

Coronavirus Pandemic

Impact of COVID-19 lockdowns and refugee influx on scabies presentations to dermatology outpatient clinics in Turkey

Rabia Öztaş Kara¹, Berna Solak¹, Ahmet Kara¹

¹ Faculty of Medicine, Sakarya University, Sakarya, Türkiye

Abstract

Introduction: The frequency of scabies and its relationship with the coronavirus disease 2019 (COVID-19) pandemic is a current scientific curiosity in Turkey and worldwide. The data presented in this article will help raise awareness of dermatologists in situations such as pandemic-induced quarantines where scabies can spread rapidly.

Methodology: This was a retrospective study to compare patients who presented with scabies and were evaluated during the COVID-19 pandemic, with those who presented before and after the pandemic, in terms of the diagnosis ratios. In addition, the recurrence rates were compared in terms of age, nationality, and the environment in which they lived.

Results: The frequency of scabies was statistically significantly higher in the post-COVID period in all quarters of the year, with a higher rate of patients in the first and last quarters, which is typical of scabies patients. However, a significant difference in recurrence rates was not detected.

Conclusions: Several factors might be responsible for the increased frequency of scabies during the lockdown periods in Turkey. First, entire families, including relatives, had to live together in a crowded space. Second, there was a relative increase in doctor visits, in spite of the stay-at-home policy, owing to the overwhelming itchiness of scabies.

Key words: COVID-19, scabies, pandemic, outbreak, epidemiology.

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Introduction

Scabies is a parasitic skin infestation caused by *Sarcoptes scabiei* var. *hominis* (*S. scabiei*) and is characterized by pruritus, vesicles, papules, burrows and excoriations (Figure 1). Pruritus is more intense during the night, and papular lesions commonly occur on the wrists, elbows, armpits, interdigital spaces, nipple, penis, and waist [1]. It is a significant public health problem since all ages, races, gender, and socioeconomic groups are vulnerable to the disease. Moreover, it causes severe itching that impairs the quality of life and may lead to complications and even mortality in some individuals [2].

In classical scabies treatment, topical therapies are the first-line approach. The main agents used are permethrin cream 5%, crotamiton lotion/cream 10%, sulfur (5–10%) ointment, and lindane lotion 1%. Permethrin cream 5% is reported to be a safe option in infants aged 2 months and older, as well as in pregnant and lactating women. Although it is not yet Food and Drug Administration (FDA) approved, oral ivermectin should be considered in cases where topical treatment has failed or cannot be tolerated by the patients [1].

The World Health Organization (WHO) estimates that scabies affects more than 200 million people worldwide at any time. It is transmitted by close skin contact from person to person, or by fomites. Therefore, its occurrence is closely related to the living conditions of the people, such as, war, migration, lack of health services, and living in communal spaces such as barracks and dormitories. Autumn and winter months are risk factors for the rapid spread of the disease. Diagnosis and treatment opportunities are scarce in low socioeconomic environments, therefore the scabies epidemic significantly affects many people's lives in these environments with adverse sequelae [2]. Scabies is not associated with poor personal hygiene, but rather with poverty, poor socioeconomic status, and living in overcrowded settings [1]. Indeed, in recent years, a general increase in the frequency of scabies has been reported in Turkey, mainly attributed to extreme refugee migration [3–7].

Coronavirus disease 2019 (COVID-19) is a disease caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). WHO declared COVID-19 as a pandemic in February 2020. The Ministry of

Figure 1. Scabies is a skin infection caused by *Sarcoptes scabiei* var. *hominis*. The pathogen creates a burrow just under the skin's surface.



Health reported the first case in Turkey in March 2020. Pandemic measures were implemented in Turkey on 1 April 2020. There have been very few studies from our country examining the effects of COVID-19 lockdowns on the frequency of scabies [3–9]. The data presented in this article is important because it includes the largest patient group and examines the current frequency of scabies and their relationship with the COVID pandemic, both in Turkey and worldwide.

Methodology

This was a retrospective study in which patients presented with scabies were evaluated. All the patients diagnosed with scabies were screened between February 1, 2018, and May 31, 2022. The data were obtained from the hospital database system, and the Sakarya University Ethics Committee approved the study protocol for non-interventional studies (BSH-2021/28).

Data collection

The electronic records of the dermatology outpatient clinic of Sakarya University Medical Faculty Training and Research Hospital were reviewed. Since this was an incidence study, we excluded the scabies diagnoses made by departments other than dermatology from the study to ensure diagnostic certainty. The diagnosis of scabies was based on the International Alliance for the Control of Scabies (IACS) 2020 report criteria, which included the observation of mites' eggs or the mites' feces in dermoscopy; or the clinical presence of burrows, typical lesions in the male genital area, lesions with a typical clinical distribution and characteristics; or the presence of itching; and a history of contact, along with the presence of atypical lesions [1]. The patients diagnosed with scabies (according to the International Classification of Diseases-10th Revision (ICD-10) B86 code) were screened. The age, gender, nationality, and application date were recorded.

Recurrent admissions due to treatment failure or re-infestation were considered as single enrollment. Re-applications within 30 days were considered as treatment failure and were not considered in analyses, whereas re-applications over 30 days were accepted as re-infestation.

The numbers of other patients who applied to the clinic in the same period were also obtained from the hospital statistics service and used for comparison.

Statistical analysis

All statistical procedures were performed with Excel (Microsoft 2010, Redmond, Washington) and Statistical Package for Social Sciences (SPSS) 20.0 (Chicago, IL, USA). Statistical significance was determined at p values < 0.05 . The results were presented as mean (standard deviation) or the number of patients (percentage). Pearson Chi square and Fisher's exact test were used for categorical variables. When the degrees of freedom in Chi square tests were greater than 1, post-hoc comparison was made using the z-test. Independent samples were compared with appropriate comparison tests (Kruskal-Wallis H, Mann-Whitney U) after checking the normality of distribution of numeric variables by Kolmogorov Smirnov. Following the Kruskal Wallis H and Chi square tests, Bonferroni correction was performed to avoid type I error.

Results

A total of 177,969 outpatients in the dermatology clinic were screened during the time period of this study. Among them, 5,594 (3.14%) were diagnosed with scabies. The mean age of the patients with scabies was 30.88 ± 20.06 years (min–max: 0–97 years). Of all patients, 2,864 (51.2%) were female. The mean age of females was 32.03 ± 20.30 years (min–max: 0–93 years), and the mean age of the males was 29.68 ± 19.73 years (min–max: 0–93 years); thus, age was significantly higher in females ($p = 0.000$). There was no statistically significant variability in the age of the patients analyzed by years and quarters ($p = 0.768$).

We analyzed the frequency of scabies patients according to years and quarters and observed a significant increase in the ratio of patients with scabies to other outpatients over the years (Table 1).

In addition, the patients' data after the second quarter of 2020, which coincided with the onset of the epidemic in Turkey was compared with similar periods of the year in the pre-COVID time. The proportion of patients with scabies who applied to outpatient clinics in the pre-COVID period was 2.02, compared to the

Table 1. Mean age, and number and percentages of scabies patients in the quarters from 2018 to 2022.

Quarter	Mean age (mean ± SD) (years)	Number of patients with scabies (n = 5594)	Total number of outpatients (n = 172375)	Scabies percentage* (%)
2018-2 nd quarter	31.4 ± 20.0	196	15105	1.30
2018-3 rd quarter	33.0 ± 19.6	140	14624	0.96
2018-4 th quarter	30.9 ± 19.3	226	15518	1.46
2019-1 st quarter	29.8 ± 19.0	261	15481	1.69
2019-2 nd quarter	30.4 ± 19.0	234	13978	1.67
2019-3 rd quarter	29.0 ± 20.1	269	13012	2.07
2019-4 th quarter	31.0 ± 20.4	562	14930	3.76
2020-1 st quarter	31.1 ± 20.6	488	12273	3.98
2020-2 nd quarter**	29.2 ± 17.0	135	2398	5.63
2020-3 rd quarter**	32.0 ± 21.1	272	7346	3.70
2020-4 th quarter**	30.6 ± 19.5	295	4740	6.22
2021-1 st quarter**	33.2 ± 19.8	435	6928	6.28
2021-2 nd quarter**	28.5 ± 18.3	307	7853	3.91
2021-3 rd quarter**	31.2 ± 21.4	385	8444	4.56
2021-4 th quarter	29.9 ± 19.8	750	9832	7.63
2022-1 st quarter	32.0 ± 21.2	639	9913	6.45

*Number of patients with scabies/Total number of outpatients x 100; ** Stay at home periods.

proportion of 5.30 during the COVID-19 pandemic ($p = 0.000$). In addition, the proportion of patients with scabies was higher in the first and fourth quarters of all years. However, the proportion of patients with scabies was higher in the second quarter of 2020, compared to the first quarter of the same year, when the COVID-19 pandemic began (Figure 2).

The frequency of scabies was found to be significantly higher in the post-COVID period in all quarters of the year. The rate was higher in the first and last quarters, which is typical of scabies patients, and continued in the post-COVID period (Figure 3).

The distribution of patients according to age was as follows: 3.4% infants (0–1 year), 6.5% preschoolers (1–6 years), 9.8% school age (7–14 years), 56.3% young

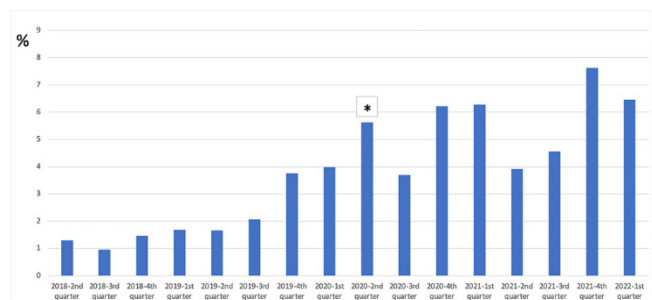
adults (15–44 years), 16.2% middle age (45–65 years), 7.8% elderly (> 65 years). When the age groups and recurrence rates of the disease were examined, it was seen that the recurrence rates varied between 13.7% and 20.1%. The differences were not statistically significant ($p = 0.130$) (Table 2).

Refugees constituted 2.9% of the patients who presented during the study period. The recurrence rate was 14.8% among Turkish patients, and 11.8% among refugees. The difference was not statistically significant ($p = 0.296$). One percent of the patients consisted of prisoners. Nine patients were in the child welfare agency, and only seven patients were soldiers. When the groups were compared in terms of relapse, the recurrence rate was 23.2% among the prisoners, and 14.6% among the non-prisoners. The numbers of those staying in the military and child welfare agencies were

Table 2. Classification of single infestation and relapsed cases across age groups.

Patient group	Single infestation	Relapsed cases	Total	<i>p</i> value
Infants (0–1 year)	162 (85.2%)	28 (14.8%)	190 (3.4%)	0.130
Preschoolers (1–6 years)	310 (85.3%)	53 (14.7%)	363 (6.5%)	
School-aged children (7–14 years)	475 (86.3%)	75 (13.7%)	550 (9.8%)	
Young adults (15–44 years)	2695 (85.6%)	453 (14.4%)	3148 (56.3%)	
Middle-aged adults (45–65 years)	781 (85.9%)	128 (14.1%)	909 (16.2%)	
Older adults (> 65 years)	350 (80.6%)	84 (19.4%)	434 (7.8%)	
Total	4773 (79.9%)	821 (20.1%)	5594 (100%)	

Figure 2. Distribution of scabies cases by years and quarters.



* The only period that the rate of scabies patients in the second quarter was higher than in the first quarter.

Table 3. Comparison of numbers of single infestation and relapsed cases among refugees and natives, prisoners and free patients, and patients in child welfare agencies and soldiers.

	Single infestation	Relapsed cases	Total	p value
Refugees	142 (88.2%)	19(11.8%)	161(2.9%)	0.296
Natives	4631 (85.2%)	802 (14.8%)	5433 (97.1%)	
Free	4716 (85.4%)	806 (14.6%)	5522(98.7%)	0.070
Prisoner	43 (76.8%)	13 (23.2%)	556 (1%)	Statistically not comparable
Patients in child welfare agencies	9 (100%)	0	9 (0.2 %)	
Soldier	5 (71.4%)	2 (28.6%)	7 (0.1%)	
Total	6012 (86.1%)	967 (13.9%)	5594 (100%)	

low; therefore, they were not compared statistically. The difference was insignificant compared to the prisoner group (0.070) (Table 3).

Discussion

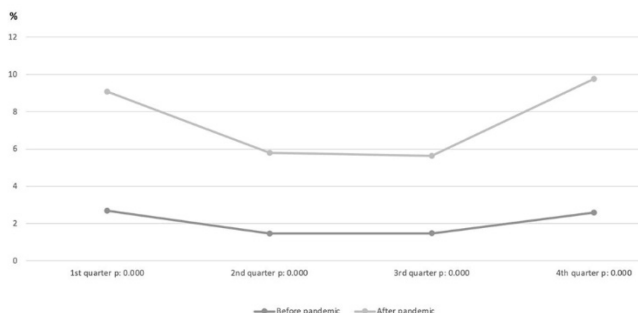
The most prominent findings of the current study are: i) the frequency of scabies patients admitted to dermatology outpatient clinics increased after the spread of COVID-19 infection, ii) the frequency of scabies increased in the fall and winter, iii) the female-to-male ratio of all scabies patients was close to one, iv) both single infection and relapsed cases were more common in young adults, v) there was no difference in terms of recurrence status across age groups, and vi) there was no difference in recurrence frequency between refugees and natives.

Scabies has significant health and financial impact. It results in loss of workforce for a certain period of time, and simultaneously adds to healthcare costs. Scabies continues to be a major health problem, especially with the recently reported treatment resistance in developing countries and in countries affected by war and refugee migration. According to WHO data, the prevalence of scabies varies between 0.2% and 71% [10]. It has been reported that scabies is more common in East Asia, Southeast Asia, and tropical regions [11]. Since 2017, a significant increase in the frequency of scabies has been reported by dermatologists in Turkey [5,6,12]. This increase was in part attributed to the massive migration of refugees

from Syria since the inception of the civil war in 2011. Baykal *et al.* [5] compared the annual percentage of scabies among all patients seen in an outpatient clinic in Turkey in 2016 and 2019, and reported that the percentage of scabies patients were 0.99% vs. 3.08% in the primary and tertiary care centers, and 0.67% vs. 2.96% in other tertiary care centers. Ozden *et al.* reported that the numbers of patients with scabies increased seven times in 2018 and 30 times in 2019, compared to 2017. They also stated that the number of patients requiring systemic treatment increased in 2018 and 2019 compared to 2017 [12]. The authors suggested that the outbreaks may have occurred because of various factors such as migration, global warming, and sexual intercourse [12]. A hospital-based cross-sectional study in 2021 revealed that the prevalence of scabies was 10.9% in northeastern Turkey [2]. Aktas *et al.* reported that the rate of scabies cases admitted to dermatology outpatient clinics increased gradually from 2013 to 2018, and proposed that it may be related to the increased number of refugees in the region (0.4% vs. 1% respectively, $p < 0.001$) [6]. The increase in the frequency of scabies infestation, seen before the onset of the COVID-19 pandemic in our region, and especially before the closure period, may be associated with the refugees coming from regions where the incidence of scabies is higher than our country. However, it is not possible to determine the difference between the incidence of scabies in native and refugee patients with our data. Therefore, considering the similar single and recurrent infestation rates between the two groups, it is not possible to make a definite conclusion on whether the incidence of scabies was higher among the refugees.

COVID-19 pandemic measures were applied with great care in Turkey. The first COVID-19 lockdown or "stay at home" was declared on 1 April 2020 by the Ministry of Health of Turkey. After that, further intermittent relaxation and lockdown periods ensued. Life was completely normalized on 1 July 2021 and all restrictions on movement were removed in Turkey. In our study, the increase in the rate of scabies in the

Figure 3. Distribution of scabies cases by years and quarters in the pre- and post-COVID-19 period.



dermatology outpatient clinic started in 2019, and increased significantly following the lockdown period. The number of patients who had scabies seemed low in absolute terms; however, the total number of patients seen in the outpatient clinics was also down. Although it seemed at first that there were fewer patients with scabies, when ratios of scabies to all dermatology admissions were taken into account, it was quite apparent that the rate of occurrence of scabies had increased during this period.

In a study investigating the effect of the COVID-19 pandemic on scabies, the rate of occurrence of scabies among outpatients between 2019 and 2020 was analyzed and it was found that the incidence of scabies in the first three quarters of 2020 was significantly higher than in 2019 [7]. In a study from Turkey, the authors examined the incidence of scabies between 2017 and 2020. They reported that the gradually increasing frequency significantly decreased in March and April 2020, which coincided with the COVID-19 lockdown period, but then the increase continued from where it left off. The decrease in this interval may probably be explained by the decrease in hospital admissions due to the lockdown [3]. In another study from Turkey, which compared the incidence of scabies in 2019 and 2020, the authors observed that the incidence of scabies increased significantly in 2020 compared to 2019 (1.77%, and 0.71%, respectively, $p < 0.001$) [13]. The authors suggested that the increase in the prevalence of scabies during the COVID-19 quarantine was due to the increased amount of time spent with family and close contact with relatives; delays to inpatient admission, access to a doctor, and initiation of treatment; and increased resistance to permethrin treatment.

In a study reported from North Carolina, the frequency of scabies and lice were compared between March 2017 to February 2021, in the pre-and post-COVID-19 period, and the authors reported that the frequency of both decreased during the COVID-19 pandemic lockdown period. In this study, it was suggested that the decrease in the frequency of scabies during the stay-at-home periods was due to decrease in contact [14]. Contrary to this study, in all studies reported from Turkey, including the present one, it was reported that the frequency of scabies increased during lockdown periods. We propose that the increase seen in our region may be due to cultural differences. Lockdown could not prevent frequent contact between close-knit families and relatives due to of cultural factors. Most individuals in Turkey do not live alone but in a family, and close-knit families are common.

Therefore, people live together with their relatives according to their cultural norms and do not completely cut off their contact with neighbors and other relatives.

In a study reported from Italy, there was a significant increase in the percentage of patients positive for scabies in 2020 compared with the percentage of positive patients per year from 2015 to 2019 (33.03% vs. 23.05–26.10%) ($p < 0.01$) [15]. The authors suggest that increased close contact with relatives and household members during the lockdown period and changes in personal hygiene and body care due to social isolation may be responsible for this increase.

A study by Kutlu *et al.* [16] that compared the frequency of patients admitted to dermatology outpatient clinics before and after the stay-at-home policy, reported that the frequency of scabies increased during the stay-at-home period (12.8%). The authors explained that despite the stay-at-home policy and the severity of the epidemic increased and led to hospital admissions due to the disturbing itching of scabies that do not even allow the patients to sleep.

Although some studies showed that scabies is more common in women [6–17], in general, there is not much difference in the frequency of scabies by gender [10]. On the contrary, Turan *et al.* found no change in male–female ratios in 2019 and 2020, and the number of males was higher in both years [7]. In the present study, despite a very slight female predominance, there was a fairly balanced gender distribution of 50.7% (female) to 49.3% (male).

It has been reported that the incidence of scabies is high among children, adolescents, and the elderly, particularly in underdeveloped and high-burden scabies areas [1]. However, such differences between age groups is not observed in regions with the lowest scabies burden, such as North America and Western Europe. The incidence of scabies in these regions is evenly distributed among all age groups [11]. In our study, we found that the parasite was more common among young adults. The fact that it was detected more frequently in this sexually active age group can be explained by the fact that sexual intercourse can considerably increase the risk of transmission [18]. In addition, the fact that the students stay in the dormitories, and the young age group must enroll in a compulsory military service period in our country, may also have contributed to the high scabies ratio seen in this age group. Other studies reported from Turkey showed that scabies was more common in young adults [7,17]. Aktaş *et al.* [7], examined the frequency of scabies between 2013 and 2018, and reported that the

mean age decreased over the years (from 49.7 years in 2013 to 31.4 years in 2018, $p = 0.006$). However, in another study from Turkey that compared the the incidence of scabies in 2019 and 2020, the authors reported that the mean age was significantly higher in 2020 compared to 2019, with the majority of cases in both years being young adults [8]. In our study, the mean age did not show any discernable pattern over the years, and there was no statistically significant difference in mean age from 2018 to 2022.

It is known that the frequency of scabies increases in winter and autumn. In addition to the effect of cold and humid weather, increasing use of smaller spaces in winter may also explain the seasonal difference [7–19]. In our study, we observed that the frequency of scabies was generally compatible with the increased pattern in autumn and winter. In addition, the frequencies were lower in the second and third quarters of the investigated years, except for the second quarter of 2020, which was the time of onset of the pandemic in Turkey.

There are a few limitations in our study. Since our study was retrospective, characteristics such as socioeconomic status, living conditions, number of individuals in the family, and the treatments administered were not evaluated. The fact that only dermatology outpatients' data were evaluated in our study might have caused a partial bias. Data from other departments such as internal medicine, pediatrics, emergency department, and general practice centers were not included. In addition, since the exact number of refugees in the region where the study was conducted is unknown, it was impossible to provide precise data on the frequency of scabies in this population.

Conclusions

The increased frequency of scabies infestation before the COVID-19 pandemic may be related to the increasing numbers of refugees in Turkey. The incidence of scabies increased markedly during the pandemic and several factors may be responsible for this increase during lockdown periods. First, entire families had to live together in a crowded space, often along with some relatives. Second, there was relative increase in doctor visits in spite of the stay-at-home policy owing to the overwhelming itching from scabies. Our results contribute to raising awareness of dermatologists and primary healthcare workers in situations such as pandemic-related lockdowns during which diseases transmitted by close contact, such as scabies, may spread rapidly. In this regard, it would be beneficial to organize digital awareness programs,

remote diagnosis, and treatment alternatives for disease prevention in the future.

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Corresponding author

Rabia Oztas Kara, MD.

Department of Dermatology, Sakarya University Faculty of Medicine,

54000, Korucuk, Sakarya, Türkiye.

Tel: : +90 505 488 5472

Fax: +90 264 255 21 05

Email: r.oztas.kara@gmail.com

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