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The effect of socioeconomic status on the prevalence of scabies

Najlaa Siddig Nasir [1], Najwa Ismail Burhan [1], Mohamed Osman Elamin [2,*], Hatim A. Natto [3], Wahaj A. Khan [2], Hatim Matooq Badri [2], Ahmad Salah Alkathiri [4], Abdullah Muhammad Alzhrani [2], Abdallah Alhazmi [3], Waheeb D. Alharbi [5], Fowzi O. Elamin [4]

[1]*Faculty of Public Health, Alazhari University, Khartoum North, Sudan*
[2]*Department of Occupational and Environmental Health, Faculty of Public Health and Health Informatics, Umm Al-Qura University, Mecca, Saudi Arabia*
[3]*Department of Epidemiology and Medical Statistics, Faculty of Public Health and Health Informatics, Umm Al-Qura University, Mecca, Saudi Arabia*
[4]*Department of Health Promotion and Education, Faculty of Public Health and Health Informatics, Umm Al-Qura University, Mecca, Saudi Arabia*
[5]*Department of Physiology, Faculty of Medicine, Umm Al-Qura University, Mecca, Saudi Arabia*

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ABSTRACT

Scabies is a common health issue in Sudan, influenced by factors such as poor hygiene, overcrowding, malnutrition, low socioeconomic status, and limited access to healthcare, particularly in developing regions. Globally, scabies accounted for 0.21% of DALYs in the Global Burden of Disease in 2015 study, with the highest burden observed in East and Southeast Asia, Oceania, and parts of Latin America. Despite its impact, there is limited data on scabies prevalence in Sudan. This cross-sectional, hospital-based study was conducted at El-Gadarif Dermatology Clinic from January to December 2019 to assess the effect of socioeconomic factors on the epidemiology of scabies. A total of 200 patients were selected using systematic random sampling, and data were collected through structured questionnaires and analyzed using SPSS version 26. Results showed that most patients were male children and adolescents from low-income, overcrowded households with poor hygiene practices. Farmers, workers, and the unemployed represented the majority of cases. The findings confirm that poverty-related factors significantly contribute to scabies prevalence, even in severely resource-limited communities. Despite high transmission pressure, proper hygiene remains a potential protective factor. This study, the first of its kind in El-Gadarif State, highlights the urgent need for public education and stronger healthcare responses to reduce the disease burden in underserved populations.

1. Introduction

Human scabies is a parasitic skin infestation caused by *Sarcoptes scabiei*, a microscopic mite that burrows into the epidermis to deposit eggs. This activity initiates a host immune reaction, leading to intense pruritus and characteristic rashes. Secondary bacterial infections can complicate scabies, resulting in skin sores that may progress to severe outcomes such as septicemia, rheumatic heart disease, and chronic kidney disease (Simonart and Lam Hoai, 2024).

As one of the most prevalent dermatological conditions worldwide, scabies accounts for a significant proportion of skin diseases in low- and middle-income countries. Current global estimates suggest that over 200 million individuals are affected at any given time; however, more comprehensive assessments are needed to understand the full burden (Li et al., 2024). Reported prevalence rates vary widely in the literature, ranging from 0.2% to 71%, with endemic rates in many resource-limited tropical regions often reaching 5–10% among children. Repeated infestations are common and place considerable strain on healthcare systems. While sporadic cases occur in high-income countries, institutional outbreaks—particularly in hospitals, nursing homes, and marginalized communities—can

* Corresponding Author.
Email Address: mobushara@uqu.edu.sa (M. O. Elamin)
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Corresponding author's ORCID profile:
https://orcid.org/0000-0002-9655-8206

contribute substantially to healthcare costs (Andrews et al., 2009).

Globally, scabies impacts all age groups, but young children and the elderly in disadvantaged settings remain particularly vulnerable to infestation and its sequelae. The highest prevalence is seen in countries with warm, tropical climates where poverty, overcrowding, and poor access to medical care converge (Mitchell et al., 2024).

The *Sarcoptes scabiei* life cycle involves the female mite burrowing into the stratum corneum to lay eggs, which hatch within 3–4 days and mature into adults over 1–2 weeks. Clinical symptoms often appear 4–6 weeks post-infestation, as the host mounts an allergic response to mite proteins and fecal matter, resulting in severe itching and a characteristic rash. On average, an infected individual harbors 10–15 mites.

Patients typically exhibit intense pruritus, linear burrows, and vesicular lesions in areas such as the finger webs, wrists, limbs, and around the waistline. In infants and young children, the rash may be more widespread, involving the palms, soles, scalp, and even face. Nodular scabies can occur, especially in adult males (penile and scrotal areas) and females (around the breasts). Early infestations in close contacts may show burrows before pruritus develops.

In endemic settings, particularly in impoverished and marginalized communities, scabies presents unique challenges for public health management. Social factors such as migration, cultural practices, inadequate healthcare access, overcrowding, and poor sanitation significantly influence disease transmission. In such populations, severe infestations and complications are more common, especially among children, and sleep disruption due to persistent itching is frequently reported (Heukelbach et al., 2013).

Epidemiological evidence indicates that scabies prevalence is not significantly affected by race, age, or gender; instead, socioeconomic factors—poor hygiene, poverty, and congested living conditions—are the primary determinants (Hay, 1994). Although the disease affects individuals across all social strata, certain groups—including immunocompromised patients, elderly individuals in care facilities, and school-aged children—face higher infection risks due to close contact and environmental factors (Talaga-Ćwiertnia, 2021; Ramos et al., 2016). Variability in epidemiological patterns underscores the influence of community-specific factors on disease dynamics (Azene et al., 2020).

In Sudan, socioeconomic challenges remain profound, with a large proportion of the population living under conditions that favor the spread of infectious diseases such as scabies. These circumstances hinder effective prevention and control measures. This study was therefore designed to explore how social and economic factors contribute to the frequency of scabies infestation among Sudanese communities. Collinson et al. (2020) reported that their study calculated prevalence rates while adjusting for clustering effects at both community and household levels. They utilized multivariable random-effects logistic regression to analyze relationships with key demographic factors. The survey included 1,318 individuals from 477 households. Scabies was identified in 9.3% of participants (95% CI: 6.5–13.2%), affecting 75 households (19.7%). The prevalence of impetigo or secondary infections related to scabies was recorded at 0.8% (95% CI: 0.4–1.9%). Over half (52%) of scabies cases were categorized as severe. The analysis revealed a lower prevalence among females and a higher prevalence in the youngest age group, while no significant links were observed with other demographic or socioeconomic characteristics. Dermatology Life Quality Index (DLQI) scores demonstrated that scabies had a very or extremely large impact on health-related quality of life for 29% of affected adults and 18% of children. These findings highlight a considerable burden of scabies in the peri-urban Liberian community studied, underscoring an urgent need for targeted interventions to manage and reduce its impact.

According to Ugbomoiko et al. (2018), scabies was identified in 65% (325) of the study participants. The most frequently observed skin manifestations included excoriations (68.6%), vesicles (61.8%), and papules (58.8%). Pruritus was reported as the predominant symptom by 77.5% of those affected, while 64% experienced disturbances in their sleep patterns. Additionally, lymph node enlargement was present in 48.3% of cases. The most commonly affected body regions were the abdomen (35.5%), groin (19.1%), and spaces between the fingers (14.2%). Socioeconomic factors such as lack of education (OR: 7.15; 95% CI: 3.71–13.95), low household earnings (OR: 7.25; 1.19–88.59), absence of proper flooring in homes (OR: 12.17; 2.83–52.34), and overcrowding (OR: 1.98; 1.08–2.81) showed strong associations with scabies infestation. Behavioral practices like sharing beds or pillows (OR: 2.11; 1.42–3.14) and clothing (OR: 2.51; 1.57–3.99) further increased the risk. Conversely, maintaining regular bathing routines (OR: 0.37; 0.24–0.56) and consistent use of soap while bathing (OR: 0.36; 0.21–0.53) served as protective factors. The study concluded that scabies remains highly prevalent in the examined communities and is closely tied to severe poverty, contributing significantly to the disease burden.

A study by Korycinska et al. (2020) highlighted that many health problems are due to poor hygiene. The benefits of safe water supply and sanitation efforts in a given community can easily be lost if the communities still engage in poor personal hygiene. Health-related programs, therefore, should consider carefully the changes in hygienic practices needed to complement improved water and sanitation facilities.

The results suggest that an improvement in socio-economic conditions may contribute to a reduction in the number of scabies infections. The

possibility should be considered of monitoring the parameters, such as air temperature and humidity, particularly when scabies outbreaks occur (Korycinska et al., 2020).

While a number of studies have explored the epidemiology of scabies, we still don't have a clear picture of how economic status, living conditions, and personal hygiene practices come together to determine the severity of the disease. Many investigations have looked at these factors separately or provided simple descriptive analyses, rather than combining them into a single, robust predictive model that assesses each factor's unique impact. Filling this gap is crucial for developing focused public health strategies that can effectively reduce the burden of severe scabies in vulnerable communities.

In this study, we aimed to assess the effect of socioeconomic factors on the epidemiology of scabies in patients attending the El-Gadarif Dermatology Clinic.

2. Materials and methods

This study was a descriptive, cross-sectional, hospital-based study conducted from January 2019 to December 2019 at the dermatology referral clinic of El-Gadarif Teaching Hospital in El-Gadarif State, Sudan. The study population included all patients who met the case definition criteria (diagnosed with scabies based on clinical features) and attended the dermatology clinic during the study period.

All patients of different age groups who fulfilled the inclusion criteria during the study period were enrolled. Patients who met the case definition but declined to participate were excluded from the study and did not receive treatment. Family members of infected patients who were asymptomatic were provided with prophylactic treatment, particularly children who shared beds and clothing.

Data were collected using a comprehensive, structured, closed-ended questionnaire designed to capture all relevant variables. The researcher collected the data directly, obtaining sociodemographic information from patients and, in the case of children, from their parents.

Strict precautions against COVID-19 infection were observed throughout the data collection process. These included the use of face masks by the researcher, patients, caregivers, and the medical counselor, as well as disposable gloves for each patient. Clinical examinations were performed with the assistance of a dermatology consultant.

The study variables included both independent and dependent variables. Independent variables were demographic characteristics such as age, gender, residence, and family history. Dependent variables included socioeconomic status, risk factors, and diagnosis.

The data were cleaned and entered into Microsoft Excel, then analyzed using SPSS version 26. Categorical data were summarized as frequencies and proportions, and the Chi-square test was applied to assess associations in qualitative data. Continuous data were expressed as means and standard deviations, and Analysis of Variance (ANOVA) was used to compare means across more than two groups. Graphical presentations, such as bar diagrams, were created using MS Excel and MS Word. A p-value of <0.05 was considered statistically significant, applying standard statistical assumptions and a 95% confidence level.

3. Results and discussion

A total of 200 children were involved in the study. More than half of the patients (66%) were males, and 34% were females. Moreover, 41% of the participants were between 6 to less than 16 years old, 31.5% were between 16 to 20 years old, 16.5% were above 20, and 11% were under 6 years old (Table 1).

Furthermore, the sample was equally distributed between the illiterate and the educated, with each group comprising 50% of the total sample (Fig. 1).

Study cases were distributed in similar proportions among the unemployed, farmers, and workers: 39% were farmers, 36% were workers, and 25% were unemployed (Table 2).

Regarding monthly income, 16% of families had an average monthly income of less than 2000 SDG (Sudanese Pound), 55% had an average monthly income from 2000 to 5000 SDG, and 29% had an average monthly income of 65000 SDG (Table 3).

Regarding the number of individuals in one room, 67% of responses indicated that fewer than 4 individuals reside in one room (Table 4). Regarding the type of house construction, 53% of responses indicated houses constructed from clay (Table 5). Regarding the type of house floors, 54.5% of responses indicated floors made of sand (Table 6).

Regarding sharing the same bed among respondents, we found that 54.5% of cases shared beds (Table 7). Furthermore, 60.5% of the study cases shared clothes with other family members (Table 8). Regarding bathing habits, we observed that 57.5% of cases bathed irregularly (Table 9). Also, 50.5% used bathing soap irregularly (Table 10).

Table 1: Distribution of cases according to gender

Sex	Frequency	Percent
Male	132	66
Female	68	34
Total	200	100%

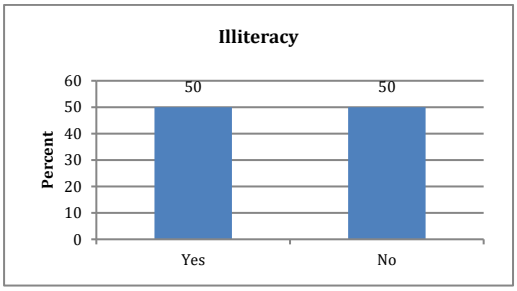

Fig. 1: Frequency distribution of the sample according to the illiteracy

Table 2: Distribution of the sample members according to the monthly employment

Occupation	Frequency	Percent
Unemployed	50	25
Farming	78	39
Wage earner	72	36
Total	200	100%

Table 3: Distribution of the sample members according to the monthly income based on SDG (Sudanese Pound)

Monthly income	Frequency	Percent
Less than 2000	32	16
5000 - 2000	110	55
Above 5000	58	29
Total	200	100%

Table 4: Distribution of the sample members according to the number of individuals in the room

No. of individuals in the room	Frequency	Percent
Less than4	134	67
Above 4	66	33
Total	200	100%

Table 5: Distribution of the sample members according to the house architecture type variable

House architecture	Frequency	Percent
Bricks	63	31.5
Adobe	106	53
Palm products	31	15.5
Total	200	100%

Table 6: Distribution of the sample members according to the house floor type

Type of floor	Frequency	Percent
Sandy	109	54.5
Clay	62	31
Cement	29	14.5
Total	200	100%

Table 7: Distribution of the sample according to the bed participation variable

Bed sharing	Frequency	Percent
Yes	160	80
No	40	20
Total	200	100%

Table 8: Distribution of the sample according to the clothing sharing

Clothes sharing	Frequency	Percent
Yes	79	39.5
No	121	60.5
Total	200	100%

Table 9: Distribution of the sample members according to the bathing

Clothes sharing	Frequency	Percent
Irregular	85	42.5
Regular	115	57.5
Total	200	100%

Table 10: Distribution of the sample members according to the bath soap use

Use soap	Frequency	Percent
Irregular	101	50.5
Regular	99	49.5
Total	200	100%

4. Discussion

This investigation marks the first systematic, community-based assessment of scabies within Elgadareif State, revealing a remarkably high prevalence and associated morbidity. The findings show that scabies occurrence correlates strongly with poverty-related factors, even in these extremely resource-constrained communities characterized by precarious living conditions. The notably high prevalence suggests that scabies remains under-recognized in such settings, where access to healthcare services is severely limited.

In this study, the majority of affected individuals were male (66%, n=132), aligning with observations from similar research (Korycinska et al., 2020; Gujarati et al., 2021) that reported higher infection rates among males. This trend may reflect greater exposure risks among men due to their roles or activities. Additionally, the prevalence varied considerably by age, with school-aged children exhibiting higher infestation rates compared to older cohorts. This finding concurs with studies from other endemic regions, which attribute increased vulnerability in children to close physical contact during play. Nevertheless, transmission to adults—including elderly family members—is common, contributing to outbreaks in communal settings such as kindergartens, schools, and nursing homes. The presence of scabies in individuals over 21 years old likely reflects ongoing exposure through contact with infected children, particularly among men. Furthermore, the anatomical distribution of scabies-related lesions varied across the population.

The study also highlighted that substandard housing and certain behaviors, such as sharing bedding and pillows—which can act as fomites—serve as significant risk factors. Crowded living conditions, low income, communal use of clothing, and illiteracy were all strongly associated with scabies infestation. Multivariate analyses underscored the protective effect of hygiene practices, with regular bathing and soap use identified as independent preventive factors. Another notable outcome was the uneven distribution of scabies prevalence and morbidity across different population segments.

Behavioral factors played a critical role in transmission, with 80% of cases reporting bed-sharing practices. This is consistent with findings from a Nigerian study (Korycinska et al., 2020), which identified similar behaviors as major contributors to infestation. Additionally, irregular bathing habits and inconsistent soap use were prevalent among affected individuals, mirroring patterns observed in studies conducted in Khartoum (Abass et al., 2024) and Kassala, where no significant association between hygiene and skin diseases was documented. Overcrowding also emerged as a key risk factor, reflecting socioeconomic deprivation; in this study, 33% (n=66) of cases resided in densely occupied rooms. Comparable trends were reported in Nigeria (Korycinska et al., 2020) and northeast Poland, where scabies was more common in overcrowded households.

Moreover, over half of the participants (54.5%) lived in homes with sandy, unstable floors, further

elevating infestation risks. This observation aligns with findings by Ugbomoiko et al. (2018), who noted that the lack of solid flooring and overcrowded conditions significantly contributed to scabies transmission.

5. Conclusion

Scabies was found to be highly prevalent in the communities of Elgadareif State examined in this study, contributing significantly to morbidity levels. The findings underscore that poverty-related factors remain key determinants of infestation, even in the most underdeveloped and vulnerable settings. Additionally, maintaining good hygiene practices appears to provide a degree of protection, despite the intense transmission dynamics present in these communities. Factors such as overcrowded living conditions and high unemployment rates were also identified as contributors to the increased burden of scabies. The study highlights an urgent need for intervention from the healthcare system and advocates for the implementation of public health education initiatives aimed at reducing the prevalence of scabies among affected populations in Sudan.

Compliance with ethical standards

Ethical considerations

Ethical approval for this study was granted by the Elzaeem Alazhari administrative authority (Approval No. 033404.0022) and the Research Department of the State Ministry of Health. Additionally, written authorization was obtained from the administrative body of the city hospital where the study was conducted.

Conflict of interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

References

Abass MN, Mohammed MA, and Elgadal AH (2024). The spectrum of pediatric skin diseases: A prospective study in Sudan. Sudan Journal of Medical Sciences, 19(2): 238-247. https://doi.org/10.18502/sjms.v19i2.14550

Andrews RM, McCarthy J, Carapetis JR, and Currie BJ (2009). Skin disorders, including pyoderma, scabies, and tinea infections. Pediatric Clinics, 56(6): 1421-1440. https://doi.org/10.1016/j.pcl.2009.09.002 **PMid:19962029**

Azene AG, Aragaw AM, and Wassie GT (2020). Prevalence and associated factors of scabies in Ethiopia: Systematic review and meta-analysis. BMC Infectious Diseases, 20: 380. https://doi.org/10.1186/s12879-020-05106-3 **PMid:32460770 PMCid:PMC7254678**

Collinson S, Timothy J, Zayzay SK, Kollie KK, Lebas E, Candy N, Halliday KE, Pullan R, Fallah M, Walker SL, and Marks M (2020). The prevalence of scabies in Monrovia, Liberia: A population-based survey. PLOS Neglected Tropical Diseases, 14(12): e0008943. https://doi.org/10.1371/journal.pntd.0008943 **PMid:33284821 PMCid:PMC7746289**

Gujarati R, Reddy SR, Babu TN, and Janardhan B (2021). Patterns of dermatoses in children in a tertiary care hospital. Indian Journal of Paediatric Dermatology, 22(1): 29–36. https://doi.org/10.4103/ijpd.IJPD_128_19

Hay RJ, Castanon RE, Hernandez HA, Lopez GC, Fuentes LL, Solis SP, and Andersson N (1994). Wastage of family income on skin disease in Mexico. BMJ, 309: 848. https://doi.org/10.1136/bmj.309.6958.848 **PMid:7950615 PMCid:PMC2541080**

Heukelbach J, Mazigo HD, and Ugbomoiko US (2013). Impact of scabies in resource-poor communities. Current Opinion in Infectious Diseases, 26(2): 127-132. https://doi.org/10.1097/QCO.0b013e32835e847b **PMid:23343887**

Korycinska J, Dzika E, and Kloch M (2020). Epidemiology of scabies in relation to socio-economic and selected climatic factors in north-east Poland. Annals of Agricultural and Environmental Medicine, 27(3): 374-378. https://doi.org/10.26444/aaem/109319 **PMid:32955217**

Li J, Liu Z, and Xia X (2024). The disability-adjusted life years (DALYs), prevalence and incidence of scabies, 1990–2021: A systematic analysis from the Global Burden of Disease Study 2021. PLOS Neglected Tropical Diseases, 18(12): e0012775. https://doi.org/10.1371/journal.pntd.0012775 **PMid:39724068 PMCid:PMC11709319**

Mitchell E, Wallace M, Marshall J, Whitfeld M, and Romani L (2024). Scabies: Current knowledge and future directions. Frontiers in Tropical Diseases, 5: 1429266. https://doi.org/10.3389/fitd.2024.1429266

Ramos JM, Moles-Poveda P, Tessema D, Kedir M, Safayo G, Tesfasmariam A, Reyes F, and Belinchón I (2016). Skin problems in children under five years old at a rural hospital in Southern Ethiopia. Asian Pacific Journal of Tropical Biomedicine, 6(7): 625-629. https://doi.org/10.1016/j.apjtb.2016.05.009

Simonart T and Lam Hoai XL (2024). Escalating threat of drug-resistant human scabies: Current insights and future directions. Journal of Clinical Medicine, 13(18): 5511. https://doi.org/10.3390/jcm13185511 **PMid:39336998 PMCid:PMC11432065**

Talaga-Ćwiertnia K (2021). Sarcoptes infestation. What is already known, and what is new about scabies at the beginning of the third decade of the 21st century? Pathogens, 10(7): 868. https://doi.org/10.3390/pathogens10070868 **PMid:34358018 PMCid:PMC8308645**

Ugbomoiko US, Oyedeji SA, Babamale OA, and Heukelbach J (2018). Scabies in resource-poor communities in Nasarawa State, Nigeria: Epidemiology, clinical features, and factors associated with infestation. Tropical Medicine and Infectious Disease, 3: 59. https://doi.org/10.3390/tropicalmed3020059 **PMid:30274455 PMCid:PMC6073861**