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The İmpact of COVID-19 Pandemic on The Diagnostic Distribution in Dermatology Outpatient Clinic

COVID-19 Pandemisinin Dermatoloji Polikliniğinde Tanı Dağılımına Etkisi

Nur Cihan Coşansu[1], Mahizer Yaldız[1], Bahar Sevimli Dikicier[1], Ünal Erkorkmaz[2]

[1] Sakarya University, Education and Research Hospital, Department of Dermatology, Sakarya, Turkey

[2] Sakarya University, Education and Research Hospital, Department of Biostatistics, Sakarya, Turkey

ORCID ID: Nur Cihan Coşansu https://orcid.org/0000-0001-6156-6380, Mahizer Yaldız https://orcid.org/ 0000-0003-0502-9024 Bahar Sevimli Dikicier https://orcid.org/ 0000-0002-1912-3946, Ünal Erkorkmaz https://orcid.org/ 0000-0002-8497-4704

***Sorumlu Yazar / Corresponding Author:** Nur Cihan Coşansu , **e-posta / e-mail:** mimaroglu5@hotmail.com

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Abstract

Aim After the COVID-19 epidemic, the admission frequency of dermatological diseases has changed. The aim of this study is to evaluate admission diagnoses in dermatology outpatient clinics during the COVID-19 pandemic.

Material and Method The International Codes of Diseases (ICD-10) categories and patient's diagnoses were evaluated before and after the pandemic. All patients, who applied to the dermatology outpatient clinic between June 1, 2020, and September 1, 2020, were included in our study. This information was compared with the same period of the previous year.

Results The hospital admissions were found reduced by 42.6%. The ratio of the patients with dermatophytosis, anogenital warts, scabies, seborrheic keratosis, urticaria, and xerosis cutis was significantly increased ($p < 0.05$), while the ratio of patients with actinic keratosis, callosities and corns, allergic contact dermatitis, lichen simplex, melasma, mycosis fungoides, nail disorders, nevi, prurigo nodularis, pruritus, psoriasis, and warts were significantly decreased after the COVID-19 pandemic ($p < 0.05$).

Conclusion The present study shows the frequency and most common types of outpatient dermatology visits, during the period of restriction reduction 3-6 months after the coronavirus pandemic. Many factors such as restrictions and hygiene practices, that affecting the quality of life, may cause changes in the diagnostic distribution of dermatology.

Keywords COVID-19; skin diseases; diagnose.

Özet

Amaç *COVID-19 salgını sonrası dermatolojik hastalıkların başvuru sıklığı değişmiştir. Bu çalışmanın amacı, COVID-19 pandemisi sırasında dermatoloji polikliniklerine başvuru tanılarını değerlendirmektir.*

Gereç ve Yöntem *Pandemiden önceki ve sonraki Uluslararası Hastalık Kodları (ICD-10) kategorileri ve hasta tanıları değerlendirildi. Çalışmamıza 1 Haziran 2020 ile 1 Eylül 2020 tarihleri arasında dermatoloji polikliniğine başvuran tüm hastalar dahil edildi. Bu bilgiler bir önceki yılın aynı dönemi ile karşılaştırıldı.*

Sonuçlar *Hastane başvurularının %42.6 azaldığı bulundu. COVID-19 pandemisinden sonra dermatofitozlar, anogenital siğil, uyuz, seboreik keratoz, ürtiker ve kserozis kutis hastalarının oranı önemli ölçüde artarken; aktinik keratoz, kallus ve boynuzlaşma, alerjik kontakt dermatit, liken simpleks, melazma, mikozis fungoides, tırnak bozuklukları, nevüs, prurigo nodularis, pruritus, psoriazis ve siğiller anlamlı olarak azalmıştır ($p < 0.05$).*

Sonuç *Bu çalışma, koronavirüs pandemisinden 3-6 ay sonraki kısıtlama azaltma döneminde, ayaktan hasta dermatoloji ziyaretlerinin sıklığı ve en yaygın türlerini göstermektedir. Yaşam kalitesini etkileyen kısıtlamalar ve hijyen uygulamaları gibi birçok faktör dermatolojinin tanısal dağılımında değişikliklere neden olabilir.*

Anahtar Kelimeler *COVID-19; cilt hastalıkları; tanı.*

INTRODUCTION

Coronavirus disease 2019 (COVID-19) is an emerging respiratory infectious disease caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), which was first recognized in Wuhan, China, in December 2019[1]. It has spread rapidly all over the world and been declared as a pandemic by the World Health Organization (WHO). Healthcare services internationally have reduced or canceled the majority of elective activity to focus on emergency care during the pandemic.

The first case was seen on March 11 2020 in Turkey, the day WHO declared a pandemic[2]. The rapid increase of the infected count created the necessity to take precautions to reduce the spread of the infection. The government gradually took a series of strict measures, including curfews, to ensure social isolation due to arising new cases in all cities across the country within a short time. As of June, restrictions have been eased and some have been ended. Routine dermatology outpatient care was also started again in June. However, the number of patients who want to admit dermatology outpatient clinics, as well as the diagnostic spectrum of the dermatologic diseases, was significantly affected due to the psychological consequence or other type effects of the pandemic[3,4].

The aim of this study is to evaluate the changes in the frequency and profiles of dermatologic diseases, after restrictions were reduced, by comparing with the same period of the last year.

MATERIALS and METHODS

Study design and patients

The current study was an observational single-centre study and conducted retrospectively by examining the numbers and diagnoses of patients who applied to the dermatology outpatient clinic in Sakarya University Education and Research Hospital in Turkey. The total number of patient and their diagnoses, who applied to the outpatient clinic between June 1, 2020 and September 1, 2020 were included in the present study. The total number and diagnosis of patients, who applied to the hospital in the same period of the previous year, were also investigated in order to exclude seasonal effects by scanning the hospital registry system. The diagnoses were listed based on the primary and digit categories of ICD-10 (International Classification of Diseases-10th Revision) codes. Category codes with three characters including code letters and the following two numerical digits were used, and subcategories were collected under its category. However, subcategoric numerical digits were used to differentiate several diagnoses This study complied with the Declaration of Helsinki and was approved by the independent medical ethics committee of Sakarya University Education and Research Hospital, Sakarya, Turkey (20/10/2020: 71522473/050.01.04/559).

Statistical analysis

Analyses were performed using commercial software (MedCalc Statistical Software version 19.5.3, MedCalc Software bvba, Ostend, Belgium). The Chi-Square test was used to compare the prevalence of various dermatological diseases between 2019 and 2020 years. Odds ratios and 95% Confidence Intervals (CI) were calculated for dermatological diseases. Categorical variables were presented as a count and percentage. A p-value <0.05 was considered significant.

RESULTS

A total of 17494 patients were admitted to the dermatology outpatient clinic between 1 June 2019 and 1 September 2019, while 10054 patients were admitted between 1 June 2020 and 1 September 2020 with a 42.6% reduction in admissions to our dermatology outpatient clinic. The percentage of patients with scabies, anogenital warts, dermatophytosis, seborrheic keratosis, urticaria, and xerosis cutis were significantly increased after the pandemic (Table 1). However; the percentage of patients with actinic keratosis, callosities and corns, allergic contact dermatitis, lichen simplex chronicus, melasma, mycosis fungoides, nail disorders, melanocytic nevi, prurigo nodularis, pruritus,

psoriasis, and warts were significantly decreased after the COVID-19 pandemic (Table 2). The percentage of other dermatologic diseases were not significantly changed after the COVID-19 pandemic (Table 3). The odds ratio for diseases that increased or decreased after the COVID-19 pandemic is shown in Table 4.

Table 1. Dermatologic diseases which increased significantly 3-6 month after the occurrence of the COVID-19 pandemic.

Diseases	ICD-10 code	Before COVID-19	After COVID-19	P values
Scabies	B86	211 (%1,2)	277 (%2,75)	<0,001
Anogenital warts	A63.0	152 (%0,87)	112 (%1,11)	0,049
Dermatophytosis	B35	1493 (%8,53)	998 (%9,93)	<0,001
Seborrheic keratosis	L82	156 (%0,89)	122 (%1,21)	0,010
Urticaria	L50	799 (%4,57)	556 (%5,53)	<0,001
Xerosis cutis	L85.3	1035 (%5,91)	989 (%9,83)	<0,001

Data are n (%).
Abbreviation: ICD, International Classification of Diseases

Table 2. Dermatologic diseases which decreased significantly 3-6 month after the occurrence of the COVID-19 pandemic.

Diseases	ICD-10 code	Before COVID-19	After COVID-19	P values
Actinic keratosis	L57.0	152 (%0,86)	51 (%0,5)	<0,001
Allergic contact dermatitis	L23	159 (%0,9)	58 (%0,58)	0,004
Prurigo nodularis	L28.1	128 (%0,73)	47 (%0,47)	0,009
Pruritus	L29	636 (%3,63)	231 (%2,3)	<0,001
Lichen simplex	L28	235 (%1,34)	94 (%0,93)	0,003
Melasma	L81. 1	322 (%1,84)	129 (%1,28)	<0,001
Mycosis fungoi-des	C84	195 (%1,11)	44 (%0,44)	<0,001
Nail disorders	L60	132 (%0,75)	46 (%0,46)	0,004
Callosities and corns	L84	272 (%1,55)	99 (%0,98)	<0,001
Melanocytic nevi	D22.9	207 (%1,18)	70 (%0,7)	<0,001
Psoriasis	L40	1032 (%5,9)	466 (%4,63)	<0,001
Warts	B07	755 (%4,31)	314 (%3,12)	<0,001

Data are n (%).
Abbreviation: ICD, International Classification of Diseases.

Table 1. Dermatologic diseases which increased significantly 3-6 month after the occurrence of the COVID-19 pandemic.

Diseases	ICD-10 code	Before COVID-19	After COVID-19	P values
Acne	L70.0	2795 (%15,97)	1591 (%15,82)	0,743
Alopecia areata	L63	170 (%0,97)	83 (%0,82)	0,208
Atopic dermatitis	L20	250 (%1,43)	170 (%1,69)	0,090
Irritant contact der-matitis	L24	1779 (%10,17)	1003 (%9,98)	0,614
Erythema intertrigo	L30. 4	159 (%0,91)	98 (%0,97)	0,618
Herpes zoster	B02	135 (%0,77)	59 (%0,59)	0,086
Mollucum contagio-sum	B08.1	53 (%0,3)	24 (%0,24)	0,363
Neoplasms	D48.5	202 (%1,15)	119 (%1,18)	0,823
Pityriasis versicolor	B36.0	301 (%1,72)	154 (%1,53)	0,234
Rosacea	L71	172 (%0,98)	98 (%0,97)	0,935
Seborrheic dermati-tis	L21	564 (%3,22)	342 (%3,4)	0,420
Hypertrophic disor-ders of the skin	L91.8	255 (%1,46)	137 (%1,36)	0,500
Other follicular di-sorders	L73	278 (%1,59)	143 (%1,42)	0,268
Telogen effluvium	L65	274 (%1,57)	134 (%1,33)	0,113
Vitiligo	L80	222 (%1,26)	137 (%1,36)	0,480
Recurrent aphthous stomatitis	K12.0	39 (%0,22)	23 (%0,23)	0,866
Pemphigus vulgaris	L10.0	45 (%0,26)	36 (%0,36)	0,142
Androgenetic alope-cia	L64	84 (%0,48)	54 (%0,54)	0,498
Dyshidrosis	L30.1	101 (%0,58)	47 (%0,47)	0,230
Herpes simplex	B00	54 (%0,3)	31 (%0,31)	0,885

Data are n (%).
Abbreviation: ICD, International Classification of Diseases.

Table 4. The odds ratio for diseases which increased or decreased during the COVID-19 pandemic.

Diseases	Odds Ratio	95% Confidence Interval
Scabies	2,321	1,937 - 2,781
Anogenital warts	1,285	1,006 - 1,643
Dermatophytosis	1,181	1,086 - 1,285
Seborrheic keratosis	1,365	1,076 - 1,732
Urticaria	1,223	1,094 - 1,367
Xerosis cutis	1,735	1,584 - 1,9
Actinic keratosis	0,582	0,423 - 0,8
Allergic contact dermatitis	0,633	0,468 - 0,855
Prurigo nodularis	0,637	0,456 - 0,891
Pruritus	0,623	0,535 - 0,726
Licken simplex	0,693	0,545 - 0,882
Melasma	0,693	0,564 - 0,851
Mycosis fungoides	0,39	0,281 - 0,541
Nail disorders	0,605	0,432 - 0,846
Callosities and corns	0,63	0,5 - 0,794
Melanocytic nevi	0,586	0,446 - 0,769
Psoriasis	0,775	0,693 - 0,867
Warts	0,715	0,625 - 0,817

DISCUSSION

Hospital admissions decreased in countries affected by COVID-19 as a result of the restrictions taken against the pandemic. The COVID-19 pandemic has also a significant impact on dermatologic practice[5]. The distribution of dermatological disease in any country is affected by many factors. Therefore, the distribution of diagnoses after the pandemic needs to be investigated. As far as we know, there are several studies on the diagnostic profile of dermatologic diseases for those who applied to the outpatient clinic. The present study documented that, there was a 42.6% decrease in the number of applications to the dermatology outpatient clinic compared to the previous year after the restrictions were reduced in June. According to our results; acne, contact dermatitis, xerosis cutis, psoriasis, and urticaria were the most common diagnoses before the pandemic, respectively. Moreover, acne, contact dermatitis, callus, urticaria, and psoriasis were the most common diagnoses after the pandemic. The percentages of scabies, anogenital warts, dermatophytosis, seborrheic keratosis, urticaria, and xerosis cutis were found significantly increased after the onset of the COVID-19 pandemic. On the other hand, the percentages of diseases actinic keratosis, callosities and corns, allergic contact dermatitis, lichen simplex, melasma, mycosis fungoides, nail disorders, melanocytic nevi, prurigo nodularis, pruritus, psoriasis, and warts significantly decreased.

The previous studies have shown that psychological disorders such as depression and anxiety increase in the community with the COVID-19 pandemic[6,7]. An increasing percentage of psoriasis and urticaria is expected during the pandemic, which has profound effects on the quality of life8,9. Moreover, acute urticaria may be one of the presentations of COVID-19[10,11]. In the present study, both increase in social anxiety and stress and the negative impact of COVID-19 pandemic on the quality of life may explain the significant increase in urticaria. Psoriasis is a chronic disease in dermatology practice that has a well-known negative effect on the quality of life. Furthermore, psoriasis patients usually require regular follow-up. The percentage of psoriasis was found significantly decreased but remained one of the most common diagnoses after the pandemic. The admission to the hospital may have been reduced due to the convenience of receiving systemic therapy or biologic agents without going to the hospital with the issued regulation for these patients in Turkey. Furthermore, it is known that diseases such as pruritus, prurigo nodularis, telogen effluvium, vitiligo, alopecia areata, lichen simplex chronicus, and herpes zoster are associated with stress[12,13]. In the present study, it was found that these stress-triggered diseases decreased or did not change after the pandemic. In our country, the flexible working model has been started after the pandemic, therefore there may have been a decrease in stress levels.

Melasma, warts, nail disorders, melanocytic nevi, and actinic keratosis are among diseases that also significantly decreased during the COVID-19 pandemic as compared

with the corresponding period in the previous year. The significant decrease in the number of patients with these diseases may indicate that these diseases may be delayed under certain conditions. Moreover, people are also avoid going to the hospital due to fear of being exposed to the virüs. Therefore, the significant decrease in the number of certain diseases may be related to the fact that these diseases affect the quality of life less than other dermatological diseases that increased after the beginning of the pandemic.

In this study, we found that scabies cases increased 2.[32] times compared to the same period of the previous year. The increasing percentage of scabies during the pandemic have also been reported in other studies from Turkey[14-16]. The increased rate of scabies may be due to increased close contact as a result of home stay orders. Dermatophytosis and anogenital warts were also found significantly increased during the COVID-19 outbreak compared to the corresponding period in the last year. In previous studies, different results were obtained regarding the frequency of these diseases[15,17,18]. Since our study represents a high population and a long period, we think the consistency in the result may be more accurate. In the current study, xerosis cutis cases were found to be increased 1.73 times as compared with the corresponding period of the last year. Hygienic concerns led to the frequent use of soap, disinfectant, and cologne which might cause skin irritation[19,20]. So, the percentage of xerosis cutis may be increased due to the excessive use of protective hygiene measures.

According to our results, the admission to dermatology outpatient clinic with complaints of irritant contact dermatitis remained unchanged after the pandemic. Preventive hygienic measures have resulted in an increased in irritant contact dermatitis cases. However, patient education might have been playing an important role in decreasing these cases during the COVID-19 pandemic. In our study, we think that the unchanged in irritant contact dermatitis cases were caused by the balancing of these two factors. Atopic dermatitis also did not significantly change after the pandemic in our study. However, the ratio of allergic contact dermatitis was significantly decreased. This result may be due to restrictions on workplaces and encouragement to stay at home.

The present study has some limitations. First of all, our study was conducted in a single tertiary care center, and there was no demographic information of patients. Secondly, it was a retrospective design and there was no data such as detailed clinical examinations, anxiety levels, life quality, and their treatments. Tertiary, physicians may have made an error in ICD coding, especially in patients with multiple diagnoses.

In conclusion, the applications for dermatology outpatient clinics decreased significantly after COVID-19 arose in Turkey. This study shows the frequency and nature of outpatient dermatology visits and the most common types of diseases, seen 3-6 months after the coronavirus pandemic, reflecting the period when restrictions were reduced. Many factors caused the change in the diagnostic distribution of dermatology patients during the pandemic period. Understanding the effects of COVID-19 on health systems and patients will enable dermatologists to prepare faster for the diagnosis and etiology of diseases during the COVID-19 pandemic.

Confilict of Interest

None declared by the authors.

Financial Disclosure

None declared by the authors.

This study was approved by Sakarya University Education and Research Hospital Ethics Committee (20/10/2020: 71522473/050.01.04/559).

Authors contributions:

All authors have read and approved the final manuscript. N.C.C., M.Y. and B.S.D. performed the research. N.C.C.,

M.Y., B.S.D., and Ü.E. designed the research study. N.C.C, M.Y., B.S.D., and Ü.E. contributed essential reagents or tools. Ü.E. analysed the data. N.C.C. wrote the paper.

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