Mask-Induced Facial Dermatoses in the Saudi Arabian Population During the COVID-19 Pandemic: A Cross-Sectional Study

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Abstract

Background

The severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) emerged in 2019 and was responsible for noteworthy morbidity and death throughout the world. Due to preventive measures, various adverse reactions to the skin occurred which were associated with prolonged use of wearing a face mask.

Objectives

The study aimed to determine the incidence and assess the clinical features of mask-induced dermatoses.

Methods

A cross-sectional study was conducted involving both healthcare and non-healthcare individuals in Saudi Arabia. A questionnaire was designed that included mask-related problems, preexisting skin conditions, frequency and duration of use of face masks, type of face mask, and demographic information. Further information on their clinical symptoms was collected.

Results

This study included 2326 participants. Participants who refused to participate in the study and did not wear masks (232) were excluded from the study. Redness, itchiness, and acne were the most reported symptoms. 37.8% of the total wore the mask daily with 58.2% using their face mask for more than two hours per day. 44.4% of the participants had mask-induced dermatosis. Almost half of the participants (46.8%) had the cheek as the most affected area. Contact dermatitis was significantly less in non-healthcare workers as compared to healthcare workers (p<0.001). Similarly, conditions like nonspecific erythema (p=0.004) and rosacea (p=0.027) were also significantly less in non-healthcare workers as compared to healthcare workers.

Conclusion

There was a strong relationship between the frequency of mask use and facial dermatosis during the pandemic. The prevalence or pattern of mask-induced facial dermatoses was not significantly different between healthcare workers and non-healthcare workers. However, contact dermatitis and nonspecific erythema were significantly more common in healthcare workers.
The virus itself has emerged from cross-species transmission to humans like its predecessors. Once the outbreak occurred, it primarily transported itself from one human to another through the small respiratory droplets of the infected person. The droplets can be exhaled by a cough/sneeze of the infected person and can be transmitted via direct contact with the mucosal membrane of the healthy person. However, the droplets are not able to pass more than 6 feet. Various studies further suggest that it can also be transmitted via fecal or blood swabs [5]. The incubation time for the disease is 14 days with characteristic symptoms like fever, sore throat, dry cough, GI upset, and loss of sense of smell and taste [4].

After the incidence of the pandemic, one of the key approaches taken to prevent the transmission of this disease was to use personal protective equipment (PPE) i.e., face masks, and face helmets as the shield for the protection of respiratory symptoms among healthcare workers (HCWs) as well as the local population. This period of use of PPEs against COVID-19 was prolonged and continued till the end of this pandemic [5]. The extended use of face masks in turn caused multiple skin-related problems like an increase in the progression of existing dermatosis, contact, seborrheic dermatitis, and acne among various health workers [6,7]. Various other studies have provided evidence of facemask-associated damage to the skin as it can trigger rosacea flares and acne as well. Furthermore, a new phenomenon has emerged called mask-induced Koebner [8].

Even though it was mandatory for healthcare professionals throughout the world to use face masks, the authorities have also encouraged individuals of the local population to use them to reduce the transmission of the virus and prevent local outbreaks. Since this use of face masks was applied worldwide, the period of use of face masks also increased which brought attention to the occurrence of face mask-induced dermatosis in the local population [9]. Currently, there are very few research studies present based on a large-scale population on the adverse reaction on the skin due to prolonged use of face masks among the general population. Therefore, the focus of this study was to increase the understanding of the prevalence, clinical characteristics, and treatment options for mask-induced dermatoses among HCWs and non-healthcare workers (non-HCWs).

Materials And Methods

Study design and setting

This is a cross-sectional electronic questionnaire-based study that was distributed via social media.

Study participants

The sample size was determined via Raosoft online calculator. The recommended sample size was 385 with a confidence interval of 95% and a 5% margin of error. However, 2526 people responded to the questionnaire. The study’s inclusion criteria were people over 18 years old, both healthcare workers and non-healthcare workers who live in Saudi Arabia, those who confirmed their agreement, and those who completed the questionnaire. Participants who refused to participate in the study and did not wear masks (232), people not living in Saudi Arabia, those under 18 years old, those who did not confirm their agreement, and those who did not complete the questionnaire were excluded from the study.

Data collection process

To guarantee that each participant was represented correctly, similar links were distributed to each participant. The questionnaire’s content was identical across all links. In addition, besides the link provided via social media, a brief introduction of the study’s goals and objectives was displayed. The participants were enlightened that participation was completely voluntary and anonymous and that all information would be kept completely private. Following that, participants must confirm their involvement in the study by selecting either “agree” to continue with the study or “disagree”. The data collection period was from April to June 2022.

Instrument development

The questionnaire included four parts. The first part was about the participant’s demographics, including the participant’s place of residence, gender, age, occupation, marital status, and education level. In the second part, participants were asked about how often they wear a facial mask per week, the estimated duration of mask-wearing per day, the type of facial mask, whether the facial mask was fitting perfectly, and if they reused a disposable mask or not. In the third part, we evaluated the prevalence and presentation of face mask-induced facial dermatoses among individuals. Participants were asked about the skin conditions that they have been diagnosed with, whether they have been diagnosed with these conditions before or after using face masks, was the condition aggravated/worsened by using face masks, how many times did they get mask induced dermatoses during the COVID-19 pandemic, and the facial area that was involved. In the fourth part, we evaluated risk factors associated with the incidence of mask-induced dermatoses. Participants were asked if they had an allergy to a specific type of face mask. In addition, they were asked about their adherence to the general measures that prevent mask use-related facial dermatoses and their skin type. Also, some mask pictures were added to the questionnaire.
This questionnaire was validated using a method that included focus group discussions, expert appraisal, pilot research, reliability, and validity testing. Three dermatology experts and one biostatistician worked together to validate our questionnaire. For reliability and validity analysis, data from a pilot study with 21 individuals were used. The content and face validity of the questionnaire were assessed using expert review and focused group discussion. An exploratory factor analysis was used to examine the questionnaire’s construct validity. Internal consistency was examined for questionnaire reliability, and Cronbach’s result was 0.81. If the Cronbach’s value is more than 0.7, the questionnaire is considered internally consistent. All of the questionnaire items were translated into Arabic by a healthcare practitioner and a translator specialist who is skilled in both Arabic and English. Two more specialists who were fluent in both languages then translated the Arabic questionnaire into English. The back-translated version of the questionnaire was compared to the original English version to confirm the quality of the translation.

Data analysis

The results of the questionnaires were displayed in an Excel version 16.16.23 (Microsoft, Redmond, WA, USA) and data were analyzed statistically using SPSS version 26 (IBM Corp., Armonk, NY, USA). To test the relationship between variables, qualitative data were expressed as numbers and percentages, and the Chi-squared test ($\chi^2$) was used. A $p$-value of less than 0.05 was considered statistically significant.

Ethical considerations

Ethical approval was provided by the institutional review board (IRB) at Princess Nourah Bint Abdul Rahman University, Riyadh, Saudi Arabia (HAP-01-R-059).

Results

Table 1 shows that 63.6% of the participants had an age that ranged from 18-25 years, 73.5% were females and 29.7% were married. Also, 81.6% of them had a university level of education or higher and only 9.2% were HCWs. About 26% of the participants were from the Eastern region of Saudi Arabia.
| Variable                  | No. (%)       |
|---------------------------|---------------|
| **Age**                   |               |
| 18-25                     | 1330 (63.6%)  |
| 26-35                     | 385 (18.4%)   |
| 36-45                     | 236 (11.3%)   |
| 46-60                     | 133 (6.4%)    |
| More than 60              | 7 (0.3%)      |
| **Gender**                |               |
| Female                    | 1537 (73.5%)  |
| Male                      | 554 (26.5%)   |
| **Marital status**        |               |
| Married                   | 620 (29.7%)   |
| Not married               | 1471 (70.3%)  |
| **Please select your education level?** | |
| High school or lower      | 384 (18.4%)   |
| University or higher      | 1707 (81.6%)  |
| **Please select your occupation?** | |
| Student                   | 1210 (57.9%)  |
| Unemployed                | 215 (10.3%)   |
| Retired                   | 40 (1.9%)     |
| Employed (healthcare sector) | 192 (9.2%)   |
| Employed (non-healthcare sector) | 433 (20.7%) |
| **Health care worker?**   |               |
| Yes                       | 193 (9.2%)    |
| No                        | 1897 (90.8%)  |
| **Which part of Saudi Arabia do you reside in?** | |
| Northern region           | 246 (11.8%)   |
| Eastern region            | 552 (26.4%)   |
| Southern region           | 357 (17.1%)   |
| Western region            | 545 (26.1%)   |
| Middle region             | 391 (18.7%)   |

**TABLE 1: Distribution of the participants according to their demographic characters (No.:2090)**

Table 1 shows that 37.8% of the participants were wearing the face mask every day, 29.8% were wearing it for five to seven hours and the majority (86.8%) were using a procedure/surgical mask. About half of the participants (50.4%) reported that the mask was well fit. 29.2% of them reported that they never re-use a disposable mask, and 23.8% mentioned that they do this sometimes.
### TABLE 2: Distribution of the participants according to the pattern of using the face mask (No.:2090)

Mask-induced facial dermatoses among studied participants were 44.4% (No.:928) (Figure 1).
The most common presentation of face mask-induced facial dermatoses was acne (maskne) (42.6%), nonspecific erythema (18.7%), and desquamation (14.9%) (Figure 2).

Table 3 shows that among participants having mask-induced dermatoses (No.: 928), 80.5% got mask-induced dermatoses during the COVID-19 pandemic one to three times. Most of them (46.8%) had the dermatoses on their cheeks and the most common symptoms were redness (51%), itching (49.5%), acne (43.7%), and blisters (38.6%). The most commonly used measures to prevent mask use-related facial dermatoses were maintaining oral hygiene (66.1%), cleansing skin with a gentle soap-free cleanser (58.6%), and taking regular breaks from the mask to relieve the pressure and prevent moisture build-up (54.2%). Only 44.7% of the participants were allergic to face masks, and the procedure/surgical mask was the most common allergic type (45.4%). Most participants with facial mask-induced dermatosis (51.3%) were cleaning their faces after using facial masks and 31.1% reported applying cosmetics. The most common skin type among them was the combination type.
While having a mask induced dermatosis, which of the following symptoms did you suffer from? (check what is applicable)

| Symptom               | Frequency |
|-----------------------|-----------|
| Itchiness             | 460 (49.5) |
| Redness               | 474 (51)  |
| Blisters              | 359 (38.6) |
| Dry/cracked skin      | 259 (27.9) |
| Burning sensation     | 204 (21.9) |
| Tightness/stinging    | 194 (20.9) |
| Acne                  | 406 (43.7) |

Did you use the following general measures to prevent mask-use related facial dermatoses (You can choose more than one option)

| Measure                                                                 | Frequency |
|------------------------------------------------------------------------|-----------|
| Cleanse skin with a gentle soap-free cleanser                          | 544 (58.6) |
| Apply a light emollient at least 30 minutes before applying facial mask| 448 (48.2) |
| Apply a silicon based barrier tape—e.g. siltape (Advancis)—to nasal bridge and cheeks | 94 (10.1) |
| Take time to fit the mask and ensure it is not too tight              | 421 (45.3) |
| Take regular breaks from the mask (every one hour for respirators) to relieve the pressure and prevent moisture build up | 503 (54.2) |
| Maintain oral hygiene (teeth brushing twice daily and daily interdental flossing/brushing) | 614 (66.1) |

Are you allergic to specific type of face mask?

| Response | Frequency |
|----------|-----------|
| No       | 514 (55.3) |
| Yes      | 414 (44.7) |

If yes, what mask you are allergic to? (No.: 410)

| Mask Type          | Frequency |
|--------------------|-----------|
| Face shield        | 8 (1.9)   |
| Procedure/surgical mask | 188 (40.4) |
| Non-woven (e.g air queen) | 32 (7.7)  |
| Cloth mask         | 145 (35)  |
| N95                | 41 (10)   |

Do you clean your face after using facial masks?

| Response | Frequency |
|----------|-----------|
| No       | 452 (68.7) |
| Yes      | 476 (31.3) |

Do you apply any cosmetic products such as (foundations, concealers, face powders, etc) underneath the face mask?

| Response | Frequency |
|----------|-----------|
| No       | 645 (60.9) |
| Yes      | 288 (31.1) |

What's your skin type?

| Skin Type    | Frequency |
|--------------|-----------|
| Dry          | 129 (15.9) |
| Sensitive    | 25 (3.1)   |
| Oily         | 302 (35.3) |
| Normal       | 137 (14.7) |
| Combination  | 335 (38.2) |

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Table 4 demonstrates that HCWs had a significantly higher percentage of those who were wearing the face mask on daily basis, who were wearing it for a longer duration (eight to 10 hours), and who were wearing the N95 mask type (p< 0.05).

| Variable | Group | χ² | p-value |
|----------|-------|----|---------|
| How often you wear a face mask per week? | | | |
| 1-2 days | 15 (7.8) | 360 (20.6) | 33.55 | <0.001 |
| 3-4 days | 20 (10.4) | 343 (18.1) | | |
| 5-6 days | 48 (30.1) | 473 (24.9) | | |
| Every day | 100 (51.8) | 691 (36.4) | | |
| What is the estimated duration of mask wearing per day? | | | |
| Less than two hours | 13 (6.7) | 360 (19) | 89.49 | <0.001 |
| 2-4 hours | 38 (6.4) | 556 (29.3) | | |
| 5-7 hours | 44 (22.8) | 580 (30.6) | 68.40 | <0.001 |
| 8-10 hours | 72 (37.8) | 313 (16.5) | | |
| 12 hours | 25 (13) | 88 (4.6) | | |
| What type of face mask you wear usually? | | | |
| Face shield | 1 (0.5) | 7 (0.4) | | |
| Procedure/surgical mask | 155 (80.3) | 1660 (87.5) | | |
| Non-woven (e.g. air queen) | 7 (3.6) | 53 (2.8) | 36.12 | <0.001 |
| Cloth mask | 14 (7.3) | 146 (7.7) | | |
| N95 | 16 (8.3) | 31 (1.6) | | |
| Does your face mask usually fit your face perfectly? | | | |
| Tight | 15 (7.8) | 65 (5) | | |
| Wide | 75 (39.9) | 352 (44.9) | 4.36 | 0.113 |
| Well fit | 103 (53.4) | 950 (50.1) | | |
| Do you usually re-use a disposable mask? | | | |
| Never | 55 (28.5) | 552 (29.1) | | |
| Often | 33 (17.1) | 305 (16.1) | | |
| Sometimes | 47 (24.4) | 451 (23.8) | | |
| Always | 20 (10.4) | 209 (11) | | |
| Rarely | 38 (19.7) | 360 (20) | | |

Table 4 shows that HCWs had a significantly higher percentage of those who were presented with contact
dermatitis and nonspecific erythema compared to non-HCWs (p<0.05). At the same time, HCWs had a significantly higher percentage of those who had a combination skin type (p<0.05). On the other hand, a non-significant difference was found between HCWs and non-HCWs according to other presentations or the prevalence of mask-induced facial dermatoses (p>0.05).

### Table 5: Difference between healthcare workers and non-healthcare workers according to presentation and prevalence of mask-induced facial dermatoses (No.:2090)

| Variable                        | Group                              | χ²  | p-value |
|---------------------------------|------------------------------------|-----|---------|
|                                | Health care workers No. (%)        |     |         |
|                                | Non-health care workers No. (%)    |     |         |
| Which of the following skin conditions have you been diagnosed with? | | | |
| Acne (Maskne)                   | 96 (46.6)                          | 1.39| 0.228   |
| Hypopigmentation                | 11 (5.7)                           | 0.85| 0.356   |
| Hyperpigmentation               | 19 (9.8)                           | 0.99| 0.319   |
| Contact dermatitis              | 24 (12.4)                          | 14.4| <0.001  |
| Nonspecific erythema            | 51 (26.4)                          | 8.44| 0.004   |
| Desquamation                    | 36 (18.5)                          | 0.07| 0.786   |
| Urticaria                       | 9 (4.7)                            | 0.73| 0.376   |
| Cheilitis                       | 24 (12.4)                          | 3.71| 0.054   |
| Atopic eczema                   | 15 (7.8)                           | 3.09| 0.079   |
| Seborrheic eczema               | 18 (9.3)                           | 2.51| 0.091   |
| Rosacea                         | 12 (6.2)                           | 4.91| 0.027   |
| Mask induced dermatoses         | Yes                                | 0.31| 0.574   |
|                                | No                                 | 111 (57.5)| 105 (55.4) |
| What’s your skin type?          | Dry                                | 11 (5.7)  | 114 (6)   |
|                                | Sensitive                          | 2 (1)     | 23 (1.3)  |
|                                | Oily                               | 14 (7.2)  | 288 (15.2)| 11.09| 0.049 |
|                                | Normal                             | 16 (8.3)  | 121 (6.4) |
|                                | Combination (both oily and dry skin)| 38 (20.2) | 206 (15.4)|

Table 6 shows that a non-significant difference was found between HCWs and non-HCWs regarding the pattern of mask-induced dermatoses or associated factors (p>0.05).

### Table 6: Difference between healthcare workers and non-healthcare workers regarding the pattern of mask-induced dermatoses or associated factors (p>0.05)

| Variable                        | Group                              | χ²  | p-value |
|---------------------------------|------------------------------------|-----|---------|
|                                | Health care workers No. (%)        |     |         |
|                                | Non-health care workers No. (%)    |     |         |
| How many times did you get mask induced dermatoses during COVID pandemic? | | | |
| 1-3 times                       | 48 (25.2)                          | 0.98| 0.380   |
| 3-6 times                       | 7 (3.6)                            | 678 (35.7)| 206 (15.4)|
| 6 times or more                 | 7 (3.6)                            |    |         |
|  | HWE 928  | 163 (8.6) | 0.49 | 0.974 |
|---|---|---|---|---|
| Nose | 16 (8.3) | 163 (8.6) | 0.49 | 0.974 |
| Cheeks | 27 (19.2) | 368 (21) | 0.27 | 0.209 |
| Chin | 20 (10.4) | 190 (10) | 0.6 | 0.738 |

While having a mask induced dermatosis, which of the following symptoms did you suffer from? (check what is applicable)

- **Itchiness**: 45 (23.3) vs. 15 (21.9), OR 1.29, p = 0.525
- **Redness**: 43 (21.8) vs. 432 (22.8), OR 0.31, p = 0.854
- **Blisters**: 36 (18.7) vs. 323 (17), OR 0.13, p = 0.52
- **Dry/cracked skin**: 29 (15) vs. 230 (12.1), OR 0.31, p = 0.854
- **Burning sensation**: 20 (10.4) vs. 194 (9.7), OR 0.6, p = 0.738
- **Tightness/stinging**: 21 (10.9) vs. 173 (9.1), OR 1.47, p = 0.479
- **Acne**: 33 (17.1) vs. 373 (19.7), OR 0.74, p = 0.698

Are you allergic to specific type of face mask?

- **No**: 48 (24.9) vs. 466 (24.6), OR 0.96, p = 0.718
- **Yes**: 34 (17.6) vs. 380 (20)

If yes, what mask you are allergic to? (No.:410)

| Mask Type             | HWE 928  | 163 (8.6) |
|-----------------------|----------|----------|
| Face shield           | 1 (0.5)  | 7 (0.4)  |
| Procedure/surgical mask | 15 (7.8) | 173 (9.1) |
| Non-woven (e.g. air queen) | 2 (1)    | 30 (1.6)  |
| Cloth mask            | 10 (5.2) | 135 (7.1) |
| N95                   | 6 (3.1)  | 30 (1.6)  |

Did you use the following general measures to prevent mask-use related facial dermatoses (You can choose more than one option):

- **Cleanse skin with a gentle soap-free cleanser**: 49 (24.9) vs. 459 (26.1), OR 0.36, p = 0.835
- **Apply a light emollient at least 30 minutes before applying facial mask**: 43 (20.7) vs. 408 (21.5), OR 0.32, p = 0.85
- **Apply a silicon-based barrier tape—e.g., siltape (Advancis)—to nasal bridge and cheeks**: 15 (7.7) vs. 83 (4.4), OR 1.34, p = 0.512
- **Take time to fit the mask and ensure it is not over tight**: 37 (19.2) vs. 384 (20.2), OR 0.31, p = 0.853
- **Take regular breaks from the mask (every one hour for respirators) to relieve the pressure and prevent moisture build up**: 48 (24.9) vs. 455 (24), OR 0.97, p = 0.616
- **Maintain oral hygiene (teeth brushing twice daily and daily interdental flossing/brushing)**: 53 (27.5) vs. 561 (29.6), OR 0.4, p = 0.816

| Measure | HWE 928  | 163 (8.6) |
|---------|----------|----------|
| No      | 41 (21.2) | 497 (21.5) |
| Yes     | 41 (21.2) | 435 (22.9) |

Do you clean your face after using facial masks?

| Measure | HWE 928  | 163 (8.6) |
|---------|----------|----------|
| No      | 56 (29)  | 580 (32.4) |
| Yes     | 26 (13.5) | 262 (13.8) |

Do you apply any cosmetic products such as (foundations, concealers, face powders, etc) underneath the face mask?

| Measure | HWE 928  | 163 (8.6) |
|---------|----------|----------|
| No      | 56 (29)  | 580 (32.4) |
| Yes     | 26 (13.5) | 262 (13.8) |

**TABLE 6: Difference between healthcare workers and non-healthcare workers according to pattern of mask-induced dermatoses and associated factors (No.:928)**

**Discussion**

One of the most effective protections against COVID-19 is wearing a mask. Therefore, wearing a face mask...
in public areas is required in many countries including Saudi Arabia [10]. Previous studies have revealed that
wearing a face mask for a prolonged period of time promotes friction, occlusion, and hyperhidrosis, and this
compromises the skin and epidermal integrity and appears as facial dermatosis [11]. The most frequent
adverse effects of face masks include itching, stinging, and dryness. Additionally, contact dermatitis and
acne are the two most common skin diseases [12]. In this study, we aimed to assess face mask-induced facial
dermatoses in terms of clinical presentation and factors associated with mask use among the Saudi
population during the COVID-19 pandemic.

One of the research aspects was to assess mask-wearing habits among participants. Among 2326
participants, 37.8% wore their masks daily, and 25.4% used their masks five to six days a week. Moreover,
most participants (58.2%) used their face masks for more than two hours per day, 29.8% of them used masks
between five and seven hours per day. These findings suggest that most of the participants used masks for
most of the week for long hours and this would increase the risk of mask-induced dermatosis and its
complications [13]. Furthermore, concerning results demonstrates that 51% of the participants re-used their
masks regularly and 23.8% reported that they ‘sometimes’ re-used a disposable mask, only 29.1% of the
respondents answered that they ‘never’ re-used a disposable face mask. Centers for Disease Control and
Prevention (CDC) guidelines do not recommend reusing disposable face masks [14]. Re-used disposable face
masks can contain dead skin cells, debris, microbes, and sweat or might be improperly stored which can be a
source of contamination and infection [15,16]. When comparing mask use patterns between HCWs and non-
HCWs, results showed that over half of HCWs (51.8%) used the face mask daily and they are less likely to
wear the face mask for a lesser frequency per week. Only 7.8% of them used their masks one to two times per
week when comparing them to non-HCWs (20.6%). This is probably due to the nature of their work, and a
higher level of knowledge of the face mask’s role in infection prevention [17]. Moreover, the face mask-
wear duration was longer in HCWs in comparison to non-HCWs. Among HCWs, 50.8% wore a mask for
over eight hours per day. This could be due to longer working hours among HCWs.

In this study, 44.4% of the study participants had mask-induced dermatosis and that is similar to a previous
study done by Bukhari et al. in Saudi Arabia in which they found that 48.6% had dermatological
manifestations associated with face mask use [10]. Furthermore, when observing the overall prevalence of
face mask-induced dermatosis, it was noted that 42.6% of participants had masks followed by nonspecific
erythema (18.7%). Maskne probably was the commonest presentation since acne on its own is one of the
most common dermatological diseases worldwide [11]. Nonspecific erythema might be associated with mask
friction on the face and inflammatory processes [18]. Maskne was also the highest presentation associated
with mask-induced dermatosis in previous research such as the one done by Althobaiti et al. [19] but differs
from a study done by Choi et al. in South Korea in which their most common presentation was found to be
contact dermatitis [12]. In our study, maskne was the commonest presentation among both HCWs and non-
HCWs (46.6% and 42.2%, respectively). Contact dermatitis (12.4%) and nonspecific erythema (26.4%) were
more prevalent among HCWs than non-HCWs.

Most affected face parts and dermatosis distribution were assessed among participants. Results showed that
almost half of the participants (46.8%) reported that the cheeks were the most affected face part, and the
least is the nose (11.2%). This finding is similar to many previous studies like the ones done by Althobaiti et
al. and Bakhsh et al. [19,20]. Furthermore, symptoms associated with mask-induced dermatosis were
evaluated in this research. The three most reported symptoms were redness (51%), itchiness (49.5%), and
acne (43.7%). The least reported symptoms were tightness or stinging. These outcomes are congruent with
the most reported presentations among the studied participants which were reported to be acne and
nonspecific erythema. These findings are slightly different from previous research done by Bukhari et al. and
Althobaiti et al. [10,19]. Almost half of the participants did follow the preventative measure to prevent
mask-induced dermatosis with oral hygiene (66.1%) being the most applied preventative measure and
silicon-based barrier tape being the least followed preventative measure. This might be due to the lesser
popularity of silicon-based barrier tape among the general population. Moreover, 45.4% reported that
surgical/procedural masks induced allergies. This could be because surgical/procedural masks were the most
commonly used masks among our population (86.8%).

Among the studied participants, 36.3% had a combination skin type and 32.5% had oily skin. It is suggested
that participants’ skin type had a role in developing acne as acne was the most common dermatosis among
the current study participants [21]. This is partially similar to the research done by Althobaiti et al. as the
commonest skin types among their participants were combination and normal skin [19]. The possible
limitation of this study is that the majority of the participants were females and only 9.2% of the
participants were HCWs.

Conclusions

In conclusion, our paper studied mask-induced dermatosis from different aspects including associated
demographic features, face mask-use pattern, prevalence, presentation, disease characteristics, and
associated factors. There was a strong link between the frequency of mask use and facial dermatosis with
redness, itching, and acne being the most prevalent symptoms. Moreover, across all mask varieties, the
surgical mask was the main cause of allergy. Additionally, contact dermatitis and non-specific erythema
were more common in HCWs. Therefore, future studies on prevention/treatment, the establishment of
Additional Information

Disclosures

Human subjects: Consent was obtained or waived by all participants in this study. Institutional Review Board at Princess Nourah Bint Abdul Rahman University issued approval HAP-01-R-059. Animal subjects: All authors have confirmed that this study did not involve animal subjects or tissue. Conflicts of interest: In compliance with the ICMJE uniform disclosure form, all authors declare the following: Payment/services info: All authors have declared that no financial support was received from any organization for the submitted work. Financial relationships: All authors have declared that they have no financial relationships at present or within the previous three years with any organizations that might have an interest in the submitted work. Other relationships: All authors have declared that there are no other relationships or activities that could appear to have influenced the submitted work.

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