

The Effect of the COVID-19 Pandemic on Stress-related Dermatologic Diseases

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ABSTRACT The number and variety of patients admitted to hospitals have changed due to the COVID-19 pandemic. These changes have also affected dermatology clinics. The pandemic has had an adverse effect on the psychology of people by negatively affecting their quality of life. Patients who were admitted to the Bursa City Hospital Dermatology Clinic between July 15, 2020 and October 15, 2020 and from July 15, 2019 to October 15, 2019 were included in this study. The data of patients were gathered retrospectively by reviewing the electronic medical records and International Classification Diseases (ICD-10) codes. Our results showed that, despite the decrease in the total number of applications, a significant increase was observed in the frequency of stress-related dermatological diseases such as psoriasis ($P<0.001$), urticaria ($P<0.001$), atopic dermatitis ($P<0.001$), and seborrheic dermatitis ($P=0.035$). However, there was no significant change in the rates of alopecia areata, vitiligo, herpes zoster, and lichen simplex chronicus ($P>0.05$, for all). There was a significant decrease in the telogen effluvium rate during the pandemic ($P<0.001$). Our study demonstrates that the incidence of certain stress-related dermatologic diseases increased during the COVID-19 pandemic, which may increase awareness of dermatologists on this issue.

KEY WORDS: COVID-19; stress; outpatient; dermatology.

INTRODUCTION

The new virus called 2019-nCoV, the 7th member of the coronavirus family that infects humans, first appeared in Wuhan, China, in December 2019 (1). The 2019-nCoV virus is frequently associated with signs and symptoms such as fever, cough, shortness of breath, muscle pain, headache, and loss of smell (2,3). This disease has been reported to lead to higher mortality rates, particularly in elderly patients and patients with comorbidities (2). As a result of the worldwide increase in the number of infected patients, the World Health Organization (WHO) declared the COVID-19 outbreak to be a pandemic on March 11, 2020 (4). This pandemic has affected the whole world in a short time and caused 99.3 million cases and 2.1 million deaths, according to the data obtained from the WHO (January 26, 2021) (5).

The COVID-19 pandemic has caused severe systemic illnesses in people and has negatively affected the psychology of many people. Depression, anxiety, and stress are the main psychological conditions reported (6). Social distancing and stay-at-home policies implemented to control the epidemic made it difficult for people to cope with the stressful pandemic process (7). It is well-known that dermatological diseases are closely related to psychological stress, which causes the onset and exacerbation of various diseases (8).

The purpose of this study was to evaluate the effect of the COVID-19 pandemic on stress-related dermatologic disorders by comparing the number of patients that presented to our clinic during the pandemic with a corresponding time period in previous years.

PATIENTS AND METHODS

Study design

This cross-sectional study was approved by the Bursa City Hospital ethics committee and the Ministry of Health of the Republic of Turkey Scientific Research Platform (2020-11-13T10_43_20). Informed consent was waived because of the retrospective nature of the study, and the analysis used anonymous clinical data. This study was conducted in accordance with the Declaration of Helsinki. Patients who were admitted to the Bursa City Hospital Dermatology Clinic between July 15, 2020 and October 15, 2020 and from July 15, 2019 to October 15, 2019 were included in this study. Stress-related dermatologic diseases were included in this study: psoriasis, urticaria, atopic dermatitis, alopecia areata, vitiligo, seborrheic dermatitis, telogen effluvium, herpes zoster, and lichen simplex chronicus. The data of patients were gathered retrospectively by reviewing the electronic medical records and International Classification Diseases (ICD-10) codes (Psoriasis, L40; urticaria, L50; atopic dermatitis, L20, L20.9; alopecia areata, L63, L63.8, L63.9; vitiligo, L80; seborrheic dermatitis, L21, L21.8, L21.9; telogen effluvium, L65.0; herpes zoster, B02; lichen simplex chronicus L28).

Statistical analysis

Descriptive statistics are presented as mean \pm standard deviation or frequency and percentage. Categorical variables were compared using Pearson's chi-square test and Fisher's exact test between

groups. The Bonferroni test was used as a multiple comparison test. $P < 0.05$ was considered statistically significant. Statistical analyses were performed using IBM SPSS ver.23.0 (IBM Corp. Released 2015. IBM SPSS Statistics for Windows, Version 23.0. Armonk, NY: IBM Corp.).

RESULTS

The total number of patients who were admitted to the dermatology clinic from July 15 to October 15, 2019 was 12632, whereas 7938 patients were admitted between July 15 and October 15, 2020. The decrease in the total number of applications was 37%.

Table 1 shows the frequency of stress-related dermatologic disorders during the COVID-19 pandemic compared with the previous year. The rate of urticaria among all patients who applied to the dermatology clinic during the COVID-19 pandemic was 8.38%, seborrheic dermatitis 6.42%, atopic dermatitis 5.38%, psoriasis 3.65%, alopecia areata 2.29%, telogen effluvium 2.95%, lichen simplex chronicus and prurigo 1.56%, vitiligo 1.42%, and herpes zoster 1.44%. A significant increase in the total number of applications in the 2020 time period compared with 2019 was found for urticaria, psoriasis, atopic dermatitis, and seborrheic dermatitis ($P < 0.001$, $P < 0.001$, $P < 0.001$, $P = 0.35$, respectively). While there was no significant increase in the rates of alopecia areata, vitiligo, herpes zoster, lichen simplex chronicus, and prurigo in 2020, a significant decrease was observed for telogen effluvium during the same period. Table 2 shows the subgroup analysis of the frequency of the diseases that

Table 1. Changes in the frequency of dermatological diseases in the period of 4-7 months after the emergence of the COVID-19 pandemic

Diseases	ICD-10 code	2019 (year) n (%)	2020 (year) n (%)	P
Urticaria	L50	758 (6)	665 (8.38)	<0.001
Psoriasis	L40, L40.0	326 (2.58)	290 (3.65)	<0.001
Atopic dermatitis	L20, L20.9	156 (1.23)	427 (5.38)	<0.001
Seborrheic dermatitis	L21, L21.8, L21.9	908 (7.19)	510 (6.42)	0.035
Alopecia areata	L63, L63.8, L63.9	289 (2.29)	182 (2.29)	0.982
Vitiligo	L80	165 (1.31)	113 (1.42)	0.478
Herpes zoster	B02	154 (1.22)	114 (1.44)	0.182
Telogen effluvium	L65.0	514 (4.07)	234 (2.95)	<0.001
Lichen simplex chronicus + Prurigo	L28, L28.0	186 (1.47)	124 (1.56)	0.607

ICD: International Classification of Diseases.

significantly increased during the pandemic. Sex and age comparisons were performed for the subgroup analyses. Significant increases were observed in all sub-groups for urticaria and atopic dermatitis. There was a significant increase in psoriasis in men and under 18 years of age, while a significant increase in seborrheic dermatitis was observed in men and above 18 years of age.

DISCUSSION

In this study, it was observed that there was an increase in the frequency of urticaria, seborrheic dermatitis, atopic dermatitis, and psoriasis, though the total number of applications to our dermatology clinic decreased during the COVID-19 pandemic. These results indicate that stress might have played a role in the onset and exacerbation of those diseases, compared with the previous year.

How healthcare services were run had to be adjusted worldwide due to the COVID-19 pandemic. These changes have also affected dermatology clinics, and have led to a decrease in the number of patients admitted to dermatology outpatient clinics and the number of hospitalized dermatology patients (9,10). In our study, there was a 37% decrease in the total number of patients who were admitted to the

dermatology outpatient clinic between July 15 and October 15, 2020, compared with the corresponding period in 2019. The main reasons for this decrease may be the effect of the quarantine/isolation policy (9), the regulation of outpatient recruitment by the clinics, the postponement of elective practices and surgeries during this period (11), or the tendency to avoid entering the hospital environment due to COVID-19. Additionally, it has become important to maintain health services by protecting patients and healthcare workers from the risk of COVID-19 transmission without physical contact, using telehealth applications during the pandemic process, and their use in dermatology has increased with the pandemic (12,13). With more active use of telehealth applications, the number of outpatients might decrease in the following years.

The body's response to stress is mainly regulated through the hypothalamic-pituitary-adrenal (HPA) axis and the autonomic nervous system (14). In addition to creating a structural barrier to the external environment, the skin also plays an active role in the stress response with keratinocyte, Langerhans cells, mast cells, melanocyte, Merkel cells, nerve endings, and adnexal structures. While the bilateral relationship between the skin and the central nervous

Table 2. Subgroup analysis of the frequency of the diseases that significantly increased during the pandemic

		2019 (year) n (%)	2020 (year) n (%)	P
Urticaria	Male	284 (2.25)	276 (3.48)	<0.001
	Female	474 (3.75)	389 (4.9)	<0.001
	Age <18	71 (0.56)	82 (1.03)	<0.001
	Age ≥18	687 (5.44)	583 (7.34)	<0.001
Psoriasis	Male	146 (1.16)	142 (1.79)	<0.001
	Female	180 (1.42)	148 (1.86)	0.014
	Age <18	23 (0.18)	53 (0.67)	<0.001
	Age ≥18	303 (2.4)	237 (2.99)	0.010
Atopic dermatitis	Male	83 (0.66)	221 (2.78)	<0.001
	Female	73 (0.58)	206 (2.6)	<0.001
	Age <18	110 (0.87)	331 (4.17)	<0.001
	Age ≥18	46 (0.36)	96 (1.21)	<0.001
Seborrheic dermatitis	Male	416 (3.29)	238 (3)	<0.001
	Female	492 (3.89)	272 (3.43)	0.084
	Age <18	175 (1.39)	130 (1.64)	0.145
	Age ≥18	733 (5.8)	380 (4.79)	0.002



system is necessary for homeostasis, chronic activation of this system can lead to the onset of various dermatological diseases (14,15).

Psychological stress disrupts the balance of the neuro-immune-cutaneous cycle and causes chronic spontaneous urticaria (16). In a study that evaluated low income-related stress levels during the COVID-19 pandemic using the urticaria activity score, it was found that stress increased the intensity of the itching and was associated with the formation of urticarial lesions (17). However, urticarial rash has been shown to be one of the most common cutaneous findings of COVID-19 (18,19). In our study, the frequency of urticaria was significantly higher during the pandemic period. There was a significant increase in gender and age distribution in all sub-groups. In our study, we could not determine how many of the patients who presented with the diagnosis of urticaria in the three months of 2020 (July 15 to October 15) developed their lesions after COVID-19 infection.

Although the chronic lesions caused by the disease, as well as stigmatization and itching, can be a source of stress and anxiety in psoriasis, it is also known that stress is one of the triggers of the disease itself (20). It is a fact that the COVID-19 pandemic also negatively affected quality of life. However, there were some unanswered questions on the use of immunomodulators and biological agents for the treatment of psoriasis, especially in the early period of the pandemic, due to their possible effect on the course of COVID-19 infection. Because of these issues, treatment changes might have been introduced in patients with psoriasis (21). Although there is currently no consensus, it is thought that these treatments can be continued, and case-based decision-making determined by the accompanying comorbidities and treatment used may be a more appropriate approach (22,23). The epidemiology of psoriasis varies according to geographical region, racial characteristics, and level of development, but the prevalence of psoriasis in Turkey is 1.3%, with a female predominance (24). The age of onset was 25 ± 16 years in women and 26 ± 15 years in men (24). In our study, a significant increase during the pandemic period was observed in men and under the age of 18 compared with the corresponding period of the previous year. We believe that this increase might be related to pandemic-induced stress, which negatively affects the quality of life, and that the stress factor might be more pronounced in children and men. This increase may also be related to the fact that people under the age of 18 are less afraid of COVID when presenting to the hospital, while cosmetic concerns are more prominent. However, future studies should investigated in

whether treatment changes and other factors may have affected this increase in patients during the pandemic period.

Frequent hand washing, increased use of disinfectants, and prolonged use of personal protective equipment such as masks and gloves can disrupt the skin barrier and contribute to dermatitis (25). However, the policy of staying at home, decreased physical activity, increased temperature at home, decreased humidity, changing diet, less exposure to sunlight, and increased stress level can contribute to the formation of atopic dermatitis (25,26). In our study, atopic dermatitis increased significantly in all subgroups during the pandemic period when compared with the previous year. Seborrheic dermatitis has been shown to occur frequently following stressful events (27). Especially when there is facial involvement, it can contribute to this process by causing depression and anxiety (27). Additionally, increased use of masks in the COVID-19 pandemic is thought to cause an increase in sebum and temperature and aggravate seborrheic dermatitis, with increased redness and desquamation (28). In our study, seborrheic dermatitis was significantly higher in men and above 18 years of age during the pandemic period. Kutlu *et al.* evaluated the next two months after the first case in Turkey, and there was no increase in rates of urticaria, seborrheic dermatitis, and psoriasis (29). Our study analysed a period of 4 to 7 months after the first case, and a significant increase was observed in these three disease groups. We believe that our study is important in terms of showing the long-term effect of the pandemic.

In our study, no significant increase was found in the rates of alopecia areata, vitiligo, herpes zoster, lichen simplex chronicus, and prurigo compared with the pre-pandemic period. There was also a decrease in the rate of telogen effluvium. Unlike the study in which the increase in alopecia areata during the COVID-19 pandemic period was associated with short-term stress (30), our study did not show a significant increase in alopecia areata. In a study in which the effect of the pandemic on hair diseases was evaluated online, it was observed that patients with alopecia areata and telogen effluvium presented less to dermatologists less frequently during the pandemic period (31). This may be caused by the hesitation of patients with alopecia areata, vitiligo, herpes zoster, lichen simplex chronicus, and prurigo, and particularly patients with telogen effluvium, to come to the hospital due to the pandemic.

There were some limitations to our study. Firstly, we had limited patient data due to the retrospective, record-based nature of this study. Our study could

not reveal whether the patients had a new onset of disease or an ongoing disease. Furthermore, there were not enough data about the compliance of patients with medication use. Our study also lacked quality of life and stress scale evaluations of patients, which would demonstrate the impact of stress on the admission frequency of the patients.

CONCLUSIONS

In conclusion, it is a fact that the COVID-19 pandemic has a dramatic effect on the healthsystem and the lives of the people. Homestay policies, social isolation incentives, telehealth practices, and people's hesitation from entering the hospital environment during the pandemic period significantly reduced the number of admittances to the dermatology outpatient clinics. However, despite the decrease in the total number of patients admitted to our clinic, a significant increase was found in the rate of patients with diseases known to be associated with stress such as urticaria, psoriasis, atopic dermatitis, and seborrheic dermatitis. The quality of life reduction in the pandemic, as well as treatments and increased use of hand washing-disinfectant and protective equipment may have affected this increase. We believe that our study is important in terms of showing the long-term effect of the COVID-19 pandemic on stress-related dermatologic diseases.

References:

1. Zhu N, Zhang D, Wang W, Li X, Yang B, Song J, *et al.* A novel coronavirus from patients with pneumonia in China, 2019. *N Engl J Med.* 2020;382:727-33.
2. Chen N, Zhou M, Dong X, Qu J, Gong F, Han Y, *et al.* Epidemiological and clinical characteristics of 99 cases of 2019 novel coronavirus pneumonia in Wuhan, China: a descriptive study. *Lancet.* 2020;395(10223):507-13.
3. Meng X, Deng Y, Dai Z, Meng Z. COVID-19 and anosmia: A review based on up-to-date knowledge. *Am J Otolaryngol.* 2020;41:102581.
4. Cucinotta D, Vanelli M. WHO declares COVID-19 a pandemic. *Acta Biomed.* 2020;91:157-60.
5. WHO. Coronavirus disease (COVID-19) Situation Dashboard. World Health Organization website. 2020.
6. Rajkumar RP. COVID-19 and mental health: A review of the existing literature. *Asian J Psychiatr.* 2020;52:102066.
7. Badr H, Oluyomi A, Adel Fahmideh M, Ahsan Raza S, Zhang X, El-Mubasher O, *et al.* Psychosocial and health behavioural impacts of COVID-19 pandemic on adults in the USA: protocol for a longitudinal cohort study. *BMJ Open.* 2020;10:e044642.
8. Kimyai-Asadi A, Usman A. The role of psychological stress in skin disease. *J Cutan Med Surg.* 2001;5:140-145.
9. Kutlu Ö, Güneş R, Coerd K, Metin A, Khachemoune A. The effect of the "stay-at-home" policy on requests for dermatology outpatient clinic visits after the COVID-19 outbreak. *Dermatol Ther.* 2020;33:e13581.
10. Białynicki-Birula R, Siemasz I, Otlewska A, Matusiak Ł, Szepietowski JC. Influence of COVID-19 pandemic on hospitalizations at the tertiary dermatology department in south-west Poland. *Dermatol Ther.* 2020;33:e13738.
11. Storino CB, Watson JC, Sanchez W, Brown MJ, Tande AJ, Loftus CG. Revamping outpatient care for patients without COVID-19. *Mayo Clin Proc.* 2020;95(9s):S44-S46.
12. Monaghesh E, Hajizadeh A. The role of telehealth during COVID-19 outbreak: a systematic review based on current evidence. *BMC Public Health.* 2020;20:1193.
13. Bhargava S, McKeever C, Kroumpouzou G. Impact of covid-19 pandemic on dermatology practice: results of a web-based, global survey. *Int J Womens Dermatol.* 2021;7:217-23.
14. Alexopoulos A, Chrousos GP. Stress-related skin disorders. *Rev Endocr Metab Disord.* 2016;17:295-304.
15. Tanida M, Katsuyama M, Sakatani K. Relation between mental stress-induced prefrontal cortex activity and skin conditions: a near-infrared spectroscopy study. *Brain Res.* 2007;1184:210-216.
16. Konstantinou GN, Konstantinou GN. Psychological stress and chronic urticaria: A neuro-immunocutaneous crosstalk. A systematic review of the existing evidence. *Clin Ther.* 2020;42:771-82.
17. Shen M, Xiao Y, Yuan Y, Chen X, Li J. Perceived stress links income loss and urticaria activity during the coronavirus disease 2019 pandemic. *Ann Allergy Asthma Immunol.* 2021;126:89-90.
18. Young S, Fernandez AP. Skin manifestations of COVID-19. *Cleve Clin J Med.* 2020.
19. Gisondi P, S PI, Bordin C, Alaibac M, Girolomoni G, Naldi L. Cutaneous manifestations of SARS-CoV-2 infection: a clinical update. *J Eur Acad Dermatol Venereol.* 2020;34:2499-504.
20. Ferreira BI, Abreu JL, Reis JP, Figueiredo AM. Psoriasis and associated psychiatric disorders: A systematic review on etiopathogenesis and clinical correlation. *J Clin Aesthet Dermatol.* 2016;9:36-43.

21. Conforti C, Giuffrida R, Dianzani C, Di Meo N, Zalaudek I. COVID-19 and psoriasis: Is it time to limit treatment with immunosuppressants? A call for action. *Dermatol Ther.* 2020;33:e13298.
22. Amerio P, Prignano F, Giuliani F, Gualdi G. COVID-19 and psoriasis: Should we fear for patients treated with biologics? *Dermatol Ther.* 2020;33:e13434.
23. Di Lernia V. Antipsoriatic treatments during COVID-19 outbreak. *Dermatol Ther.* 2020;33:e13345.
24. Kundakci N, Türsen U, Babiker MO, Gürgey E. The evaluation of the sociodemographic and clinical features of Turkish psoriasis patients. *Int J Dermatol.* 2002;41:220-4.
25. Shah M, Sachdeva M, Alavi A, Shi VY, Hsiao JL. Optimizing care for atopic dermatitis patients during the COVID-19 pandemic. *J Am Acad Dermatol.* 2020;83:e165-e167.
26. Patruno C, Nisticò SP, Fabbrocini G, Napolitano M. COVID-19, quarantine, and atopic dermatitis. *Med Hypotheses.* 2020;143:109852.
27. Misery L, Touboul S, Vinçot C, *et al.* Stress and seborrheic dermatitis. *Ann Dermatol Venerol.* 2007;134:833-7.
28. Veraldi S, Angileri L, Barbareschi M. Seborrheic dermatitis and anti-COVID-19 masks. *J Cosmet Dermatol.* 2020.
29. Kutlu Ö, Metin A. Relative changes in the pattern of diseases presenting in dermatology outpatient clinic in the era of the COVID-19 pandemic. *Dermatol Ther.* 2020;33:e14096.
30. Kutlu Ö, Aktaş H, İmren IG, Metin A. Short-term stress-related increasing cases of alopecia areata during the COVID-19 pandemic. *J Dermatolog Treat.* 2020:1.
31. Turkmen D, Altunisik N, Sener S, Colak C. Evaluation of the effects of COVID-19 pandemic on hair diseases through a web-based questionnaire. *Dermatol Ther.* 2020;33:e13923.