

Epidemiological Evaluation of Scabies Cases Encountered in the Last Three Years as a Tertiary Health Center

Üçüncü Basamak Sağlık Merkezi Olarak Son Üç Yılda Karşılaşılan Skabiyez Olgularının Epidemiyolojik Değerlendirilmesi

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ABSTRACT

Objectives: We aimed to reveal the change in the demographic characteristics of patients with scabies in the last three years and the increase in frequency of patients with scabies observed in our region.

Methods: All patients diagnosed as having scabies in Erzurum Regional Training and Research Hospital and Palandöken State Hospital, Clinic of Dermatology between January 2017 and December 2019 were retrospectively evaluated. Data such as age, gender, citizenship, presentation dates were recorded from the hospital database by anonymizing.

Results: The disease was significantly more common in men than women ($p<0.001$). Of female patients, 40.9% and of male patients, 51.9% were young adults (15-44 years of age). Of 252.261 patients who were admitted to the dermatology outpatient clinic in the past three years, 1.952 (0.77%) were diagnosed as having scabies. It was observed that the frequency of scabies gradually increased in the last three years (0.55%, 0.80% and 0.94%, respectively). The case frequency was significantly higher in 2019 compared to 2017 ($p<0.001$). Considering the quarters of the year, the lowest rate was observed in the first quarter of 2017, while the highest was in the last quarter of 2019 (0.42% and 1.54%, respectively). It was determined that the frequency of scabies between the quarters of the year increased significantly in the last quarters ($p<0.001$). One hundred and twenty six (6.5%) patients had a recurrent presentation. It was remarkable that suspicion of treatment failure gradually increased from 3.2% to 6.2% in the past three years.

Conclusion: The frequency of scabies in our region was indeed increased significantly in 2019 and especially in the 3rd and 4th quarters.

Keywords: Epidemiology, scabies, treatment failure

ÖZ

Amaç: Çalışmamızda, son üç yılda uyuz hastalarının demografik özelliklerindeki değişimi ve bölgemizde gözlemlediğimiz uyuz olgularındaki artışı ortaya koymayı amaçladık.

Yöntemler: Ocak 2017 ve Aralık 2019 tarihleri arasında Erzurum Eğitim ve Araştırma Hastanesi ile Palandöken Devlet Hastanesi Dermatoloji kliniklerinde scabies tanısı alan tüm hastalar retrospektif olarak değerlendirilerek çalışmaya alındı. Yaş, cinsiyet, vatandaşlık ve başvuru tarihleri hastane veri tabanından anonimleştirilerek elde edildi.

Bulgular: Hastalık erkeklerde kadınlara oranla anlamlı olarak daha sıkı ($p<0,001$). Kadın hastaların %40,9'u ve erkek hastaların %51,9'u genç yetişkinlerdi (15-44 yaş). Son üç yıl içinde dermatoloji polikliniğine başvuran 252,261 hastadan 1,952'si (%0,77) uyuz tanısı aldı. Uyuz frekansının son üç yılda tedricen arttığı (%0,55, %0,80 ve %0,94; sırasıyla) gözlemlendi. Olgu sıklığı 2019'da, 2017 yılına göre istatistiksel olarak anlamlı derecede yüksekti ($p<0,001$). Yılın çeyrekleri değerlendirildiğinde yine en az oranda olgu 2017'nin ilk çeyreğinde görülürken en yüksek 2019'un son çeyreğinde idi (sırasıyla; %0,42 ve %1,54). Yılın çeyrekleri arasındaki uyuz frekansının, son çeyreklerde anlamlı derecede arttığı belirlendi ($p<0,001$). Yüz yirmi altı (%6,5) hastanın tekrarlayan başvurusu mevcuttu. Tedavi başarısızlığı şüphesinin son üç yıl içinde kademeli olarak %3,2'den %6,2'ye yükseldiği dikkat çekiciydi.

Sonuç: Bölgemizdeki uyuz sıklığının 2019'da ve özellikle 3. ve 4. çeyreklerde önemli ölçüde arttığı tespit edildi.

Anahtar Kelimeler: Epidemiyoloji, scabies, tedavi başarısızlığı



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INTRODUCTION

Scabies is an ectoparasitic infestation caused by *Sarcoptes scabiei* var. *hominis*. It affects approximately 300 million people worldwide each year, causing severe morbidity (1). It is a relatively common infestation that affects people of all ages and socioeconomic status, although it is seen in tropical countries with a limited economy, especially with a high population density (2). Migration, deprivation of health services, living in common areas such as dormitories, and camps with poor housing and hygiene conditions are the most critical factors affecting the transmission of the disease, which increases in autumn and winter months (3,4). Besides, using common things such as beds, clothes, homelessness, dementia, and traveling to endemic areas are other risk factors (1). The infectivity of the disease is continuous and cause severe infestations if left untreated (3).

The life cycle of scabies mite begins with the entrance of the fertilized female parasite into the human epidermis and laying 2-3 eggs per day. The larvae that hatch from the eggs turn into adult mite within two weeks and complete their life cycle within 4-6 weeks. Contamination is most commonly caused by direct skin contact. However, mites can survive outside the human body for 24-36 hours under ordinary room conditions. It is accepted that mites that are still contagious during this period can be transmitted indirectly from clothes, beds, other inanimate objects (5). Symptoms such as itching exacerbated at night and skin rash result from sensitization to mite proteins and feces (type 4 hypersensitivity reaction). Therefore after the first infestation, symptoms appear 3 to 6 weeks later; this period is 1-2 days in re-infestation. Although it may involve the whole body, mostly hand fingers, flexor face of the wrist, axilla, back of the ear, ankles, feet, buttocks, belt region, lower abdomen, nipple in women, and genital region in men are affected. Unlike adults, the head, neck, palms, and soles of the feet may be involved in children and infants (6-8). Skin rashes are often small, erythematous, nonspecific, excoriated papules due to severe itching. Although the tunnel (sillion) and vesicle perle are pathognomic, it is difficult to see them intact due to itching (9). The 2020 IACS Criteria categorized diagnosis recently at three levels of diagnostic certainty (Confirmed, Clinical and Suspected Scabies) and eight subcategories to facilitate the standardization of scabies diagnosis in researches. Confirmed scabies (level A) requires direct visualisation of the mite or its products such as eggs or fecal pellets. Clinical scabies (level B) and suspected scabies (level C) rely on clinical assessment of signs and symptoms. Levels B and C are stated to be most suitable for clinical settings and field surveys because of high sensitivity (10). Clinical features such as excoriated papules in predisposing locations, typical distribution, intense nocturnal pruritic rash, family and contact history are usually sufficient for diagnosis (3). Scabies is an important public health problem due to causing widespread outbreaks, especially in schools and treatment costs. Scabies can affect the quality of life in patients and their family members on account of causing sleep disturbances, psychosocial problems, and stigmatization (1,6). Treatment of scabies includes the administration of permethrin 5% cream or lotion, lindane 1% lotion, crotamiton 10% cream, benzyl benzoate 25% lotion, systemic ivermectin tablet and topical magistral prescription containing 5-10% sulfur (2,11). Topical permethrin 5%, which is the most frequently used available drug in our country, has high cure rates, approaching 90% in randomized studies (12). It is emphasized in the current scabies guideline by the centers

for disease control (CDC) and prevention that if itching still is present more than 2 to 4 weeks after treatment or if new burrows or pimple-like rash lesions continue to appear, re-treatment may be required (13).

In this study, we aimed to determine the increase in scabies that we observed in our region in the last year and the change in the demographic characteristics of patients with scabies in the last three years.

METHODS

All scabies patients were enrolled consecutively from the Clinic of Dermatology and Venereology in the Erzurum Regional Training and Research Hospital and Palandöken State Hospital affiliated with training hospital, between 01 January 2017 and 31 December 2019. Data such as age, gender, citizenship, presentation dates, ICD-10 (International Classification of Diseases-10th Revision) codes were obtained from the electronic registration database by anonymizing. When diagnosing patients who presented for the first time or had recurrent persistent symptoms, almost no laboratory and imaging methods were used. Patients diagnosed with scabies according to levels B and C by the dermatology specialists were included in the study. Scabies diagnosed by departments other than dermatology were excluded from the study in order to ensure their diagnostic validity and to estimate the borders of the universe in the frequency study. Patients with recurrent presentations due to treatment failure or re-infestation were considered as single records. Patients who were re-evaluated with scabies after 10-30 days and 31 days were considered as treatment failure suspicion and re-infestation suspicion, respectively. All recurrent presentations within ten days after the previous application were considered trivial and were removed from the records.

This single-center cross-sectional study was approved by the Ethics Committee of Regional Training and Research Hospital, Erzurum, Turkey (decision no: 2020/02-17), and was performed according to the tenets of the Declaration of Helsinki.

Statistical Analysis

All statistical procedures were conducted using IBM SPSS Statistics 21.0 and MS-Excel 2010. Results were presented as the median (interquartile range) or number of patients (percentage). Pearson chi-square and Fisher's exact test were used for categorical variables, where appropriate. In chi-square tests with a degree of freedom greater than 1, pairwise comparisons (post-hoc) were performed using the z-test. After checking the normality distribution of scale variables by Kolmogorov-Smirnov, independent samples were compared with appropriate significance tests (Kruskal-Wallis H, Mann-Whitney U). The age distribution according to gender in scabies patients is shown on the horizontal bar chart. Two-sided p-values of <0.05 were considered statistically significant. Correction for alpha inflation (Bonferonni style) was applied as post-hoc after the Kruskal-Wallis H and chi-square tests.

RESULTS

A total of 252.261 patients, 1.952 of whom were scabies, presented to dermatology polyclinics in the last three years were enrolled in the study. The frequency of scabies among the patients

examined in our center according to the quarters in the last three years is shown in Table 1. The period with the lowest frequency of scabies was in the first quarter of 2017, while the highest was in the last quarter of 2019 (0.42% vs. 1.54%; respectively). It was noteworthy that there was a gradual increase in the frequency of scabies between 2017 and 2019 (0.55%, 0.80%, and 0.94%, respectively).

One thousand seventy-six (55.1%) patients with scabies were male, and 876 (44.9%) were female. This difference was statistically significant ($p < 0.001$). When evaluated separately on annual basis, in 2017, 2018 and 2019, the frequencies of scabies in male dominance were maintained consistently; however, the difference in 2018 was insignificant ($p = 0.004$, $p = 0.053$, and $p = 0.001$; respectively). There was no statistically difference in gender distribution within three years ($p = 0.437$) (Table 2). There were six groups according to the age: Infants (0-1), preschool children (1-6), school children (7-14), young adults (15-44), middle-aged persons (45-65), and aged persons (65+). The distribution of age groups according to the gender in the last three years was shown in Figure 1. Although scabies was observed in all age groups, 40.1% of women and 50.9% of men with scabies were young adults (15-44 years). While scabies was significantly more common in male infants and young male adults ($p = 0.019$, and $p < 0.01$; respectively), it was determined that it was significantly more common in women in middle age ($p = 0.045$). There was no difference in terms of gender distribution in preschool and school children and aged patients with scabies ($p = 0.491$, $p = 0.954$, and $p = 0.703$; respectively) (Figure 1).

The median age (interquartile range) of the patients with scabies was 25 (27), 20 (28), and 21 (23) years between 2017 and 2019, respectively. Although both men and women were significantly older in 2017 than in 2018, male and female patients were identical concerning age in 2018 and 2019. Besides, female patients were significantly younger in 2019 than in 2017. When the age distribution was examined by years, it was found that only in 2017, women were significantly older than men ($p < 0.001$) (Table 2).

The proportion of refugees with scabies was significantly lower in 2018 (1.7%) than in 2017 (4.2%) and 2019 (3.3%).

As shown in Table 2, the frequency of scabies between the quarters of a year increased significantly in the last quarter of the last three years, gradually ($p < 0.001$). In the first and third quarters, there were significantly more frequent scabies cases in 2018 and 2019 than in 2017. In the second quarter of the year, there was

no significant change in the frequency of scabies in the last three years ($p = 0.411$). When analyzed yearly, the frequency of scabies gradually increased in the last three years, but the increase was statistically significant only in 2019 compared to 2017.

When the proportional changes in the distribution in the age groups of the patients with scabies were examined in the last three years, a statistically significant increase was observed in the 0-6 age groups [Infants (0-1), pre-school children (1-6)] with the scabies patients in the last two years compared to 2017. There were no significant changes in the middle-aged persons and aged persons in point of the scabies distribution rates ($p = 0.052$, and $p = 0.884$; respectively). However, the decrease in the proportion of middle-aged patients was remarkable in the last two years compared to 2017 (Table 2).

One hundred and seven (84.9%) out of 126 patients with the repeated outpatient application were evaluated twice with the diagnosis of scabies. Treatment of scabies was reorganized in 17 (13.5%) patients three times and in 2 (1.6%) patients four times. There was no difference between the repeated outpatient application rates of refugees and Turkish citizens with scabies ($p = 0.398$). There was no significant increase in repeated application rates ($p = 0.579$). Nevertheless, the frequency of treatment failure suspicion among patients with re-applications was significantly increased compared to re-infestation suspicion in the last two years ($p = 0.006$, and $p < 0.001$; respectively). Rate of the treatment failure suspicion was higher, and rate of the

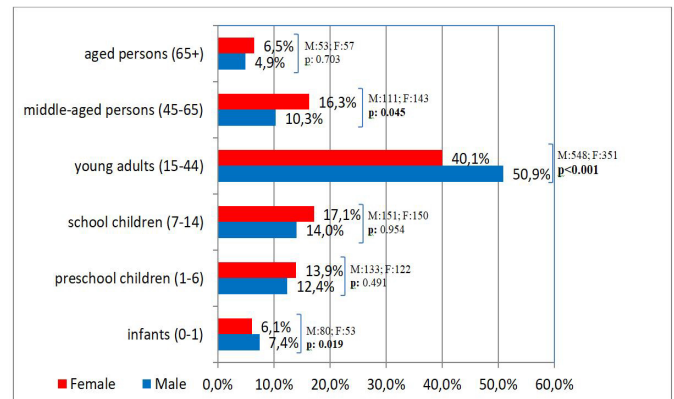


Figure 1. The distribution of age groups according to gender in scabies patients (M: male, F: Female)

Table 1. Frequency distribution of scabies according to years and quarters

	Number of outpatients	Quartiles of a year				Total
		Q1	Q2	Q3	Q4	
2017	Scabies/All outpatients	78/18672	128/17726	93/18492	102/18241	401/73131
	Scabies percentage	0.42%	0.72%	0.50%	0.56%	0.55%
2018	Scabies/All outpatients	154/25900	156/25124	231/23366	241/22953	782/97343
	Scabies percentage	0.60%	0.62%	0.99%	1.05%	0.80%
2019	Scabies/All outpatients	130/20215	120/18863	192/21480	327/21229	769/81787
	Scabies percentage	0.64%	0.64%	0.89%	1.54%	0.94%
Total	Scabies/All outpatients	362/64787	404/61713	516/63338	670/62423	1952/252261
	Scabies percentage	0.56%	0.66%	0.82%	1.07%	0.77%

Q1: January-March; Q2: April-June; Q3: July-September; Q4: October-December

re-infestation suspicion was lower in 2019, although there was no significant difference in 2019 compared to 2017 and 2018 ($p=0.067$, and $p=0.533$; respectively). It was noteworthy that treatment failure suspicion has gradually increased from 3.2% to 6.2% within the last three years (Table 2).

DISCUSSION

Scabies is a disease that does not require a vector in the life cycle and can be transmitted directly from person to person or indirectly from the objects and can easily cause outbreaks. Scabies continues to be a global health problem since all age, race, gender, and socioeconomic groups are susceptible to disease and cause severe itching to disrupt the comfort of life. As we found in the present study, a general increase in frequency has been reported in recent years (3,14,15). In light of the studies, it is essential to know the epidemiological data about the disease and to take the necessary precautions.

When the gender distribution of patients with scabies is examined, confusing results are noteworthy in recent studies. Unlike many other studies also from Turkey, where female dominance was observed, male dominance was noted in so many studies too (3,14,16-20). These contradictory results may arise from the population and geographical differences in the studies.

In the present study, there was a statistically significant male dominance in each of the last three years. When "Figure 1" was examined, it was understood that this difference was due to male dominance observed in young adults and the infantile period; though it was more common in women in the middle-aged period. No statistically significant difference was found between the genders in preschool children, school children and aged persons. Similar to our study, Dagne et al. (1) reported that they did not find any difference in gender distribution among school children with scabies, because school children share the same environment and are more frequently in close contact. In our region, where men are more dominant in social life, we think that as the place of women in social life increases, it will be in the same risk group as men in terms of the frequency of transmission of scabies. The distribution of scabies prevalence according to age groups varies in developed and developing countries. In low-income countries where scabies is an endemic disease, the prevalence of scabies peaking during infancy and childhood continues to decline towards the adult period. However, the prevalence in developed countries such as North America and Western Europe is equally low in all age groups (21-23). In our country, Aktaş et al. (14) reported that scabies tends to shift to younger ages from 2013 to 2018, although it was seen in patients with a mean age of 40 years. Çetinkaya et al. (3) reported that scabies was more common

Table 2. Change in age and several frequencies associated with scabies and age over the last 3 years

	2017 (n=401)	2018 (n=782)	2019 (n=769)	P
Age (years)	25 (27)	20 (28)	21 (23)	<0.001^{a,b}
Male-age (years)	21 (16)	20 (24)	21 (19)	0.019^a
Female-age (years)	37 (31)	20 (36)	19 (30)	<0.001^{a,b}
p	<0.001	0.125	0.289	-
Sex (male/female)	229/172	418/364	429/340	0.437
Proportion of refugees with scabies	17 (4.2%)	13 (1.7%)	25 (3.3%)	0.026^{a,c}
Change of scabies frequency in the quartiles				
Q1 (January-March)	78 (0.42%)	154 (0.60%)	130 (0.64%)	0.007^{a,b}
Q2 (April-June)	128 (0.72%)	156 (0.62%)	120 (0.64%)	0.411
Q3 (July-September)	93 (0.50%)	231 (0.99%)	192 (0.89%)	<0.001^{a,b}
Q4 (October-December)	102 (0.56%)	241 (1.05%)	327 (1.54%)	<0.001^{a,b,c}
Total (January-December)	401 (0.55%)	782 (0.80%)	670 (0.94%)	<0.001^b
Change in the age distribution of scabies patients				
Infants (0-1)	16 (4.0%)	66 (8.4%)	51 (6.6%)	<0.016^a
Preschool children (1-6)	34 (8.5%)	128 (16.4%)	93 (12.1%)	<0.001^{a,c}
School children (7-14)	48 (12.0%)	135 (17.3%)	118 (15.3%)	0.058
Young adults (15-44)	212 (52.9%)	312 (39.9%)	375 (48.8%)	<0.001^{a,c}
Middle-aged persons (45-65)	67 (16.7%)	96 (12.3%)	91 (11.8%)	0.052
Aged persons (65+)	24 (6.0%)	45 (5.8%)	41 (5.3%)	0.884
Repeated outpatient application	23 (5.7%)	48 (6.1%)	55 (7.2%)	0.579
Treatment failure suspicion	13 (3.2%)	36 (4.6%)	48 (6.2%)	0.067
Re-infestation suspicion	9 (2.2%)	16 (2.1%)	11 (1.4%)	0.533
p	0.394	0.006	<0.001	-

Data are expressed as median (interquartile range) or number of patients (percentage). Kruskal-Wallis H, Mann-Whitney U, and chi-square tests were used. Bonferroni correction was applied as post-hoc after Kruskal-Wallis H and chi-square tests. Significant values were shown in bold.

^a: adjusted $p < 0.05$ for the difference between 2017 and 2018, ^b: adjusted $p < 0.05$ for the difference between 2017 and 2019, ^c: adjusted $p < 0.05$ for the difference between 2018 and 2019

in patients aged 25-44 years. In the present study, we found that scabies was more common in young adults (15-44 ages). Also, similar to the study by Aktaş et al., we denoted that the mean age decreased significantly in 2018 and 2019 compared to 2017. Increasing socialization, personal and sexual contact, military participation in this age group may be the reasons for the spread of the disease.

The prevalence of scabies ranges from 0.2% to 71%, according to World Health Organization data (24). There is a need of recent studies on the frequency of scabies in our country. Aktaş et al. (14) reported that the scabies frequency in 2013 and 2018 was 0.4% and 1%, respectively, in patients applied to Karabük Training and Research Hospital. In the study of Çetinkaya et al. (3), the highest number of cases was reported in 2014, and the number of patients started to increase again in the first four months of 2017. We found that the frequency of scabies was 0.55% in 2017, 0.80% in 2018, and 0.94% in 2019. Among the reasons for this notable increase in 2018 and 2019, recent migration to our country, refugee growth, and related overcrowding come to mind. It is suggested to use oral ivermectin with the permission of the local health authority for effective control in communities with a high prevalence of scabies or outbreak (25). This drug is only available from abroad by producing an off-label drug report. Considering the increase in the frequency of scabies in recent years, we believed that the ivermectin tablet may be needed in the future.

In our study, although we observed that the proportions of refugees among patients with scabies were statistically more frequent in 2017 and 2019 than in 2018, we did not see a significant prominent increase in the number of foreign patients in our city as the western parts of the country hosted more refugees, unlike our region. Causes such as worsening of socioeconomic conditions, poor hygiene, and increased public living spaces may also be responsible for the increase in the frequency of scabies. In addition, treatment failure due to incomplete or incorrect application of drugs as well as possible resistance to conventional treatments or re-infestation of scabies may be reasons for increase in the frequency of scabies.

Patients with scabies may experience persistent itching for up to 4 weeks despite treatment, although its severity decreases. If this situation is not explained to the patients, there will be unnecessary hospital applications. However symptoms that persist or worsen beyond 2 to 4 weeks, especially if the rash worsens or new burrows appear, should trigger the physician and follow-up care should be arranged to assess for medication failure as well as re-infestation (13,26,27). In our clinical practice, there is a tendency to repeat the treatment in stubborn itching, the severity of which does not subside after the 10th day following the treatment of scabies, with the awareness that the disease is a public health issue. For this reason, the cut-off is considered 10 days instead of 14 days for "treatment failure suspicion". In the present study, there was a remarkable increase in the frequency of treatment failure suspicion of scabies patients in 2019 compared to 2017 (from 3.2% to 6.2%), although there was no significant difference ($p=0.067$). Nevertheless, after 2017, recording significant increases in favor of treatment failure suspicion as a reason for re-application suggests a suspicion that scabies in recent years is more resistant to conventional treatments. Rate of the re-infestation suspicion was lower in 2019, although there was no significant difference in 2019 compared to 2017 and 2018.

The fact that rates of the re-infestation suspicion have decreased may be related to the social consciousness developing due to the recent broadcasting about outbreaks of scabies (14,28). In our region, we found that scabies increased in late summer (3rd quarter of the year) and peaked in autumn (4th quarter of the year). In this respect, we have reached similar results with the studies of Aktaş et al. from Turkey and Kim and Cheong (21) from South Korea (11,18). There is no seasonal trend in incidence in tropical countries such as Taiwan, Brazil, Gambia, and Malawi (23,29). The lack of incidence differences in tropical climates may be because seasonal standards are not observed and that a positive heat balance is maintained throughout the year. However, in countries with seasonal standards, peaks in winter can be more easily understood as cool and humid weather is more suitable for living and fertility conditions of mites (29). One reason for the increase in cold months may be the tendency to share small areas that support increased close contact with infected persons.

The main limitation of our study was being retrospective. Besides, data from other departments such as internal medicine, pediatrics, emergency service, and primary care health centers were not included. Socioeconomic status, living conditions, number of individuals in the family, and treatments were not evaluated. Another limitation is that patients with suspected treatment failure and re-infestation were evaluated only by the clinician's decision, without being supported as a laboratory. Therefore, the reported treatment failure and re-infestation rates were probably higher than the actual rates.

This study was planned to base the increase in the frequency of scabies observed in our country in the recent period on a scientific basis and to guide the subsequent studies. Our results cannot be generalized to Turkey because of the methodology but are important in terms of being inspirational.

CONCLUSION

Scabies continues to exist as a global health problem. As seen in the present study, the frequency of scabies in our region was indeed increased significantly in 2019, especially in the 3rd and 4th quarters and there was an increase in treatment failure suspicion gradually from 3.2% to 6.2%, but not significantly, within the last three years. It was concluded that the perception that scabies is more resistant to treatment over the past year does not reflect the truth.

* Ethics

Ethics Committee Approval: This single-center cross-sectional study was approved by the Ethics Committee of Regional Training and Research Hospital, Erzurum, Turkey (decision no: 2020/02-17), and was performed according to the tenets of the Declaration of Helsinki.

Informed Consent: No patient consent was required, provided that the data such as name and citizenship numbers were anonymized by the IT team and with the permission of the ethics committee.

Peer-review: Externally and internally peer-reviewed.

* Authorship Contributions

Concept: Ç.T., Design: Ç.T., N.M., Z.U., Data Collection or Processing: Ç.T., N.M., Z.U., Analysis or Interpretation: Ç.T., Literature Search: Ç.T., N.M., Z.U., Writing: Ç.T., N.M., Z.U.

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