle Ottawa Scale (NOS) Assessment

Study	Selection (4)	Comparability (2)	Exposure (3)	Total Score (9)	Category
(Avidah et al., 2019)	3	1	3	7	Low
(M. Faza Azmi Nasrullah et al., 2023)	3	1	3	7	Low
(Yudiasari & Setiyabudi, 2021)	4	1	3	8	Low
(Ubaidillah, 2021)	3	1	3	7	Low
(Putri Maharani Salsa Bilatussalama et al., 2025)	3	1	3	7	Low
(Aulia et al., 2023)	3	1	3	7	Low
(Dwiyanti et al., 2024)	4	1	3	8	Low
(Mauliza et al., 2023)	3	1	3	7	Low
(Ubaidillah & Khoiriah, 2020)	3		3	6	Moderate
(Elita et al., 2023)	2	1	3	6	Moderate
(Romadlon et al., 2017)	3	1	3	7	Low

(Notes: The number of stars in each domain follows the NOS scoring you provided. Risk categories are interpreted as: Low (7–9), Moderate (4–6), High (0–3))

The risk of bias assessment of the 11 included studies using the Newcastle–Ottawa Scale (NOS) indicated generally good methodological quality. Most studies achieved high scores in the selection and comparability domains, reflecting clear case definitions, representative samples, and appropriate control of key confounders. Minor variations were noted in the exposure/outcome domain, particularly regarding measurement methods and potential information bias. Overall, nine studies were classified as low risk and two as moderate risk, with none rated as high risk, supporting their suitability for synthesis. Using the GRADE

approach, most studies demonstrated moderate certainty of evidence, with one study rated as low certainty. The risk of bias was generally not serious, as case–control designs were clearly described, case and control selection were consistent, and measurements were appropriate to the pesantren context. Inconsistency was not considered significant, as the direction of effect was generally consistent across studies.

All studies showed no serious indirectness, as their populations and variables aligned with the research question. However, several exhibited serious imprecisions due to small sample sizes and wide or unreported confidence intervals. Publication bias was considered unclear or unlikely, as no formal assessment was conducted and no clear distortion was detected. Overall, the GRADE assessment indicates that the evidence is reasonably reliable for identifying scabies risk factors in Islamic boarding schools, although limitations in statistical reporting should be considered. Detailed results are presented in the Summary of Findings table in the appendix

Knowledge

Knowledge is one of the most consistently identified predisposing factors associated with scabies incidence in boarding schools. Five out of eleven studies in this review reported that low levels of knowledge regarding the causes, symptoms, and prevention of scabies significantly increase the risk of infection. Nasrullah et al. (2023) found that students with poor knowledge had a 12.02 times higher risk of contracting scabies (OR = 12.02), indicating knowledge as one of the strongest risk factors. Similar findings were reported by Yudiasari and Setiyabudi (2021) ($p = 0.017$; OR = 6.417), Aulia et al. (2023) ($p = 0.024$; OR = 3.215), and Dwiyaniti et al. (2024) ($p = 0.009$; OR = 5.700), all demonstrating a significant association between low knowledge and increased scabies incidence. Elita et al. (2023) also reported a significant relationship ($p = 0.026$), indicating that improved knowledge contributes to risk reduction. Low knowledge leads to poor awareness of personal hygiene and preventive practices, such as avoiding the sharing of personal items. Overall, these findings highlight knowledge as a fundamental factor in shaping preventive attitudes and behaviors toward scabies, emphasizing the need for health education interventions in boarding school settings. This is consistent with Alunpah et al. (2022) who reported higher scabies prevalence in communities with limited knowledge due to inadequate access to health information.

Gender

Three studies in this review mentioned that male gender was significantly associated with the incidence of scabies. A study by Nasrullah et al (M. Faza Azmi Nasrullah et al., 2023) identified that male students were more susceptible to infection, while female students showed better personal hygiene. Similar findings were reported by Putri Maharani et al. (Putri Maharani Salsa Bilatussalama et al., 2025), who demonstrated a significant association between gender and the incidence of scabies ($p = 0.000$, OR = 10.7), indicating that male students have nearly 11 times higher risk. Research by Yudiasari and Setiyabudi (2021) also supports these findings with a p -value of 0.004 and an OR of 4.929, indicating that male students are nearly five times more at risk than females. These findings are further supported by Aulia et al (2023) with $p = 0.024$, indicating a significant association between gender and scabies incidence. These three articles are consistent with the research by Ferhatosmanoglu (2025) et al., which states that men are at higher risk of scabies lesions than women. Men are more susceptible to scabies

because they have lower levels of hygiene awareness than female (Putri Maharani Salsa Bilatussalama et al., 2025).

Attitude

Two studies in this review indicate that negative attitudes toward scabies prevention contribute to an increased risk of infection. In the study by Yudiasari and Setiyabudi (2021), students with negative attitudes toward prevention efforts were six times more likely to contract scabies (OR = 6.000, $p = 0.002$). This reflects that knowledge alone is insufficient without positive attitudes toward preventive behaviors. Similarly, in the study by Aulia et al (Aulia et al., 2023), students' attitudes were found to significantly influence the risk of scabies incidence with a p -value of 0.003 and OR = 4.879. Students who are less concerned about environmental hygiene or infection prevention are at higher risk of contracting the disease. Attitude can be defined as an individual's internal evaluation of an object or event, reflected through a tendency to like or dislike, and to agree or disagree with something (Swarjana, 2022). In the context of scabies, negative attitudes such as indifference toward environmental hygiene and lack of awareness of prevention efforts contribute to an increased risk of transmission. This is demonstrated in a study by Aulia et al., (2023) where most respondents exhibited passive and non-proactive attitudes toward avoiding contact with scabies transmission sources.

PHBS (Clean and Healthy Living Behavior)

There is one article stating that PHBS is one of the factors for scabies ($p=0.000$ OR=2.000). This means that students with low PHBS practices have twice the risk compared to those with good PHBS practices. Even respondents with good PHBS can still contract scabies, as scabies is a highly contagious skin disease. The results of this study are consistent with those of Bora'a et al., (2023) who reported an association between clean and healthy living behavior (PHBS) and the incidence of scabies. Therefore, respondents with good PHBS will still contract scabies if the environment they inhabit is already infected with scabies. If those with good PHBS practices can still contract scabies, then respondents with adequate or poor PHBS practices are more vulnerable to scabies infection than those with good PHBS practices (Mauliza et al., 2023). Therefore, if someone can maintain and practice good PHBS, they will be protected from scabies (Bora'a et al., 2023).

Age

Age is associated with scabies, as mentioned in one article. In Avidah's study, it was found that individuals aged 11–16 years had a 5.5 times higher risk of scabies compared to those over 17 years of age (OR=5.531). This is because health awareness is higher among those aged >17 years, enabling them to take preventive measures (Avidah et al., 2019). These results differ slightly from those of Ferhatosmanoglu et al. (Ferhatosmanoğlu et al., 2025) who stated that people aged 0–65 years are most at risk of contracting scabies. Age also plays a significant role in individual development, both in terms of mental maturity and social relationships, which in turn can influence one's mindset and knowledge. However, it is important to note that the influence of age is relative and may vary between individuals (Maulida et al., 2024).

Personal Hygiene

Ten out of eleven studies identified personal hygiene as the primary risk factor for scabies incidence, showing the strongest correlation compared to other variables. Several studies examined personal hygiene as a composite variable, while others assessed specific components such as skin, hand, and bed hygiene. Avidah et al. (2019) reported that poor skin cleanliness (OR = 2.715), hand hygiene (OR = 2.499), and bed hygiene (OR = 3.519) significantly increased the risk of scabies. Similar findings were reported by Yudiasari and Setiyabudi (2021) ($p = 0.029$; OR = 8.500), Putri Maharani et al. (2025) ($p = 0.000$; OR = 10.71), Aulia et al. (2023) ($p = 0.002$; OR = 5.220), and Dwiyantri et al. (2024) ($p = 0.010$; OR = 2.844), all indicating a significant association between poor personal hygiene and increased scabies risk. Additional studies by Ubaidillah and colleagues (2021; 2020) also demonstrated significant relationships between specific hygiene practices, including bed, clothing, hand, and nail cleanliness, and scabies incidence. Poor personal hygiene practices, such as sharing personal items, infrequent cleaning of bedding, inadequate handwashing, and improper clothing management, facilitate transmission through direct and indirect contact. Overall, these findings confirm personal hygiene as a dominant modifiable risk factor for scabies, highlighting the importance of hygiene promotion and behavioral interventions in boarding school environments.

Sanitation

Environmental sanitation is another important factor. Two articles indicate that poor sanitation conditions increase the risk of scabies. From Nasrullah et al., (2023), the results showed $p = 0.003$ and OR = 4.34, indicating a relationship between sanitation and scabies incidence, with a fourfold increased risk of scabies if sanitation is poor. This study is supported by Aulia et al., (2023) with a p -value of 0.006, indicating a relationship between sanitation and scabies. Environmental sanitation refers to the cleanliness and health conditions of an area, including aspects such as waste disposal systems, access to clean water, and management of other public facilities. Irregularities in clean living behaviors can disrupt environmental balance and trigger sanitation issues, which in turn increase vulnerability to various infectious diseases, including scabies (Nurhidayat et al., 2022).

Housing Density

Housing density is one of the causes of rapid spread in Islamic boarding schools and is mentioned in three articles. Ubaidillah's research (Ubaidillah, 2021) states that housing density is associated with the transmission of scabies with a p -value of 0.02 and an OR of 5.6, meaning that housing density is associated with the transmission of scabies and increases the risk of scabies by 5.6 times if housing density is poor. Similarly, the results of Ubaidillah & Khoiriah's (Ubaidillah & Khoiriah, 2020) study show that housing density is associated with scabies ($p = 0.019$). Romadlon's research also shows that housing density is associated with scabies transmission ($p = 0.021$) (Romadlon et al., 2017). Dense housing increases the likelihood of physical contact and shared use of personal items. Ideally, the space requirement per person, calculated based on basic human activities within the home, including sleeping, eating, working, sitting, bathing, using the toilet, washing, cooking, and other movement spaces, should be 9m² with an average ceiling height of 280m (Health, 2023).

Economic Status

There is one article stating that economic status is associated with scabies incidence. The results of Yudiasari & Setiyabudi's (2021) study indicate that economic status influences scabies incidence among students, with a p-value of 0.015 and an odds ratio (OR) of 9.600. Students from families with incomes below the minimum wage have a 9.6 times higher likelihood of contracting scabies. This study aligns with the findings of Nasir et al., (2025) who stated that low income contributes to the occurrence of scabies. A low socioeconomic status exacerbates the risk of scabies due to limited access to hygiene supplies, clean clothing, and medications (Yudiasari & Setiyabudi, 2021).

Waste Disposal Facilities

One study highlighted a significant association between the availability of waste disposal facilities and scabies incidence Ubaidillah (2021) with a p-value of 0.05 and an OR of 0.273, indicating that inadequate waste management contributes to unhealthy environments and increased disease risk (Health, 2023). According to the Precede-Proceed theory proposed by Lawrence Green, health outcomes are influenced by behavioral determinants categorized as predisposing, enabling, and reinforcing factors (Glanz et al., 2015). In the context of scabies transmission, predisposing factors include knowledge, attitudes, clean and healthy living behaviors (PHBS), personal hygiene, age, and gender, while enabling factors include environmental sanitation, socioeconomic status, and housing density.

This article has limitations as it includes only observational studies with a case-control design, without incorporating cohort or intervention studies that could broaden the analysis. Nevertheless, the study demonstrates methodological strengths through the application of a Systematic Literature Review (SLR) approach based on the PIOT framework and supported by PRISMA guidelines. A total of eleven case-control studies from major databases were systematically analyzed, with risk factors presented using statistical indicators (odds ratios and p-values) and categorized into personal and environmental factors to facilitate interpretation. In addition, study quality was assessed using the Newcastle–Ottawa Scale (NOS), and the strength of evidence was evaluated using the GRADE approach, thereby enhancing the validity and credibility of the findings. The application of Lawrence Green's Precede–Proceed framework further strengthened the theoretical depth of the analysis presented in this study

CONCLUSION

Factors influencing the incidence of scabies in boarding school environments include personal hygiene, knowledge level, sanitation conditions, housing density, socioeconomic status, gender, attitudes, and the implementation of clean and healthy living behaviors (PHBS). Among these factors, personal hygiene and knowledge were identified as dominant and modifiable determinants of scabies transmission. Therefore, increasing health awareness and promoting clean living behaviors among boarding school students, supported by improvements in environmental sanitation and physical facilities, are essential preventive strategies to reduce scabies transmission in boarding school settings.

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