



Use of Face Masks and Self-Perceived Breath Odour Amidst Covid-19 Pandemic- A Cross Sectional Online Questionnaire-Based Study

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Abstract:

Background: Self-perception rate of bad breath is usually low. Unprecedented and massive use of face masks throughout the Covid-19 pandemic could have a bearing on increased self-perception of breath odour.

Aims and Objectives: To assess self-perceived breath odour (SPBO) associated with unprecedented wearing of face masks amidst Covid-19 pandemic.

Methodology: A cross-sectional study was carried out involving 547 subjects. A well-structured breath odour questionnaire was sent to the participants utilizing online social media platforms. The data collected was assessed and statistically analysed.

Results: Changes in self-perceived breath odour were reported by 190 participants. Females had higher SPBO than males post Facemask usage. Post pandemic SPBO were significantly associated with smoking, systemic conditions, and the period of face mask use and previous diagnosis of halitosis.

Conclusion: Wearing of facemasks are pronouncedly associated with self-perceived breath odour which is highly associated with the time period of its use. SPBO after facemask usage is significantly more in smokers, those on medication and those having previously been diagnosed with halitosis.

Keywords: breath odour, COVID-19, face mask, halitosis, self-perception

Introduction:

The unpleasant odour from the oral cavity is named commonly as bad breath or halitosis¹. Halitosis, also commonly known as “bad

breath,”; is a concern of many patients seeking help from health care professionals². The etiology of oral malodor can be of extra oral

origin or intra oral origin. It can have a physiological or pathological mechanism. Halitosis may be genuine halitosis, pseudo-halitosis and halitophobia. The main causes of halitosis in vast majority of affected population are related to intraoral factors such as poor oral hygiene, tongue coating, periodontal diseases and dental caries³. Extra-oral causes may arise from upper and lower respiratory tract, diabetes, liver problems, gastrointestinal tract conditions, use of medications, the intake of certain foods, alcohol consumption and smoking^{4,5}.

Halitosis has a global occurrence with a prevalence of 25-40%⁶. There can be a good amount of underestimation of its prevalence as most of the people seldom perceive their own breath odour⁷.

The subjective perception of breath odour is a puzzling issue and little is known about the factors that affect this perception of breath odour in the general population⁸. The difficulty of scenting one's own bad breath has been previously attributed to adaptation and habituation, although this could be questionable⁷.

With Covid-19 pandemic wreaking havoc and with its transmissibility rate, people started inculcating a new behavior- Covid appropriate behavior. Epidemiologic data suggested that droplets expelled throughout face-to-face exposure while talking, coughing or sneezing is the most common form of transmission⁹. Facemasks formed an indispensable arm of this behavior.

Health care workers being at the forefront of war against Sars-Cov-2, wear time of

facemasks is much higher compared to general population. Some adverse effects of this use have been reported, such as tolerability issues, discomfort and headaches¹⁰. A multitude of physiological and psychological effects of wearing face masks were also speculated.¹¹

Breathing inside the mask may change odorant concentrations to keeping the odour intensity constant and therefore influencing the individual's perception.¹²

This study was done to assess self-perceived breath odour (SPBO) associated with unprecedented wearing of face masks amidst Covid-19 pandemic.

MATERIALS AND METHODS

Sample and study design:

The present cross-sectional study was carried out on a sample of population including faculty, staff, administrative manpower and students and their families and friends to whom access through social media platforms was accessible. Both males and females, age between 15 and 65 years; smokers and non-smokers were included in the study. Patients with systemic diseases like Type 2 DM, those wearing masks for less than 1 hour per day were excluded from the study design.

Data collection and questionnaire items:

A well-structured questionnaire with closed-ended questions was randomly sent via various social media platforms to approximately 1500 individuals, retrieving 547 replies. The data collected was assessed and statistically analysed. The questionnaire included a total of 10 items. (Table 1)

Table 1:

Breath Odour Questionnaire
Did you ever perceive your breath having a foul odour?
Have you ever been diagnosed of bad breath?
Has any member of your family told you that you have bad breath?
On daily basis, for how much time did you use your face mask during Covid-19 pandemic?
Has wearing a face mask made you perceive that you have bad breath?
Do you plan to visit a dentist for treating your bad breath?
Are you a healthcare worker?
Are you a smoker?
Whether you are on any medication? if yes, please mention the illness.
Would you like your response included in this survey?

Ethical considerations:

The Institutional Ethical Research Committee of the institution approved the present study. It was fully conducted on the ethical principles of the Helsinki Declaration. All participants gave an informed consent prior to the entry in the study.

STATISTICAL ANALYSIS

Statistical analysis was performed using Statistical package for social sciences (SPSS) version 23.

P-value of ≤ 0.05 was considered statistically significant.

RESULTS

Sample was composed by 547 individuals, age range 15 to 65 years old, 322 men (58.8%) and 225 women (41.2%). All of the participants reported face mask usage during Covid-19 pandemic with varying daily frequencies of - less than 1 h for 55 individuals (10.05%), from 1 to 3 h for 105 individuals (19.19%), from 4 to 6 h for 161 individuals (29.43%) and greater than 6 hours for 226 individuals (41.31 %). The subjects who reported having changed their

SPBO post wearing a face mask was 34.7% (n =190). SPBO was higher among females (n=110) The statistic to be underlined here is that 296 individuals who didn't report of SBPO before the pandemic when compared to 186 individuals who reported of bad breath after the pandemic.

427 (78.2%) of the participants were non-smokers. 64 subjects (11.7%) had previously been diagnosed of bad breath. 170 participants (31%) were on medication for systemic disease. SPBO was comparatively higher for those who had earlier been diagnosed with bad breath ($p < 0.005$), for smokers ($p < 0.001$), and for those on medication for systemic disease ($p < 0.004$). (Table 2)

Also, worth highlighting is the fact that a good percentage of healthcare workers (43.7%) reported of SPBO after wearing of facemasks during Covid-19 pandemic. A partly percentage (16.1 %) of participants were planning to visit a dentist for treating their bad breath.

Self-perceived Breath Odour (SPBO) Measures among the study sample:**Table 2;**

Gender	NO	YES	P
Males(n=322)	242 (75.15 %)	80 (24.85%)	
Females(n=225)	115(51.11%)	110 (48.89%)	
Smokers	NO	YES	P
NO (n= 427)	92.3%(n=394)	7.7%(n=33)	<0.001
YES (n=120)	9.7 %(n=12)	90.3%(n=108)	
Earlier Diagnosed?	NO	YES	P
NO(n=483)	95.65 %(n=462)	4.35%(n=21)	<0.005
YES(n=64)	68.40 %(n=44)	31.60%(n=20)	
On medication	NO	YES	P
NO (n=377)	95.3%(n=359)	4.7%(n=18)	<0.004 (CI 95%)
YES (n=170)	5.85 %(n=10)	94.15%(n=160)	
Face mask Wearing	NO	YES	P
< 1 hour per day (n=55)	96.36%(n=53)	3.63%(n=2)	Baseline/Reference
1-3 hours per day(n=105)	94.29%(n=99)	5.71%(n=6)	<0.005
4-6 hours per day(n=161)	83.23%(n=134)	16.77(n=27)	<0.005
> 6 hours per day(n=226)	65.49%(n=148)	34.51(n=78)	<0.001

DISCUSSION

The present study was conducted to assess the impact of unprecedented wearing of facemasks over self-perceived breath odour amid Covid-19 pandemic.

Until recently, use of facemasks was largely limited to the medical realms. Face mask wearing can be conceived within the practice of extending the medical science into the “outside world,” by making the behaviors and rituals of the society/culture more alike the scientific (laboratory) practices.¹³ In the present study, facemask wearing time among the participants varied from a few hours of usage to keeping the mask on for more than 6

hours daily. 29.25 % of participants recorded a wear time of less than 3 hours while as 41.31% wore it for more than 6 hours. Expectedly, health care personnel formed a vast majority of participants who wore it for more than 6 hours per day. In a study by Faria et al,2021, 11.3 percent of participants had a facemask wear time of more than 6 hours.¹² The difference can be attributed to the fact that a good percentage of participants in the present study had a medical professional background.

The present study showed that 34.7% of the study sample had an altered SPBO post wearing a face mask amidst the current pandemic. A total of 186 individuals started perceiving their halitosis during the pandemic.

These findings are highly consistent with the results of a similar study by Faria et al,2021 that reported 33.8% of their study sample with SPBO during the pandemic⁸. Eli et al,2001, described self-perception as multifactorial, closely related to body image and both physiological and psychological factors.⁸ The increased wearing of facemasks having had no historical precedent, may increase the self-perception of breath. This particularly can be due the fact that return or back-breath from masks can increase the self-perception of halitosis.

SPBO and wear time of masks form a highly relevant coupling variables. The participants who wore their facemasks for more than 6 hours had a more likelihood of perceiving halitosis (OR=2.10).

Breath odour's self-perception and self-estimation are closely related to preconceived assumptions and evaluations, being similarly subjective (Rosenberg et al., 1995)⁷. Previous perceptions about breath malodor hence understandably increase the chances of SPBO during the pandemic. In the present study, with regards to SPBO, 11.7% participants had previously been diagnosed of bad breath. SPBO was comparatively higher for those who had earlier been diagnosed with bad breath.

Smoking habits are an extrinsic origin of halitosis.¹⁴ Smoking also predisposes to xerostomia (dry mouth) that is a further cause of oral malodour (Scully & Greenman, 2008), and it was also associated with self-perceived halitosis (Al Sadhan, 2016).^{15,16} In a study by Setia et al (2014), smoking and dryness of mouth had statistically significant correlation with halitosis¹⁷. The present study participants who were smokers also reported a higher SPBO ($p < 0.001$). This further amplifies the duty of oral care professionals in aiding and guiding their patients towards smoking cessation.

In the present study, the participants who were on medication for systemic diseases had a

higher percentage of reporting SPBO($p < 0.004$). Kinberg et al. published a review in 2010, in which they examined 94 patients having halitosis out of which 54 had gastrointestinal pathology suggesting that gastrointestinal is one of the common extra oral causes of halitosis¹⁸. Various drugs like Griseofulvin, Antihistaminic, Chloralhydrate, Penicillamine, Bisphosphonates, Metronidazole, Diuretics etc. are known to cause halitosis.

Some limitations of the present study could not be ruled out. Being a questionnaire-based study, some bias is inevitable. The study can be extrapolated by conducting similar studies with a larger sample size. Other Demographic variables like socioeconomic and educational background can be standardized.

CONCLUSION

Wearing of facemasks are pronouncedly associated with self-perceived breath odour which is highly associated with the time period of its use. SPBO after facemask usage is significantly more in smokers, those on medication and those having previously diagnosed with halitosis. Individuals self-perceived oral health may enable oral healthcare professionals towards a more patient centric outcome.

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