



Prevalence and Incidence of *Sarcoptes scabiei* infestation in Patients in Kurdistan Region – Iraq

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Article Info

Volume 6, Issue 8, April 2024

Received: 12 Feb 2024

Accepted: 12 March 2024

Published: 07 April 2024

Abstract

Scabies is one of the major dermatological issues that affects people worldwide, particularly in developing nations. The current study's objective is to ascertain the exact extent of scabies infestation in the Kurdistan region in order to improve scabies disease management and control. The study involved outpatients who visited the dermatological clinic between September 2021 and late August 2022, spanning different age groups and both sexes. A variety of other variables, including residence, level of education, and family size, were also investigated. Of the 40000 skin patients, 7200 (18%) had a scabies diagnosis. Age groups 19 to 39 years old had higher rates of scabies (39.86%), however as age increased, the prevalence declined. There were more male patients than female patients (55% and 45%, respectively). Furthermore, the rate that was highest (42.41%) was observed among patients in primary schools, and it declined as educational attainment increased. In comparison to suburban residents (26.62%), the prevalence rates among urban and rural people were higher (33.12 and 40.25%). Based on the educational status of the infected patients, 33% of the patients were illiterate at the time of infestation. There were two months with the highest infestation percentages: January (14.20%) and December (13.26%); July (2.23%) and August (2.68%) had the lowest infestation percentages.

Key words: *Sarcoptes scabiei*, Scabies infestation, Skin infection and health centers.

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Introduction

Sarcoptes scabiei is an obligate ectoparasite that infests human skin and causes the epidermal parasitic disease scabies [1, 2]. It is a disease with a global spread, with an estimated 300 million cases recorded annually. However, due to the lack of a standardized reporting system, determining the scope of the global issue is exceedingly challenging [1, 3, 4]. Scabies was included in the list of neglected tropical diseases by the World Health Organization (WHO), and each year a large number of experts and researchers gather to discuss and share their discoveries [5-7]. All age ranges, all social classes, immunocompromised patients, care facility residents, and densely populated areas with poor socioeconomic status have all reported cases of scabies disease [8]. Scabies prevalence is influenced by factors such as mother's education and career, family income, and the number of family members [8, 9].

Numerous body parts are infested with scabies parasites, which can cause cutaneous lesions, skin rashes, subcutaneous tunnels, nocturnal skin pruritus and itching, allergic reactions, and secondary bacterial infections. The female mite can cause cutaneous sores through the creation of a tiny, uneven skin tunnel [1, 10]. The most common way for the scabies disease to spread is through close contact with an infected person, although it can also spread through friends and sexual activity [6, 11]. Due to the significant risk of scabies infestation, every family member who has direct contact with an infected person must have treatment as well [12]. Numerous studies have demonstrated a significant relationship between the length of the scabies survival period and the seasons, low temperatures, and excessive humidity [9, 13].

Scabies is more common in winter than in summer, and it affects women and children more frequently in urban areas [14]. Numerous studies regarding the prevalence of scabies have been published by different researchers. Because of the high level of parasite infestation, the significance of the health system, treatment, effective preventive measures, and therapeutic techniques, it is imperative to develop special programs for the elimination of this disease. The purpose of this research is to determine the epidemiology, prevalence, and relationship between scabies and patient age, sex, and socioeconomic status in the Kurdistan area of Iraq.

Materials and Methods

Study Area

This study was done in Kurdistan region main cities (Erbil, Duhok and Sulaimaniyah) and several refugees' camps. All data were collected during the period of September 2021 until late August 2022. This study was conducted in a dermatology clinic and health care center including (Azadi Teaching Hospital- Dermatology consultant department, Gulan General Hospital – Akre, Hawler Dermatology Center and Sulaimaniyah Dermatology Center). A specialist dermatologist made a clinical diagnosis for each patient, usually based on the patient's clinical symptoms. The diagnosis was then verified by microscopic identification or, in cases where the diagnosis was ambiguous, by using a dermatoscope to confirm the presence of scabies. Subsequently, skin scraping samples were obtained from various body parts based on the appearance of the lesion. The recruited patients' demographic information was gathered through the use of a questionnaire covering a number of possible risk variables, such as age, gender, and family size, as well as past medical history, place of residence, and literacy level.

Microscopic Examination

A drop of mineral oil is applied to the surgical blades before beginning the process of skin scraping. Scrapings are taken from the crusted area of skin until very little blood appears (e.g. from scabietic papules or from under the fingernails). After being treated for ten minutes in 10% KOH, a tiny portion of the scrubbed specimen was put on a microscope slide and viewed under low power magnification using a light direct microscope. Scabies can be definitively diagnosed by identifying mites, eggs, and eggshell fragments from skin scrapings or by using a dermatoscope to find the mite at the end of its burrow. All positive samples that remained were preserved in absolute ethanol for future research once the negative samples were eliminated.

Ethical Consideration

The research commenced on July 13, 2021, following approval by the Duhok Directorate General of Health's Ethical Committee, with reference number 13072021-7-8.

Results and Discussion

The current study was based on an analysis of over 40,000 skin patients in the Kurdistan region (Duhok, Hawler, and Sulaimaniah). A total of 17,280 skin patients in the province of Duhok, 21,600 skin patients in Hawler, and 18,720 skin patients in Sulaimaniah were studied between September 2021 and late August 2022. These results are displayed in Figure 1. 8.33% of the patients in the province of Duhok were afflicted with scabies. Furthermore, Hawler City has the highest infection rate (16%).

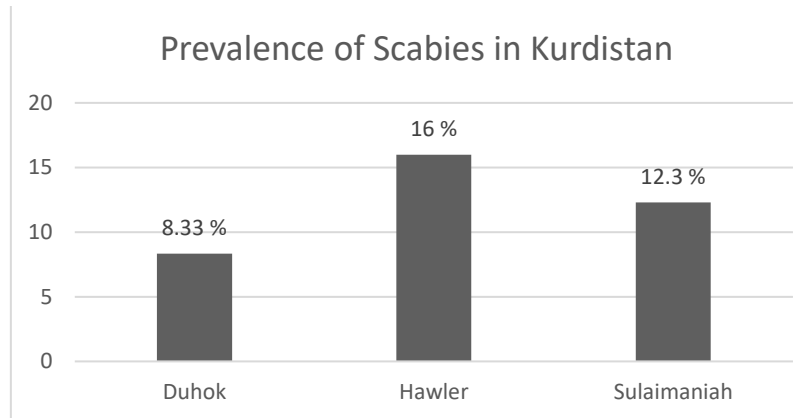


Figure 1: Infestation prevalence of scabies in the major cities of the Kurdistan Region

Table 1 presents the total number of scabies-infested patients in Duhok province (8.33%), with 55% of male patients and 45% of female patients. The highest prevalence of scabies was found in the age range of 19–39 years, while the lowest incidence was found in the age group of over 50 years.

Table 1: Incidence of scabies in Kurdistan according to age and gender

Age by years	Infested No.	% Infested	Male No.	% Infested	Female No.	% Infested
Under 18	1888	26.22 %	967	51.05 %	921	48.95 %
19-39	2870	39.86 %	1153	40.17 %	1717	59.83 %
40-49	1592	22.11 %	1109	69.66 %	483	30.33 %
Over 50	850	11.80 %	731	86 %	119	14 %
Total	7200	100 %	3960	55 %	3240	45 %

Table 2 shows that individuals enrolled in primary school had the greatest infection rate (42.41%). With the exception of patients who are illiterate, whose rate is somewhat high 33%, the rate declined as education levels increased. Furthermore, this project also examined the residence. Infestation rates are slightly greater among rural and urban residents (40.25 %, 33.12 %, and 26.62 %, respectively) than among suburban people.

Table 2: Scabies prevalence based on residency and literacy level

Literacy level			Residency			
Level	Infested Scabies	with % Infested	Residency	No. Infested	% Infested	
Illiterates	2376	33 %	Rural	2898	40.25 %	
School level	3054	42.41 %	Urban	2385	33.12 %	
literate	1050	14.58 %	Sub-Urban	1917	26.62 %	
Higher Education	720	10 %				
Total	7200	100 %	Total	7200	100 %	

As shown in (Table 3), 27.11 % of the infested patients with scabies seek medical attention during the first month of having the symptoms, 41.20% with is six month of having symptoms and 31.68 % of cases delayed their medical consultation for more than six month. On the other hand, overcrowding in the residence place was an important attribute for the patients with scabies. Only a small proportion (26.25%) of them lived in a house with less than five persons. This condition offers better socioeconomic circumstances and higher standard of living, 73.74% of the studied cases lived in a very crowded residence with a household size of 6 to 18 individual.

Table 3: Prevalence of Scabies according to Family size and duration of infestation

Family Size			Duration of Infestation		
Family Member	No. Infested	% Infested	Duration\ Month	No. Infested	% Infested
1-5	1890	26.25 %	Up to 1	1952	27.11 %
6-10	2909	40.40 %	2-6	2967	41.20 %
More than 10	2401	33.34 %	More than 6	2281	31.68 %
Total	7200	100 %	Total	7200	100 %

In addition, with regards to the seasonal fluctuations in infestation, this study found that the Kurdistan area had the highest rates of scabies infestation in January, February, and December, at 14.20%, 12.54%, and 13.26%, respectively. Figure 2 illustrates that the months of June, July, and August had the lowest infestation rates, at 3.45%, 2.23%, and 2.68%, respectively.

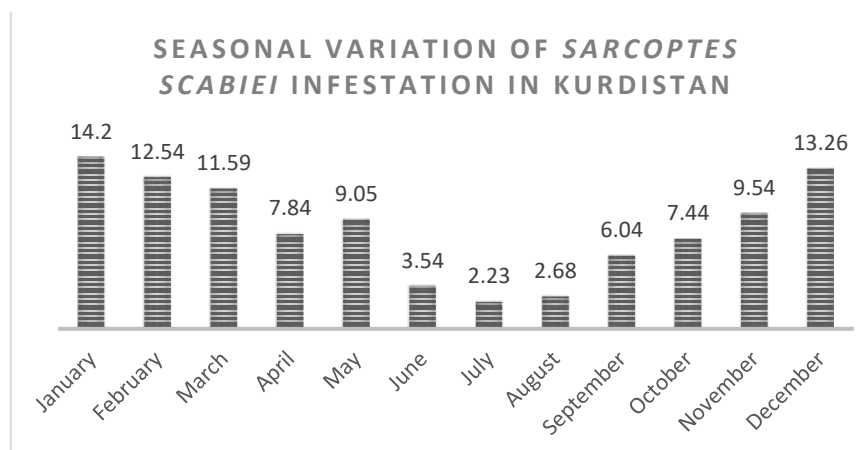


Figure 2: Scabies prevalence in the Kurdistan area on a monthly basis

Discussion

One of the most significant cutaneous ectoparasites in humans that causes skin disorder is *Sarcoptes scabiei*. [15]. There aren't many studies on the prevalence and risk factors of this ectoparasite in our area. According to the current study, this parasite infected 8.33% of the infected individuals in the province of Duhok; Hawler City had the highest infection rates, at 16% (Figure 1). It was reported that 45% of patients with infestations were female and 55% of patients with infestations were male (Table 1). The proportion of contaminated major cities in Kurdistan varies. Numerous elements, including population density, substandard housing, illiteracy, social interactions, and individual conduct, contribute to and enable the spread of scabies. The findings of this investigation align with those of Mero and Hassan [16], which their investigation revealed to be 5.56% of scabies infestation. The study's conclusions are more in line with those of Daliri and Shafiei [17], which in their research they found 5.9% of cases of scabies. Barwari [18] Barwari's investigation revealed a 4.5% scabies infestation rate, which is less than what we have on record. In their investigation, Landwehr and colleagues found 4% of cases of scabies in Malawi and Cambodia, which is likewise less than what we found [19]. According to Odueko et al. and Hegazy et al., there is a significant variation in scabies infestation rates based on an individual's economic status [20, 21].

The current study indicates that male scabies infestation rates are higher than female rates contrary to Mero and Hassan [16]; Lassa et al. [22]; Ciftci et al. [23]; Golchai et al. [24]. However,

the results of other investigations support those of the present investigation. In line with our findings, Barwari [18] and Mason et al. [25] showed a higher percentage of infestation in the male than the female. Men are more likely than women to contract scabies, which can be brought on by their line of work, regular outdoor activities, poor personal hygiene, their socioeconomic standing, and crowded living conditions [26]. Age groups were also examined in the current study, and it was found that those between the ages of 19 and 39 had the highest rates of scabies infestation. This higher prevalence in this age group could be attributed to a number of factors, including overcrowding, the nature of their jobs, and poor living conditions for patients. Our findings are consistent with those of Jaberhashemi et al. [27] and not with those of Mero and Hassan [16], Al-Shawa[28], El- Okbi et al. [29]. However, a number of studies found that age and sex did not affect scabies infestation [30].

Based on the educational status (Table No. 2), primary school students account for the highest percentage of infestation (42.41%). This could be caused by the filthy conditions and excessive number of students in elementary schools. Patients without formal education had a 33% infestation prevalence. As educational attainment increased, the rate fell. The high percentage of illiteracy may be a sign of poverty because it could be brought on by low income, sleeping outside the house, a low standard of living, unsanitary conditions, or a lack of education. According to Table 4, the rates of infestation for urban and rural residents are slightly greater than those for suburban ones, at 33.12%, 40.25, and 26.62%, respectively. According to other research, scabies is quite common in rural areas, such as those in Bangladesh[31], Egypt [21], and the United Kingdom [32]. In general terms, the majority of the population lived in densely populated communities that were not only poorly educated and sanitized but also had low incomes.

According to Table (3), 27.11% of scabies patients seek medical attention during the first month of symptoms, 41.20% do so within six months of infestation, and 31.68% postpone seeking care for longer than six months after symptoms first appear. There isn't enough information available in this direction to compare the outcomes. Many of them demonstrated improper drug application when questioned further. The infection rate recorded here is significantly greater than that of Al-Chalabi [33], who stated that only 13% of the subjects had scabies infestations that recurred. Overcrowding in the residential location was a significant factor for the scabies patients, as Table (3) illustrates. According to the study's findings, patients from households with five to ten members who reside in small houses were more likely to have scabies. Similar findings were documented from other developing nations, where large families with a high crowding index at night were more likely to have scabies cases due to close proximity and bed sharing, which increases the scabies mite's ability to spread. The current investigation found that families with scabies cases frequently had high crowding index numbers. This suggests that sharing bedding and intimate contact may contribute to the spread of the scabies mite [21, 33, 34].

According to Liu et al. [35] and Ahmed and Aftabuddin [36], the monthly prevalence of scabies in Duhok province and the camps housing refugees from that region is highest in January and December and lowest in July and August. The ideal figure would have a decreasing incidence of scabies as the temperature increases from left to right, however this one shows a spike in the incidence of scabies in the middle due to the varying temperatures and humidity levels in the various Kurdistan area locations.

Numerous studies also show that there is an inverse relationship between temperature and the scabies disease, with the parasite being less active in high temperatures and more active in low temperatures, when fertility is high [37, 38]. Finally, the treatment for scabies is crucial because this study demonstrated that the disease is widely distributed in some places and that outbreaks are likely.

Conclusion

The current investigation came to the conclusion that Hawler province has a significant prevalence of scabies infestation. In addition, high rates of scabies were noted in patients who lived in densely populated areas, specifically those who were residents of urban and rural areas, and more than 50% of these patients contracted the infestation through household contact. Scabies was most common among outpatients who visited dermatology clinics, especially in males in the 19–39 age group. It has been demonstrated that scabies is widely distributed in some places and that outbreaks are likely, hence treating scabies is crucial. It is recommended to use control and preventative measures through appropriate and specific health programs. Maintaining personal cleanliness and educating oneself are crucial for managing this illness. In families with many members, it is recommended to treat all afflicted members as well as any other individuals who may have had lengthy or recent contact with the infected person. Adults should

take care to apply medication to the full skin surface, including the webs of their fingers and toes, rather than just the affected areas. This includes the neck and lower extremities.

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