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Association and awareness on Covid associated halitosis among dental students- a survey

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ABSTRACT :

INTRODUCTION:

Halitosis may be a reflective condition for systemic insults like respiratory, and gastrointestinal pathologies which will give salivary characteristics and tongue dorsum susceptibility for hosting anaerobic microorganisms. The high prevalence of halitosis globally requires a multidisciplinary approach for its diagnosis, assessment and treatment to reduce halitosis.During the COVID period ,people affected by the COVID and in the older age people have several oral problems and halitosis. The aim of this is to create awareness among the people about bad breath during COVID and also aimed at investigating the effect of mouth breathing on dental, oral health status and halitosis.

MATERIALS AND METHOD :

This study was about bad breath during COVID pandemic period. A self-administered questionnaire concerning various aspects of bad breath was distributed among 113 dental students of Saveetha University ,Chennai. A questionnaire based survey in google forms circulated within the dental students of Saveetha University ,Chennai. Responses of about 113 participants were received and the data was recorded . Statistical analysis was done . The data was tabulated. The data was analysed using SPSS software (version 23) and the chi-square test was done. The level of significant difference was $p<0.05$. The study was approved by SRB of Saveetha Dental College.

RESULT :
In our study, the age group between 18-19 were more aware of halitosis during COVID.Male were more aware of halitosis and undergraduate students were more aware about halitosis. About 64.6% of people think that bad breath is common for all diseases and the p value is 0.35. About 63.7% of people are aware of the term halitosis and 36.3% of people are not aware of halitosis and the p value is 0.32. About 83.3% of people think that breathing through the mouth causes dental caries and 17.7% responded No and the p value is 0.057.

CONCLUSION :
The present study offers an opportunity of diagnosing the origin of halitosis and to create awareness among the people about oral complications. Majority of people think that bad breath is common for all diseases.In our study, we can see the complications of halitosis and create awareness among the people.

KEY WORDS : Bad breath, Halitosis ,Oral health, COVID period, innovative method

INTRODUCTION :

The term “halitosis“ comes from the Latin halitosis (expired air) and it's a term that refers to unpleasant breath. It’s non-oral aetiology includes tract conditions, gastrointestinal and neurological disorders, various sorts of systemic diseases like diabetes, certain sorts of carcinoma, hormonal changes like menstruation and pregnancy(1). There's also physiological halitosis, referred to as morning halitosis, which appears after several hours of sleep and fasting, in response to the decomposition of food particles and bacterial agglomeration aggravated by reduction in salivary flow and pH(2).Halitosis may be a reflective condition for systemic insults like respiratory, and gastrointestinal pathologies which will give salivary characteristics and tongue dorsum susceptibility for hosting anaerobic microorganisms. The high prevalence of halitosis globally requires a multidisciplinary approach for its diagnosis(3,4).

During the COVID period, people affected by the COVID and in the older age have several oral problems and halitosis(5). Lack of oral hygiene, opportunistic infections, stress, immunosuppression, and hyper-inflammatory response secondary to COVID-19 are the foremost important predisposing factors for onset of oral lesions in COVID-19 patients(6).Organoleptic tests are essential within the diagnosis and treatment of halitosis thanks to three main functions: (A) measuring halitosis, for which it is considered because the gold standard method; (B) helping patients to recover their self-confidence as they get more confident whenever their breath is well evaluated; (C) assessing the origin of halitosis through oral and nasal organoleptic tests and by comparing mouth and nose exhaled air, which is feasible for diagnosing oral, nasal or extraoral origins of halitosis with a really small error margin(7,8). Dysgeusia is called a diminished taste sensation, it is the first oral symptom for coronavirus.

The goal is to exchange chemical testing methodologies with less cost effective methods(7–9). At the start of COVID-19 pandemic period where there's a scarcity of oral involvement features during COVID period. There's just one systematic review of oral manifestation of COVID-19 focused on impairment of taste. The foremost of individuals aren't conscious of COVID and not aware of bad breath which can lead to oral manifestation. Most people think that bad breath is sort of a small bacterial disease(10). Other authors studied Halitosis during COVID, a replacement technique for tongue brushing halitosis reduction, dental health halitosis and mouth breathing and potential connection, oral manifestation

of COVID-19 disease, risk factors of critical and mortal COVID-19 cases. a scientific literature review and meta analysis, diagnostic procedure for assessing Halitosis origin using oral and nasal organoleptic tests(11). Our team has extensive knowledge and research experience that has translated into high quality publications (12),(13),(14),(15),(16),(17),(18),(19),(20),(21),(22),(23),(24),(25),(26),(27),(28),(29),(30),(31). The aim of this study is to create awareness among the people about bad breath during COVID and also aimed at investigating the effect of mouth breathing on dental, oral health status and halitosis.

MATERIALS AND METHODS :

Study design: In the present study, the study subjects were recruited from undergraduate dental students of Saveetha University. The questionnaire based survey was sent through online Google forms. Data was collected by means of entering intoMicrosoft Excel and sheets and analysed by SPSS Version 23 and Data analysis. Descriptive analysis through pie charts and correlation is done by Bar charts.This study was about bad breath during COVID pandemic period. A self-administered questionnaire concerning various aspects of bad breath was distributed among 113 dental students of Saveetha University ,Chennai. A questionnaire based survey in google forms circulated within the dental students of Saveetha University ,Chennai. A response of about 113 received and the data was collected. . Statistical analysis was done . The data was tabulated . The data was analysed using SPSS software (version 23) and the chi-square test was done. The level of significant difference was $p<0.05$.The study was approved by the Scientific Review Board of Saveetha Dental College.

QUESTIONNAIRE :

The questionnaire comprised a series of questions including their demographic characteristics like age ,gender and qualification.The other questions are as follows:

1- Do you think mouth breathing has effects on your oral cavity?
2- Do you think bad breath is common for all diseases?
3- Do you smell bad when you are wearing a mask?
4- Which causes more bad breath to the mouth?
5- Do you think smoking and chewing tobacco cause bad breath?
6- Are you aware of the term halitosis?
7- Do you think breathing through the mouth causes dental caries?
8- Have you done any treatment for oral complications?
9- Do you think bad breath is associated with COVID?

RESULT :

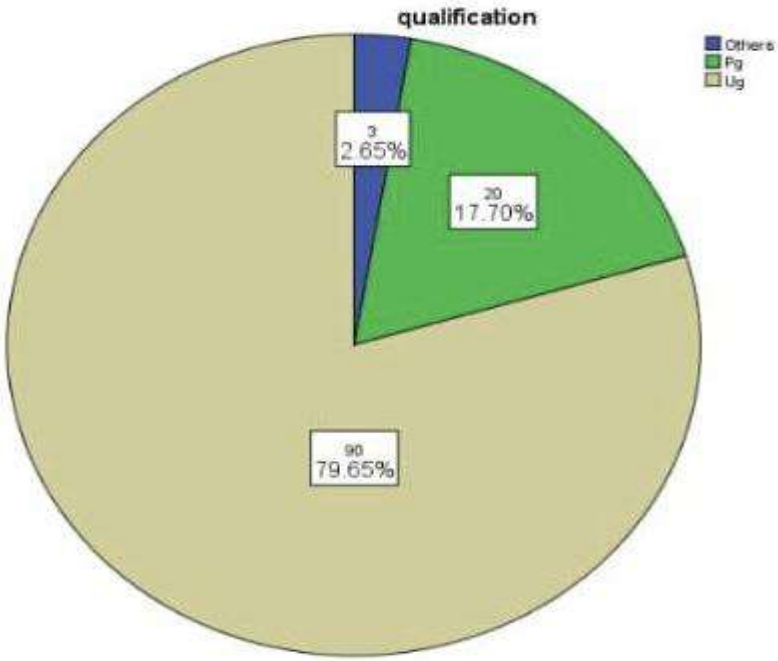

Figure 1 : Pie chart showing the percentage distribution about the year of study of students. where the beige colour represents undergraduates (79.65%), Green represents post graduates (17.70%) and Blue represents others (2.65%). Majority of the people in our study were undergraduates.

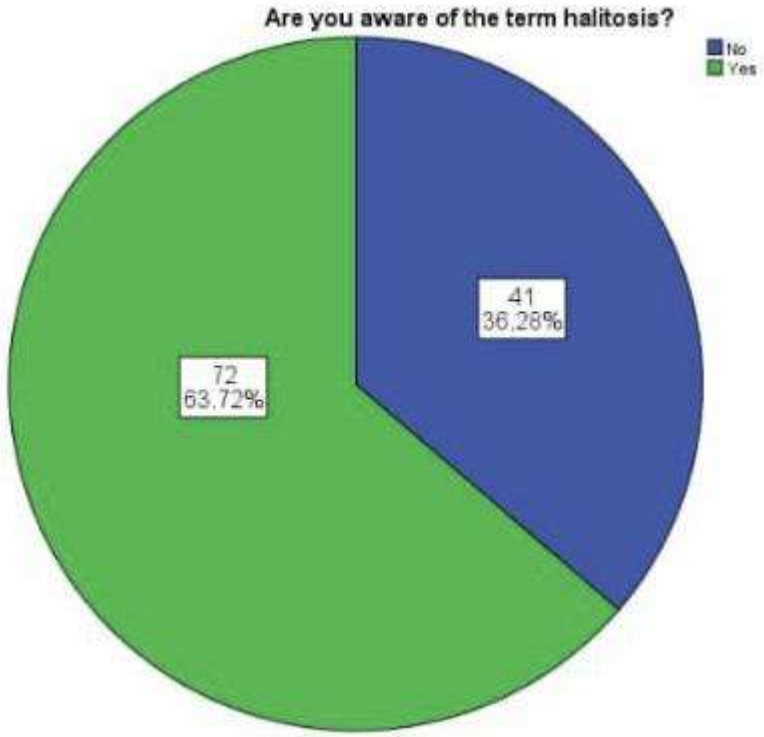

Figure 2 : Pie chart showing the percentage distribution of awareness about bad breath among the people . where Green represents those who responded Yes (63.72%) and Blue represents those who responded No (36.28%). About 63.72% of the population were aware of the term halitosis and 36.28%

of the population were not aware of the term implying that the majority of the people were aware of halitosis.

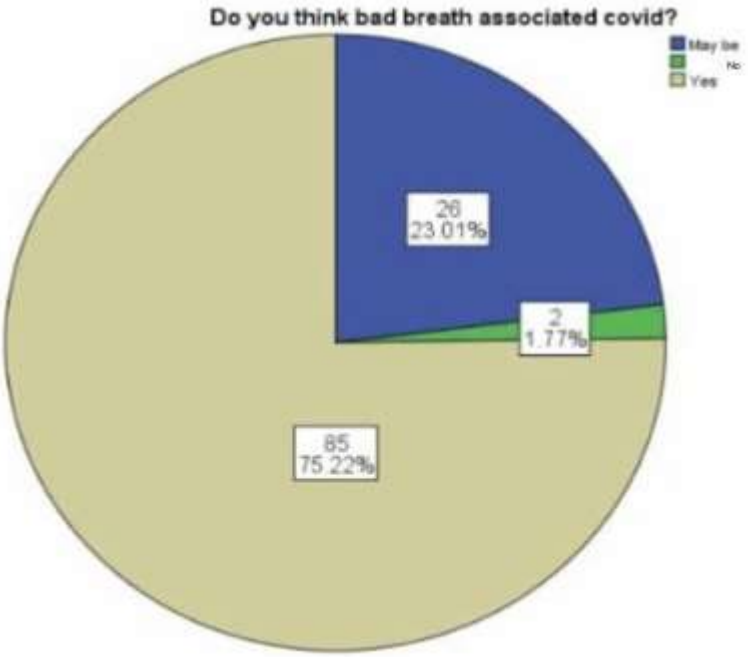

Figure 3 : Pie chart showing the percentage distribution about bad breath associated with COVID. wherein beige colour represents those who responded Yes (75.22%) and Blue represents those who responded Maybe (23.01%) and green colour represents those who responded No (1.77% . About 75.22% of the population think that bad breath is associated with COVID, about 1.77% of populations think that bad breath is not associated with COVID and 23.01% of populations think that bad breath may be associated with COVID implying that majority of population think that bad breath is associated with COVID.

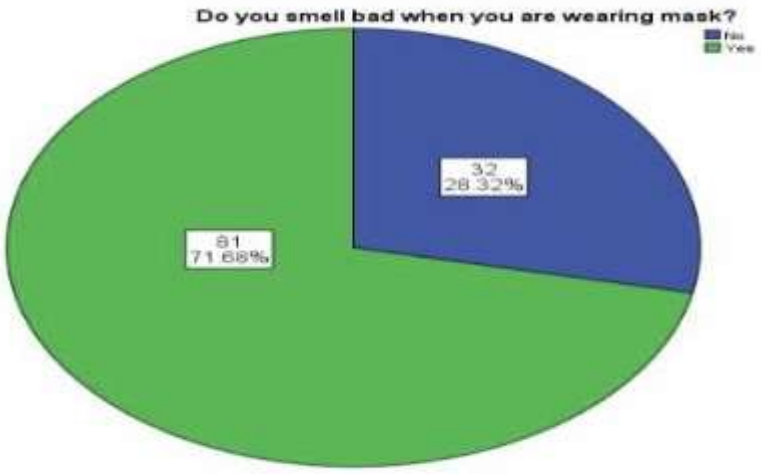

Figure 4 : Pie chart showing the percentage distribution about smelling bad when wearing a mask. where Green represents participants who responded Yes (71.68%) and Blue represents participants who responded No (28.32%). About 71.68% of the population smelled bad when they were wearing

masks,about 28.32% of the population did not smell bad when they were wearing masks implying that the majority of them smelled bad when they were wearing masks.

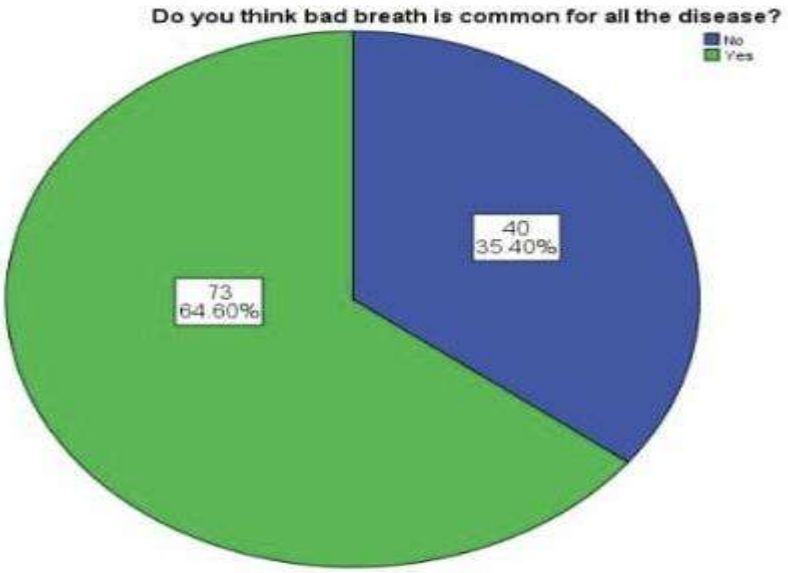

Figure 5 : Pie chart showing the percentage distribution about bad breath common for all diseases. where Green represents participants who responded Yes (64.60%) and Blue represents participants who responded No (35.40%). About 64.60% of the participants think that bad breath is common for all diseases, about 35.40% of the population think that bad breath is not common for all diseases. Majority of them think that bad breath is common for all diseases.

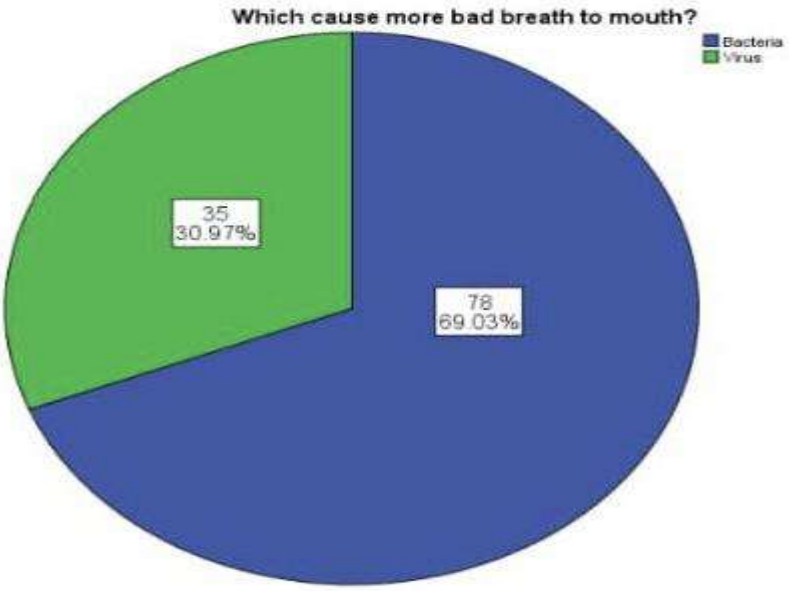

Figure 6 : Pie chart showing the percentage distribution about what causes bad breath. where Green represents those who responded to viruses (30.97%) and Blue represents those who responded to bacteria(69.03%) . About 69.03% of the population think that bacteria cause more bad breath to

mouth, 30.97% of populations think that viruses cause more bad breath to mouth implying that majority of them think that bacteria cause more bad breath.

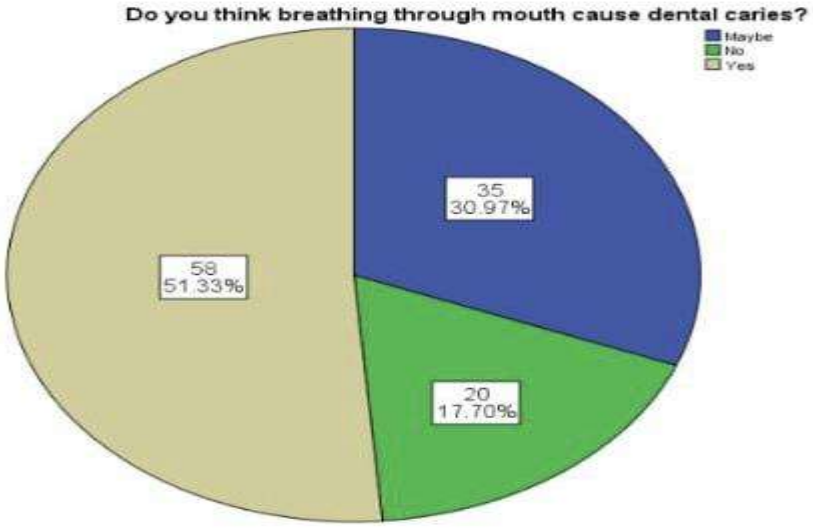

Figure 7 : Pie chart showing the percentage distribution about breathing through mouth causing dental caries. where Green represents those who responded No (17.70%), Blue represents those who responded May be (30.97%) and Beige colour represents those who responded Yes(51.33%) . About 51.33% of populations think that breathing through mouth causes dental caries, about 30.97% of populations think that breathing through mouth does not cause dental caries ,about 17.70% of populations think that breathing through mouth causes dental caries implying that majority of them think that breathing through the mouth causes dental caries.

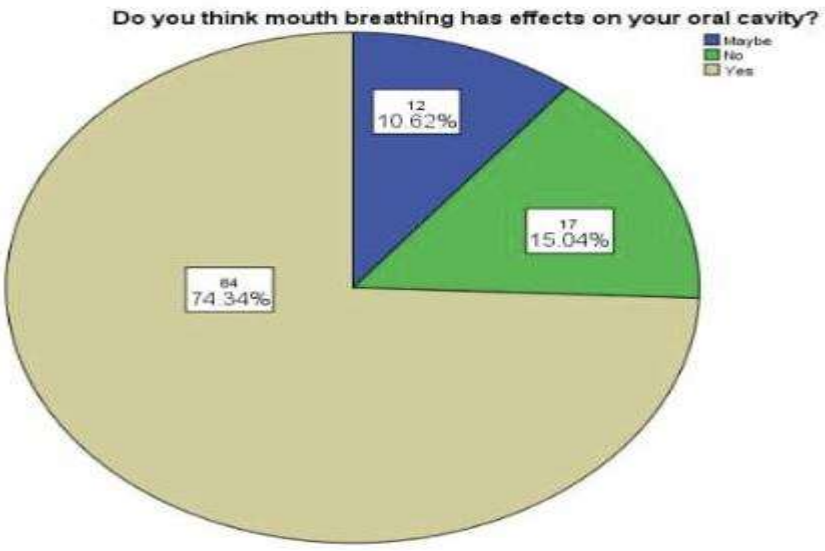

Figure 8 : Pie chart showing the percentage distribution about the effects of mouth breathing on your mouth. where Green represents those who responded No (15.04%) and Blue represents those who responded May be(10.62 %) and Beige colour represents those who responded Yes (74.34%). About

74.34% of population think that mouth breathing has effects on oral cavity, 15.04% of population think that mouth breathing has no effects on oral cavity and 10.62% of population think that mouth breathing may have effects on oral cavity implying that majority of them think that mouth breathing has effects on the oral cavity.

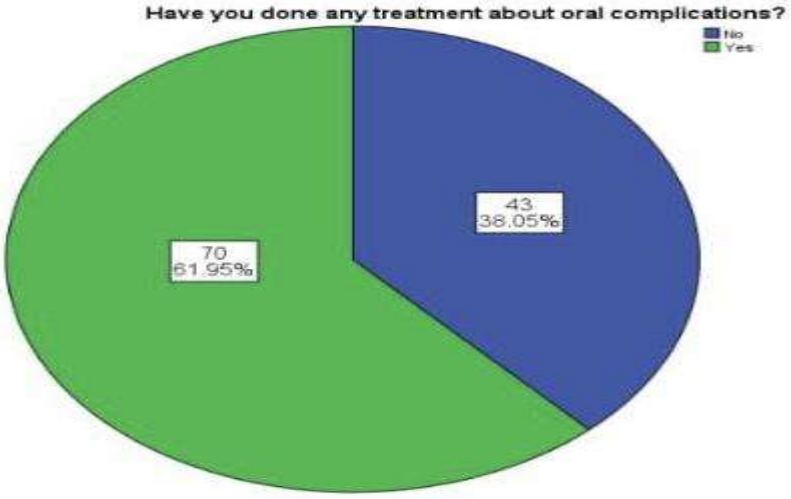

Figure 9 : Pie chart showing the percentage distribution about have you done treatment for oral complications. where Green represents those who responded Yes (61.95%) and Blue represents those who responded No (38.05%). About 61.95% of populations have done treatment on oral complications, about 38.05% of populations have not done treatment on oral complications implying that majority of them have done treatment on oral complications.

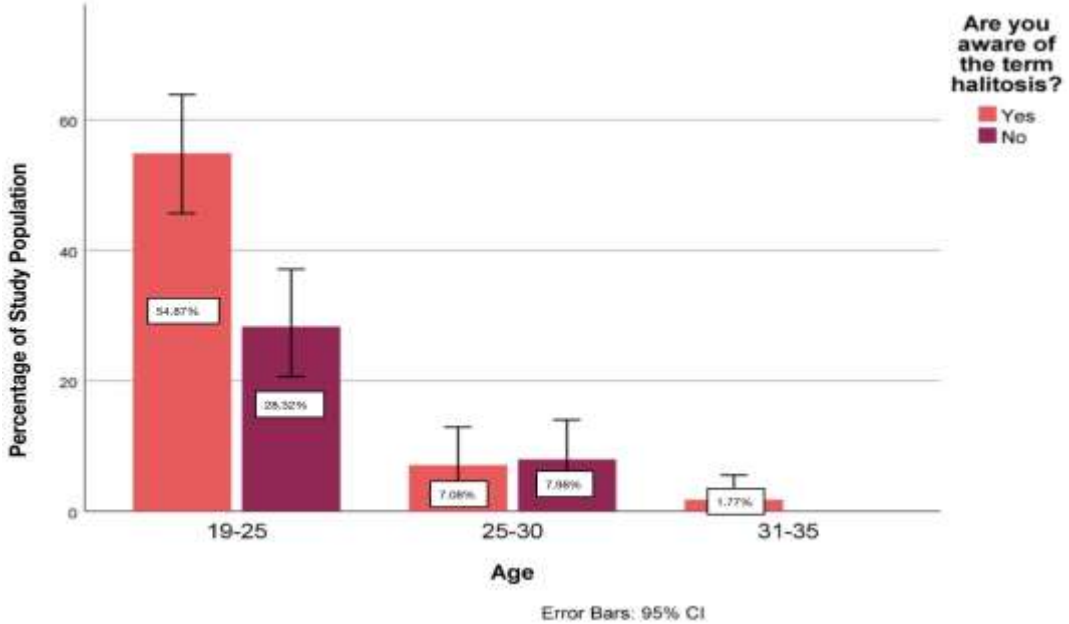

Figure 10 : Depicts the bar chart showing association between students' responses based on age. The X axis represents the age and the Y axis represents the percentage . Orange represents Yes and Maroon represents No. Majority of age groups between 19-25 were more aware of halitosis than others . Chi-square value 1.825 and p value is 0.402 ($p > 0.05$) indicating statistically insignificant. The age group between 19-25 were more aware of halitosis, other age groups are less aware of halitosis.

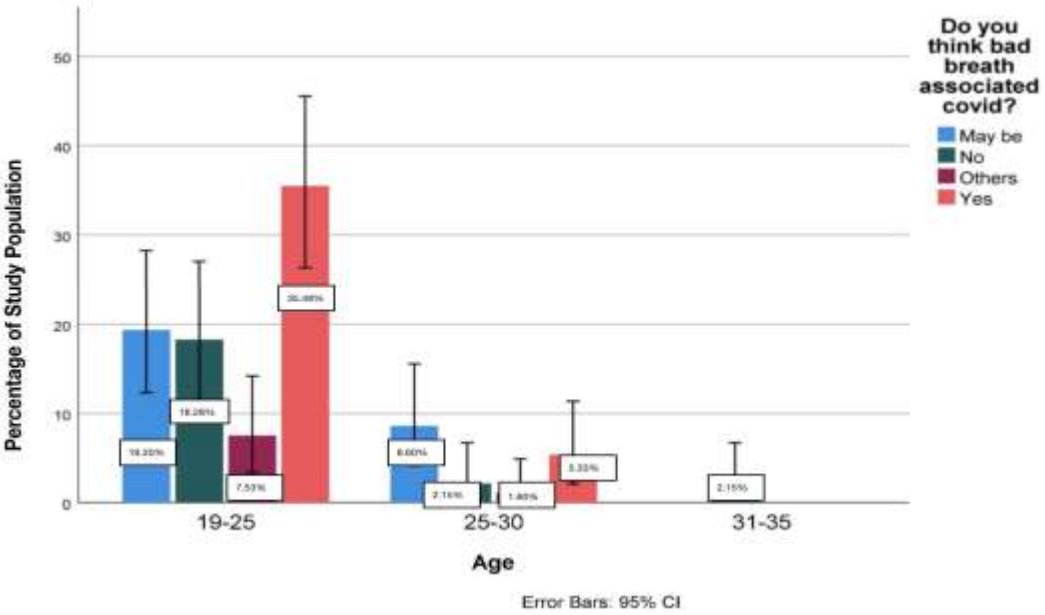

Figure 11 : depicts the bar chart showing association between students' responses based on age . The X axis represents the age and the Y axis represents the percentage. Green represents no and Blue represents Maybe, Orange represents yes and Maroon represents others. Majority of age groups between 19-25 says that bad breath is associated with COVID than others. Chi-square value 3.295 and p value is 0.915 (p >0.05) indicating statistically insignificant.Most of the participants between the age 19-25 says that bad breath is associated with covid and the age group between 26 -30 says that may be bad breath associated with covid .

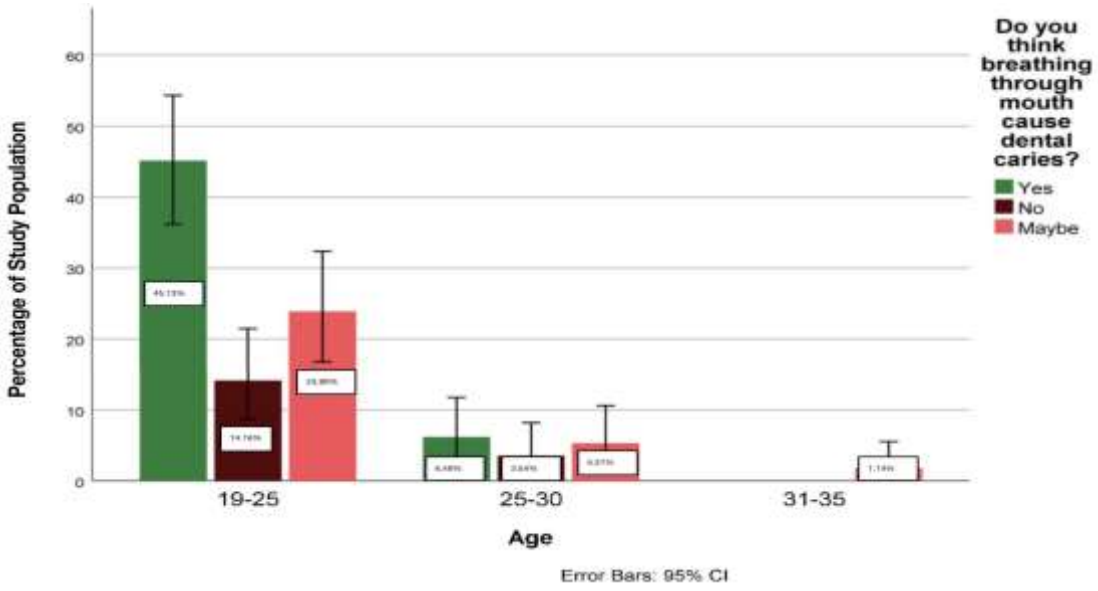

Figure 12 : depicts the bar chart showing association between students' responses based on age . The X axis represents the age and the Y axis represents the percentage . Green represents Yes and Orange represents Maybe and Brown colour represents No . Majority of age groups between 19-25 think that breathing through the mouth causes dental caries . Chi-square value 7.58 and p value is 0.095 (p>0.05) indicating statistically insignificant.The participants between the age 19-25 think that breathing through the mouth cause dental caries.

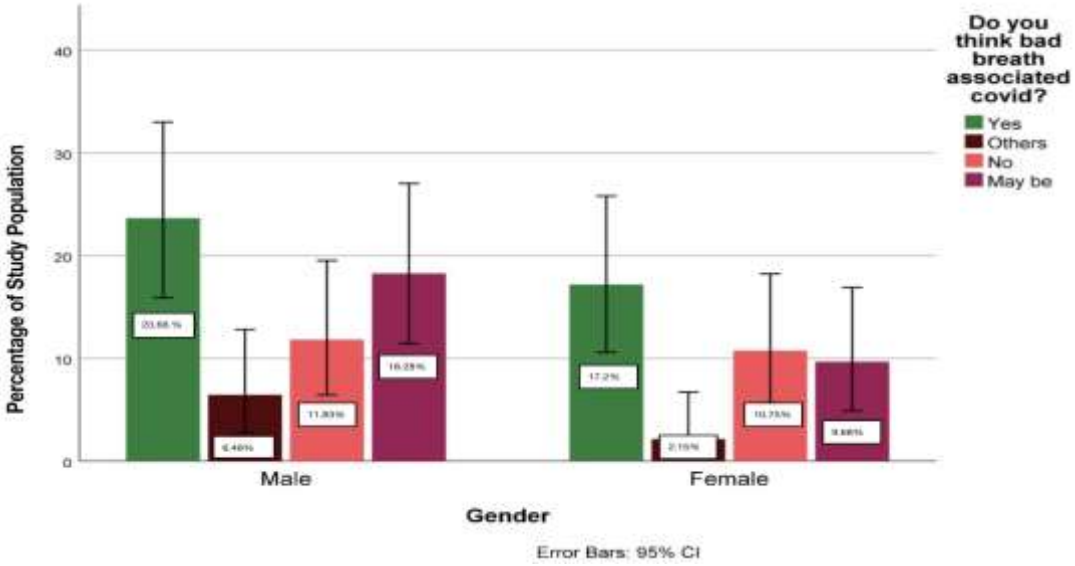

Figure 13 : depicts the bar chart showing association between students' responses based on gender and bad breath associated with covid .The X axis represents the gender and the Y axis represents the percentage. Green represents Yes, Orange represents No, Maroon represents Maybe and Brown represents Others. Majority of females 29.73% said Yes and the majority of male 46.85% said yes. Chi-square value 0.273 and p value is 0.87 (p>0.05) indicating statistically insignificant.Majority of the male participants says that bad breath is associated with covid.

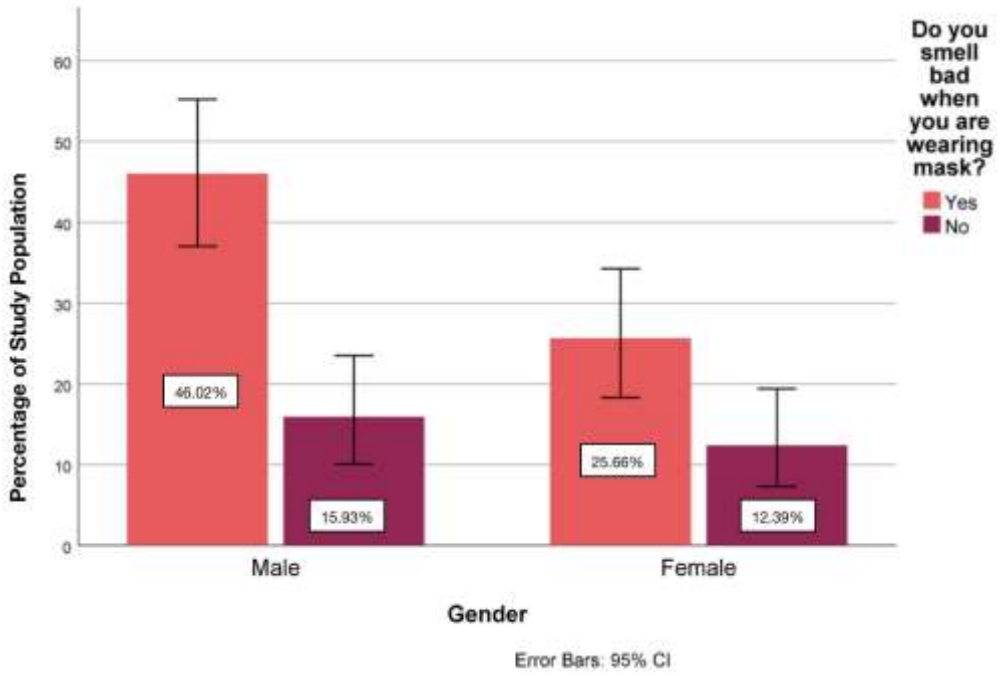

Figure 14 : depicts the bar chart showing association between students' responses based on gender . The X axis represents the gender and the Y axis represents the percentage. Orange represents Yes and Maroon represents No. Majority of females 25.66% said Yes and the majority of male 46.02% said yes. Chi-square value 0.615 and p value is 0.43 (p >0.05) indicating statistically insignificant. Majority of males smell bad when they are wearing a mask.

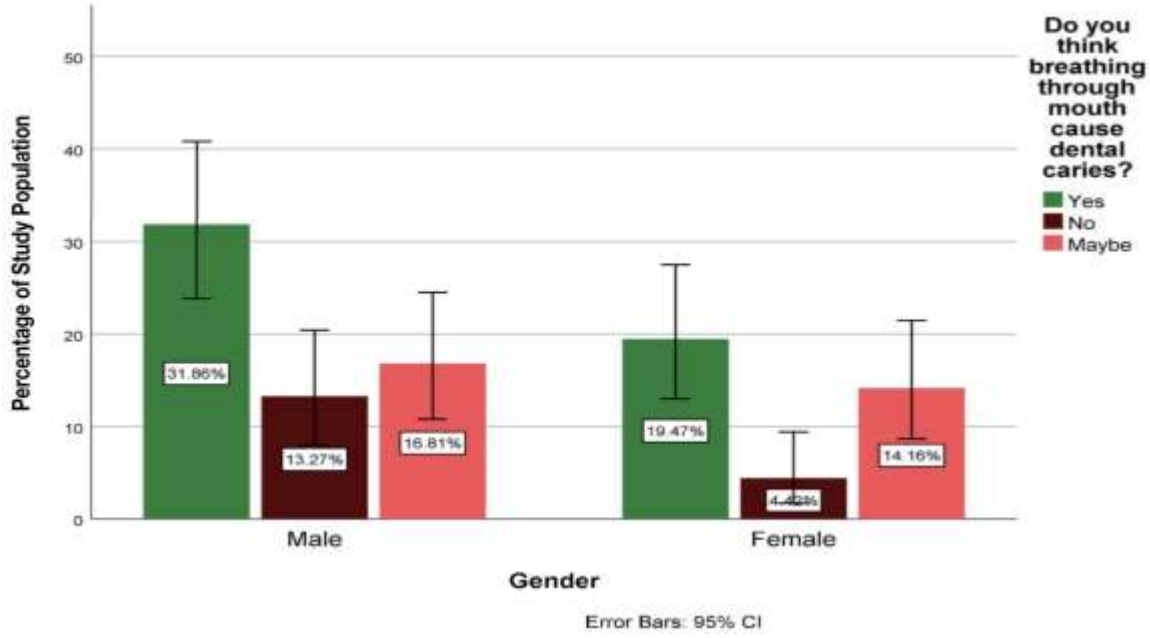

Figure 15 : depicts the bar chart showing association between students' responses based on gender. The X axis represents the gender and the Y axis represents the percentage . Green represents Yes, Orange represents Maybe and Brown colour represents No. Majority of females 19.47% said Yes and the majority of male 31.86% said yes . Chi-square value 2.31 and p value is 0.31 (p >0.05) indicating statistically insignificant. Majority of males think that breathing through the mouth causes dental caries.

In our study, the age group between 18-19 were more aware of halitosis during COVID. Male were more aware of halitosis and undergraduate students were more aware about halitosis. In our study, most of the people were not aware of the term Halitosis. Participants between the age 19-25 are more aware of bad breath (Figure-10). Dental students are aware of bad breath and others are not much aware of bad breath. Most of them say that it has effects on the oral cavity and think that bad breath is common for all diseases (Figure-5).In our study, the age group between 19-25 were more aware of halitosis . Male were more aware of halitosis and undergraduate students were more aware about halitosis (Figure-1). About (71.7%) of people smell bad when they are wearing a mask and the p value is 0.43 (Figure -14).Most of them think that breathing through the mouth causes dental caries and (17.7%) of people say No for breathing through mouth causes dental caries and p value is 0.095 (Figure-12) .In our study, the majority of males think that breathing through the mouth causes dental caries. About (64.6%) of people think that bad breath is common for all diseases (Figure-5). About (71.7%) of people smell bad when they are wearing a mask and the p value is 0.43 (Figure- 14).69% of the participants consider bacteria to cause bad breath and 31% of people say that viruses cause bad breath to the mouth (Figure-6) . About 63.7% of people are aware of the term halitosis and 36.3% of people are not aware of halitosis (Figure-2).

DISCUSSION :

In our study, most of the people are not aware of the term Halitosis. Participants between the age 19-25 are more aware of bad breath. Dental students are aware of bad breath and others are not much aware of bad breath. Most of them say that it has effects on the oral cavity and think that bad breath is common for all diseases.In our study, the age group between 19-25 were more aware of halitosis . Male were more aware of halitosis and undergraduate students were more aware about halitosis. In our study , individuals between the age of 19-25 are aware of COVID and bad breath, whereas people with 29 and above age people are not much aware of COVID and bad breath. In our study, dental students are more aware of COVID and others are less aware of COVID and bad breath and among dental students undergraduate students were aware of bad breath.In previous research, post graduate students were more aware of bad breath(32). In our study ,most of them think that mouth breathing has effects on the oral cavity about (74.3%) and p value is 0.11. In previous research ,around (80%) of people think that mouth breathing has effects on the Oral cavity(32).In our study, Around (71.4%) of people feel that smell is bad when they are wearing a mask . Around (69%) of people say that bad breath is due to Bacteria and the p value is 0.31. In the previous research, about (70%) of people said that bad breath is due to bacteria((33–35).In our study, around (63.7%) of people are aware of the term Halitosis and p value is 0.36. (51.3%) of people think that bad breath is associated with COVID and p value is 0.02 . In previous research , around (90%) of people think that bad breath is associated with COVID and around (85%) of people were not aware of the term halitosis before COVID (36).In previous findings suggest that possible epithelial alterations of the tongue dorsum may be caused by SARS-CoV-2 which are located in abundance around the oral mucosa .By further investigation found that halitosis was strongly associated with epithelium of tongue .The acute infections of covid can cause xerostomia and thus leads to greater occurrence of halitosis.In another study, Bacterial infections arising along with covid may have a role in modulating the oral environment to favour the proliferation of halitosis associated microbes. The impact of the covid outbreak could change health ,behaviours and oral hygiene. Mouth breathers are at a higher risk of getting infected by covid,it leads to developing xerostomia and halitosis. A 35 year-old female presented with severe

halitosis adjacent to necrotizing gingivitis which suggested the impact of bacterial coinfection with covid(4).Another indirect effect of covid on oral health recorded by previous researchers is triggered by universal masking which may cause mouth breathing leads to xerostomia and halitosis. The diagnosis of halitosis in covid affected people is increased attention of the public towards their mouth odour due to their new habit of wearing face masks thus indicating that halitosis was previously undiagnosed(37).These studies to estimate the prevalence of halitosis among covid affected people and to further investigate possible complications that may be linked with Covid. In our study, other than dental students are not aware of bad breath and Halitosis associated with COVID.Both male and female should be aware that Halitosis is associated with COVID. Only the people 19-25 are aware of bad breath and other age group people are not much aware of the term halitosis.Most of them are not aware of Halitosis and think that bad breath is common for all diseases and they are not aware that bad breath was also associated with COVID. In our study ,people were not very aware of halitosis (bad breath) and they think bad breath is common for all diseases.

Limitation:

Limitation of our study is less number of samples in a shorter period of time.

Future scope:

This study is to create awareness among them and to know about oral complications due to bad breath during complicated periods.

CONCLUSION:

In our study, dental students were aware of halitosis and others were not much aware of halitosis.Most of them think that bad breath is common for all diseases. Further studies should evaluate test methods and refine the guidelines to stop the spreading of the disease and to make awareness among the people about bad breath.

ACKNOWLEDGEMENT :- Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Science, Saveetha University

CONFLICT OF INTEREST :

The author declares that there was no conflict of interest in the present study

SOURCE OF FUNDING :

The present study was supported by the following agencies

- Saveetha Institute of Medical and Technical Sciences
- Saveetha Dental College and Hospitals
- Saveetha University
- Dhanalakshmi dental clinic, Madurai

AUTHORS CONTRIBUTION :

SATHYA KUMAR .M :Literature search, data collection analysis, manuscript drafting.

Dr. Palati sindhuja : Aided in conception of the topic, has participated in the study design, and has supervised in preparation and final corrections of the manuscript.

Dr . Lakshmi .T. A : Data verification, manuscript drafting, preparation of the manuscript.

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