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Impact of facemasks on the mouth as an emerging dental concern: A survey among residents of Karachi

Muhammad Muzzamil [a], Hana Pervez [b], Rimsha Nawaz [b], Shaeroz Raza [b], Zoaib Habib Tharwani [c,*], Maryam Nisa [a]

[a] Health Services Academy, Islamabad, Pakistan
[b] Jinnah Medical and Dental College, Pakistan
[c] Dow University of Health Sciences (Dow Medical College), Pakistan

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ABSTRACT

Background: The illness known as "mask-mouth syndrome," which is brought on by constantly covering one's mouth and nose with a mask, was particularly prevalent among healthcare personnel. The covid-19 pandemic, however, had far-reaching effects on people's daily lives all around the world, to the point where mask use became practically mandatory. With Covid-19 posing a new threat to dental health, this study aims to assess the public's awareness of the issue and investigate how wearing a facemask affects oral hygiene.

Methods: Cross-sectional research was conducted at Karachi's Jinnah Medical & Dental College. From February to May of 2022, it was carried out in the Dental Opd. A survey of 400 people was conducted, representing a cross-section of society in terms of age, gender, occupation, and other criteria. The poll had 11 closed-ended questions. The data was analyzed using SPSS 24. Descriptive analysis was used to examine the responses.

Results: Men made up 44.5% (n = 174) of responses and women 56.5% (n = 226). Mean participant age was 27.31, ranging from 18 to 50. 99% (n = 396) of respondents wear masks. 48% (n = 192) of participants were uncomfortable using facemasks. Disposable face masks were voted the best option by 60.5% of respondents (n = 242). Negative effects or conditions brought on by mask use, such as halitosis (47.3%, n = 189) and dehydration (64.3%, n = 257).

Conclusion: Mask-mouth syndrome can occur as a result of using a face mask for prolonged periods of time. Mask benefits outweigh the danger of mask mouth syndrome.

1. Introduction

The year 2019, the year that modified the everyday regular lives of people around the globe. As a new virus pandemic commenced known as COVID-19. Life of the people around the world was affected, as a disease that started in Wuhan (China) was able to make its way to different countries in a quick time. The first COVID-19 index case was reported in Karachi on February 26, 2020.[1]

Re-emerging infections are a new threat to human health in recent decades.[2] However, the old virus strands that caused huge damage to different countries' health care systems previously when modified and emerged as a new variant not only cause chaos but also affect the health care system of a country.[3] Lack of preparedness, including poor public health infrastructure and fragile health care system, results in the severe spread of infections and aggravates the burden of disease, and puts a great strain on the health care system.[4]

NCOC (National Command and Operation Centre) to improvise and stop the spread of disease provided with pointers that WHO (World Health Organization) gave regarding concerning precautionary measures. These precautionary measures include mask-wearing and social distancing. These measures were only effective if they are in consideration accordingly and without any errors. Facemasks were considered a first step in preventing and controlling disease transmission.[5]

"Mask Mouth" is one of the words we learned during the COVID-19 pandemic. Using a mask for lengthy periods of time might lead to mask mouth, an oral hygiene-related condition. Masks are now a part of our daily lives and are recommended by the WHO and the NCOC, making them a new concern.[6] Due to the widespread use of facemasks,

* Corresponding author.
E-mail addresses: muzzamilrao21@gmail.com (M. Muzzamil), drhanapervez@gmail.com (H. Pervez), nrimsha@hotmail.com (R. Nawaz), razashaeroz@gmail.com (S. Raza), zoaibhabib@hotmail.com (Z.H. Tharwani), maryamnisa441@gmail.com (M. Nisa).

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mask mouth was a prevalent issue among medical practitioners. Now due to the COVID-19 pandemic, almost every individual is wearing a mask and this problem is not limited to health care professionals but the common people as well. The most frequent oral health problems that are persisting in the population are halitosis (bad breath), gingivitis, and dental caries. The reason behind these problems is that when a person wears a mask nose is partially blocked and that person breathes from the mouth. Mouth breathing leads to dry mouth (xerostomia) as the saliva inside the mouth decreases and this causes the number of bacteria present in the mouth to multiply leading to these oral health disorders.[7]

Halitosis is a condition marked by an unpleasant mouth odor, or "bad breath". As public awareness of oral hygiene grows, more people seek medical advice to help them recover from this condition.[8,9]

Genuine and deluded halitosis are the two types of halitosis.

Delusional or Imaginary Halitosis includes the following:

Pseudo halitosis: In pseudo halitosis, the sufferer has a bad breath that others don't.[10,11] Halitophobia: In this condition, the patient is afraid that everyone around him would think his breath stinks and that it will stay that way after therapy.[12,13]

Genuine involves Physiologic and Pathological Halitosis are:

Cause from within the mouth:

These bacteria are responsible for around 80%–85%[14,15] of all halitosis cases. Gingival and periodontal diseases are two diseases of the mouth (acute necrotizing ulcerative gingivitis, herpetic gingivitis, and periodontal abscess).

A dip in pH is caused by a decline in saliva oxygen saturation, which leads to the creation of diamines, which generate smell.

Causes besides the mouth:

It is possible for halitosis to affect the nose, sinuses, tonsils, and parts of the upper respiratory system (pharynx and larynx) all at once.

1.1. Pathophysiology

VSCs, or volatile sulfur compounds, are responsible for bad breath. This includes hydroxide, methylmercaptan, dimethylsulfide, and other sulfur-containing compounds these compounds are produced by the Gram-negative and anaerobic bacteria that cause periodontal disease.[16,17,18,19,20,21]

The present study planned to understand the problems faced by the people of Karachi and to evaluate what measures they take to solve these oral health-related problems face by extensive use of facemask.

2. Methods

Cross-sectional survey was conducted at Jinnah Medical and Dental College (JMDC) at Karachi's Outpatients Department (OPD) between February and May of 2022. Based on prior surveys, we used a WHO calculator to estimate the sample size, taking into account an absolute precision of 5% and a 95% confidence interval (CI) for the total sample size. The non-probability convenience sampling method was used to get the sample.

A survey was conducted among participants of various ages, gender, job statuses, and other demographic characteristics. A total number of 11 close-ended questions were asked in the survey. The questionnaire helps us to understand the respondent's beliefs about the topic mentioned above. Males and females of consenting age were included, and all were literate enough to grasp the questions asked of them in the questionnaire. Those who were not willing to participate and were not willing to give verbal consent were not made part of this study. 415 participants were approached out of which 400 participated and 15 declined to participate.

Following the patients' verbal informed consent, data was obtained using a self-administered 11-item English-language questionnaire, the validity of which was reviewed by a committee comprised of community dentistry, an orthodontist, and a general dentist. The questionnaire was revised in response to the input. The final version was forwarded to a panel of general dentists for review to ensure that the questions were comprehensible and fit within the specified framework.

The questionnaire was based on earlier research [P. K. Purushothaman and Suryakumari Achanta]. It was validated in a pilot study with 120 people later who again participated in the final sample. SPSS 24 was used to analyze the data. A descriptive analysis was performed, and the responses' frequencies and percentages were determined.

3. Result

There were 400 participants in this study, with 43% (n = 174) males and 56% (n = 226) females. Of individuals who are working 44% (n = 176) and undergraduate students, 43% (n = 172) actively engaged in the survey, whereas among those who are jobless 13% (n = 52) showed less interest. The average age of the participants was 27.31 years, with a minimum age of 18 years and a maximum age of 50 years.

When asked about mask-wearing habits, 99% (n = 396) of people said they wear any form of mask to protect themselves against Covid-19, whereas 1% (n = 4) said they don't wear any type of mask (refer to Fig. 1).

52% (n = 208) of participants reported feeling comfortable while using a facemask, whereas 48% (n = 192) reported feeling uncomfortable when wearing a facemask. When asked which type of facemask was favored by the participants, 60.5% (n = 242) selected disposable masks, while others liked 9.8% (n = 39) Kn95, 14.2% (n = 57) cloth masks, and 15.5% (n = 62) preferred both disposable and cloth masks combined (refer to Fig. 2).

When questioned about the negative effects or conditions caused by mask use, such as halitosis, 47% (n = 189) indicated yes. A second question was asked of the 189 participants who replied yes, do they feel uncomfortable talking to others with halitosis? Of the 189 participants, nearly half (n = 121) said yes they do feel uncomfortable talking to others with halitosis. Another question was asked of the same 121 unpleasant participants: how do they diminish this emotion, or what measures do they employ to minimize the uncomfortable feeling? 36% (n = 43) of those polled said they brush their teeth, 12% (n = 14) said they use mouthwash, and nearly half (n = 64) said they use mouth fresheners or gum to alleviate the sensation (refer to Table 1).

Prolonged use of a mask results in inadvertent mouth breathing. The amount of water consumed after wearing a mask has been dramatically altered because mouth breathing lowers the pH of the mouth, causing dehydration when participants are asked whether they experience dry mouth after wearing a mask. Yes, 64% (n = 257) of people replied. Individuals were also asked what they did to reduce dryness or a feeling of dehydration, both of which contribute to bad breath (refer to Table 1). The majority of participants (84%) (n = 217) said that they drank water to combat dehydration, whereas 15% (n = 40) reported that they

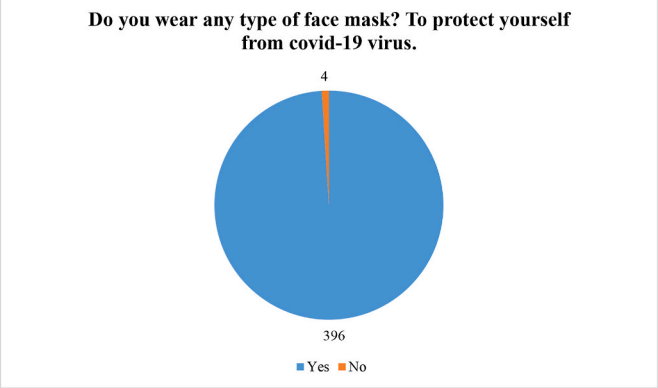

Fig. 1. Mask Wearing Habit among participants. Out of 400 participants, (4 said No) while (396 said Yes) about wearing face mask.

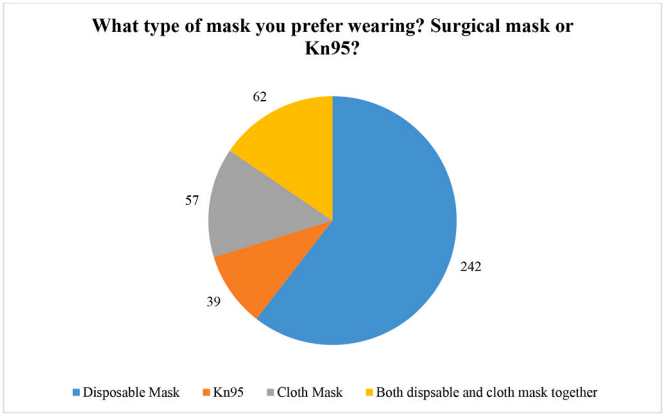

Fig. 2. Type of mask is considered among general population. Disposable mask = (n = 242) was rated as the greatest solution, while Kn95 (n = 39) was rated least good option.

Table 1
Include descriptive analysis frequencies and percentages.

Experience (Halitosis) bad breath after wearing mask for couple Of hours			
	Frequency	***percentage***	***p-value***
Do you feel your mouth drying more often while wearing a mask?			
Yes	257	64	**0.04**
No	143	36	
Do you know that wearing facemask for a long time can cause an increase in bacterial activity in your mouth?			
Yes	209	52	**0.02**
No	191	48	
Do you know this increase in bacterial activity is causing bad oral hygiene such as (Halitosis) bad breath?			
Yes	224	56	0.06
No	176	44	

For the table, we used the Chi-square test as our statistical method. Drying out the mouth and overexposure to a facemask both have a strong correlation with halitosis, as both categorical variables with values less than 0.05 are considered significant.

chewed bubble gum to increase saliva production and thereby alleviate dehydration for a short period of time.

Three questions regarding knowledge, attitude, and practice were asked at the end of the questionnaire. The usage of face masks for an extended period of time increases bacterial activity, and an increase in bacterial activity leads to halitosis. The replies demonstrate a good outcome, with nearly half of them being aware. 52% (n = 209) are aware of the increased bacterial activity, and 56% (n = 224) are aware that an increased number of bacteria is producing halitosis. When asked, do you realize that keeping proper dental hygiene can assist in reducing this problem? In their responses, 77% (n = 311) said yes.

4. Discussion

In the event of a pandemic, face masks are an essential piece of equipment. Reducing airflow, increasing perspiration, and increasing warmth around the mouth are all side effects of wearing a facemask. This reduces the pH in the mouth, making it seem like the mouth is healthy even when there may be a problem. The usage of a facemask for an extended period of time can reduce metabolic heat loss.[22]

Oral health is an important indicator of general health and well-being.[23] Dentists have seen an increase in patients complaining of poor breath, rotting teeth, and bleeding gums during the COVID pandemic, compared to the incidence previous to the pandemic for a variety of reasons. Many patients who have worn masks for more than a couple of hours have complained of poor breath and dried mouth.

In former research, 33% of subjects opted for cloth masks.[24] Surgical/disposable masks were selected as the optimal choice in the current survey. The current survey shows that mouth masks cause a variety of negative side effects, including dry mouth and bad breath (halitosis), in a larger percentage of those who use them for long periods of time. Dry mouth was reported by 35% of participants in earlier surveys.[25]

Wearing a mask may alter the kind and quantity of microorganisms in your mouth, which can lead to plaque build-up and dental issues. However, proper oral hygiene helps avoid dental disorders, particularly periodontal disease and dental cavities.[26]

The study is adequate for testing the technical hypothesis but insufficient for analyzing multifactorial effects. Response bias may have occurred as a result of the questionnaire survey. The results should be interpreted with caution due to the sample characteristics, such as the fact that it was collected from a single hospital's dental opd and that the majority of respondents were female. The study's results provided a solid foundation for future studies. One patient-centered outcome is the patient's own assessment of his or her own oral health.

5. Conclusion

Mask mouth syndrome can be treated using a variety of low-cost, non-invasive options. Wearing a mask is a selfless act that could help someone out right now. Using this prophylactic measure for a long time could lead to mask mouth syndrome. Oral health concerns can be identified and treated to prevent mask use from being discouraged even if the risks of mask mouth syndrome outweigh the benefits of using a mask. Proper mask etiquette, good oral hygiene, staying hydrated, and regular dental check-ups are all important things that the public should be aware of and encouraged to do.

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Declaration of competing interest

None.

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