Received: 18 January 2022 | Revised: 19 April 2022 | Accepted: 2 May 2022

DOI: 10.1111/jocd.15044

JCD Journal of Cosmetic Dermatology WILEY

ORIGINAL ARTICLE

# The change in the frequency and severity of facial dermatoses and complaints in healthcare workers during the COVID-19

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## Abstract

**Background:** The coronavirus disease 2019 (COVID-19) pandemic has led to a dramatic increase in the use of personal protective equipment (PPE). However, the increased use of PPEs may lead to facial skin complaints.

**Aims:** This survey study aims to evaluate the effect of the COVID-19 pandemic on facial dermatoses and complaints.

**Methods:** A total of 1017 volunteers (age 18–60 years), consisting of healthcare workers, participated in the study. In the present study, healthcare professionals were screened for facial dermatoses and complaints between 1 and 15 April 2021 with an online survey.

**Results:** The vast majority of the survey were women (82.4%) and between 26 and 35 years old (49.2%). The most new-onset facial complaints were acne (25.3%) and lip dryness (29.2%). Along with the pandemic, 50.9% of patients with seborrheic dermatitis had an increase in lesions. Another remarkable result was a 60.5% increase in acne complaints. Moreover, the rate of exacerbations of rosacea, melasma, and lip dryness was increased after the COVID-19 pandemic (39.1%, 22.0%, and 42.7%, respectively). Exacerbations of seborrheic dermatitis, acne, and lip dryness have occurred more frequently in females when compared to males ($p < 0.001$).

**Conclusions:** The current pandemic has had serious impacts on facial dermatoses which had to be managed carefully. Compared to the pre-pandemic period, there was a significant increase in the frequency and severity of complaints in facial dermatoses related to PPE. If the complaints that may develop due to PPE are known in advance, their development can be prevented by taking precautions against them.

KEYWORDS
COVID-19, facial dermatoses, pandemic

## 1 | INTRODUCTION

The coronavirus disease 2019 (COVID-19) outbreak is an alarming international public health emergency. The potentially lethal respiratory illness is caused by a newly identified coronavirus first recognized in Wuhan, China, in December 2019.[1,2] Transmission mainly takes place through droplets and touching the nose, mouth, and eye mucosa after contact with contaminated surfaces.[3] Most of the governments have imposed COVID-19 lockdown restrictions and several control measures to restrict case numbers. Healthcare

  

workers (HCWs) are at high risk of various respiratory hazards including COVID-19. In HCWs, proper use of appropriate face masks or respiratory protective equipment is crucial and may prevent transmission of COVID-19. Therefore, all HCWs need to be trained for the appropriate use of personal protective equipment (PPE).[4]

It is well known that PPE usage, especially over prolonged periods, may result in certain skin diseases.[5-7] Previous studies have shown high incidences of PPE-related dermatoses, such as facial pressure injuries and dermatitis, during the current COVID-19 pandemic.[8-10] Furthermore, adverse skin reactions from prolonged use of masks may exacerbate existing skin diseases. Facial dermatoses are common diseases encountered by dermatologists; however, there are some challenging aspects to face during the COVID-19 pandemic. PPE use, first only among HCWs and then among the general population, has led to an increase in facial dermatoses.[11] It has been demonstrated that masks induce occlusion and consequently a damp and warm microenvironment, which can cause or exacerbate these conditions.[10]

In this study, we aimed to search for the change in the frequency and severity of facial dermatoses and complaints in HCWs during the COVID-19 outbreak in Turkey.

## 2 | MATERİAL AND METHOD

The present study was designed as a cross-sectional descriptive online survey research including 25 questions through the web-based survey (Google Forms) and was performed between 1 and 15 April 2021 at Sakarya University Education and Research Hospital, Sakarya, Turkey. Turkish HCWs aged 18–60 years, who agreed to participate in the online survey were considered eligible. The survey questions were prepared and reviewed by all authors by reviewing and discussing the literature on the subject. The first part of the questionnaire examined subjects as demographic characteristics. The second part asked about facial dermatoses in HCWs before and during the COVID-19 outbreak. The survey was completed by the participants without any time limit. Available data were collected from 1017 volunteers.

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 (22/03/2021: 71522473-050.01.04-20132-174).

### 2.1 | Statistical analysis

Descriptive analyses were performed to provide information on the general characteristics of the study population. Categorical variables were compared by the Chi-Square test. Categorical variables were presented as a count and percentage. A $p$-value $< 0.05$ was considered significant. Analyses were performed using SPSS statistical software (IBM SPSS Statistics, Version 23.0. Armonk, NY: IBM Corp.)

**TABLE 1** Sociodemographic characteristics of the participants

| Sociodemographic characteristics | *N* (%) |
|---|---|
| Age, *n* (%) | |
| 15–25 years | 151 (14.84%) |
| 26–35 years | 501 (49.26%) |
| 36–50 years | 295 (29.01%) |
| 51–65 years | 70 (6.89%) |
| Gender, *n* (%) | |
| Male | 179 (17.6%) |
| Female | 838 (82.4%) |
| Marital status, *n* (%) | |
| Married | 677 (66.56%) |
| Single | 340 (33.44%) |
| Monthly income, *n* (%) | |
| 500$ and below | 458 (45.03%) |
| Above 500$ | 569 (54.97%) |
| Working status during the pandemic (hours/week), *n* (%) | |
| 40 and below | 528 (51.92%) |
| 40–60 | 396(38.93%) |
| Above 60 | 93 (9.15%) |

*Note:* Data presented as number (%).

## 3 | RESULTS

### 3.1 | Demographic data

This questionnaire study involved 1017 volunteers (179 males and 838 females; 17.6% vs. 82.4%). The characteristics of the participants of the study are summarized in Table 1. The ages of the participants ranged from 18 to 60 years with 34 ± 9 years mean of age. About half of the participants were in the 26–35 age range (49.2%). Two-thirds of the participants were married. 88.1% of the participants were at least university graduates.

### 3.2 | PPE use and hygiene measures

The PPE usage and hygiene measures of the participants are summarized in Table 2. In our study, it was determined that the HCWs used at least one mask in the hospital. The most commonly used mask type was found as a single surgical mask (47.3%). Double surgical mask (24.4%) and N95+single surgical mask (16.4%) were seen as other frequent mask uses. The 18.9% of the HCWs used face shields. It was determined that 6.9% of the HCWs wore protective glasses. There was no significant difference between males and females according to PPE usage ($p > 0.05$).

Before the pandemic, cosmetic products were used for face washing by 37.0% of the participants, and 30.0% used tap water only while soap was used by 24.7%. After the COVID-19 outbreak, soap was used by 48.5% of the participants, 35.4% used tap water only, and 12.7% used cosmetic products when washing their faces.

**TABLE 2** Personal protective equipment usage

| Types of mask | Male *N* (%) | Female *N* (%) | Total *N* (%) | *p* |
|---|---|---|---|---|
| Single surgical mask | 97 (54.18%) | 381 (45.46%) | 482 (47.39%) | >0.05 |
| Double surgical mask | 31 (17.31%) | 217 (25.89%) | 249 (24.48%) | >0.05 |
| N95+single surgical mask | 27 (15.08%) | 138 (16.46%) | 167 (16.42%) | >0.05 |
| N95 | 11 (6.14%) | 33 (3.93%) | 44 (4.33%) | >0.05 |
| Other mask | 12 (6.70%) | 63 (7.51%) | 75 (7.38%) | >0.05 |
| Face shield | 23 (12.84%) | 169 (20.16%) | 193 (18.98%) | >0.05 |
| Protective glasses | 9 (5.02%) | 61 (7.27%) | 71 (6.99%) | >0.05 |

*Note:* Data presented as number (%).

### 3.3 | Facial dermatoses

Changes in the frequency and severity of various facial dermatoses and complaints in HCWs before the COVID-19 outbreak and 1 month after the onset of the outbreak are presented in Table 3. There was an increase in the frequency of all facial dermatoses. Moreover, it was determined that there was an increase in the severity of complaints. Of the 1017 patients, 10.8% stated that they had seborrheic dermatitis (SD) before the pandemic. Along with the pandemic, 50.9% of them had an increase in lesions. A total of 367 participants (36.2%) stated that they had acne or folliculitis in the face before the pandemic and an increase in lesions was observed in 60.5% of them. While rosacea was seen in 6.8% of the participants before the pandemic, an increase in lesions was observed in 39.1% of these patients during the pandemic. Pre-pandemic melasma was present in 22.5% of the patients, and an increase was observed in the lesions of 22% of these patients during the pandemic period. While lip dryness was present in 38.3% of the patients, an increase in complaints occurred in 42.7% of the patients with the pandemic.

Changes in the frequency and severity of various facial dermatoses and complaints according to gender are presented in Table 4. Although more seborrheic dermatitis was seen in male participants before the pandemic ($p < 0.001$), it was determined that there was a greater increase in the complaints of females after the pandemic ($p < 0.001$). Although acne was at a similar rate before the pandemic, it was observed that the complaints of females increased more than males during the pandemic ($p < 0.001$). Moreover, pre-pandemic rosacea, melasma, and dry lips were more common in females than males ($p$: 0.021, $p < 0.001$, and $p < 0.001$, respectively). While a similar increase in severity was observed in rosacea in both genders with the pandemic ($p > 0.05$), melasma became more prominent in males ($p = 0.004$) and lip dryness in females ($p < 0.001$).

**TABLE 3** Changes in the frequency and severity of various facial dermatoses and complaints after the COVID-19 outbreak compared to before

| | Pre-pandemic cases | New cases | Increase in complaints |
|---|---|---|---|
| Seborrheic dermatitis | 110 (10.8%) | 26 (2.8%) | 56 (50.9%) |
| Acne or folliculitis | 367 (36.2%) | 159 (25.3%) | 221 (60.5%) |
| Rosacea | 69 (6.8%) | 4 (0.4%) | 27 (39.1%) |
| Melasma | 227 (22.5%) | 6 (0.7%) | 49 (22.0%) |
| Lip dryness | 388 (38.3%) | 180 (29.2%) | 162 (42.7%) |

*Note:* Data presented as number (%).

## 4 | DISCUSSION

Facial PPE is one of the most important methods to prevent the spread of COVID-19 in hospitals for HCWs. Long-term use of facial PPE may increase the skin permeability and temperature, which causes a change in the microbiota.[12] In studies investigating the relationship between PPE and facial dermatoses in healthcare personnel during the COVID-19 pandemic, it has been reported that the use of PPE cause or exacerbates dermatoses, especially acne, rosacea, and seborrheic dermatitis.[13-15] It was shown that participants with pre-existing facial dermatoses, such as rosacea, seborrheic eczema, and perioral dermatitis, were more likely to show skin symptoms.[16] Since the last 2 years, there has been an increase in reported cases of occupational dermatoses related to facial PPE.[17] In a systematic review, Thatiparthi reported that wearing face masks to protect from COVID-19 can increase adverse facial dermatoses and exacerbate underlying dermatology conditions.[18] Similarly, wearing a face mask for more than 3 h daily was associated with facial skin disease, most commonly eczema and acne in HCWs.[19] Moreover, Skiveren showed HCWs using facial PPE for >6 h versus <3 h per day had a four times higher risk of adverse skin reactions.[20] A systematic review synthesizing the results of 16 studies on pressure injuries associated with COVID-19 showed that pressure injuries caused by protective devices are one of the causes of facial dermatoses.[21] The most commonly affected areas by facial PPE were the bridge of the nose (48.4%), cheeks (45.8%), ears (36.3%), forehead (21.8%), and wrists (20.8%).[22] In this study, 61.7% experienced worsening of their preexisting skin disease and 90.5% had reported developing new skin problems related to PPE. Furthermore, new lesions or acne worsening were reported by 56.0% of subjects during the state of

**TABLE 4** Changes in the frequency and severity of various facial dermatoses and complaints due to gender after the COVID-19 outbreak compared to before

| | Pre-pandemic | | | Increase in severity | | |
|---|---|---|---|---|---|---|
| **Facial dermatoses** | **Male** | **Female** | ***p*** | **Male** | **Female** | ***p*** |
| Seborrheic dermatitis | 40 (% 22.5) | 70 (% 8.4) | <0.001 | 15 (%37.5) | 41 (%58.6) | <0.001 |
| Acne or folliculitis | 64 (% 35.8) | 303 (% 36.5) | >0.05 | 19 (%29.7) | 202 (%66.7) | <0.001 |
| Rosacea | 5 (% 2.8) | 64 (% 7.7) | 0.021 | 2 (%40) | 25 (%39.1) | >0.05 |
| Melasma | 17 (% 9.6) | 210 (% 25.3) | <0.001 | 5 (%29.4) | 44 (%21.0) | 0.004 |
| Lip dryness | 38 (% 20.5) | 350 (% 41.7) | <0.001 | 9 (%23.7) | 153 (%43.7) | <0.001 |

*Note:* Data presented as number (%).

emergency and by 67.5% in the following 7–9 months.[23] The most widely implicated contactants were increased frequency of hand hygiene, gloves, N95 masks, and goggles.[24] Schwensen demonstrated that nickel allergy can be induced by a metal thread in face masks.[25] The use of patch tests is also recommended to determine the correct diagnosis in patients with facial dermatitis.[26]

During the COVID-19 pandemic, there have been several reports of seborrheic dermatitis exacerbated by facial PPE. In one of these studies, 37.5% of HCWs whose underlying SD had worsened due to facial PPE.[27] Another study showed 34% new cases of SD in HCWs after the first month of the pandemic and a worsening of SD in 47% of HCWs.[28] Veraldi et al reported that using facemasks exacerbated seborrheic dermatitis in 46.5% of patients. Moreover, of these patients with worsening symptoms, 75% were men.[12] In our study, the rate of seborrheic dermatitis was 10.8% before the pandemic, and new-onset seborrheic dermatitis was 2.8%. The exacerbation of existing seborrheic dermatitis was found at 50.9%, similar to the literature. Although seborrheic dermatitis is more common in males before the pandemic, the most of exacerbation occurred in females in the present study. To prevent SD exacerbation, the face should be cleaned with gentle facial cleaners before and after wearing a long-term mask, and contact time with facial PPE should be limited if possible.[29] Furthermore, the contact area between the mask and skin should be maximized.[30]

New onset and exacerbation of acne on the face occurs frequently due to facial PPE.[31] Mask-related acne and acne-like eruptions have been referred to as "maskne" on social media.[32] The use of facial PPE for extended periods leads to a warm and humid environment under the PPE that can increase the sebum secretion rate and occlude pores, subsequently leading to comedone formation predisposing to acne flare-ups. The temperature rise created by the mask induces an increased sebum excretion rate equal to 10% for every 1°C.[33] A lengthy daily non-changed mask-wearing leads to *Staphylococcus aureus* activation and causes an infection, for instance, impetigo.[34] In the literature, the rates of new-onset acne were calculated as 31.2% and 17.8% in concordance with our studies (25.3%).[35,36] Aravamuthan and Arumugam reported a statistically significant relationship between the female gender and acne development due to PPE use among healthcare professionals.[35] In another study, being female, using an N95 surgical mask compared to a surgical mask, and the daily average duration of mask use was determined as risk factors for acne development due to mask use.[37] Similarly, exacerbation of acne significantly more occurred in the females than males in our study. Practicing proper facial skincare is important as it helps prevent and treat acne. Furthermore, limiting cosmetics and make-up products and avoiding the long-term use of masks can also be helpful.[38]

Rosacea is a common chronic inflammatory skin disease. Rosacea usually involves the "T zone" of the face, including convex areas such as the forehead, nose, cheeks, and chin, beyond the area covered by masks.[33] In a survey completed by 404 healthcare professionals, all 26 rosacea cases reported disease activation.[24] It can be explained by the change in innate immunity due to excessive sweating and the change in the microenvironment of the skin.[39] Differently, the rate of exacerbation was 9.1% in our study while the new onset of rosacea was very rare. This data suggest that PPEs are responsible for the aggravation of rosacea, not its development. Washing with gentle cleansers and, if tolerated, salicylic acid or benzoyl peroxide cleansers is an effective first step in the treatment of rosacea.[38]

In the literature, there was no information about the relationship between melasma and lip dryness with PPE use among healthcare professionals. In the present study we showed that new-onset melasma was very rare (0.7%), but 22.0% of HCWs whose underlying melasma had worsened due to facial PPE. Although pre-pandemic melasma was more frequent in females, in contrast, more exacerbation occurred in males. The extended duration of lockdown and stay-at-home policies might have caused visible and frequent facial lesions such as acne, rosacea, comedones, and melasma to draw greater attention. Accordingly, a recent report showed an increase in appearance-focused behaviors (e.g., mirror checking and appearance comparisons) in patients with higher dysmorphic concerns during the COVID-19 pandemic due to the closure of beauty services.[40] A similar situation may have arisen due to the fact that HCWs started to work in COVID clinics and due to the shift work system, the time spent uninterrupted at home increased. Moreover, an increase in the use of cosmetics and antidepressant drugs during the pandemic period may cause exacerbation of melasma by phototoxic mechanisms. In addition, the increase in the use of soap and skin cleansers may cause hyperpigmentation on the face. Also, we showed that 29.2% of HCWs had new-onset lip dryness and 42.7% of pre-pandemic disease had worsened due to facial PPE. In addition, it was shown that exacerbation more occurred in females.

The present study had certain limitations. Only medical personnel were included in the study, and therefore, the results do not reflect the situation in the general population. This is a self-administered questionnaire study. Therefore, the questions asked to give an idea about the diagnosis, but it is difficult to make a definitive diagnosis with this method.

## 5 | CONCLUSİON

Acne was the most common facial dermatosis and lip dryness was the most common complaint in HCWs before the COVID-19 outbreak. However, compared to the pre-pandemic period, there was a significant increase in the frequency and severity of complaints in all facial dermatoses related to PPEs. Especially women are at higher risk for facial complaints during the pandemic. Limiting cosmetics and make-up products on days of extended mask-wearing can also be helpful. At the same time, it is also very important to strictly limit the continuous wearing time of medical protective equipment. If the complaints that may develop due to personal protective equipment are known in advance, their development can be prevented by taking precautions against them.

### AUTHOR CONTRIBUTIONS

All authors have read and approved the final manuscript. N.C.C, G.Y., and O.K. performed the research. N.C.C., M.U., and B.S.D. designed the research study. N.C.C, M.Y., and B.S.D. contributed essential reagents or tools. O.K. and M.U. analyzed the data. N.C.C., M.Y., and G.Y. wrote the paper.

### CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

### ETHICAL APPROVAL

Ethics committee approval was obtained.

### DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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**How to cite this article:** Cosansu NC, Yuksekal G, Kutlu O, Umaroglu M, Yaldız M, Dikicier BS. The change in the frequency and severity of facial dermatoses and complaints in healthcare workers during the COVID-19. *J Cosmet Dermatol*. 2022;00:1–6. doi:10.1111/jocd.15044