

# The Effects of Changing Lifestyle and Daily Behaviours in the First Months of COVID-19 Outbreak on Dermatological Diseases: Retrospective Cross-Sectional Observational Study

## COVID-19 Salgınlarının İlk Aylarında Değişen Yaşam Tarzı ve Günlük Davranışların Dermatolojik Hastalıklar Üzerindeki Etkileri: Retrospektif Kesitsel Gözlemsel Çalışma

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**ABSTRACT Objective:** COVID-19 disease caused panic, fear of death, anxiety in people at the beginning of pandemic. This situation has dramatically changed people's lifestyle and daily behavior. The aim of our study was to determine the effects of changing lifestyle and daily behaviours on dermatological diseases in the first months of outbreak. **Material and Methods:** The diagnosis of the first patient with COVID-19 in Turkey was established on 11 March 2020. In the same period, between 11 March and 30 April of 2020 and 2019, 454 versus 2.903 patients were admitted to the dermatology outpatient clinic and included in the study. The rates of dermatological diseases were compared. Pearson's chi-square test was used for statistical analysis. **Results:** Most of the patients were women (59.2 and 64.8%), and the average ages of the patients were 36.6±17.5 and 35.1±18.2 years for these time periods. Although admission to the hospital for those under 20 years of age due to curfew was decreased (16.8-10.1%), acne frequency increased (18.6-21.1%, p=0.198). The frequency of psoriasis among papulosquamous diseases significantly increased (p=0.016). Urticaria (4.33-9.47%, p<0.001), drug eruptions (0.17-1.32%, p<0.001), and dermatitis and eczema (25.52-30.44%, p=0.025) significantly increased. The frequency of alopecia areata among hair disorders significantly increased (p=0.005). Rosacea (1.59-0.44%, p=0.05), bacterial infections (1.45-0.44%, p=0.046), fungal infections (5.29-3.3%, p=0.042) and xerosis cutis (6.26-1.1%, p=0.025) significantly decreased. Admissions due to benign skin diseases (1.38-0%, p=0.012) significantly decreased. **Conclusion:** We consider that this study will contribute to providing the needed-evidence for the prevention and treatment of dermatological comorbidities by helping to identify the effects of changing lifestyles and daily behaviours on dermatological diseases because of the novel experimental environment created by the COVID-19 outbreak.

**Keywords:** COVID-19; dermatology; lifestyle; daily behaviours; outpatient

**ÖZET Amaç:** Koronavirüs hastalığı-2019 [coronavirus disease-2019 (COVID-19)], pandeminin başlangıcında insanlarda paniğe, ölüm korkusuna, kaygıya neden oldu. Bu durum, insanların yaşam tarzlarını ve günlük davranışlarını önemli ölçüde değiştirmiştir. Çalışmamızın amacı, salgının ilk aylarında değişen yaşam tarzı ve günlük davranışların dermatolojik hastalıklar üzerindeki etkilerini belirlemektir. **Gereç ve Yöntemler:** Türkiye'de ilk COVID-19 hastasının tanısı, 11 Mart 2020 tarihinde konulmuştur. 2019 ve 2020 yıllarında 11 Mart-30 Nisan tarihleri arasında dermatoloji polikliniğine başvurmuş 2.903 ve 454 hasta çalışmamıza dâhil edildi. Dermatolojik hastalıkların oranları karşılaştırıldı. İstatistiksel analiz için Pearson ki-kare testi kullanıldı. **Bulgular:** Hastaların çoğu kadın (%59,2 ve %64,8) olup; hastaların yaş ortalaması 36,6±17,5 ve 35,1±18,2 yılıdır. Sokağa çıkma yasağı nedeniyle 20 yaş altı hastaların hastaneye başvuruları azalmasına (%16,8-%10,1) rağmen akne sıklığı arttı (%18,6-%21,1, p=0,198). Papüloskuamöz hastalıklar arasında psöriyazis sıklığı anlamlı olarak arttı (p=0,016). Ürtiker (%4,33-%9,47, p<0,001), ilaç döküntüleri (%0,17-%1,32, p<0,001) ile dermatit ve ekzema (%25,52-%30,44, p=0,025) anlamlı olarak arttı. Saç hastalıkları arasında alopesi areata sıklığı anlamlı olarak arttı (p=0,005). Rozasea (%1,59-%0,44, p=0,05), bakteriyel enfeksiyonlar (%1,45-%0,44, p=0,046), mantar enfeksiyonları (%5,29-%3,3, p=0,042) ve kserozis kutis (%6,26-%1,1, p=0,025) önemli ölçüde azaldı. İyi huylu cilt hastalıkları nedeniyle başvurular anlamlı olarak azaldı (%1,38-%0,0, p=0,012). **Sonuç:** Bu çalışmanın, COVID-19 salgınının yarattığı yeni deneysel ortam nedeniyle değişen yaşam tarzı ve günlük davranışların, dermatolojik hastalıklar üzerindeki etkilerinin belirlenmesine yardımcı olarak dermatolojik komorbiditelerin önlenmesi ve tedavisi için gerekli kanıtların sağlanmasına katkıda bulunacağını düşünüyoruz.

**Anahtar Kelimeler:** COVID-19; dermatoloji; yaşam tarzı; günlük davranışlar; ayaktan tedavi

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The pathogen of the coronavirus disease-2019 (COVID-19) causing the pandemic is a new virus called severe acute respiratory syndrome-coronavirus-2. It is a disease that can be easily transmitted from person to person through droplets and can be fatal. It is a serious health problem that has caused severe economic and social problems worldwide and threatens today and future of humanity.

The first COVID-19 case in our country was diagnosed on 11 March 2020. Thereafter, along with the increase in the number of cases and deaths, all schools were closed, “stay-at-home” calls for entire weekends and public holidays were made, and inter-city travel was restricted. A curfew was applied for people under age 20 and above age 65, and sometimes during certain periods for all people.

The pandemic board created by the Ministry of Health has provided significant information about the importance of using masks and complying with hygiene and social distancing rules to prevent contamination and protect against the disease. In this way, the spread of the disease and possible morbidity and mortality were largely prevented.

This new lifestyle created to prevent contamination has caused the skin to be exposed to excessive hygiene products, people to have less contact with the outside environment, and people to stay indoors at home and to have a sedentary life. In addition, to strengthen the immune system and prevent disease, people created new forms of nutrition, took food supplements and increased medication use.

The panic, fear of death, anxiety, and staying at home caused by this disease, which covers the whole country, have led to intense pressure on people. This has also increased alcohol and cigarette use for some people.

Some skin disorders are potentially affected by stress, changing lifestyle and daily behaviours that may influence the prevalence of these diseases.<sup>1-5</sup>

For some dermatological diseases, current treatments ensure only temporary remission or symptomatic relief. Therefore, to determine of replaceable lifestyle and daily behaviours for a healthier life may help reduce the loading of these diseases. Good identification of the changing lifestyle and daily be-

haviours affecting skin diseases can also positively contribute to the prevention and treatment of some dermatological diseases.

With this study, we tried to determine the effects of changing lifestyle and daily behaviours on dermatological diseases in the first months of COVID-19 outbreak by comparing the incidence of dermatological diseases in patients admitted to the outpatient clinic in the same periods of 2019 and 2020.

## MATERIAL AND METHODS

### Patients Population

In this study, the records of patients who were admitted to the dermatology outpatient clinic of a university hospital between 11 March and 30 April 2020 during the COVID-19 outbreak and in the same period in 2019 were retrospectively assessed. All patients admitted to the dermatology outpatient clinic in these periods were included in this study.

### Study Design and Ethical Approvals

Approval of the Pamukkale University Non-interventional Clinical Research Ethics Committee was taken for this single-centre, cross-sectional retrospective study (Decision No: 60116787-020/34308, Date: 11 June 2020). At first, application was performed to the Ministry of Health Scientific Research Platform at the beginning of the study (Application No: 2020-05-22T10-32-38). This study was conducted in accordance with the principles of the Declaration of Helsinki.

### Disease Diagnosis and Classification

The diagnosis of dermatological diseases was established based on anamnesis and patients' clinical signs. Laboratory and histopathological examinations were performed when needed to establish the diagnosis. Dermatological diseases were classified according to the International Classification of Diseases.

## STATISTICAL ANALYSIS

While the rates of the disease groups were compared with each other according to the number of admissions, subgroup diseases were compared according to their ratio within the disease group.

SPSS version 20.0 (SPSS Inc., Chicago, IL., USA) was used for statistical analysis. Pearson's chi-square and Fisher's exact tests were used to compare the disease rates. A p value of <0.05 was accepted as statistically significant.

## RESULTS

In the first 6 weeks of the pandemic, the number of patients who applied to the dermatology outpatient clinic decreased significantly compared to the same period in 2019 (from 2,903 to 454 patients). The majority of these patients were women (64.8% in 2019 and 59.2% in 2020).

Detailed data on age ranges, the number of patients and other characteristics for each group are presented in Table 1 and Table 2.

Although the rate of admissions to the hospital for those under 20 years of age due to the curfew decreased (16.8% to 10.1%), acne frequency increased (18.6% to 21.1%,  $p=0.198$ ).

Admissions due to rosacea decreased from 1.59% to 0.44% ( $p=0.05$ ).

Fungal (from 5.29% to 3.3%,  $p=0.042$ ) and bacterial (from 1.45% to 0.44%,  $p=0.046$ ) infections significantly decreased.

The frequency of psoriasis among papulosquamous diseases increased significantly ( $p=0.016$ ).

There was no significant change in admissions for connective tissue diseases.

Admissions due to urticaria and drug eruptions increased considerably ( $p<0.001$  for both).

Admissions due to alopecia areata increased significantly ( $p=0.005$ ).

While the rate of patients presenting with malignant skin diseases did not change, a significant decrease was observed in benign skin diseases ( $p=0.012$ ).

The rate of patients with xerosis cutis decreased significantly (from 6.26 to 1.1%,  $p=0.025$ ).

There was a significant increase in admissions due to dermatitis and eczema (from 25.52 to 30.44%,  $p=0.025$ ).

All detailed knowledge about the numbers and rates for every disease is presented in Table 3.

## DISCUSSION

Significant changes in lifestyle and daily behaviours, including dietary changes, limited physical activity,

**TABLE 1:** Percentage of females and males, mean age and age ranges of the patients who applied to our dermatology outpatient clinic in the beginning period of the outbreak in 2020 (11 March-30 April 2020).

| Age group | Total (n) | Female, n (%) | Male, n (%) | Mean±SD (Age) | Minimum-maximum (Age) | %     |
|-----------|-----------|---------------|-------------|---------------|-----------------------|-------|
| <20       | 46        | 33 (71.7)     | 13 (28.3)   | 14.96±4.34    | 2-19                  | 10.13 |
| (20-65)   | 366       | 216 (59.1)    | 150 (40.9)  | 35.42±13.08   | 20-64                 | 80.61 |
| >65       | 42        | 20 (47.6)     | 22 (52.4)   | 71.57±7.21    | 65-92                 | 9.25  |
| Total     | 454       | 269 (59.2)    | 185 (40.8)  | 36.62±17.54   | 2-92                  | 100   |

SD: Standard deviation.

**TABLE 2:** Percentage of females and males, mean age and age ranges of the patients who applied to our dermatology outpatient clinic in the same time range in 2019 (11 March-30 April 2019).

| Age group | Total (n) | Female, n (%) | Male, n (%)  | Mean±SD (Age) | Minimum-maximum (Age) | %    |
|-----------|-----------|---------------|--------------|---------------|-----------------------|------|
| <20       | 489       | 313 (64)      | 176 (36)     | 13.82±5.68    | 0-19                  | 16.8 |
| (20-65)   | 2,126     | 1,425 (67.02) | 701 (32.8)   | 35.03±13.94   | 20-64                 | 73.3 |
| >65       | 288       | 144 (50)      | 144 (50)     | 71.59±6.16    | 65-96                 | 9.9  |
| Total     | 2,903     | 1,882 (64.8)  | 1,021 (35.2) | 35.07±18.21   | 0-96                  | 100  |

SD: Standard deviation.

**TABLE 3:** The numbers, rates, frequencies and statistical differences in the skin diseases in the patients who applied to the dermatology outpatient clinic at the beginning of the outbreak in 2020 and in the same time range in 2019.

| Diagnosis                                 | 2020              |      | 2019              |       | p value |
|---|-------------------|------|-------------------|-------|---------|
|   | 11 March-30 April |      | 11 March-30 April |       |         |
|   | n                 | %    | n                 | %     |         |
|   | 454               | 100  | 2,903             | 100   |         |
| Acne                                      | 96                | 21.1 | 540               | 18.67 | 0.198   |
| Rosacea                                   | 2                 | 0.44 | 46                | 1.59  | 0.05*   |
| Fungal infections                         | 15                | 3.3  | 153               | 5.29  | 0.042*  |
| Viral infections                          | 22                | 4.84 | 155               | 5.36  | 0.662   |
| Warts                                     | 18                |      | 113               |       | 0.372   |
| Herpes                                    | 2                 |      | 21                |       | 0.561   |
| Zona                                      | 2                 |      | 15                |       | 0.930   |
| Molluscum                                 | 2                 |      | 4                 |       | 0.446   |
| Others                                    | 0                 |      | 2                 |       | 0.592   |
| Bacterial infections                      | 2                 | 0.44 | 42                | 1.45  | 0.046*  |
| Parasitic infections                      | 1                 | 0.22 | 16                | 0.55  | 0.356   |
| Vesiculobullous diseases                  | 6                 | 1.32 | 47                | 1.62  | 0.636   |
| Pemphigus vulgaris                        | 4                 |      | 37                |       | 0.506   |
| Bullous pemphigoid                        | 1                 |      | 9                 |       | 0.884   |
| Epidermolysis bullosa simplex             | 1                 |      | 1                 |       | 0.078   |
| Papulosquamous diseases                   | 43                | 9.47 | 217               | 7.5   | 0.139   |
| Psoriasis                                 | 41                |      | 174               |       | 0.016*  |
| Lichen planus                             | 1                 |      | 35                |       | 0.017*  |
| Pityriasis rosea                          | 1                 |      | 5                 |       | 0.049*  |
| Others                                    | 0                 |      | 3                 |       | 0.438   |
| Connective tissue diseases                | 5                 | 1    | 26                | 0.89  | 0.670   |
| Discoid and systemic lupus erythematosus  | 1                 |      | 8                 |       | 0.627   |
| Morphea/scleroderma                       | 1                 |      | 7                 |       | 0.746   |
| Granuloma annulare                        | 1                 |      | 3                 |       | 0.605   |
| Sarcoidosis                               | 1                 |      | 1                 |       | 0.178   |
| Panniculitis                              | 1                 |      | 5                 |       | 0.968   |
| Others                                    | 0                 |      | 2                 |       | 0.521   |
| Vitiligo                                  | 1                 | 0.22 | 20                | 0.69  | 0.239   |
| Urticaria                                 | 43                | 9.47 | 126               | 4.33  | <0.001* |
| Drug eruptions                            | 6                 | 1.32 | 5                 | 0.17  | <0.001* |
| Hair disorders                            | 10                | 2.2  | 88                | 3.01  | 0.329   |
| Alopecia areata                           | 8                 |      | 30                |       | 0.005*  |
| Telogen effluvium                         | 2                 |      | 38                |       | 0.158   |
| Androgenic alopecia                       | 0                 |      | 18                |       | 0.113   |
| Others                                    | 0                 |      | 2                 |       | 0.630   |
| Ingrown toe nail                          | 2                 | 0.44 | 8                 | 0.27  | 0.651   |
| Other nail diseases                       | 0                 |      | 5                 | 0.17  | 0.376   |
| Skin lymphomas                            | 3                 | 0.66 | 11                | 0.38  | 0.313   |
| Malign neoplasms and premalignant lesions | 17                | 3.74 | 158               | 5.43  | 0.130   |
| Actinic keratoses                         | 12                |      | 128               |       |         |
| Squamous cell carcinoma                   | 2                 |      | 8                 |       |         |
| Basal cell carcinoma                      | 1                 |      | 16                |       |         |
| Malignant melanoma                        | 2                 |      | 3                 |       |         |
| Others                                    | 0                 |      | 3                 |       |         |

Continue →

**TABLE 3:** The numbers, rates, frequencies and statistical differences in the skin diseases in the patients who applied to the dermatology outpatient clinic at the beginning of the outbreak in 2020 and in the same time range in 2019 (*continued*).

| Diagnosis                | 2020              |      | 2019              |      | p value           |
|--------------------------|-------------------|------|-------------------|------|-------------------|
|                          | 11 March-30 April |      | 11 March-30 April |      |                   |
|                          | n                 | %    | n                 | %    |                   |
| Benign neoplasms         | 0                 | 0    | 40                | 1.38 | <b>0.012*</b>     |
| Skin tag                 |                   |      | 17                |      |                   |
| Melanocytic nevi         |                   |      | 33                |      |                   |
| Genodermatoses           | 2                 | 0.44 | 3                 | 0.1  | 0.083             |
| Neurofibromatosis        | 0                 |      | 2                 |      |                   |
| Tuberous sclerosis       | 1                 |      | 1                 |      |                   |
| Xeroderma pigmentosum    | 1                 |      | 0                 |      |                   |
| Pruritus                 | 35                | 7.7  | 279               | 9.6  | 0.196             |
| Xerosis cutis            | 5                 | 1.1  | 181               | 6.26 | <b>&lt;0.001*</b> |
| Dermatitis and eczema†   | 139               | 30.6 | 738               | 25.4 | <b>0.025*</b>     |
| Atopic dermatitis        | 20                |      | 89                |      | 0.596             |
| Seborrhoeic dermatitis   | 20                |      | 87                |      | 0.275             |
| Contact dermatitis       | 56                |      | 275               |      | 0.248             |
| Lichen simplex chronicus | 13                |      | 73                |      | 0.845             |
| Numuler eczema           | 15                |      | 89                |      | 0.912             |
| Other dermatitis         | 15                |      | 125               |      | 0.125             |
|                          | <b>454</b>        | 100  | <b>2,903</b>      | 100  |                   |

\*Statistically significant; †Group and subgroup analyzes for dermatitis and eczema.

increased indoor time and excessive hygiene, occurred during the pandemic. Some skin disorders have been reported in the literature as closely associated with these changes. Therefore, accurate identification of risk factors and indicators of skin diseases, especially changes in lifestyle and daily behaviours occurring during the COVID-19 outbreak, can provide significant contributions and help to prevent and treat some dermatological diseases. Increased stress and anxiety, intense physical and psychic pressure on people, excessive cigarette and alcohol consumption, and food supplement use can also result in some dermatological diseases.

In this study, we evaluated the possible effects of a new lifestyle, changing behaviours, stress and anxiety caused by COVID-19 on dermatological diseases by associating them with our own results.

This study demonstrated that there were significant decreases in cases in dermatology outpatient clinics during the COVID-19 outbreak from 11 March to 30 April 2020 compared to the same time range in 2019.

There was a significant decrease in admissions to the dermatology outpatient clinic, especially in patients under 20 years of age, because of the curfew in this age group, although the hospital acceptance was not restricted.

There was a considerable increase in the rate of acne in this time period during the outbreak. This can be explained by the fact that people with acne predisposition stayed indoors due to the COVID-19 outbreak, and they were exposed to stress and consumed a carbohydrate-rich diet.<sup>6,7</sup>

During this period, a significant decrease was noted in rosacea disease due to the necessity to stay at home. Patients were protected from ultraviolet light during this period. Ultraviolet light is an important triggering factor for rosacea. This reduction shows how important it is to avoid triggers.<sup>8</sup>

In this period, fungal and bacterial infections decreased significantly, while viral infections were not affected. This result can be explained by the high compliance with hygiene rules that prevent the facil-

itating factors for these infections and the wearing of comfortable, breathable clothes at home that do not sweat.<sup>9,10</sup>

In the literature, the importance of triggering factors for bullous diseases, such as pemphigus, is emphasized.<sup>11</sup> However, there was no change in the number of bullous patients during the outbreak period in this study. This can be explained by the necessity of application to the outpatient clinic of some patients to continue their current treatment (intravenous immunoglobulin, etc.), or it may indicate that longer periods are needed to reveal the effects of outbreaks on these diseases. The long-term COVID-19 effect on these autoimmune diseases may be the subject of another study.

During the outbreak, all people were asked to self-isolation and avoiding from the social interaction to protect from COVID-19. Evidence suggests that obligatory self-isolation due to the current pandemic may lead to depression and post-traumatic stress disorder.<sup>12</sup> In relation to this situation, papulosquamous diseases, such as psoriasis, in which the significant effect of stress is known, increased.

There is a need for some things to be avoided in the treatment of patients with psoriasis. Time away from outdoor sports, deprivation from ultraviolet light, staying at home, consuming a gluten- and carbohydrate-rich diet, and increased smoking or exposure to cigarette smoke may also have contributed to the exacerbation of psoriasis.<sup>13,14</sup> Some patients may also have given up their immunosuppressive medication of their own initiative due to a fear of contracting COVID-19.

In our study, it was observed that the number of patients who applied to the outpatient clinic due to connective tissue diseases was not affected. However, since it is known that environmental factors and autoimmunity contribute to the formation of these diseases, the effect of the new lifestyle and conditions created by the COVID-19 on these diseases will be better demonstrated in the long term.<sup>15</sup>

Vitiligo patients consider their current illness a cosmetic problem that does not require urgent treatment.<sup>16</sup> However, the admissions of vitiligo patients did not decrease statistically during this period.

In this period, cases of urticaria increased considerably. Although the cause of urticaria is not always known, stress has an important place among the triggers, and avoiding triggers also plays a main role in the control of the disease.<sup>17,18</sup> Food supplements and drugs taken to increase the defence against COVID-19 have significantly increased the frequency of both urticaria and drug reactions, as seen in our results. The most common dermatological findings in COVID-19 are urticarial lesions, eruptions, vesicular and maculopapular rashes, livedo reticularis, and chilblain-like lesions of the extremities.<sup>19</sup> Dermatologists should not overlook the fact that COVID-19 could potentially play a role in the formation of this type of skin lesion, such as urticaria. Moreover, this type of skin lesion may also be seen in COVID-19 carriers with no symptoms or in COVID-19 patients with very few symptoms.<sup>19</sup> Therefore, dermatologists should always keep these in mind.

Similarly, alopecia areata increased significantly during this period, possibly due to increased stress and anxiety.<sup>5</sup>

During this period of the pandemic, nobody applied to our outpatient clinic for benign neoplasms, such as skin tags. This may be related to the fact that these patients are accustomed to their lesions and know that they do not require urgent attention from the health institution.

We can explain the decreased rate of xerosis cutis cases as people not participating in sports that cause sweating and the decreased need for bathing combined with social isolation.<sup>20</sup>

Frequent and prolonged hand washing with soap and using hand sanitizers on a regular basis, which are some of the basic preventive measures against COVID-19 during the pandemic, have become common behaviours for society as a whole. As a result of this obligation, the frequency of contact dermatitis patients presenting to our outpatient clinic has increased significantly. This behaviour, which is an indispensable element for hygiene, can lead to a contact dermatitis pandemic in the future if protective measures are not taken. Contact dermatitis, which constitutes 70-80% of occupational skin diseases, may threaten not only at-risk occupational groups but also

the entire society.<sup>21</sup> Determining how other skin diseases are affected by this process is valuable for preventive medicine.

During this period, lifestyle changes, such as a closed home environment, staying away from the sun, and stress, may have caused exacerbation of atopic dermatitis, as expected, and these changing conditions may be the reason for the increase in the admission of this type of patients.<sup>22</sup> We consider that the increase in the number of our seborrheic dermatitis cases is also related to similar reasons.<sup>23,24</sup>

It seems that premalignant and malignant diseases of the skin, such as actinic keratosis, squamous cell carcinoma, and basal cell carcinoma, which especially affect the elderly population, were not affected during this period. However, these elderly patients may not have wanted to come to the hospital because of their high risk for COVID-19 and because their lesions have been present for a long time.

Many dermatological disorders have a psychosomatic or behavioural aspect. The skin and brain continually interact through psychoneuroimmunoen-docrine mechanisms and through behaviours that can strongly affect the initiation of skin disorders.<sup>25</sup>

The possibility of a causal relationship between emotional stress, stressful life events and the course of many skin diseases has long been recognized. The relationship between psoriasis, alopecia areata, atopic dermatitis, urticaria and stressful events is well known. Stress and anxiety may be related to the new onset of psoriasis or worsening of psoriasis symptoms.<sup>26</sup> Similarly, stressful life events may be one of the risk factors in the onset and course of alopecia areata.<sup>5</sup> As stated before, urticaria, psoriasis, and alopecia areata increased significantly in our results in this period of the pandemic. Seborrheic dermatitis can also be exacerbated by stress. It also often occurs in patients with mood disorders.<sup>27</sup>

During the outbreak, public health programs encouraged people to maintain high levels of personal hygiene. However, intensified handwashing and disinfection resulted in increased irritant contact dermatitis by interrupting epidermal barrier functions.

Atopy, wet working and contact allergy may be important risk factors for the development of hand eczema. Identification of etiological factors and prevention or minimization of these factors are of great importance as they play a major role in treatment. During the COVID-19 outbreak, the number of people with hand eczema increased, and most of them were medical staff.

Behavioural practices can also impact skin microbial communities.<sup>28,29</sup> In this period, infectious diseases of the skin were reduced due to a high compliance with hygiene rules.

Zeytun et al. reported that Demodex infestation decreased with an increasing number of daily face washes.<sup>30</sup> Yazısız et al. reported that Demodex may play a role in the aetiopathogenesis of rosacea, acne vulgaris, blepharitis, and perioral dermatitis.<sup>31</sup> We can associate these data with the decrease in the number of rosacea cases in our outpatient clinic.

Some studies have primarily focused and investigated the effects of lifestyle change and daily behavior on dermatological diseases. However, the effects of dietary changes, decreased physical activity and increased stay at home during the outbreak on dermatological diseases still remain a research area.<sup>32</sup>

Frankel et al. demonstrated that running and performing aerobic exercise could reduce the risk of psoriasis.<sup>33</sup>

Lifestyle changes may improve psoriasis. Optimal ultraviolet radiation exposure with outdoor sports has been reported as an effective treatment for psoriatic plaques. Doing outdoor sports regularly makes the skin synthesize more vitamin D.<sup>13</sup>

The usage frequency and consumption rates of dietary supplements increased because of news. Social media platforms have popularized the use of dietary supplements in the treatment and prevention of COVID-19. This situation may have resulted in increased skin reactions similar to drug eruptions, as in our results.

Some researchers state that there is compelling evidence that diet may exacerbate acne. There are three major food classes consisting of carbohydrates,

milk and other dairy products, and saturated fats. In addition, smoking can aggravate acne.<sup>6</sup> Some studies have shown a possible curative effect of a gluten-free diet on psoriasis.<sup>34</sup> During the stay-at-home period, consumption of handmade carbohydrates and a gluten-rich diet increased. Such a diet can be considered as another factor contributing to an increase in acne and psoriasis cases.

Smoking plays a major role in developing various inflammatory skin diseases, such as psoriasis, systemic lupus erythematosus, palmoplantar pustulosis, contact allergy and hidradenitis suppurativa.<sup>13</sup>

Relationship between hand dermatitis and smoking has been shown by numerous studies.<sup>35</sup>

Many dermatology patients increasingly used drugs during the outbreak to relieve their symptoms or treat their illness. While some patients ignore the important role of environmental factors in their disease development and prognosis, they are constantly trying new drugs to solve their dermatologic problems. Increased skin changes during the pandemic and various expert recommendations (such as using moisturizers) for prevention contributed to increased patient awareness due to increased health interest in the community due to COVID-19.

Therapeutic lifestyle changes are known to be as effective as pharmacotherapy in the treatment of dermatological diseases, but they are still not used enough.

As a result;

COVID-19 seriously caused panic, fear of death and anxiety in people at the beginning of the pandemic. This situation has dramatically changed people's lifestyles and daily behaviors.

This newly formed lifestyle has had an impact on the incidence of some dermatological diseases and the frequency of admission to the outpatient clinic.

In this period, urticaria, drug eruptions, dermatitis and eczema, psoriasis, alopecia areata significantly increased, while bacterial and fungal infections, xerosis cutis, rosacea significantly decreased in dermatology outpatient clinic admissions.

This novel experimental environment created by COVID-19 once again reminded to dermatologists how important therapeutic lifestyle changes are in the treatment of dermatological diseases.

## CONCLUSION

We consider that this study will contribute to providing much-needed evidence for the design of new interventions and treatment modalities and preventing dermatological comorbidities by helping to identify the effects of changing lifestyle and daily behaviours on dermatological diseases.

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*During this study, no financial or spiritual support was received neither from any pharmaceutical company that has a direct connection with the research subject, nor from a company that provides or produces medical instruments and materials which may negatively affect the evaluation process of this study.*

### Conflict of Interest

*No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.*

### Authorship Contributions

**Idea/Concept:** Şule Gökşin; **Design:** Şule Gökşin; **Control/Supervision:** Şeniz Duygulu; **Data Collection and/or Processing:** Işıl Göğem İmren; **Analysis and/or Interpretation:** Şule Gökşin; **Literature Review:** Işıl Göğem İmren, Hülya Cenk; **Writing the Article:** Şule Gökşin; **Critical Review:** Şeniz Duygulu, Nida Kaçar.

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