

ORIGINAL ARTICLE

Adverse effects of Prolonged use of Face Masks among Medical Students during COVID-19

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ABSTRACT

To identify common problems associated with extended mask wear and various mitigation measures adopted by medical students. A cross-sectional study was conducted at CMH Lahore Medical College. The survey was distributed among medical students attending onsite clinical wards. It consisted of 4 components: demographic details, mask preference/duration of use, associated adverse effects, and potential solutions. Data was analyzed using SPSS 20. Binomial test was run to find the prevalence of mask related problems. Chi square test was done to find associations and $p < 0.05$ was significant. Out of 208 responses, the average durations of daily mask use were: >6 hours (20.2%), 4-6 hours (50%), 1-3 hours (29.3%) and <1 hour (0.5%). Surgical masks were the most preferred type of mask, followed by N95 masks. Double masking was not common. The practice of reusing masks was high. Majority reported discomfort with wearing masks (57.2%). Mask induced itch was the most common complaint (73.1%). Acne aggravation was more common in females ($p < 0.01$) and was associated with pre-existing acne vulgaris ($p < 0.05$). Nasal congestion was also common among females ($p < 0.05$). There were increased reports of headache (65.4%). Popular strategies for mask related problems were frequent face washing (59%), rechanging masks (52%) and taking breaks (66.3%). Medical students wear masks for long durations and experience adverse dermatological and physiological effects. We need studies that can provide efficient solutions for such problems.

Key words: Face masks, Adverse effects, Mitigation strategies, Medical students

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INTRODUCTION

Historically, the practice of face covering among surgeons and physicians was adopted in the late 1800s [1]. Face masks had a significant role during the 1918 influenza pandemic in slowing the infection spread [2]. Even in the current pandemic, health guidelines include face covering as an important measure of personal protection. Therefore, medical masking was made mandatory in all healthcare facilities [3]. The Coronavirus pandemic has badly affected the education sector and has disrupted the medical education and training of future healthcare professionals. On site clinical rotations are important for clinical year students to gain clinical skills. During their rotations, they need to wear facemasks, for personal protection, for extended periods of time. Since distancing measures cannot be implemented in such a setting, facemasks can provide adequate protection to the students. However, studies have shown that wearing masks for prolonged periods is associated with adverse effects [4]. In a recent paper, the term "Mask fatigue" was introduced and was defined as "lack of energy which accompanies and/or follows prolonged wearing of a mask."⁵ In this study, we tried to identify common problems associated with extended mask wear and mitigation measures adopted by medical students. The data obtained from this study can be used to synthesize possible alternatives for mask related problems and to generate potential strategies to mitigate the negative effects of prolonged face mask wear.

MATERIAL AND METHODS

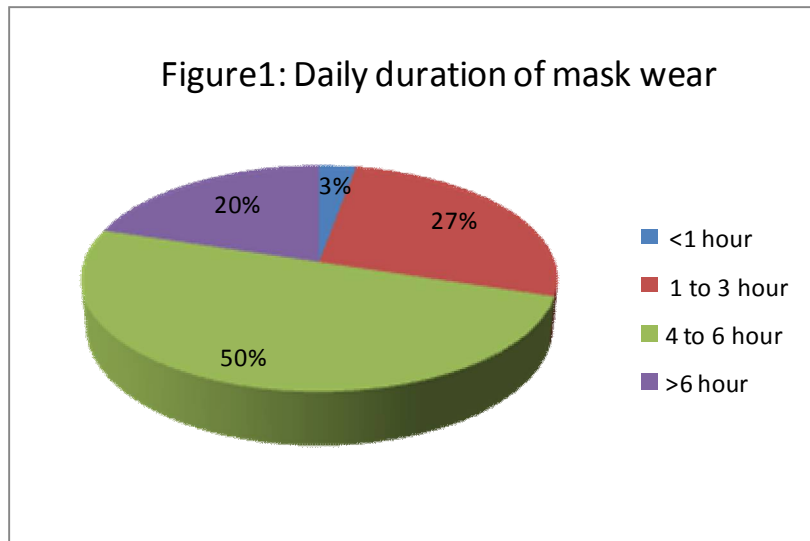
A cross-sectional study was conducted at CMH Lahore Medical College from December 2021 to February 2021. We surveyed medical students from 3rd year, 4th year and final year. The sample size was 208 (at 95%CI, 5% margin of error and 50% response distribution; $n = \frac{DEFF * Np(1-p)}{[(d2/Z2 1-a/2*(N-1)+p*(1-p))]$). Convenient sampling was employed. Inclusion criteria was medical students attending clinical rotations while exclusion criteria included medical students in the preclinical years.

Data was collected using a pretested questionnaire. Our survey contained demographic questions, questions about types/number/duration of face mask used, mask related problems and adopted strategies. The questionnaires were distributed among medical students after taking verbal consent. This study was approved by the Ethical Review Committee of CMH Lahore Medical College with Reference Number 112/ERC/CMHLMC.

Data was analyzed using SPSS 20. Descriptive data was expressed as frequency and percentage. Chi square test of independence was applied to find associations between variables, and p value of <0.05 was considered significant. One sample binomial test with Clopper Pearson 95% CI was run to determine frequency of mask related problems.

RESULTS

We received a total of 208 responses. The mean age of the participants was 22 years. The participants consisted of medical students from third year (n=85, 41%), fourth year (n=51, 24%) and fifth year (n=72, 35%). The majority reported good quality of sleep (n=127, 61%). Their daily duration of mask wear is shown in figure 1.



Surgical masks were the most popular choice among medical students (n=184, 88.5%), followed by N95 masks (n=60, 28.8%) and other varieties such as cloth masks (n=15, 7.2%) and polyester masks (n=9, 4.3%). The respondents mostly wore a single layer of surgical mask (n=139, 66.8%) daily while some preferred to wear two layers of the same mask (n=23, 11.1%). The use of single N95 masks (n=33, 15.9%) was also observed. Single cloth masks were the least opted option (n=7, 3.4%). Double masking with an N95 and a surgical mask (n=27, 13%) or with a surgical and a cloth mask (n=9, 4.3%) was observed. Fifty percent of the respondents reuse only reusable masks and while 32.2% tend to reuse all kinds of masks. We found that most of them (57.2%) thought masks were uncomfortable to wear. The problems associated with extended mask use are shown in table 1.

Table 1: Problems associated with extended mask use

Adverse event	Prevalence	Confidence interval	p value	
Acne aggravation	47%	0.38-0.527	0.24	insignificant
Dermatitis	27%	0.215-0.34	.00	significant
Nasal bridge scarring	50%	0.43-0.570	1.00	insignificant
Itching	73.1%	0.665-0.790	.00	significant
Sweating around the mouth	68.3%	0.615-0.745	.00	significant
Difficulty breathing	25.5%	0.197-0.320	.00	significant
Headache	65.4%	0.585-0.718	.00	significant
Earache	22.6%	0.171-0.289	.00	significant
Nasal congestion	53.8%	0.468-0.608	0.29	insignificant
Increased facial temperature	57%	0.507-0.695	0.03	significant
Foggy glasses	26%	0.201-0.325	.00	significant
Lightheadedness	18%	0.137-0.247	.00	significant

About 22% had pre-existing acne vulgaris. It showed significant association with acne worsening. ($X=10.13$ (13), $p<0.05$). Incidence of acne aggravation was higher among females (60%), $X = 38.59$ (1); $p<0.01$.

Similar association was found with occurrence of nasal congestion, $X = 10.89$ (1), $p< 0.05$.

Table 2 shows the frequencies of strategies adopted for mask related problems.

Table 2: strategies adopted for mask related problems.

Strategies	Frequency (%)
Frequent face washing	123 (59.1%)
Frequent change of mask	110 (52.9%)
Face wipes	33 (15.9%)
Improved skin care routine	86 (41.3%)
Topical creams (antibacterial/antifungal)	46 (22.1%)
Painkillers	19 (9.1%)
Rubber stopper to adjust the fitting of the mask	22 (10.6%)
Take frequent breaks without a mask	138 (66.3%)
Use tape to prevent glasses from fogging	12 (5.7%)

DISCUSSION

Medical students attending clinical rotations, work in an environment where covid suspected patients are present. Their interaction within a health facility puts them at risk of cluster transmission [7]. Maintaining appropriate distance is not possible and masks are the only means of protection. That is why we surveyed medical students to learn how they were affected by the prolonged use of face masks and how they are coping with some of the unwanted effects of extended mask wear.

The participants reported that they wear face masks for at least 4-6 hours during a routine working day (50%). Some (20.2%) reported wearing masks for longer than 6 hours. Currently there's no evidence for appropriate or safe duration of mask use. According to CDC, an N95 respirator can be used for 8 continuous hours, if it is not visibly soiled [3]. A study done by Chughtai *et al* showed that prolonged use of medical masks (>6hr) was associated with increased risk of self-contamination [8].

Some reused all types of masks (32.2%) while mostly only reused reusable masks (50%). The practice of reusing face masks is common in our setup [9, 10].

About 57% respondents reported that wearing face masks was uncomfortable. Adverse effects associated with prolonged mask wear, including feelings of discomfort, have the effect of lowering compliance [11].

The majority of the respondents in this study reported wearing surgical masks for daily use. The reason could be that surgical masks are cheap and easily available, and comfortable to use because of their loose fitting [12]. The second most frequently used mask was the N95 mask. The N95 respirator has a tighter fit but is difficult to wear for long hours. Some people preferred cloth masks (3.4%). According to the WHO, cloth masks are not a good alternative to medical masks for protection of healthcare workers. ³Double masking was not very common among medical students and majority reported using a single layer surgical mask. Double masking enhances filter capability and also improves the fitting of the mask. An experiment conducted by the CDC showed that various mask combinations improved mask function [13].

Previous studies on the effects of extended mask wear have reported high incidence of adverse effects [4, 6, 14]. In this study, itch was the most common complaint among mask users. Mask-induced itch has been documented in a few studies [6, 15, 16]. Respondents also complained of excessive sweating around the mouth. Fitted masks create a space of humid air around the mouth and increase the temperature of the perioral region [17]. Fifty percent reported increased facial temperature. Significant number of respondents had complaints of headache. The frequency and severity of headaches are linked to duration of mask wear [18]. Acne aggravation and nasal congestion were more common among females and showed significant association with gender. We did not observe similar associations in other studies. Compared to previous studies, we had fewer reports of earache. In our study, breathing difficulty was not very common. Although studies have shown that wearing a mask lowers pulmonary function [19].

People have adopted different strategies to make mask use more tolerable. Some of these strategies include taking intermittent breaks without masks or using rubber stoppers/adjustable straps to reduce the tightness of the mask. Frequent change of masks and improved skin hygiene were also observed. There is an urgent need for studies that provide data-based solutions for mask related problems that are effective and practical.

This was a single institute study and therefore its findings cannot be generalized. The study design is another limitation. Since it was conducted at a time when students were attending onsite clinical lectures, recall bias is minimum.

CONCLUSION

Medical students wear face masks for long durations and experience adverse effects associated with extended mask use. Reducing the duration of mask wear can provide some relief. Good facial hygiene is important to reduce the frequency of dermatological effects.

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