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Frequency and Associated Factors of Mask-Induced Acne among Healthcare Workers

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Abstract

Background: Mask-induced acne, also known as maskne, is a skin condition that has become increasingly prevalent during the COVID-19 pandemic. The prolonged use of facial masks has been found to cause skin irritation, inflammation, and the development of acne. Healthcare workers are at an increased risk due to their prolonged and consistent use of facial masks during their work.

Objective: To investigate the occurrence and identify risk factors of mask induced acne among health care workers.

Patients and Methods: This cross-sectional study included 115 healthcare workers at Al_Imamain Al_Kadhumain Medical city who wore the mask daily. Collected data include demographic characteristics (age, sex, and occupation), mask-wearing data include the type of mask worn, the pattern of mask use (disposable or reusable mask), time spent wearing masks over the years, the daily duration of mask usage, and specifics regarding participants' acne, encompassing the type and facial location of the acne, as well as accompanying symptoms (itching, dryness, oiliness, moisture, warmth, and excessive facial sweating), and factors that exacerbate the condition, were all considered in the study.

Results: Out of 115 included subjects 37 (32.17%) were suffering from new-onset mask induce acne. There were 10 men and 27 women. The mean age was 35.5±7.3 years (range: 24-47). The vast majority of the included participants (81.08%) were wearing surgical masks. The duration of mask use in about three-fourths of patients was ≥ one year. About three-fourth of patients were using reusable mask. Pustules were the most common lesion, accounting for two-thirds of the participants, followed by comedones (37.83%). The most common site was cheeks (75.67%), followed by the chin (48.65%). Stress was the most common aggravating factor occurred in 37.84% of the participants, followed by high-glycemic diet and hot weather (27.03% each).

Conclusion: Female, prolonged duration of mask use and wearing reusable masks could be associated with the development of maskne. Stress and a glycemic diet could aggravate the lesion associated with maskne.

Keywords: Maskne, acne lesion, aggravating factors.

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Introduction

Acne is considered to be the third-commonest skin pathology. It is defined by pilosebaceous unit impediment and/or inflammation. Clinically, it represents as

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whiteheads, blackheads, or pimples [1]. Acne pathogenesis involves the interaction of four main pathogenic factors: sebaceous gland hyper-secretion, aberrant follicular keratinization (resulting in pilo-sebaceous duct block), increased follicular establishment of the commensal, anaerobic bacteria Cutibacterium acnes (C. acnes), and host inflammatory response [2,3].

During the COVID-19 pandemic and thereafter, wearing a face mask became a traditional behavior, whether among health workers or public. Although, the COVID-19 pandemic subsided, the recurrent emergence of new variants of the virus induces ongoing precautions, among them wearing a face mask. This is especially evident among health workers, because they expose more people than other populations to the imminent risk. Although such a measure is crucial, it not come without disadvantages.

Masks induce mechanical stress on the skin, manifesting as pressure, friction, and rubbing. This stress triggers keratinocyte proliferation, resulting in subsequent hyperkeratosis characterized by alterations in the stratum corneum, reduced water content, irritation, and a compromised skin barrier [4]. Moreover, the pressure from masks may prompt the occlusion of pilo-sebaceous ducts [5]. Additionally, both pressure and friction have the potential to mechanically rupture comedones, leading to subsequent inflammation [6].

The reported prevalence of acne stemming from prolonged mask usage ranges widely, from 1.3% to 53.1%. This broad spectrum in mask-induced acne prevalence may be attributed to various factors, including the participants' professions, sample sizes, genetic predispositions, environmental influences, duration of mask-wearing, types of masks used, and prior facial skin conditions [7].

In Iraq, there is no previous study that addresses the effect of wearing a mask on acne. Thus, the study aimed to investigate the incidence, demographic, and clinical profile of acne following mask wearing among health workers at Al-Imamain Al-Kadhumain Medical city/ Baghdad.

Patients and Methods

The Study Population

This is a cross-sectional descriptive study that included a total of 115 healthcare workers at Al-Imamain Al-Kadhumain Medical city whose work usually requires using a mask. The study was performed during the period from November 2022 to April 2023. Subjects with any previous history of acne before using the mask and those with known allergies were excluded from the study. The diagnosis of acne was based on clinical examinations conducted by a specialist dermatologist. The approval of the study was obtained from Institutional Review Board, College of Medicine, Al-Nahrain University.

Prior to data collection, explicit written consent was secured from each participant, accompanied by a thorough explanation of the study's objectives. Participants were granted unrestricted autonomy to withdraw from the study at any point. The confidentiality of all data throughout the study was assured, and participants were given the guarantee that the collected data would be solely utilized for research purposes.

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Data Collection

The aata were collected through a self-structured questionnaire. These data involving demographic characteristic (age, sex and occupation), details regarding mask wearing which involve the type of mask worn, pattern of mask use (disposable or reusable), the duration of mask wearing through the years, the duration of mask wearing per day, and details of participants' acne, including the type and site of acne on the face, escorted symptoms (itching, dry skin, greasy skin, moisture, heat, and excess facial sweating), and aggravating factors.

Statistical Analysis

A descriptive statistic was used to analyze the data. Numerical data were expressed as the mean and standard deviation. Categorical variables were expressed as numbers and percentages. All statistical analyses were performed with performed with SPSS software.

Results

The prevalence of acne

Out of 115 healthcare workers with daily use of the mask rolled in the study, 37(32.17%) were suffering from new-onset mask induce acne Figure (1). Of those 10 men (27.0%) and 27 women (73%). The male-to-female ratio was 1:2.7. The mean age of the participants was 35.5±7.3 years (range: 24-47). Twenty-one cases (56.76%) were doctors, 8(21.62%), were pharmacist, 5 (13.51%) nurses, and only three (8.11%) were analysts Table (1).

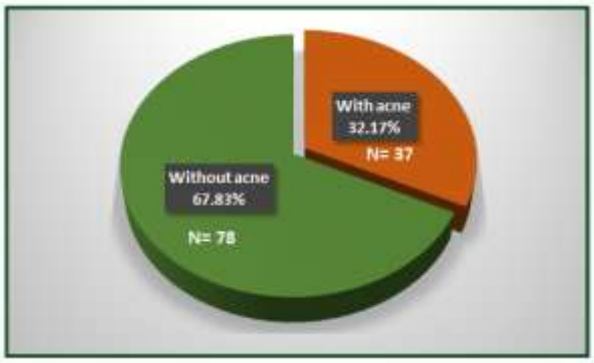

Figure (1): The prevalence of maskne among health workers with maskne.

Table (1): Demographic characteristics of the health workers with maskne (n=37).

Variables	Value
Age, years	
Mean±SD	35.5±7.3
Range	24-47
Sex	
Male	10(27%)
Female	27(73%)
Occupations	
Doctors	21(56.76%)
Pharmacists	8(21.62%)
Nurses	5(13.51%)
Analysts	3(8.11%)

* SD: standard deviation

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The Impact of mask type and duration

The vast majority of the included participants (81.08%) were wearing surgical masks. The duration of mask use in about three-fourths of patients was ≥ one year. The duration of wearing per day was less than 6 hrs in 37.84% and as needed in 43.24%. About three-fourths of patients were using reusable masks. However, one-fourth were using reusable masks Table (2).

Table (2): The impact of mask type and duration in health workers with maskne (n=37).

Variables	No.(%)
Mask type	
KN95	7(18.92%)
Surgical mask	30(81.08%)
Duration of mask using	
Less than one years	10(27%)
≥One years	27(73%)
Duration of wearing/day	
As needed	16(43.24%)
Less than 6 hrs	14(37.84%)
≥ 6 hrs	7(18.92%)
Pattern of mask use	
On time (disposable)	9(24.32%)
Reusable	28(75.68%)

Type of Lesion

Pustules were the most common lesion, accounting for two-thirds of the participants, followed by comedones (37.83%) and papules (32.44%). The least common lesion was nodulocytic lesion, accounting for 8.11% of the total lesion Figure (2). Of note, there were 17 participants with a mixed lesion.

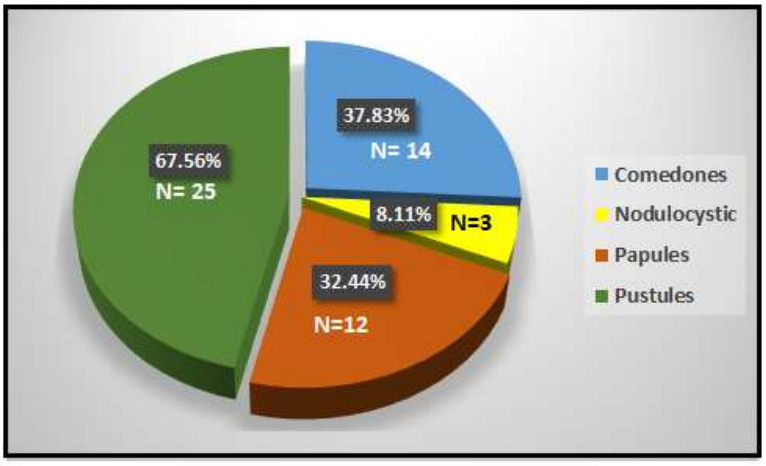

Figure (2): Types of acne lesions in health workers with maskne.

Area of distribution

Table (3) shows the area of distribution of the lesion, in which cheeks were the most common site (75%.67%) followed by the chin (48.65%), the mandibular region (16.22%), the forehead and bridge of the nose (13.51% each), and the least is the temple (2.7%).

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Table (3): Area of distribution of acne in in health workers with maskne (n=37).

Area of distribution	No(%)
Cheek	28(75.67%)
Chin	18(48.65%)
Mandibular region	6(16.22%)
Bridge of nose	5(13.51%)
Forehead	5(13.51%)
Temple	1(2.7%)

Aggravating Factors

Stress was the most common aggravating factor, occurred in 37.84% of the participants, followed by a high glycemic diet and hot weather (27.03% each), premenstrual flares and cosmetics product use (24.32% each), any medical problems (10.81%), obesity (5.41%), and finally smoking, hirsutism, and drug history (2.70% each), as shown in Table (4).

Table (4): Aggravating factors in in health workers with maskne 9n=37).

Aggravating factor	Frequency	percentage
Stress	14	37.84
High glycemic food or fast food	10	27.03
Premenstural flare	9	24.32
Smoking	1	2.70
Hot weathers	10	27.03
Cosmetic products	9	24.32
Medical conditions	4	10.81
Obesity	2	5.41
Hirsutism	1	2.70
Drug use	1	2.70

Discussion

The present study aimed to investigate the incidence, demographic, and clinical profile of acne following mask wearing among health workers.

According to the study's findings, the prevalence of maskne was 32.17%. Within the studies searching for maskne during the COVID-19 pandemic among healthcare personnel, Aravamuthan and Arumugam [8] reported the greatest rate of acne as 62.3%, whereas Shubhanshu and Singh [9] reported the lowest rate as 12%. According to other research [10-12], this percentage is 39.9%, 53.1%, and 56.0%, respectively. The new-onset acne percentages were calculated to be 31.2% and 17.8%, respectively. The survey method has been used in the majority of studies looking into the relationship between mask use and face dermatoses. Before enrolling in our study, all individuals were dermatologically evaluated.

In the current study, females were the dominant sex in 27 (72.9%) of the participants. The majority of cases (65%) were between the ages of 24 and 30. These findings were consistent with those of prior investigations. In research conducted in

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Indonesia, Christopher demonstrated that females outnumbered males by 134 (67%) to 114 (57%), with a predominant age group of less than 25 years. [13]. Hayat et al. [14] found a similar female majority of 102 (67.66%) with an average age of 30.5 years in another investigation in Lahore. This is best explained by the fact that women and adults in this age range are more concerned with their skin and are more likely to seek medical treatment for it.

In this study, surgical masks were the most commonly utilized form of mask, with reusable masks accounting for the vast majority of cases (30 (81%). This is understandable given the ease and low cost of surgical masks. On the other side, 7 (18.9%) people donned KN95 masks. Similar results were obtained by Techasatian et al. in a survey conducted in Thailand, where surgical masks accounted for 526 (63.15%) [12], however in studies conducted in Lahore [14] and New York [8] the KN95 and N95 were the most commonly used types of masks.

In the current study, 37.84% of participants used their masks for less than 6 hours per day, and 43.24% wore them as needed, with the vast majority of participants wearing reusable masks. Techasatian et al. discovered that using a face mask for >4 hours per day increased the likelihood of unwanted skin reactions over the face when compared with wearing a face mask for <4 hours per day in their study [12]. Ozkesici found that 122 (88.4%) of their subjects (health workers) wore masks for >6 hours in a Turkish study [15].

This high prevalence could be attributed to the fact that the study was accomplished during the COVID-19 outbreak, when masks were required. Han et al. reported 5 patients from the public who had their first acne infection as a result of using a mask for an extended period of time. Participants who applied the same mask repeatedly were more likely to acquire new acne or have their existing acne flare up [16]. Repeat use the same mask may cause residue buildup and raise the likelihood of sebaceous gland blockage, which leads to the etiology of mechanical acne [12].

In the current investigation, the predominant acne lesions were identified as pustules and comedones located on the cheeks and chin. This contrasts with another study where the predominant lesions were comedones and papules observed in mask-covered areas such as the chin, cheeks, and nose. Among our participants, 28 individuals (75%) experienced acne primarily on their cheeks, diverging from a study by Hayat [14], where the chin was the most affected area in 73 participants (75.6%).

The study revealed that stress, hot weather, and the consumption of high-glycemic foods were the most prevalent aggravating factors, aligning with findings in a study conducted in India by Aravamuthan and Arumugam [8], where stress was the predominant aggravating factor in 61 cases. Cordain et al. [17] proposed that high glycemic diets might significantly contribute to the elevated prevalence of acne in Western countries. The hypothesis that milk and dairy products contain hormones and bioactive molecules capable of exacerbating acne was also considered. Khunger and Kumar [18] noted that only 40 patients (22%) out of 176 using cosmetics experienced aggravation, while in our study, 24.32% reported worsened lesions

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after using cosmetics, with 27 individuals (24.5%) specifically attributing aggravation to skin-lightening agents.

Conclusions

Female gender, prolonged duration of mask use, and wearing reusable masks could be associated with the development of maskne. The most affected areas of maskne are cheeks and chin. Stress and a glycemic diet could aggravate the lesions associated with maskne.

Recommendations

An effective skincare routine involves employing a gentle facial cleanser, a lightweight moisturizer, and a non-comedogenic sunscreen to minimize irritation and friction, thus preventing acne. It is advisable to refrain from using makeup and other comedogenic products while wearing masks. Additionally, taking breaks from mask-wearing every four hours, when it is safe to do so, is recommended. For those using surgical masks, opting for a new one each day is advised to avoid prolonged reuse. In the case of fabric-reusable masks, regular washing is essential to eliminate any irritating or blocking residues.

Source of funding: The current study was funded by our charges with no any other funding sources elsewhere.

Ethical clearance: This study was conducted according to the approval of College of Medicine/ University of Diyala and in accordance with the ethical guidelines of the Declaration of ethical committee of the College (Document no. 2023KAA802).

Conflict of interest: Nil

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نسبة حدوث حب الشباب الناجم عن الكمامة بين العاملين في مجال الرعاية الصحية وعوامل الخطر المرتبطة به

خلود عباس علي[1]، زينب مجيد صكبان[2]

الملخص

خلفية الدراسة: حب الشباب الناجم عن الكمامة، والمعروف أيضًا باسم حب شباب الكمامة، هو حالة جلدية منتشرة بشكل متزايد خلال جائحة كوفيد-١٩. تبين أن الاستخدام المطول لكمامة الوجه يسبب تهيج الجلد والتهابه وتطور حب الشباب. يتعرض العاملون في مجال الرعاية الصحية لخطر متزايد بسبب استخدامهم المطول والمستمر لكمامات الوجه أثناء عملهم.

اهداف الدراسة: لتحديد نسبة حدوث حب الشباب الناجم عن الكمامة بين العاملين في مجال الرعاية الصحية وعوامل الخطر المرتبطة به.

المرضى والطرائق: شملت هذه الدراسة المقطعية ١١٥ من العاملين في مجال الرعاية الصحية في مدينة الإمامين الكاظمين الطبية الذين كانوا يرتدون الكمامة يوميا. جمعت البيانات الديموغرافية (العمر والجنس والمهنة)، وتفاصيل ارتداء الكمامة بما في ذلك نوع الكمامة التي يم ارتداؤها، ونمط استخدام الكمامة (كمامة يمكن التخلص منها أو يمكن إعادة استخدامها)، والوقت الذي يقضيه العاملون في ارتداء الكمامة على مر السنين، والمدة اليومية لاستخدام الكمامة، و تم أخذ التفاصيل المتعلقة بحب الشباب لدى المشاركين، بما في ذلك نوع حب الشباب وموقعه على الوجه، بالإضافة إلى الأعراض المصاحبة له (الحكة والجفاف والدهون والرطوبة والدفء والتعرق الزائد في الوجه)، والعوامل التي تؤدي إلى تفاقم الحالة.

النتائج: من أصل ١١٥ مشارك ، ٣٧ (٣٢,١٧٪) ظهرت لديهم اعراض حب شباب الكمامة. كان هناك ١٠ رجال و٢٧ امرأة. وبلغ متوسط العمر ٣٥,٥ ± ٧,٣ سنة (المدى = ٢٤-٤٧). ان الغالبية العظمى من المشاركين (٨١,٠٨٪) يستخدمون الكمامة الجراحية. كانت مدة استخدام الكمامة في حوالي ثلاثة أرباع المرضى ≤ سنة واحدة.، فيما كلن حوالي ثلاثة أرباع المرضى يستخدمون أقنعة قابلة لإعادة الاستخدام. البثرات هي الآفة الأكثر شيوعًا والتي ظهرت في ثلثي المشاركين، تليها الكوميدونات (٣٧,٨٣٪). وكان الموقع الأكثر شيوعاً هو الخدود (٧٥,٦٧٪) يليه الذقن (٤٨,٦٥٪). الإجهاد هو العامل الأكثر شيوعًا في التسبب في تفاقم الحالة والذي ظهر في ٣٧,٨٤٪ من المشاركين، يليه اتباع نظام غذائي عالي السكريات والطقس الحار (٢٧,٠٣٪ لكل منهما).

الاستنتاجات: يمكن أن ترتبط المدة الطويلة لاستخدام وارتداء الكمامة القابل لإعادة الاستخدام لدى الإناث بتطور حب شباب الكمامة. ويمكن أن يؤدي الاجهاد والنظام الغذائي عالي السكريات الى تفاقم الآفة المرتبطة بحب شباب الكمامة.

الكلمات المفتاحية: حب الشباب، آفة ارتداء الكمامة، عوامل الخطر

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