Original Research Article

Practice of Mouth Mask Usage and its Concerns Among Students of an Indian Dental Institution: A Cross-Sectional Survey

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Abstract:

Background: The use of mouth masks is an effective strategy in the prevention of infection as well as self-protection during the recent COVID-19 pandemic. Nevertheless, variations in knowledge and adherence to mouth mask usage have been observed across different populations, impacting infection control measures.

Aim: To assess the practice of mouth mask usage and its concerns among students of an Indian Dental Institution.

Material and methods: A descriptive cross-sectional study was conducted among 300 students of Indian Dental Institution. A self-administered questionnaire regarding the choice, maintenance of masks, usage, frequency of change, disposal and concerns was administered to the students. After checking for the completeness of the data, descriptive and inferential statistical analysis was carried out.

Results: Regarding the choice of mouth masks used, about one-fourth of the respondents (27.33%, 82/300) reported that the N95 mask was their mask of choice, while a cloth mask was preferred by (7%, 21/300) participants. Almost 63 % (186/300) of the study population in the present study experienced one or more skin issues since mouth mask usage and 26 % (78/300) experienced more than one skin-related symptom.

Conclusion: The findings underscore the importance of considering both the efficacy and potential skin-related consequences when choosing and wearing mouth masks, particularly in the context of prolonged or frequent use. Additionally, it indicates a need for further research and interventions to address and mitigate the skin issues associated with mask usage.

Keywords: Dental students, Mouth mask, N95, Questionnaire

Introduction:

The COVID-19 virus disease was first identified in Wuhan City, China, in December 2019. The World Health Organization (WHO) subsequently proclaimed the disease to be a pandemic in March 2020.[1,2] Subsequently, countries across the world felt the debilitating effects of this infection which spared no aspect of human existence, causing more than 5.4 million fatalities globally.[1,3] In the later months many novel variants of concern have emerged so far, including the Alpha, Beta, Gamma, Delta, and Omicron and these strains have demonstrated rapid transmissibility and more potent virulence.[3]

Corona virus infection primarily targets the upper respiratory tract in humans, with some involvement of the gastrointestinal tract. Thus, these patients may complain of a plethora of symptoms which could be as common as cold to advanced infections such as bronchitis and pneumonia. Dental work near the patients' oral cavity and consistent exposure to bodily secretions and fluids such as blood and saliva make the dental practitioner vulnerable and at an increased risk of infection.[4]

Amongst the many social preventive measures implemented social distancing and frequent hand washing, are the most accepted Non-Pharmaceutical Interventions (NPI), for both to prevent contamination as well as self-protection from being infected, so there was implementation all over the world for wearing a mouth mask.[5] Thus, its minimal cost and ease of implementation have popularized this preventive measure universally, for one's safety.

However, the practice of mouth mask usage have been shown to vary amongst the different populations. Therefore, the goal of the current study was to assess the dental students' mouth mask-wearing practices and concerns at an Indian dental institution.

Methodology

A cross-sectional survey was conducted among students enrolled from a dental college in Western Maharashtra. With approval from the institutional ethics committee, the study subjects signed informed consent confirming their willingness to participate. All study participants were anonymous.

Undergraduate dental students of Indian Nationals were eligible to participate in this survey, capable of providing informed consent, with a proficient understanding of English. Part-time students and individuals who were unable to comprehend English were excluded from this study.

From the list of student participants and using simple random sampling the subjects were randomly selected. A sample size of 300 was determined according to pilot study. The sample size was calculated by the following formula; sample size=$Z\alpha^2$ *(p) *(1-p)/ c^2.Thus the sample size was calculated to be 288 and was rounded off to 300.

Students were requested to complete a self-administered questionnaire regarding mouth mask selection, maintenance, disposal and related concerns. The reliability and validity of this questionnaire were evaluated before the study. All the participants answered the questionnaire and 300 responses were collected. Descriptive statistics was employed using SPSS version 20 (SPSS Inc., Chicago, IL, U.S.A.) for statistical analysis.[6]

Results

The participant's demographic characteristics showed that females accounted for 268 (89.3%), and 32 (10.66%) were males as depicted in Table 1.The average age of subjects was 22.87 years (SD = 2.7 years).

Table 1: Demographic characteristics of the study population

Demographic variable		N=300	Percentage
Age (in years)	18-19	20	6.66
	20-21	81	27
	22-23	149	49.66
	24-25	50	16.6
Gender	Male	32	10.66
	Female	268	89.3

In the current study, the selection of mouth masks among participants showed that approximately one-fourth of respondents (27.33%, 82 out of 300) favored the N95 mask for personal protection, while a cloth mask was preferred by 8.66% (26 out of 300) of participants, as illustrated in Table 2.

Table 2: Distribution of the study participants according to the type of mask used

Type of mask	n=300	Percentage
Disposable Surgical mask	13	4.33
Cloth mask	26	8.66
N 95 mask	82	27.33
Combination	179	59.66

In terms of allocation of participants in the study based on mouth mask-related skin problems encountered, nearly 62% (186 out of 300) of the study population in this research reported of experiencing one or multiple skin concerns due to mask usage, while 26% (78 out of 300) experienced multiple skin-related symptoms, as shown in Table 3.

Table 3: Distribution of the study participants as per mask-related skin issues experienced

Skin issues	300	Percentage
Swelling	4	1.33
Rash	14	4.66
Dryness	18	6.00
Itching	36	12.00
Acne/ erosions of skin	36	12.00
Multiple issues	78	26.00
No issues	114	38.00

Table 4 illustrates the oral symptoms encountered by the study participants. Out of 300 participants, 60.33% (181) did not report any oral symptoms. Among those who reported changes in the oral cavity and adjacent areas, 16.66% (50) experienced dryness of mouth and lips, whereas 8.66% (26) had bad breath.

Table 4: Distribution of the study participants as per mask-related oral symptoms experienced

Oral Symptoms Experienced	n=300	Percentage
Bleeding from gums	2	0.66
Infection of mucosa	2	0.66
Ulcers	2	0.66
Bad breath/ Halitosis	26	8.66
Dry lip and dry mouth	50	16.66
Multiple problems	37	12.33
No issues	181	60.33

Discussion

To tackle the COVID crisis, India's healthcare infrastructure and many systems was pushed to its limits. Nevertheless, a well-executed strategy of immunization and popularizing the preventive measures has resulted in a steady declining curve of new COVID-19 cases in India. This was advantageous during the fresh wave of pandemic because of newer strains and impeding predictions of greater virulence as per

scientists. The degree and impact of the third wave was greatly dependent on a variety of factors, some of which may include, the proportion of the inoculated citizens, prevention of further infection, as well as appropriate isolation and containment of the infection.[7] While newer mutations of the virus cannot be controlled, there has been a focused approach for controllable areas of prevention like social isolation, immunization, and washing of hands. However, the effective usage of mouth masks has been the primary factor responsible for controlling spread of the virus.[5]

Selection of Mouth Masks

The selection of a mouth mask from a variety of materials, companies and sizes is a critical factor in increasing the ease of usage and long-term compliance in its acceptability and application in the dental setting.

N95 masks are suggested by WHO and CDC while treating individuals having the highest risk of transmission of the virus. The "N" in N95 stands for the National Institute for Occupational Safety and Health, or NIOSH, in the United States, and the "95" indicates how effective the particle filters are. This makes the N95 mask extremely efficient, removing airborne particles at approximately 95%, particularly extremely small particles. They also provide an excellent seal at the margins which contributes to their superior utility. When this is compared with the routinely used surgical masks which provide a barrier against large respiratory particles, it is found that they are not effective in providing protection from smaller particles and poor seal at the margins.[8]

In the present study the most preferred type of mouth mask was N95 (27.33%). The second preferred choice was for the cloth mask which was selected by8.66 %(Table 2). A study on college students in Vietnam by Duong MC et al reported similar findings. They reported a considerable preference for surgical masks amongst 57.6%,while a smaller number preferred the cloth mask 23.1%.[9]

A unique finding noted in the present study was that most participants,59.67%,used various forms of masks based on the type of work and duration. In a survey of Chennai's general population, Swornappan and colleagues found that, depending on the nature of their jobs and workplaces, more than a third of the participants (26.9%) used fabric masks and respirators in addition to N95.[10]

Reusage of mouth mask

Masks once purchased need to be maintained during their usage. This is especially important for maintaining their effectiveness and avoiding any cross-contamination thereby preventing any unintended infection spread. Majority of the studied population (63.33%) revealed reusage of the mask only after it was washed thoroughly. However, such encouraging findings were not observed by Duong, MC et al who observed that only 28.8% used their masks after washing them.[9] Similarly, Swornappan M et al resounded comparative values in their study from Chennai, India where 28.5% of members continued to reuse disposable masks despite their intended single-use nature. Additionally, 7.7% of the participants from the study lacked clarity regarding the reusability of the masks.[10]

Mouth mask-related dermal lesions

Previous studies have documented that the portion of skin covered under the mouth mask has a different environment compared to the non-covered area. The covered area has a warmer and more humid presentation that may result in discomfort. The damp area coupled with stressed facial ducts due to pressure from mask material has been known to irritate and cause friction to the skin and mouth resulting in acne and blisters.[11-14]

A large part of the study population (63%)from the present study displayed solitary or multiple skin problems consequent to their mask usage and out of these 26 % had simultaneous multiple dermatological complaints. Choi SY et al in their multi-centric study amongst 12 Korean healthcare centers, on mask-related skin disorders conducted during the COVID-19 pandemic found that amongst the 330 study participants, 92.73% of them experienced skin problems most commonly pruritis (66.06%), with stinging (31.52%)and dryness (26.36%).[15]

Corrective measures suggested for these typical conditions from previous studies include the application of moisturizing creams and emollients, with barrier creams both as a preventive measure as well as for their management.[11]

Mouth mask-related generalized symptoms

Long-term mask usage has been documented to be associated with both physical and mental issues which in turn may contribute to a decreased work output. The literature review indicates a variety of findings attributed to the extended period of mask usage including pain, dryness of nasal mucosa, bleeding episodes through the nose, decreased lacrimation in eyes and unfavorable skin responses such as rashes, irritations and pruritis.[12]

A larger part of the student population i.e. 84% in this study exhibited effects like headache, shortness of breath, increased perspiration, and auditory changes. In addition, the simultaneous occurrence of different effects has been experienced by approximately half of the study population i.e. 55.33%. These statistics mimic the figures reported by Shubhanshu K et al in their digital survey among a variety of 300 healthcare professionals which included doctors, paramedical staff, and pharmacists. They found a similar presentation of symptoms including headache (23%), dryness of the nose (22%), xeropthalmia (19%), and acne (12%) in their study population.[11] In another study by Mary AV et al 76.1%of their study group had difficulties related to breathlessness due to increased duration of mask usage.[16]

However, many of these difficulties can now be prevented by simple measures such as the use of eye lubricant drops for the prevention of eye dryness and nasal saline drops or gels to reduce the dryness of the nose as well as reduce any future

complications and more serious consequences to these delicate mucosae.[17,18] Furthermore, to prevent migraine and confusion in mental cognition, preventive measures of increasing hydration and preventing dehydration proactively at the start of the working shift have been encouraged. Also, choosing the most appropriate correct fitting mask depending on the type and extent of work has been suggested to increase its utility and reduce the debilitating side-effects.[11,12]

Mouth mask-related oral findings

In the current study, 39.66% of students exhibited findings related to the oral and para-oral areas. This included 16.66%experiencing dry lips and mouth, and 8.67% reporting halitosis (Table 4). Sachdeva S et al. found similar results when they conducted a study among health practitioners about awareness of mouth masks for the COVID-19 pandemic. In their study, halitosis was reported in 66% of subjects and 41.5% experienced dryness of mouth after using mouth masks. It has been suggested that the incorporation of frequent work breaks during the daily work schedule may prove to be effective for avoiding these symptoms as it will avoid prolonged use of mask use.[19]

The current study's broad applicability was limited by the fact that it only included undergraduate students from one dental teaching institution. Furthermore, evaluation was restricted to general dental practice and not to further specialist practices such as implantology or surgical practice.

Conclusion

In these cutting-edge times, where there are frequent worldwide health issues, dental specialists have a high risk of contracting COVID-19 due to daily association with saliva and aerosols during patient care, bringing to light the significance of mask usage for future dental professionals.[20]

In this setting, the study emphasize the significance of evaluating both, the effectiveness of mouth masks and the potential skin-related effects before selecting and using them, especially with prolonged or frequent usage. This underscores the need for more studies and treatments to address and mitigate the skin issues associated with mouth mask use. This element of masks, in particular the materials used, how they should be modified and disposal rules might be included in dentistry curricula in the future to better prepare aspiring dentists.

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