A COMPARATIVE STUDY OF *SARCOPTES SCABIEI* INFESTATION IN DUHOK CITY: SEASONAL VARIATIONS, AGE, AND GENDER DIFFERENCES

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ABSTRACT
Scabies, a highly contagious skin disease that can cause serious complications for people who are infected, is caused by an overgrowth of the Sarcoptes scabiei mite. The aim of this study is to investigate the prevalence of scabies infestation among patients presenting Hospital in Duhok City, and its relation with age, gender and seasonal variations. A total of 1450 patients were infested with scabies, with the highest prevalence observed in females (50.89%). The most infested age group was 1-15 years in children, and above 45 years in the elderly. The lowest incidence was recorded in the 16-30 age group. Seasonal analysis showed the highest infestation rate in winter (33.17%) and the lowest in summer (18.55%). According to this study, we can conclude that the adequate health education and preventive measures against scabies infestation are very important.
Keywords: *Sarcoptes scabiei*, Scabies, infestation, prevalence, Gender.

INTRODUCTION

Scabies is a dermal infestation induced by the ectoparasite *Sarcoptes scabiei var hominis*, and is believed to be widespread, which is noteworthy for a neglected tropical disease (NTD) [1], Scabies occurs when female mites penetrate the outer layer of the skin for eggs laying, triggering immune responses of humans against mites' eggs and secretions, resulting in irritation and rashes, particularly at night. [2]. Epidemiological studies have demonstrated many factors, such as poor personal hygiene, overcrowded living conditions, sex, and seasonal conditions, that can affect the prevalence of scabies infestations. [3, 4]. Scabies transmits typically by skin-to-skin contact or perhaps indirectly via fomites, such as shared bedding or clothes, particularly in individuals with crusted scabies. It is estimated that about 200–300 million persons globally are affected by scabies, with significant regional differences [5-8]. This parasitic infestation has long been believed to predominantly affect people living in poverty and squalor, but recent findings indicate that it is now increasingly prevalent among the general population. Practically all countries have scabies infestations, but underdeveloped nations and tropical regions are particularly affected [9-12]. In infested individuals, the hands, particularly the between-finger spaces and wrists, the armpits, buttocks, and genitalia are frequently impacted. Sometimes scratching can be provoked , which may act as a gateway for germs and lead to secondary infection by other pathogens [13]. The high rates of re-infestation in individuals make prevention and control complicated, so effective treatment for scabies, such as topical use of Permethrin or systemic administration of Ivermectin, is very important. For severe cases of crusted scabies, a combination of the two drugs is advised [14-16]. In spite of the global importance of scabies infestation as a human concern, few researches have investigated prevalence levels of this parasite in our area, Duhok city, Kurdistan region of Iraq. Scarce data and studies on scabies in Duhok city can be considered as a gap in obtaining accurate information about the epidemiology and risk factors of this disease. This study aimed to determine the prevalence of scabies infestation in Duhok City, and find its relation with seasonal variations, patient's age and sex.

MATERIALS AND METHODS

Study area:
Duhok Governorate***,*** in the Kurdistan region of Iraq, is surrounded by mountains ranges; the city climate is rainy with mild temperatures in spring, hot in summer, moderately cold during autumn, and cold in winter. This study was carried out at the Azadi Teaching Hospital in the Duhok city, and data collection was conducted from January 2024 to March 2025. The hospital is a significant healthcare centre for the city.
Study design:
A total of 1450 patients (731 males and 719 females) with scabies, in four age groups, have visited the hospital during this time, and all attending patients were recorded by gender, age, and hospital visiting date.

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Dermatologists identified and inspected every patient. The diagnosis was typically made based on the patient's clinical symptoms, and in suspected cases, a dermatoscopy or microscopy was used to confirm the presence of scabies, and all scabies diagnosed patients, were treated by dermatologists using appropriate therapy, including 5% permethrin cream and oral ivermectin

Statistical analysis:

The collected data were analyzed statistically by SPSS 20.0. The Pearson chi-squared test was used to analyze between-group variations in scabies prevalence . (Significant P value <0.05).

RESULTS

In this study a total of 1450 infested individuals with scabies , of different sex and age, were recorded throughout the year. All cases were tabulated according to gender, age and seasonal variation (Tables 1 and 2). As shown in Table 1, the comparison based on t gender, showed a higher scabies infestation of females (50.89%) than of males (49.10%).

In the age group of 1-15 years the highest infestation rate was recorded (45.58%); the age groups of 16-30 years and 31-45 years presented similar rates, 11.65% and 11.93% , respectively, and the individuals of the age group >45 years comprised 30.82% of infestation, with no significant differences in the distribution among males and females infested persons (P-value 0.81). According to the seasonal variation in this study (Table 2), the the highest percentage of scabies infestation cases were recorded during the winter season (33.17%), and lowest percentage - in summer (18.55%), the spring and autumn infestation rates were similar, with 24.34% and 23.93% respectively, with no statistically significant differences between them (P-value 0.82).

According to the infestation distribution throughout the year, the higher infestation rate was registered in February (12.83%) and the lowest rate - in July with 5.86% of all cases.

During the other months across the seasons, the scabies infestation was recorded in different rates, as shown in Fig. No. (1).

Table 1. Prevalence of scabies infestation in Duhok city across different age groups

Age groups	Male %	Female %	Total %	P-value
1-15 years	319 (48.26)	342 (51.73)	661 (45.58)	0.81
16-30 years	82 (48.52)	87 (51.47)	169 (11.65)	
31-45 years	83 (47.97)	90 (52.02)	173 (11.93)	
45+ years	228 (51.01)	219 (48.99)	447 (30.82)	
Total	712 (49.10)	738 (50.89)	1450 (100)	

Table 2. Seasonal prevalence of scabies infestation in Duhok city

Seasons of year	Male %	Female %	Total %	P-value
Winter	233 (48.44)	248 (51.55)	481 (33.17)	0.82
Spring	172 (48.72)	181 (51.27)	353 (24.34)	
Summer	129 (47.95)	140 (52.04)	269 (18.55)	
Autumn	178 (51.29)	169 (48.70)	347 (23.93)	
Total	712 (49.10)	738 (50.89)	1450 (100)	

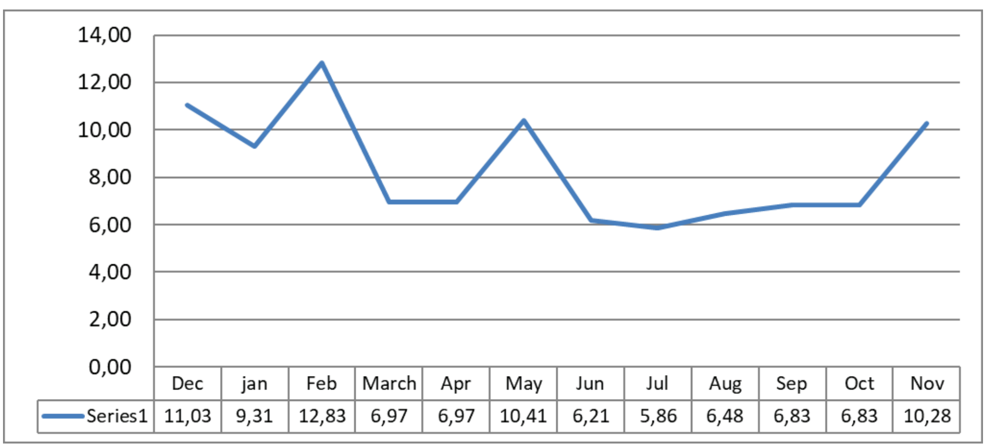

Figure 1. Monthly prevalence of scabies infestation

DISCUSSION

Sarcoptes scabiei is one of the most significant cutaneous ectoparasites that causes scabies infestation in man. [17] . The Kurdistan region of Iraq is considered as one of the areas where this ectoparasite is highly prevalent, particularly among children. [18], while few studies have been conducted in this area about the prevalence and risk factors concerning this ectoparasite. This study confirms previous research results in Duhok city [19] and Iran [4], showing higher rates of scabies infestation in females than in males. However, several other studies contradict our findings, as they report higher percentages of male infestation than of females [20-22]. The variation could be attributed to social interaction behaviours, daily household activities, and the type of labour performed. These factors can all contribute to the increased risk of scabies infestation in females [23]. Concerning the age, we found that the age group of 1–15 years had the highest rates of scabies infestation. This result could be explained by a number of biological and societal factors such as a greater exposure to places where there is a lot of physical contact, including schools and childcare centers, and a weaker immune system [24]. This observation is consistent with the findings of Karimkhani, Colombara [12], Mero and Hassan [19], and disagrees with the findings of Jaberhashemi, Khosravani [25]. Scabies prevalence in Duhok province as shown in Figure 1 was high in winter (February) and low in summer (July), which is consistent with findings from Liu JuiMing, Wang HsiaoWei [26] and Ahmed and Aftabuddin [27]. Many studies suggest that the rate of scabies infestation in man increases at low temperatures and decreases at higher temperatures. [28, 29]. Several factors can contribute to this seasonal variation. The list includes indoor close-contact activities and dry skin during the winter, while high temperatures are associated with increased perspiration, bathing and lighter clothing which promotes a better skin airflow in summer thus avoiding mite infestations [26]. Reducing overcrowding, promoting good hygiene practices like frequent handwashing and bathing, expanding access to safe housing and clean water, increasing awareness, and ensuring that everyone has access to adequate healthcare and nutrition to maintain healthy immune systems are all important ways to help scabies prevention. In light of the high rate of scabies infestation among children, health education and improved hygiene measures are strongly recommended. In prevention and control of scabies, the effectual public communication plays an essential role. Healthcare professionals should promote knowledge through clear, manageable, and evidence-based messages that emphasize early detection, proper hygiene practices, and effective disease treatment to reduce transmission and prevent recurrence.

CONCLUSION

In conclusion, this study observed the highest rate of scabies infestation in the 1–15 year age group. Based on the findings, no statistically significant differences were found between male and female participants, with overall prevalence nearly equal (50.89% in females and 49.1% in males), suggesting that gender is not a major factor in scabies infestation. These findings can help public health organizations create focused initiatives, increase public knowledge, and put into practice efficient scabies prevention strategies.

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