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# Evaluation of the risk factors for "Maskne:" Mask-use habits and facial care habits

## *"Maskne" için risk faktörlerinin incelenmesi: Maske kullanım alışkanlıkları ve yüz bakımı alışkanlıkları*

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### Abstract

**Background and Design:** "Maskne" has become a problem since the beginning of the coronavirus disease-2019 pandemic and it is a common diagnosis in the everyday practice of dermatologists. This study aims to determine the risk factors of "maskne", which is a type of mechanical acne; and to determine its impact on the quality of life.
**Materials and Methods:** A total of 105 patients with acne complaints were included in this prospective study. The daily mask use habits and facial routines of the patients, along with their age, gender, skin type, disease severity (calculated by Global Acne Evaluation Scale), and the impact on quality of life (evaluated by the Acne-Specific Quality of Life questionnaire) were noted.
**Results:** "Maskne" severity was independent of the patient's age, disease duration, duration of mask use, the daily number of masks used, mask type, using two masks at once; and the mask-ventilation or facial cleansing habits. "Maskne" risk increased with make-up frequency, whereas it decreased with the application of facial moisturizers. Quality of life decreases significantly due to "maskne" in female patients.
**Conclusion:** Patients may be advised to regularly apply moisturizer to their faces and avoid the use of make-up to prevent "maskne." In the presence of "maskne,'' female patients may be willing to seek treatment more because their quality of life deteriorates more than that of the males.
**Keywords:** Acne vulgaris, COVID-19, make-up, mask

### Öz

**Amaç:** "Maskne" pandemi süreci ile sık rastlanan bir dermatolojik şikayet olmuştur. Bu çalışmadaki amacımız "maskne" için risk faktörlerini saptamak ve "maskne"nin yaşam kalitesi üzerindeki etkisini saptamaktır.
**Gereç ve Yöntem:** "Maskne" tanısı mevcut olan toplam 105 hasta bu çalışmaya dahil edildi. Her hastanın günlük maske alışkanlıkları ve yüz bakım rutinleri ile beraber yaş, cinsiyet, deri tipi, hastalık şiddeti (Küresel Akne Değerlendirme Ölçeği'ne göre) ve yaşam kalitesi üzerindeki etkisi (Akneye Özel Yaşam Kalitesi ile ölçülerek) not edildi.
**Bulgular:** "Maskne" şiddeti hastanın yaşı, hastalık süresi maske kullanım süresi, günlük maske sayısı, maske tipi, çift katlı maske kullanımı, maske havalandırma sıklığı ve deri temizliğinden bağımsız bulunmuştur. Düzenli makyaj yapmak "maskne" riskini artırmaktadır. Düzenli nemlendirici kullanımı ise "maskne" şiddetini azaltır. "Maskne" kadın hastalarda yaşam kalitesini önemli derecede azaltır.
**Sonuç:** Hastalarımızı makyaj kullanımını azaltmak ve yüz bölgesine nemlendirici kullanımını arttırmak şeklinde yönlendirerek "maskne" şiddetini azaltabiliriz. "Maskne" kadın hastaların yaşam kalitesini daha fazla etkilemekte olduğu için kadın hastalar erkek hastalara nazaran tıbbi yardıma daha sık başvurmaktadırlar.
**Anahtar Kelimeler:** Akne vulgaris, COVID-19, makyaj, maske

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## Introduction

"Maskne" is a diagnosis that has become commonly seen in our everyday clinical practice since the beginning of the coronavirus disease-2019 (COVID-19) pandemic. It is the term used to describe the mechanical acne formation on the chin and its periphery, provoked by the use of facial masks[1-5]. The diagnosis of "maskne" is made if the eruption has started within 6 weeks since the beginning of the regular use of facial masks; lesions are exacerbated in the O-zone around the chin which is covered by the facial masks; and the differential diagnoses of seborrheic dermatitis, acne rosacea, perioral dermatitis, and pityrosporium folliculitis have been excluded[2]. Similar to the pathogenesis of acne vulgaris, cutibacterium acnes plays the leading role in the pathogenesis of "maskne." Furthermore, the use of masks increases the facial skin temperature, increases the sweat retention, and decreases the air-recirculation within the boundaries of the mask, along with the mechanical friction produced by the mask, which all propagate the formation of acneiform eruption[3].

The aim of this study is to determine the relationship between the "maskne" severity with patient characteristics, the patient's habits of mask use, and the patient's facial care habits. Knowing these relationships can help physicians in guiding their patients towards daily practices that will help decrease the risk of "maskne."

## Materials and Methods

This is a prospective study that included patients who presented to the dermatology outpatient clinic for acne compliants in the course of the COVID-19 pandemic. Those under the age of 18 and patients who did not agree to participate in the study were excluded from this study. In addition, for the consistency of the relationship between acne and mask use, patients who stated that there was no increase in acne complaints during the COVID-19 pandemic period and female patients who have previously been diagnosed with polycystic ovary syndrome were excluded from this study.

The name, age, gender, Fitzpatrick skin phototype, comorbid diseases (if any), regular drug use (if any), smoking status, disease duration, exacerbation status with the pandemic, previous dermatology consultations (if any), previous treatment modalities (if any), diagnose of polycystic ovarian syndrome (if any), location of acne lesions and severity of acne lesions were noted for each patient. The Global Acne Evaluation Scale (GAES) developed by Dréno et al.[6] was used to determine the acne severity. Each patient was asked to answer the "Acne-Specific Quality of Life (ASQL)" questionnaire as well. The mask use habits of each patient including the number of days per week, and hours per day of mask use; the mask type (surgical mask or N-95 mask or washable cloth mask); the mask-change frequency per day; number of masks used at once (one or two); and the frequency of mask-free (mask-aeration) periods were noted. The facial care habits of each patient including make-up use, facial cleansing routine, and facial moisturization routine were noted.

**Ethical Approval**

Informed consent of each patient was taken before participating in the study. The approval of İstanbul University-Cerrahpaşa, Cerrahpaşa Faculty of Medicine Ethics Committee was taken before initiating the study (approval number: E-83045809-604.01.01-384667, date: 18.05.2022).

**Statistical analysis**

IBM SPSS Statistics for Windows, Version 25.0. Armonk, NY: IBM Corp. was used for statistical analysis. For descriptive statistics, numbers and percentages are given for categorical variables. Mean, median, standard deviation, and minimum and maximum values are given for numerical variables. Proportions in independent groups were analyzed using the chi-square test. Comparisons of numerical variables in two independent groups were made using the Mann-Whitney U test, since the condition of normal distribution was not met. The statistical significance level of alpha was accepted as $p<0.05$.

## Results

One hundred and five patients completed the study, but the patients who did not notice an increase during the pandemic (12 patients) and who had been diagnosed with PCOS previously (8 patients) were excluded from the study. The median age of the patients was 25; 15.3% of the patients were male and 84.7% were female. The median attack duration of the patients was 6 months. Seventy percent of these patients have previously sought medical help; 44.7% received systemic treatment and 64.7% received topical treatment previously. The majority of the patients (75.3%) had Fitzpatrick skin type 3. Of these patients, 16.5% were smokers. The patient characteristics are summarized in Table 1.

The patients were grouped into two: those with mild acne (grade 1-2) compromising 52.9% of the patients, and those with severe acne (grade 3-4) compromising 47.1 % of the patients. The forehead was involved in 34.1%, the nose in 16.5%, the left cheek in 88.2%, the right cheek in 84.7%, the chin in 90.6%, the mandible in 74.1% and the jowl in 11.8% of the patients. The chin was the most commonly affected area in patients.

No statistically important relationship was found between the patients' age and the severity of lesions. ($p=0.190$) Again, there was no statistically important relationship between the disease duration and the severity of the lesions ($p=0.642$).

The median values of patients' mask use durations were 5 days a week and 6 hours a day. The disease severity (GEAS score) was independent of the total duration of mask use (for each patient, the number of days per week they used the mask was multiplied by the number of hours they used it per day) and the daily number of masks used ($p=0.701$ and 0.375 respectively).

The median value of the number of masks used in a day was 2 and 91.8% were using surgical masks, 2.4% were using N95 masks and 5.9% were using washable cloth masks. No relationship was found between the mask types and the severity of lesions ($p=0.458$). Forty-seven percent of patients were using at once two masks whereas 52.4% were using one. No relationship was found between using two masks at once and the severity of lesions ($p=0.740$). Seventy-eight percent were performing mask breaks to ventilate whereas 22% were using the mask continuously. No relationship was found between the mask breaks and the severity of lesions ($p=0.800$).

While 58.8% of the patients wore make-up once a week or less, the rate of those who wore make-up twice a week or more was 41.2%. Severe acne was more statistically significantly common in those who used make-up twice a week or more (p=0.037). Eighty-nine percent of the patients were washing their face with a cleansing gel twice a week or more; whereas 10.6% were washing their face with a cleansing gel once a week or less. No relationship was found between the face washing and the severity of lesions (p=0.186). Seventy-three percent of the patients were applying a moisturizing cream twice a week or more; while 27.1% of the patients were applying once a week or less.

**Table 1. Patient characteristics**

| | | Median ± SD | Min.-Max. |
|---|---|---|---|
| Age (years) | | 25±5 | 15-40 |
| Disease duration (months) | | 6±13 | 1-84 |
| | | **(n=85)** | **(%)** |
| Gender | Female | 72 | 84.7 |
| | Male | 13 | 15.3 |
| Smoking | Yes | 14 | 16.5 |
| | No | 71 | 83.5 |
| Fitzpatrick skin type | 2 | 9 | 10.6 |
| | 3 | 64 | 75.3 |
| | 4 | 12 | 14.1 |
| Previous medical visits | Yes | 60 | 70.6 |
| | No | 25 | 29.4 |
| Previous systemic treatment | None | 47 | 55.3 |
| | Doxycycline | 16 | 18.8 |
| | Erythromycin | 7 | 8.2 |
| | Isotretinoin | 15 | 17.6 |
| Previous topical treatment | Topical AB | 7 | 8.2 |
| | Topical AB + BPO | 32 | 37.6 |
| | Topical retinoic acid | 8 | 9.4 |
| | Topical azelaic acid | 2 | 2.4 |
| | Other, cosmetics | 4 | 4.7 |
| | None | 30 | 35.3 |

SD: Standard deviation, Min.: Minimum, Max.: Maximum

**Table 2. The daily routine and the features of the mask use of the patients**

| | | Median ± SD | Min.-Max. |
|---|---|---|---|
| Mask use (days/week) | | 5±2 | 1-7 |
| Mask use (hours/day) | | 6±3.6 | 1-16 |
| Number of Masks used each day | | 2±1.1 | 1-6 |
| | | **(n=85)** | **(%)** |
| Type of mask | Surgical | 78 | 91.8 |
| | N95 | 2 | 2.4 |
| | Washable cloth | 5 | 5.9 |
| Break periods of mask use | Yes | 67 | 78.8 |
| | No | 18 | 21.2 |
| Two masks at once | Yes | 42 | 49.4 |
| | No | 43 | 50.6 |
| Make-up | Once a week or less | 50 | 58.8 |
| | Twice a week or more | 35 | 41.2 |
| Face wash with cleansing gel | Once a week or less | 9 | 10.6 |
| | Twice a week or more | 76 | 89.4 |
| Moisturizing cream | Once a week or less | 23 | 27.1 |
| | Twice a week or more | 62 | 72.9 |

SD: Standard deviation, Min.: Minimum, Max.: Maximum

There was a statistically significant relationship between more frequent moisturizer use and mild acne (p=0.011). The daily routine and the features of the mask use of the patients are summarized in Table 2.

The impact of the disease on the quality of life of the patients was measured with the ASQL questionnaire. The mean total ASQL result was 17.87±0.91 (95% confidence interval: 16.05-19.59); the minimum value was 0 and the maximum value was 42.

The mean total ASQL score in female patients was 18.85; the mean total ASQL score in males was 12.46. The difference was statistically significant (p=0.011); female patients' quality of life is affected more due to "maskne" lesions. The ASQL questionnaire questions and number of patients who have replied as never, rarely, sometimes, often, and always are given in Table 3.

## Discussion

The COVID-19 pandemic has led to an increase in the diseases associated with personal protective equipment, one of which is "maskne"[2]. The aim of this study, is to determine the risk factors of "maskne" by examining the daily mask habits of patients with "maskne" of varying severity. Our results revealed that the disease severity of "maskne" was independent of patient age, disease duration, duration of mask use, the daily number of masks used, mask type, double-row mask-wearing habit, and mask-ventilation habits or facial cleansing habits. On the contrary, the habit of putting make-up on while using a facial mask was found to statistically significantly increase "maskne" severity. Moreover, acne severity decreased as the frequency of facial moisturizer use increased. Overall, female patients had a greater decrease in the quality of life compared to male patients.

A study on "maskne" by Tunçer Vural[7] has found that female gender, prolonged mask use, and fewer mask changes increased the risk of "maskne", while daily face washing habits decreased "maskne". Furthermore, the study reports that "maskne" is independent of the type of mask used and facial moisturizing habits. No relationship was found between the use of make-up and "maskne" severity[7]. In alignment with Tunçer Vural[7], we also report that female patients suffer more due to "maskne". However, unlike Tunçer Vural[7], we found no relationship between "maskne" severity and prolonged mask use and the number of masks used per day. Neither did we find a relationship between "maskne" severity and face-washing habits. On the contrary, we report an increased severity of "maskne" due to the put on make-up; and that the application of a facial moisturizing cream at least twice weekly decreases the severity of maskne.

Another study on the risk factors of "maskne" was performed by Dani et al.[8] Similar to what we have found, they also report that the female gender was a risk factor for severe "maskne". Furthermore, they report that a shorter duration of mask use decreased the risk of "maskne", to which we contradict since we did not find any relationship between the duration of mask use and the disease severity. Again, similar to us, they report that "maskne" risk is independent of the type of mask used, patients' age, and disease duration. They did not evaluate the facial cleansing, moisturizing, and make-up habits[8].

Bakhsh et al.'s[9] study on "maskne" also reports an increased risk of "maskne" with a longer daily duration of mask use and increased days per week of mask use. In contrast to Bakhsh et al.[9], we did not find an increased risk of "maskne" either due to prolonged daily use of masks or due to increased days of mask use. They also report that reusing the same mask increases the risk of "maskne", to which we also contradict since we found no relationship between the daily number of masks used and "maskne" severity. Similar to us, they also report a positive correlation between make-up and severity of "maskne". Bakhsh et al.[9] report that "maskne" risk increases with the application of facial moisturizers, however, we report a significant association between the more frequent application of facial moisturizers and milder "maskne".

A study from Poland supports our finding of increased risk of "maskne" with make-up and increased risk of "maskne" in female patients. Malczynska et al.[4] did report that the risk of "maskne" increases with increased duration of mask use. However, with this study, we report that "maskne" risk is independent of the duration of mask use.

Kiely et al.[10] report an increased risk of "maskne" in female patients, younger patients, and patients who apply moisturizers. Like Kiely et al.[10], we also found that female patients were more profoundly affected by "maskne". However, we report that the regular use of facial moisturizers decreases the severity of "maskne". Furthermore, we did not find a relationship between the age of the patient and "maskne". Similar to us, Kiely et al.[10] also report that the "maskne" risk was independent of the duration of mask use. They did not evaluate the impact of make-up habits on "maskne"[10].

Bansal et al.[11] report that the regular washing of the face and application of facial moisturizers is a protective factor against "maskne". Likewise, with this study, a significant association was found between the decreased severity of "maskne" and the regular application of facial moisturizers. However, we failed to find a relationship between "maskne" severity and face-washing habits[11]. Another aim of this study was to draw attention to the impact of "maskne" on the patients' quality of life in an era in which we face forced social isolation due to the pandemic[12]. Previously, Damiani et al.[13] reported a significant decrease in patients' quality of life due to acne and rosacea flares after mask use. Table 3 shows the questions of ASQL questionnaire and our patients' answers. Most of the patients felt anxious, ugly, stressed, hopeless, and tired due to their acne lesions; feared being found unattractive by the opposite sex; hesitated to make new friends; and forcefully isolated themselves due to their lesions. In an era of forced social isolation due to the pandemic, the impact of "maskne" lesions on the patients' quality of life is dramatic. The decrease in ASQL was significant in female patients.

### Study Limitations

Although it was planned prospectively, patients were not photographed as it was conducted as a survey study.

## Conclusion

As a concluding remark, important findings of this study were that "maskne" risk is increased in patients putting on make-up more frequently and "maskne" risk is decreased in patients applying face moisturizers more often. In the previous literature, a positive relationship between "maskne" and frequent make-up put on, has also been reported[4,9]. A correlation between face moisturizers and

**Table 3. Acne-Specific Quality of Life questionnaire answers**

| Questions | Answers | Number of patients (%), (n=85) |
|---|---|---|
| 1. Do you feel anxious, stressed, and angry due to your acne lesions? | Never | 2 (2.4) |
| | Rarely | 4 (4.7) |
| | Sometimes | 20 (23.5) |
| | Often | 28 (32.9) |
| | Always | 31 (36.5) |
| 2. Do you feel ugly or hesitate to look in the mirror due to your acne lesions? | Never | 11 (12.9) |
| | Rarely | 12 (14.1) |
| | Sometimes | 26 (30.6) |
| | Often | 23 (27.1) |
| | Always | 13 (15.3) |
| 3. Do your acne lesions impact your family/work/school life negatively? | Never | 45 (52.9) |
| | Rarely | 10 (11.8) |
| | Sometimes | 21 (24.7) |
| | Often | 7 (8.2) |
| | Always | 2 (2.4) |
| 4. Do you feel discomfort when others ask you about your acne lesions? | Never | 20 (23.5) |
| | Rarely | 21 (24.7) |
| | Sometimes | 12 (14.1) |
| | Often | 19 (22.4) |
| | Always | 13 (15.3) |
| 5. Do you hesitate to make new friends or socially isolate yourself due to your acne lesions? | Never | 53 (62.4) |
| | Rarely | 16 (18.8) |
| | Sometimes | 10 (11.8) |
| | Often | 4 (4.7) |
| | Always | 2 (2.4) |
| 6. Do acne, scars, pigmentation, itchiness or burning sensation limit your daily life? | Never | 26 (30.6) |
| | Rarely | 18 (21.2) |
| | Sometimes | 27 (31.8) |
| | Often | 10 (11.8) |
| | Always | 4 (4.7) |
| 7. Do you feel like others hesitate to hug or kiss you because of your acne lesions? | Never | 61 (71.8) |
| | Rarely | 12 (14.1) |
| | Sometimes | 6 (7.1) |
| | Often | 5 (5.9) |
| | Always | 1 (1.2) |
| 8. Do you feel like the opposite sex finds you unattractive due to your acne lesions? | Never | 36 (42.4) |
| | Rarely | 16 (18.8) |
| | Sometimes | 16 (18.8) |
| | Often | 12 (14.1) |
| | Always | 5 (5.9) |
| 9. Do you feel hopeless that your lesions will never heal? | Never | 12 (14.1) |
| | Rarely | 10 (11.8) |
| | Sometimes | 28 (32.9) |
| | Often | 23 (27.1) |
| | Always | 12 (14.1) |
| 10. Do you feel depressed spending time and energy on your acne treatment? | Never | 15 (17.6) |
| | Rarely | 15 (17.6) |
| | Sometimes | 16 (18.8) |
| | Often | 21 (24.7) |
| | Always | 18 (21.2) |
| 11. Do your acne lesions prevent you from cleaning your face or putting make-up on your face? | Never | 17 (20) |
| | Rarely | 14 (16.5) |
| | Sometimes | 21 (24.7) |
| | Often | 24 (28.2) |
| | Always | 9 (10.6) |

"maskne" is conflicting because both negative and positive results have been reported in the literature[7,9-11]. The results of this study indicate that facial moisturizers protect patients from "maskne", which is a type of mechanical acne. Furthermore, the ASQL decrease is significant in female "maskne" patients. Physicians should be well aware of the psychological impact of this dermatosis on their patients as well.

### Ethics

**Ethics Committee Approval:** The approval of İstanbul University-Cerrahpaşa, Cerrahpaşa Faculty of Medicine Ethics Committee was taken before initiating the study (approval number: E-83045809-604.01.01-384667, date: 18.05.2022).

**Informed Consent:** Informed consent of each patient was taken before participating in the study.

**Peer-review:** Externally peer-reviewed.

### Authorship Contributions

Surgical and Medical Practices: Z.A.F., Concept: Z.A.F., Design: Z.A.F., Data Collection or Processing: Z.A.F., D.Ö., Analysis or Interpretation: Z.A.F., D.Ö., Literature Search: D.Ö., Writing: D.Ö.

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