

Facial dermatoses due to increased use of masks in medical students during COVID-19 pandemic: A cross sectional study from JSMU

Faiza Zeeshan, Anusha Ahmed*, Haania Mansoor*, Zahra Mahmud*, Ushna Salahuddin*

Department of Pathology, Jinnah Sindh Medical University, Karachi, Pakistan.

* Sindh Medical College, Jinnah Sindh Medical University, Karachi, Pakistan.

Abstract

Objective To determine the frequency of skin manifestations associated with prolonged mask wearing during the course of ongoing COVID-19 pandemic.

Methods A cross-sectional study was conducted at Jinnah Sindh Medical University (JSMU), Karachi. A total of 138 medical students, who gave history of wearing masks were enrolled. The demographic data including age, gender, and their year of education was collected. A total of 20 questions were asked related to the type of mask, duration of wearing mask, associated and underlying skin disorders, etc. All information was carefully recorded on Google forms.

Results This study included 138 participants, 124 (89.9%) females and 14 (10.1%) males. The type of masks used by the medical students varied, however 84.8% used surgical masks. The average duration of mask wear was 4 hours for 72.4% of the participants. There was no significant relation between skin changes and the type and duration of mask wear. The common skin manifestations reported in this study were itching (24.6 %), redness (27.5%), rash (10.1%), burning sensation (12.3%), acne (24.6%), pimples (37.7%), pigmentation (8.7), cracked skin (1.4%), scaling of skin (2.9%), and 29.7% reported no changes. The most frequently affected locations were cheeks (41.3%), followed by chin (13.8%), nasal bridge (10.1%) and perioral area (8%). Participants with history of atopic dermatitis were affected slightly more by itching, redness, rash, burning sensation, acne than those without a history of atopic dermatitis however these manifestations had no significant relation ($p>0.05$). Pressure bruises were reported in 23.9% of the participants and there was no significant relation with the skin manifestations. About 33% of the females who use makeup under the mask found it inconvenient due to pimples and itching. ($p<0.05$). Relationship between different skin types and use of cleansers for maintaining skin hygiene generally ($p=0.006$) and after taking mask off is significant ($p=0.034$). Significant relation exists between people experiencing pimples after taking off masks and using oral/systemic drugs ($p=0.003$), and other products (ice cubes, day cream, steroids, skincare regime) for management ($p=0.012$). Significant relation exists between acne after taking off mask and use of topical drugs ($p=0.034$).

Conclusion The increase in skin manifestations is associated with the increased use of face masks during the COVID 19 pandemic among medical students. As mask wearing can't be compromised due to the nature of the working environment, certain guidelines need to be established to prevent or reduce the occurrence of such manifestations.

Key words

Atopic dermatitis, facial dermatoses, COVID 19, face mask, medical students.

Introduction

Coronaviruses are a group of viruses which cause respiratory illnesses. In 2019, a new

coronavirus (SARS-CoV-2) was recognized as the cause of an epidemic arising in Wuhan, China. It began spreading rapidly around the globe, outpacing the ability and resources of

international health care systems.¹

COVID-19 has been reported to spread through direct contact and airborne transmission which includes coughing, sneezing, droplet inhalation, contact with nasal, oral and ophthalmic mucous membranes.² It has been recommended by the governments to enforce mandatory use of face masks, which have become essential to prevent the spread of COVID-19.³

Healthcare workers (HCWs) are using masks for prolonged duration while caring for the COVID-19 patients.⁴ However, prolonged use of these masks leads to excessive sweat, oil and bacteria causing facial dermatoses and skin infections. These face masks prevent fresh air from entering resulting in exacerbation of the underlying problems.⁵ The selection and use of facemasks vary among frontline and second line HCWs including medical students, and non HCWs.⁶ The main varieties of masks used commonly by health care providers are the surgical masks, N95 and KN-95 respirators.⁵

Since the COVID-19 pandemic began, a number of facial dermatoses secondary to prolonged use of facial masks have been reported among healthcare workers.⁷ These lesions comprise of conditions of the skin like facial acne, irritant contact dermatitis, allergic dermatitis, lip lick dermatitis, and sweat dermatitis.

As wearing masks is most crucial measures in prevention of a potentially fatal illness, certain guidelines need to be established to reduce the occurrence of problematic skin manifestations among medical students and frontline healthcare

workers.⁸

Rationale

Limited data is available regarding the study on long term usage of face masks which has caused an increased number of skin manifestations in medical students, in Karachi. This study contributes to identify the prevalence of skin manifestations caused by different types of face masks and the effects that its long-term wear has on the face, to state awareness towards its prevention and management.

Methods

A cross-sectional study was conducted at Jinnah Sindh Medical University, Karachi. A total of 138 medical students who gave history of wearing masks were enrolled. A self-constructed questionnaire was made which included questions about the demographic data along with questions regarding the type, and duration of wearing masks along with associated symptoms.

All information was carefully recorded on Google forms.

The data was analyzed by using SPSS version 20. Mean, SD, median, and percentage values were calculated by using descriptive statistics. Chi-square (χ^2) test was used to analyze the association between variables.

Results

This study included 138 participants, 124 (89.9%) females and 14 (10.1%) males out of which, 117 participants were 3rd (4.3%), 4th (71.7%), 5th (8.7%) year students who due to clinical rotations have an average exposure of 4 hours. According to the results, 84.8% of the study population used surgical masks. There was no significant relation between skin changes,

Address for correspondence

Dr. Anusha Ahmed
House No 1084, Block 15 FB area,
Karachi, Pakistan.
Ph: 03332242102
Email: anushaahmed7@gmail.com

Table 1 Types of masks and duration of wear.

Types of masks	<i>n</i> (total 138)	%		
Surgical	117	84.8		
Cloth	7	5.1		
N-95	6	4.3		
KN-95	6	4.3		
Others	2	1.4		
			Average duration of mask wearing	
	<i>n</i> (total 138)	%	Total duration of wearing the same mask	
			<i>n</i> (total 138)	%
<2hours	14	10.1	5	3.6
2-4hours	54	39.1	51	37.0
4-6hours	46	33.3	39	28.3
>6hours	24	17.4	43	31.2

Table 2 Skin manifestations

History of atopic dermatitis	<i>n</i> (total 138)	%		
Yes	27	19.6		
No	111	80.4		
			Skin problems due to mask wear	
			Underlying skin problems	
Characteristics	<i>n</i> (total 138)	%	<i>n</i> (total 138)	%
Itching	20	14.5	34	24.6
Redness	22	15.9	38	27.5
Rash	145	10.1	14	10.1
burning sensation	-	-	17	12.3
cracked skin	9	6.5	2	1.4
scaling of skin	7	5.1	4	2.9
acne	53	38.4	34	24.6
pimples	68	49.3	52	37.7
pigmentation	44	31.9	12	8.7
no issues/changes	34	24.6	41	29.7
Location of skin problem				
nasal bridge	14	10.1		
cheeks	57	41.3		
perioral area	11	8.0		
chin	19	13.8		
medial concha of ear	3	2.2		
lips	0	0		
no affected area	34	24.6		
Pressure bruises				
yes	33	23.9		
no	105	76.1		
Sweat build up under mask				
no sweat build-up	4	2.9		
Mild	15	10.9		
Moderate	72	52.2		
Severe	47	34.1		

and the type and duration of mask wear. The statistics for type and duration of mask wear are enlisted in **Table 1**.

Out of 138 individuals, 19.6% had a history of atopic dermatitis. Participants with existing skin

problems and problems experienced due to mask wear along with the location have been enlisted in **Table 2**. Those with a history of atopic dermatitis were found to manage their skin in different ways enlisted in Table 3. Cheeks (41.3%). were the most frequently affected site.

Table 3 Management of underlying skin issues.

	n (total 138)	%
Petroleum jelly	7	5.1
Topical drugs (ointment)	34	24.6
Oral/systemic drugs	8	5.8
Home remedies	32	23.2
Others	11	8
Nothing	64	46.4

Most participants had oily skin type (39.9%) and it had a significant relation with history of atopic dermatitis (p=0.001). Other participants reported of having combination (26.8%) normal (15.2%) dry (12.3%) sensitive (5.8%) skin types.

The participants were also asked about how they generally maintain their facial skin hygiene before and after taking masks off, enlisted in **Table 4**. Relationship is significant between pimples as an underlying issue and use of facewash and cleansers for maintenance (p<0.05), between pigmentation as an underlying skin issue and maintenance of skin hygiene via products (p<0.05) and between people with scaling of skin as underlying issue and use of moisturizer for maintenance (p<0.05).

Relationship between different skin types and use of cleansers for maintaining skin hygiene (p=0.006) and after taking mask off is significant (p=0.034), between people experiencing pimples after taking off masks and using oral/systemic drugs (p=0.003) and other products (ice cubes, day cream, steroids, skincare regime) for management (p=0.012) and between acne after taking off mask and use of topical drugs(p=0.034).

Table 4 Maintenance of skin hygiene.

	General maintenance of skin hygiene		Skin hygiene after taking masks off	
	n (total 138)	%	n (total 138)	%
face wash	109	79	111	80.4
cleanser	53	38.4	35	25.4
moisturizer	65	47.1	36	26.1
sunscreen	68	49.3	12	8.7
soap	53	38.4	39	28.3
home remedies	39	28.3	18	13
others	5	3.6	5	3.6

Among 124 female participants, 33.3% who wear makeup under the mask said it was inconvenient. Relationship is significant between wearing make-up and pimples (p=0.044), and itching (p=0.017) after taking off masks.

Sweat buildup under masks was reported as mild (10.9%), moderate (52.2%) and severe (34.1%). Significant relation exists between wearing single or multiple masks and sweat build up (p=0.027). 53.6% (n=74) of the participants experience no systemic changes due to mask wear, however other participants reported of nausea (n=3, 2.2%), headache (n=20, 14.5%), sneezing (n=11, 8.0%) agitation (n=22, 15.9%) others (n=8, 5.13%). The systemic changes reported were increased with duration of mask wear.

Discussion

Strict compliance to mask wearing is the only way to prevent the airborne spread of COVID 19.⁸ In our study, a total of 138 medical students participated out of which (89.9%) were females. The type of masks used by the medical students varied, however 84.8% used surgical masks. There was significant relation between the year of study and duration of wearing the same mask. The average duration of mask wear was 4 hours for 72.4% of the participants. In a similar study by Foo *et al.*, it was noticed that adverse reactions were acne, facial itching and rash, pigmentation of nasal bridge, cheeks and chin.

Occlusion and friction were mentioned as the underlying mechanism.⁹ In another study the adverse skin reactions among frontline nurses using PPE included nasal bridge scar, facial itching, skin damage, dry skin rash, chapped skin, and wheals.³ According to Hayat *et al.* chin area was involved in 73 (86%) of individuals while 12 (14%) showed nose and lower cheek involvement.⁸ Presence of acne was more in subjects wearing masks for more than 6 hours per day (78%) than in those who wore them for less than six hours ($p < 0.05$). This was also consistent with the findings of Changxu in which 4 out of 5 enrolled cases wore mask for more than 7 hours.⁸

The most frequently affected location were cheeks (41.3%), followed by chin (13.8%), nasal bridge (10.1%) and perioral area (8 %) similar to Changxu Han.⁸

Also, in our study, participants with history of atopic dermatitis were affected more by itching, redness, rash, burning sensation, acne. Pressure bruises were reported in 23.9% of the participants with no significant relation with skin manifestations resulting in friction dermatitis. Sweat buildup under the mask was related to the number of masks used. In our study, 86.2% wore single masks and 13.8% used multiple.

According to a study, participants reported self-medication and application of emollients, oil and other lotions on the skin rashes minimized the irritations and dermatitis.⁴ In our study, participants who had underlying skin problems used systemic and topical drugs.

About 33% of the females who used makeup under the mask found it inconvenient due to pimples and itching. Hayat *et al.* suggested using make up while wearing mask straps the moisture and intensifies the irritation of pilosebaceous

ducts due to moisture underneath the mask.⁸

In our study skin hygienic practices have also been reported to be significant in managing underlying skin problems which corresponds to the study by Hayat *et al.*⁸ Keeping the skin clean by using cleanser and fragrance-free moisturizer helped in reducing the irritation and friction as well.

Limitations

Our research was a cross sectional study. The questionnaire provided had close ended questions. The manifestations were therefore determined subjectively and require further dermatological evaluation.

Conclusion

The increase in skin manifestations is associated with the increased use of face masks during the COVID 19 pandemic among medical students. As mask wearing can't be compromised due to the nature of the working environment, guidelines need to be established to prevent or reduce the occurrence of such manifestations.

Ethical Standards

This study was conducted after the DRC and IRB approval from Jinnah Sindh Medical University, Karachi. (Reference no. JSMU/IRB/2021/-453).

Informed consent was obtained from all participants. All respective data has been kept confidential.

References

1. Masood S, Tabassum S, Naveed S, Jalil P. COVID-19 Pandemic & Skin Care Guidelines for Health Care Professionals. *Pak J Med Sci.* 2020;36(COVID19-S4):S115-S117. doi: 10.12669/pjms.36.COVID19-S4.2748.

2. Umakanthan S, Sahu P, Ranade AV, Bukelo MM, Rao JS, Abrahao-Machado LF, Dahal S, Kumar H, Kv D. Origin, transmission, diagnosis and management of coronavirus disease 2019 (COVID-19). *Postgrad Med J.* 2020;**96(1142)**:753-8. doi: 10.1136/postgradmedj-2020-138234.
3. Purushothaman, P.K., Priyanga, E. &Vaidhyswaran, R. Effects of Prolonged Use of Facemask on Healthcare Workers in Tertiary Care Hospital During COVID-19 Pandemic. *Indian J Otolaryngol Head Neck Surg.* 2020;**73(1)**:59-65. doi: 10.1007/s12070-020-02124-0.
4. Jose S, Cyriac MC, Dhandapani M. Health Problems and Skin Damages Caused by Personal Protective Equipment: Experience of Frontline Nurses Caring for Critical COVID-19 Patients in Intensive Care Units. *Indian J Crit Care Med.* 2021;**25(2)**:134-9. doi: 10.5005/jp-journals-10071-23713.
5. Naqvi F, Inayat S, Yaqoob N, Tahir K, Sarwar U, Muhammad F. Cutaneous impact of surgical mask versus N 95 mask during COVID-19 pandemic: Incidence of dermatological side effects and response of topical methylprednisolone aceponate (MPA) treatment to associated contact dermatitis. *J Pak Assoc Dermaol.* 2020; **30(4)**:650-5.
6. Sarfraz S, Raza R, Aziz K, Umar M, Noreen K, Shehryar M. Compliance on the Use of Different Types of Face Mask by Healthcare Workers and General Public in Tertiary Care Hospital of RMU during COVID-19 Pandemic. *J Rawal Med Uni.* 2020;**24(Supp-1)**:71-6. doi:10.37939/jrmc.v24iSupp-1.1440.
7. Tan K, Greaves M. N95 acne. *Int J Dermatol.* 2004;**43(7)**:522-3. doi: 10.1111/j.1365-4632.2004.02338.x.
8. Hayat W, Malik LM, Mukhtar R, Khan MQ, Saeed A, Rashid T. 'MASKNE' (mask induced acne) in health care professionals of tertiary care hospitals of Lahore during COVID-19 Pandemic. *Pak Postgrad Med J* 2020;**31(2)**:61-5.
9. Daye M, Cihan FG, Durduran Y. Evaluation of skin problems and dermatology life quality index in health care workers who use personal protection measures during COVID-19 pandemic. *Dermatol Ther.* 2020;**33(6)**:e14346. doi:10.1111/dth.14346.