



Risk Factors for Scabies among Schoolchildren in Low- and Middle-Income Countries



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ABSTRACT

Aims This review aimed at identifying the risk factors for scabies among schoolchildren, with a particular emphasis on those in low- and middle-income countries.

Information & Methods This review assessed the literature on risk factors for scabies among schoolchildren published in databases, including PubMed, ScienceDirect, JSTOR, and ProQuest from 2000 to 2023. Case studies, narrative reports, review articles, or any studies primarily concerned with skin-related outcomes were not considered.

Findings The initial search identified 448 studies across the databases. After screening, only 13 studies were included. The most commonly observed risk factors for scabies in lower-middle-income countries included age, gender, educational level, personal hygiene habits, frequency of changing bed linens, and family economic status. The statistical data for these factors indicated a significant correlation with the occurrence of scabies.

Conclusion Gender, age, family economic status, and personal hygiene are risk factors for scabies in schoolchildren in low- and middle-income countries.

Keywords Scabies; Student; Risk Factors; School

CITATION LINKS

[1] Host immune responses to the itch mite ... [2] Scabies as a part of the World Health Organization ... [3] Scabies ... [4] Control strategies for ... [5] Scabies: New opportunities for management and ... [6] The global burden of scabies: A cross-sectional analysis from ... [7] Scabies and global control of neglected tropical ... [8] The global burden of skin disease in 2010: An analysis of the prevalence ... [9] Treatment of close contacts of people with scabies for preventing ... [10] Scabies: A neglected global ... [11] A study on knowledge, attitude and practice in preventing transmission ... [12] Risk factors for scabies in school children ... [13] The PRISMA 2020 statement: An updated ... [14] The dominant factors of scabies incidence in two Islamic boarding ... [15] Scabies among high school students in Accra, Ghana: Risk factors ... [16] Prevalence and associated factors of scabies among ... [17] Factors associated with scabies outbreaks in primary schools in ... [18] The relationship between the level of knowledge about scabies and the ... [19] Prevalence and drivers of human scabies among children and adolescents living ... [20] Riskfactors of scabies in students of Aulia Cendikia Islamic ... [21] Path analysis on factors associated with the risk of scabies among ... [22] Why are they hard to treat? A preliminary survey to predict important ... [23] Risk factors associated with scabies infestation among primary ... [24] Scabies infection among boarding school students ... [25] Epidemiological study of scabies among school going children ... [26] Epidemiology of scabies among primary school ... [27] Risk factors for transmission of scabies in students ... [28] Analysis of the relationship between risk ... [29] Seroprevalence of sarcoptes scabiei var canis antibodies ... [30] The seroprevalence of Sarcoptes scabiei var. canis and its ... [31] Seroprevalence of sarcoptes scabiei in free-ranging ... [32] The epidemiology of scabies and impetigo ... [33] Scabies and impetigo prevalence and risk factors ... [34] Scabies among primary schoolchildren in Egypt ... [35] Seroprevalence of sarcoptes scabiei var suis infestation in swine ... [36] Crusted scabies in patients with long-term use of oral corticosteroid with different underlying ... [37] Scabies in ... [38] Active case detection methods for crusted ... [39] Scabies in Spain? A comprehensive ... [40] Impact of scabies on Indonesian public boarding ... [41] Relationship scabies with learning achievement ... [42] Clinical features and associated morbidity ... [43] The effect of sleep quality on students' academic ... [44] Perceptions, attitudes and practices towards scabies in communities on the Bijagós Islands ... [45] Assessment of food security, living condition, personal hygiene health determinants and relations ...

Introduction

Infections of the skin and soft tissues represent a major global health concern. While not life-threatening, conditions, like scabies are among the most prevalent itchy skin disorders worldwide and significantly contribute to the overall disease burden [1]. Scabies is categorized as a neglected tropical disease by the World Health Organization (WHO) and is included on its roster of such diseases [2, 3].

Scabies is a global issue, impacting an estimated 200 million individuals at any given time [4]. Studies reveal that scabies prevalence is highest in tropical regions of East Asia, Southeast Asia, Oceania, and Tropical Latin America. This condition accounts for 0.21% of global disability-adjusted life years (DALYs) [5]. Despite its prevalence, there are significant gaps in our understanding of the epidemiology and risk factors of scabies, particularly in regions with a high disease burden. For instance, in Malaysia, the most recent study on scabies in children was conducted in 1980, and the subsequent study took place in nursing homes in 2010 [6].

Scabies is triggered by the mite *Sarcoptes scabiei*, which invades the outer layer of the skin, causing intense itching and scratching due to allergic reactions to the mites' proteins and waste. It spreads primarily through direct skin contact. While it frequently affects vulnerable populations, such as young children and the elderly, anyone, regardless of age, gender, or hygiene level, can be affected. Complications from scabies can include secondary bacterial infections, septicemia, rheumatic fever, and post-streptococcal glomerulonephritis [7].

Scabies alone is responsible for about 0.21% of global DALYs across all health conditions [6]. Estimates of scabies prevalence worldwide vary widely, ranging from 0.2% to 71% [3]. This condition is widespread in many impoverished tropical areas, affecting 5-10% of children. Frequent recurrences of scabies place a significant strain on healthcare systems due to both the infestations and their associated complications [8]. Factors contributing to scabies include low socioeconomic status, high population density, inadequate water management, and poor sanitation [8, 9]. Scabies is strongly linked to personal hygiene and living conditions [10], making it common among people who reside in crowded environments, such as densely populated areas or boarding schools [11, 12]. Outbreaks of scabies frequently occur in settings where there is close and prolonged skin-to-skin contact, including daycare centers, orphanages, elderly care facilities, prisons, refugee camps, Islamic boarding schools, and even hospitals [13]. Most scabies cases are found in low-income countries, often due to limited awareness, insufficient preventive measures, and inadequate facilities [6]. Additionally, scabies has been shown to negatively impact children's learning in school [14]. The treatment of scabies is relatively costly, particularly as it often affects individuals from

low-income backgrounds who struggle to afford healthcare expenses [15]. The costs can become even higher when the patient suffers from severe scabies, especially if there are complications due to secondary bacterial infections [16]. At the household level, money spent on medical care can reduce the budget available for essential needs like food, placing an additional financial strain on the family. At the institutional level, substantial resources are required to manage scabies outbreaks effectively [17].

The previous systematic review did not clearly define comparisons between countries and the types of schools [18]. It is very important to understand the differences in these situations as a basis for determining interventions more suitable to each country's conditions. This review focused on uncovering the risk factors for scabies among school-aged children in low- and middle-income countries (LMICs).

Information and Methods

Protocol

This systematic review analyzed the literature on risk factors related to the incidence of scabies in school students, particularly in LMICs published from 2000 to 2023 based on the World Bank list. The systematic steps included developing research questions using patient, intervention, comparison, outcome (PICO) structure, searching for relevant articles, assessing article eligibility, extracting data, assessing quality, documenting results, and summarizing findings in a narrative analysis [19].

Search strategy

The search for relevant articles utilized online database search engines, including ScienceDirect, PubMed, JSTOR, and ProQuest, within the publication period from 2000 to 2023. The search keyword arrangement used Boolean operators with the following structure: "Scabies" OR "Sarcoptes scabiei" AND "Risk factors" OR "Predictive factors" AND "School-children" OR "student" OR "Boarding-school" OR "Public school".

Inclusion and exclusion criteria

The studies selected for this review were chosen according to the criteria, which covered aspects, such as participant characteristics, intervention specifics, comparison groups, outcomes, and study design (PICO). This search focused on students from the community, dormitory, and elementary schools. The inclusion criteria were quantitative research that matched the search keywords, availability of full-text articles, original research papers, and articles written in English. Studies were excluded if they were: case studies, review articles with an unusual narrative ratio, non-peer-reviewed papers or theses, or articles focusing on general skin infection outcomes. Initially, articles were screened based on their titles and abstracts. Only selected full-text and eligible articles were included in the qualitative analysis.

Data extraction

Each author compiled data from the articles into a structured extraction table, with columns for details, such as article number, name of author(a), title, year of study, objective, methodology, parameters studied, findings, and themes. The second reviewer subsequently examined the assigned articles, validated the information, and added further comments to the table.

Assessment of evidence quality

The author independently evaluated the quality of each eligible study. This evaluation utilized a tool provided by the National Institutes of Health (NIH) specifically designed for observational cohort and cross-sectional studies. The tool included 14 questions that serve as criteria for determining the study's quality, focusing on the core concept of

internal validity. The categorization of study quality consisted of three levels, including good (90-100%), fair (70-89%), and poor ($\leq 69\%$).

Findings

Study selection

The database search yielded a total of 448 articles, including those found through manual searching. After removing duplicates and reviewing titles and abstracts, 68 articles were selected for further screening. Out of these, 41 articles were excluded for reasons, such as focusing on a different population as the research subject, being non-English, being irrelevant to the research, or relying on hospital data. The final selection resulted in 13 studies being included in the systematic review (Figure 1, Table 1).

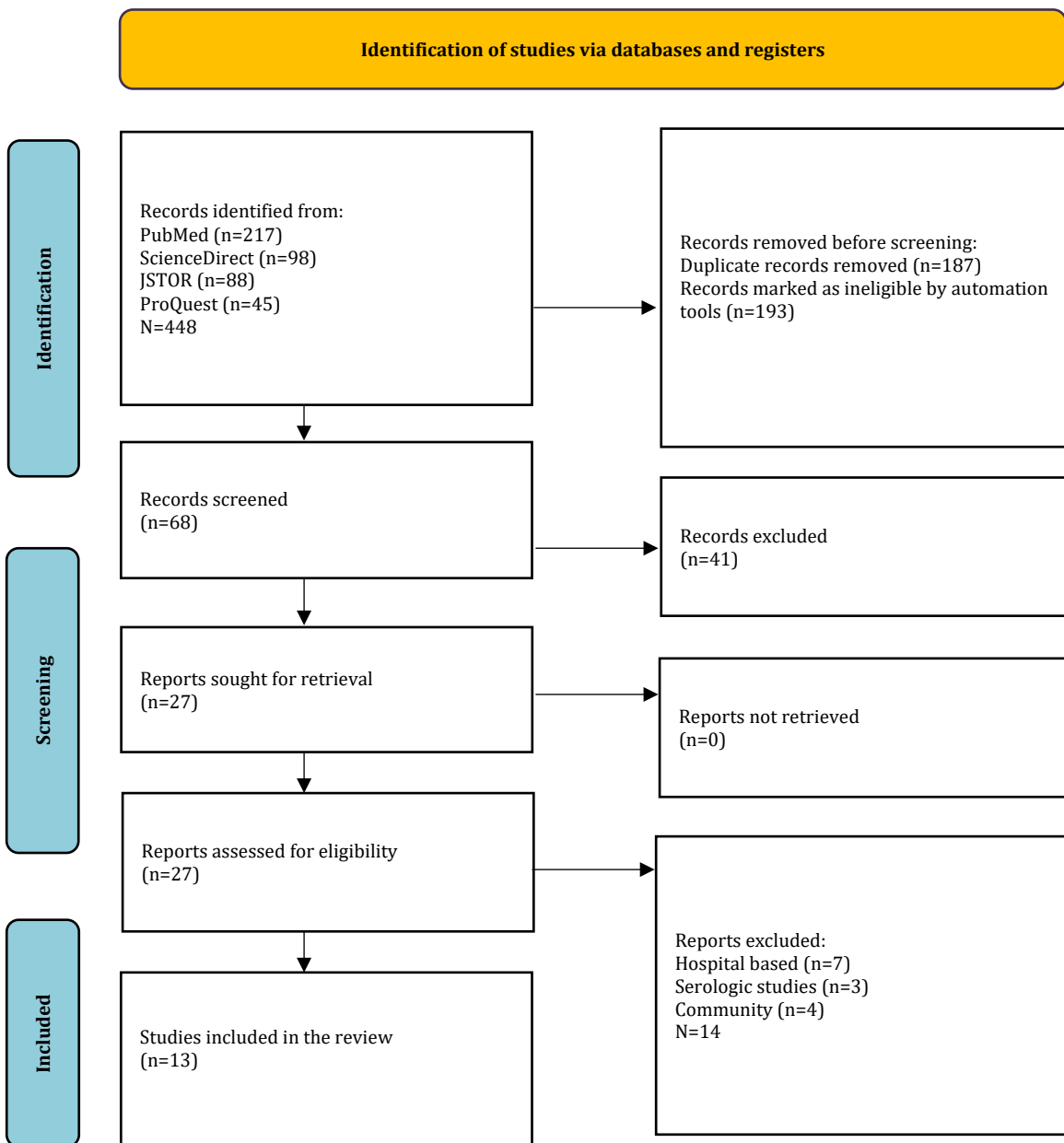


Figure 1. PRISMA flowchart for literature search

Table 1. Data extraction of the included studies

Author(s), year, country	Study design	Participants and setting	Risk factors	Tool(s)	Main finding(s)	Study quality
Argentina <i>et al.</i> , 2019, Indonesia [20]	Cross-sectional	199 students	Gender, room density, personal hygiene	Not reported	-Male>female students 1.9 times -More than 2 students per room have a 2.4 times risk of scabies	Low
Arisandi <i>et al.</i> , 2018, Indonesia [14]	Cross-sectional	93 students	Gender, age, dormitory density, student level	Interviews, observations, physical examinations, and occupancy densities using questionnaires, checklists, and measuring instruments	-Male>female students 5.580 times -Younger>older students 7,750 times higher -Junior>senior students 6.312 times -Crowded>ideal dormitory conditions 24.2 times	Low
Maleki Birjandi <i>et al.</i> , 2019, Ghana [15]	Cross-sectional	2766 students in public school	Gender, area of residence, occupation of parents	Questionnaire and the household crowding index	-Urban>suburban students -The risk of scabies is significantly related to gender (female), urban residence, and father's and mother's occupation -For more than 4 family members, the possibility of scabies is 1.8 times -Having animals and sharing clothes	-
Dagne <i>et al.</i> , 2019, Ethiopia [16]	Cross-sectional	494 students, public school	Physical contact with sufferers, hand washing without soap, knowledge, behavior, student level	Pre-tested Amharic version of the questionnaire	-Most students (450 (91.1%)) take a shower once a week -Washing hands only with water>with soap and water -Students with grade levels of 1 to 4 are 3.91 times more likely to develop scabies -Rarely bathing>often bathing	-
Ejigu <i>et al.</i> , 2019, Ethiopia [17]	Unmatched case-control	725 students, primary school	Family income, gender, family size	Structured questionnaire	-Predictors of scabies are poor knowledge about scabies, male sex, parents' illiteracy, low annual family income, sharing clothes/beds or contact with scabies cases, average family size of more than five, poor personal hygiene, and access to water	-
Hidayat <i>et al.</i> , 2022, Indonesia [18]	Retrospective	90 students, Manhajul Ulum boarding school	Personal hygiene behavior: Bathing and sleeping	Questionnaire	-There is a significant relationship between bathing and sleeping with the incidence of scabies	-
Kouotou <i>et al.</i> , 2016, Cameroon [19]	Cross-sectional	1902 students, boarding schools	Gender, age, room density	Interview, questionnaire	-Boys are more at risk than girls -Junior students are more at risk than seniors -Number of students per dormitory ≤ 10	-
Nanda <i>et al.</i> , 2016, Indonesia [21]	Cross-sectional	90 students, boarding school	Myths, healthy behavior, economic status	NA	-There is a negative relationship between scabies myths that indirectly affect through health behavior - There is a significant relationship between healthy behavior and scabies	Low
Rihatmadja <i>et al.</i> , 2019, Indonesia [22]	Qualitative	100 students, boarding school	Contact history, personal hygiene, changing clothes, using one prayer outfit for several days	Interview	-Risk factors associated with scabies are the use of clothes repeatedly before washing, having a family with scabies, and personal hygiene	Moderate
Sanei-Dehkordi <i>et al.</i> , 2021, Iran [23]	Cross-sectional	480 students, primary school	Student grade, parents' education, father occupation, family size	Interview, structured questionnaire	-Student of grade 5-6, low educational level of father, low educational level of mother, joblessness of father, employment of mother, large family size, use of shared articles, and absence of bathroom in the house are risk factors	-

Continue of Table 1 from the last page.

Yulfi et al., 2022, Indonesia [24]	Cross-sectional	220 students, boarding school	Gender, age, knowledge about prevention, bathing habits, dressing habits, sleeping arrangements, and bedroom conditions	Questionnaire	-Sharing a bed with other students has the strongest association with scabies infestation, followed by clothes that were not properly maintained (not washed properly and shared with other students), poor bedroom hygiene conditions, and younger age	Moderate
Yasmin et al., 2017, Pakistan [25]	Cross-sectional	30 school children and 40 general population, community	Number of family members, characteristics of the house, pets, personal hygiene, sleeping behavior, frequency of bathing, frequency of changing sheets, changing clothes	Questionnaire	-Sleeping behavior and the presence of head lice are significant risk factors	-
Qasim, 2015, Iran [26]	Cross-sectional	230 students, primary school	Parents education, number of family members, personal hygiene, practical hygiene	Questionnaire	-Students with uneducated parents (41.7%) suffer more from scabies -Students with <4 family members (12.2%) suffer more from scabies	-

Table 2. Summary of quality assessment

Author(s), year, country	Criteria													
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14
Argentina et al., 2019 [20]	Y	NR	Y	Y	NR	Y	Y	NR	NR	NR	Y	NA	Y	NR
Arisandi et al., 2018 [15]	Y	NR	Y	Y	NR	Y	Y	NR	NR	NR	Y	NA	Y	NR
Maleki Birjandi et al., 2019 [15]	Y	Y	Y	Y	Y	Y	NR	Y	Y	NR	Y	Y	Y	Y
Dagne et al., 2019 [16]	Y	Y	Y	Y	Y	Y	NR	Y	Y	NR	Y	NA	Y	Y
Ejigu et al., 2019 [17]	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	NA	Y	NR
Hidayat et al., 2022 [18]	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	NR	Y	NR
Kouotou et al., 2016 [19]	Y	NR	Y	Y	Y	Y	NR	Y	Y	Y	Y	NA	Y	Y
Nanda et al., 2016 [21]	Y	NR	Y	Y	NR	Y	Y	NR	NR	NR	Y	NA	Y	NR
Rihatmadja et al., 2019 [22]	Y	NR	Y	Y	NR	Y	Y	NR	NR	NR	Y	NA	Y	NR
Sanei-Dehkordi et al., 2021 [23]	Y	Y	Y	Y	Y	Y	NR	Y	Y	NR	Y	NA	Y	Y
Yulfi et al., 2022 [24]	Y	Y	Y	Y	Y	Y	NR	Y	Y	NR	Y	NA	Y	NR
Yasmin et al., 2017 [25]	Y	NR	Y	Y	NR	Y	Y	NR	NR	NR	Y	NA	Y	NR
Qasim, 2015 [26]	Y	NR	Y	Y	NR	Y	Y	NR	NR	NR	Y	NA	Y	Y

*Y=yes; NR=not reported; NA=not applicable

Study quality

According to the evaluation results from the NIH quality assessment tool for observational cohort and cross-sectional studies, which examines 14 criteria, six studies were rated as "poor" [21-26], while seven others were classified as "Fair" (Table 2) [14, 15, 21, 22, 25-27].

Risk factors for scabies in school-aged children

Several risk factors for scabies included gender, age, dormitory density, student level, physical contact with sufferers, family income, parental occupation, knowledge, hand-washing behavior, the number of family members living at home, personal hygiene, exchanging clothes, using clothes repeatedly without washing, bathing habits, characteristics of the house, pets, and the frequency of changing bed linens.

There were differences in risk factors between students in dormitories and those in public schools. Risk factors identified for students living in dormitories included dormitory density (or the

density of occupants in each bedroom), changing clothes, and using clothes repeatedly without washing. In contrast, the risk factors for scabies found among students attending public schools included the number of family members living in the same household, the characteristics of the house, the area where they live, pets, and the frequency of changing clothes. Meanwhile, the similarities in risk factors between the two situations include age, gender, student level, personal hygiene, frequency of changing bed sheets, and family economic status.

Gender, age, and student grade as the risk factors for scabies

Gender differences appeared to be one of the risk factors for scabies. This is not necessarily directly related to hormonal or genetic factors. Instead, the behavior of men and women in their daily lives was the main focus discussed in the analyzed studies. In Indonesia, there is a habit of wearing the same clothes repeatedly without washing them [16]. In

religious boarding schools (Pesantren), students regularly pray five times a day using special clothes commonly worn by male Muslims (*Baju Koko*); sometimes, these clothes are also worn when male students attend class [17]. In contrast, female students typically wear a special garment designed for prayer, commonly called "Mukena," which is worn only during prayer [18]. Male students generally pay less attention to their appearance and personal hygiene than female students [19]. This situation is markedly different from that of female students living in dormitories in Ghana [23], where they rarely bathe or change clothes, often sleep on the floor, and seldom sleep alone.

Age and student grade also contributed to the risk of scabies among students, with younger individuals and juniors in school being more likely to contract scabies compared to older individuals and seniors [18]. This is due to the lack of independence and knowledge that juniors have regarding personal hygiene and the maintenance of their surrounding environment [16]. Studies in boarding schools in Cameroon indicate that younger students (<15 years old) tend to exchange clothes and beds [16].

Different situation of students in public vs. boarding schools

Family circumstances play a crucial role in the risk of scabies among students. In LMICs, poverty is a major issue closely related to family health conditions. The lack of family income seems to impact the ability to own a home, making it common for many family members to live together [24]. Students who attend public schools and live with their parents often experience scabies due to crowding, physical contact with other family members, a lack of parental attention to personal hygiene, and a high-risk home environment. The presence of pets in the home also contributes to the incidence of scabies [24]. Meanwhile, students living in school dormitories frequently encounter crowded conditions due to the high number of residents, resulting in close interactions among them [24, 28]. Common practices, such as sharing beds, exchanging clothes, and using the same toiletries are primary causes of scabies outbreaks [29, 30]. It appears that dormitory caregivers do not adequately address the students' hygiene needs, which require attention typically provided by their parents at home [31].

Differences in risk factors among low- and middle-income countries

In studies conducted in Indonesia, most were situated in dormitories or Islamic boarding schools. Common risk factors identified included the frequent exchange of clothes among room occupants, the repeated use of prayer garments without washing them first, and the disorganized condition of the rooms. One study noted that there is a myth in the community regarding the conditions in Islamic boarding schools, suggesting that they are prone to skin diseases, which affects health behavior.

In countries on the African continent, such as Ghana, Ethiopia, and Cameroon, risk factors for scabies include the area of residence, bathing frequency, handwashing habits without the use of soap, and parents' occupations. Studies in Iran indicate that the availability of bathrooms is a risk factor for scabies. Meanwhile, a study in Pakistan identified pets and the characteristics of the house as risk factors for scabies.

Discussion

The present review assessed the risk factors associated with scabies in school students in LMICs. Thirteen studies were identified from various databases without a time frame filter. Most studies were from Asia, while some were from Africa. Geographically, there are differences between these countries; however, regarding economic status, similarities relate to the community's ability to maintain healthy behavior. There are notable differences among the countries included in this review.

Demographic factors are the most prominent risk factors compared to others, as these demographic factors appear in almost all of the studies included in this review. Gender and age are the most important demographic factors to consider. All included studies agreed that male students are the most dominant group with a higher potential to experience scabies compared to female students. Only one study in Ghana found that women are at greater risk of experiencing scabies than men [27]. Boys are more likely to sleep together, share clothing, and have close contact with girls, which increases their risk of scabies [16]. Research indicates that sex differences in scabies risk are influenced by personal habits, such as how often one bathes or changes clothes; sleeping on the floor raises the risk of infection, while sleeping alone lowers it [21]. Normaznah *et al.* [29] conducted a serological survey of indigenous populations in Malaysia, reporting no significant differences in scabies incidence between the sexes [22-24]. This suggests that the characteristics of the study population and the research methods used can affect the results. Regarding age, the incidence of scabies declines with increasing age, which aligns with earlier studies [25, 26]. The condition is most prevalent among public school students because younger children frequently have close physical contact with many family members, increasing the likelihood of exposure to scabies-infected relatives [27]. In Iran, younger or lower-grade students are more susceptible to scabies than their older peers [19]. This can be attributed to the more frequent physical interactions among students of similar ages. Other studies have highlighted the significant role of physical contact in the transmission of scabies [14]. In Indonesian Islamic boarding schools, there is a common belief that students are more prone to skin diseases. Rihatmadja *et al.* [22] discovered that

students who own only one or two “Koko clothes” often wear them repeatedly without washing, as they believe it is necessary to wear Koko clothes during prayers or when meeting their teacher. This practice is also observed among female students, who frequently use “Mukena” in a similar manner [24]. In the Pesantren, students often share personal items, including towels, which increases the spread of scabies among students living in Islamic boarding schools [32]. The family’s economic situation also contributes to the prevalence of scabies in Islamic boarding schools, with students from families with better economic status being less likely to experience scabies than those from families with lower economic status. The provision of personal hygiene equipment is influenced by the economic conditions of the students’ families; however, it is not the main factor in the prevalence of scabies.

Housing conditions, such as limited access to clean water, living in homes made of soft bricks, and keeping animals indoors, can elevate the risk of scabies infection. This review revealed inconsistent findings regarding whether owning pets raises or lowers the risk of scabies. The impact of pet ownership may vary depending on other factors, such as the population density of the area. Having animals indoors can exacerbate overcrowding and hygiene issues, thereby heightening the risk of scabies infestation. Conversely, if animals reside in large homes with separate sleeping areas from humans, the likelihood of scabies infestation decreases. A lack of water or poor water usage is also recognized as a risk factor for scabies. These findings are consistent with earlier research conducted in northern Ethiopia [33].

The factors influencing the risk of scabies vary between rural and urban environments. Previous studies suggest that individuals in rural and suburban areas generally reside in less crowded spaces, while those in urban areas face higher population density, which increases the likelihood of disease transmission through close contact. Urban issues, such as high density, migration, and displacement exacerbate the prevalence of scabies. Conversely, other research challenges this view, proposing that scabies might be more common in rural areas due to inadequate socioeconomic conditions and restricted access to healthcare [34, 35]. Additionally, access to a clean water supply is a factor in the prevalence of scabies. A study in Ethiopia indicates that the frequency of bathing among students is once a week, with some students bathing more than once a week. It was also noted that there are behaviors less related to personal hygiene, such as washing hands without using soap, which contributes to the prevalence of scabies often found on students’ arms [14].

Participants in a mixed-method study reported that they sometimes missed classes due to the distracting itching, which hindered their ability to concentrate

on their studies [36]. Feelings of inferiority do not seem to significantly affect class attendance. However, friendships may become strained as students avoid physical contact, such as handshakes, to prevent the transmission of scabies [36]. This situation supports findings from previous studies in Indonesia, which show a significant relationship between scabies incidence and students’ concentration in learning, as measured by the Brand Aufgaben test [37]. Studies in Brazil indicate that the concentration and enthusiasm of students with scabies are also affected by weakened physical conditions due to poor sleep quality, as frequent waking from itching disrupts their rest [38]. Decreased sleep quality can impact a person’s ability to concentrate, make decisions, and participate in activities. If this condition persists, it can ultimately lead to a decline in academic performance [39]. In the Bijagós community, scabies is heavily stigmatized due to concerns about its contagious nature. This stigma is linked to discriminatory attitudes, feelings of rejection, social isolation, and specific behaviors related to seeking treatment. The delay in seeking medical help and the resulting health issues may be exacerbated by the stigma surrounding the condition. Thus, students in the community may feel deeply affected and embarrassed to attend class [40].

Considering the risk factors prevalent in LMICs, both individual and environmental hygiene issues significantly contribute to the overall risk profile. Additionally, most communities in LMICs live below the poverty line, a condition closely linked to inadequate attention to hygiene [41, 42]. Environmental management appears to be a promising intervention to reduce the incidence of scabies. For instance, a boarding school in Indonesia implemented an intensive cleaning campaign over three consecutive weeks, leading to improved hygiene practices among the students. However, such campaigns alone are insufficient; they must be complemented by comprehensive health education on scabies [43]. Lopes *et al.* [44] conducted educational activities in Nigeria among boarding school students under 11 years old, using a learning module presented by a dermatologist with engaging PowerPoint slides. The results are positive, showing increased knowledge and behavioral changes among the students. Nevertheless, it is crucial for the government to ensure that this educational program is implemented routinely for optimal results, and it should not be prohibitively expensive.

A study in Bangladesh implemented a four-month program to control scabies in an Islamic boarding school. The program includes daily monitoring of personal hygiene, weekly health education classes, and monthly meetings between class monitors and scabies control officers. As a result, the school leadership, dormitory caregivers, and all students are fully committed to maintaining personal hygiene and the cleanliness of the dormitory environment [45].

One of the limitations of this study is the quality of the studies. Most included studies were of low or fair quality, raising concerns about the generalizability of the findings. Also, limited access to high-quality journals may have skewed the results toward studies published in less reputable sources. The majority of studies originated from Asia, with only a few from Africa. This limits the generalizability to other LMICs. Therefore, caution should be exercised when using the results of these studies.

This study identified several risk factors with strong significance for the incidence of scabies in children in LMICs. Additionally, this study identified differences in risk factors between students who attended public schools and those in boarding schools or Islamic boarding schools. To effectively prevent and control scabies in children, public health initiatives must consider a comprehensive range of contributing factors. This can be achieved through multisectoral strategies and partnerships that address all the elements involved in scabies transmission.

Conclusion

Gender, age, family economic status, and personal hygiene are risk factors for scabies in schoolchildren in LMICs.

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