



Self-Perceived Halitosis amongst School, Junior College and Dental College Students in Navi Mumbai Region- 'a Kap Survey'

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Abstract

Aim: The aim of this study is to evaluate the knowledge, attitude and practices of school, junior college and dental college students regarding self-perceived halitosis create awareness regarding halitosis in Navi Mumbai region.

Materials and methods: A structured questionnaire was given to 600 students which included , 200 students from 9th and 10th standard , 200 students from 11th and 12th standard and 200 students from 1st and 2nd year dental college. Questions were designed to relate halitosis to habits, oral hygiene, systemic disease and practices performed to mask halitosis.

Result: Out of the total, 21% reported of having halitosis, 22% were doubtful about the condition and 57% reported negative for halitosis. Out of the total 127 students who reported affirmative for halitosis, 51% were male students and 49% were female students. 75% of the students felt bad breath during morning hours, 6% in the afternoon, 8% in evening and 11% all day. In this study significant relation between oral pathologies such as dryness of mouth, bleeding gums, dental caries and halitosis was found. Around 84% students thought they should consult a dentist for halitosis. Out of the total students who suffered from halitosis, 17% suffered from systemic disease. The students showed overall poor oral hygiene habits such as not brushing twice daily, not using tongue cleaner and mouthwash. It was found that 48% students having halitosis consume chewing to mask bad breath.

Conclusion: The knowledge among the young population regarding halitosis and oral hygiene habits is inadequate. Most of the students were unaware about the different extra oral etiological factors for halitosis and end up thinking that it is because of a dental origin.

Keywords: Bleeding Gums; Caries; Habits; Halitosis; Oral Hygiene; Self-Perceived; Systemic Disease; Volatile Sulphur Compound

Abbreviation: VSCS; Volatile Sulfur Compounds: H_2S ; Including Hydrogen Sulphide: CH_3Sh ; Methyl Mercaptan: $(CH_3)_2S$; Dimethyl Sulphide

Introduction

Halitosis is a term derived from the Latin word "halitus" (breath) and the Greek suffix "osis" [1]. It is also called as bad breath, fetor oris, ozostomia, stomatodysodia, breath malodour. It is a symptom in which an unpleasant odor is present on the exhaling out [2]. Halitosis represents a common dental condition, although sufferers are usually not conscious of it. According to American Academy of Periodontology, Glossary of Periodontal Terms, Halitosis is defined as breath that is offensive to others, caused by a variety of reasons including but not limited to periodontal disease, bacterial coating of tongue, systemic disorders and different types of food [3].

Classification of halitosis based on etiology was given by Dominic *et al* 1982 [4], also based on cause another classification was given by Bogdasarian 1986 [5], based on local and systemic factors was given by Glickman 1894 and based on treatment needs was given by Miyazaki *et al* [7].

In simplified terms halitosis could be of the following forms, genuine halitosis, pseudo-halitosis and halitophobia. Genuine halitosis is further classified as physiologic halitosis or pathologic halitosis. Pseudo-halitosis is when oral malodour is absent but the patient believes that he or she has oral malodour. If after treatment for either genuine halitosis or pseudo-halitosis, the patient still believes that he or she has halitosis, it would be halitophobia [8]. Transient malodor caused after consumption of garlic, onion, alcohol and certain medication should not be considered as halitosis [9].

Halitosis can be subdivided into intra-oral and extra-oral halitosis, depending on the place where it originates [10]. Halitosis arises more than 80% from an intra-oral cause and 20% from extra oral causes [11]. Intra oral causes are tongue coating, periodontal infection, dental pathologies, dry mouth etc. Extra oral causes mainly involve the systemic diseases or metabolic disorders [12].

Two pathways have been identified for bad breath the first one is blood gas exchange in which there is an increase of metabolic products in the blood circulation which will then escape during breathing. The second pathway is due to increase in either the bacterial load or the amount of substrates for these bacteria at one of the lining surface of the oropharyngeal cavity and respiratory tract [11].

The malodor in case of halitosis arises mainly from volatile sulphur compounds especially hydrogen sulphide, methyl mercaptan and less important dimethyl sulphide. Sometimes, characteristic odor is seen for example, sulfur odour in case of intra oral origin, sweet odour in case of liver disease, rotten apples in case of diabetes mellitus, and fish odour in case of uraemia [11].

Aim and objective

The aim of this study was to determine self-perceived halitosis amongst school, Junior College and Dental College Students to evaluate their knowledge, attitude, practices and create awareness regarding halitosis in Navi Mumbai region and also guide them to use simple methods to prevent halitosis. The objective of this study was to determine the prevalence of halitosis amongst the students using a questionnaire and to relate halitosis to factors like salivary flow rate, habits, underlying pathology.

Materials and Methods

A structured questionnaire was formulated by reviewing the literature. A synopsis of the survey was submitted to the ethical committee of MGM Dental College and Hospital and after their approval survey was started. A written consent was taken from students and parents. Students not willing to participate were excluded.

Sample size

Total of 600 students were included in the study, out of which, 200 from to 9th and 10th standard students of IES's Navi Mumbai high school, Vashi, Navi Mumbai, 200 students from 11th and 12th PACE junior college, Nerul, Navi Mumbai and 200 from 1st and 2nd year dental college students of MGM Dental College, Kamothe, Navi Mumbai. Out of the total students 300 were male and 300 were female students. The age range was 15- 20 years.

Data collection

The questionnaire was distributed all the students in the mentioned institution after getting permission of the Head of the institutions. The identity of the students was not disclosed and the confidentiality of the identity was assured to them. Sufficient time was given to the students to fill the questionnaire. After the survey, students were given a hand out for awareness about halitosis.

Statistical analysis

The data was statistically analysed using SPSS version 11.5. Data was analysed using Chi-square test. Significance for all statistical tests was predetermined at a probability value of 0.05.

Results

Out of the total students, only 29% had previously received information about halitosis, out of which 45% were dental students, 31% were junior college students, 10% were school students.

The next few questions are elaborated in Table 1

Question	Yes	No	Don't know
Do you feel you suffer from bad breath/malodor/halitosis?	21%	57%	22%
Has anyone pointed out your bad breath?	42%	58%	NA
Put your palm in front of your mouth and exhale (breath out). Do you have bad breath?	44%	56%	NA
Has your breath interfered with your social life?	24%	76%	NA

Table 1: Out of the total students, who suffered from halitosis, 51% were male and 49% were female students. The rest of the results are summarized in Table 2

	Male	Female	Total
Yes	66	61	127
No	158	183	344
Don't Know	74	55	139
Total	300	300	600 (Grand Total)
X ² = 5.07 p = 0.079 (p value not significant)			

Table 2: When students were asked about the time of the day they felt their breath bad smelling, most of them reported morning. Their response is summarize in Table 3

	Morning	Afternoon	Evening	All day
Yes	95	7	12	16
Percentage	75%	6%	8%	11%

Table 3: The next sets of questions are summarized in Table 4

Question	Yes	No	X ²	p value (Bold=Significant)
Do you feel bad breath after waking up?	83%	17%	20.7951	<0.00001
Do you feel bad breath when you are hungry or during fast?	65%	35%	18.7457	0.000015
Do you feel bad breath when you are stressed?	81%	19%	23.6862	<0.00001
Have you noticed a yellow/white color layer on your tongue?	56%	44%	29.0802	<0.00001

Table 4: Questions regarding oral pathologies are summarized in Table 5

Question	Yes	No	X ²	p value (Bold=Significant)
Do you have dryness of mouth, (dry mouth)?	43%	57%	20.2395	<0.00001
Do you have bleeding gums?	13%	87%	8.4573	0.003636
Do you have tooth decay (Dental caries)?	39%	61%	28.1386	<0.00001

Table 5: (Pathologies) Questions regarding systemic disease are summarized in Table 6 and chart 1

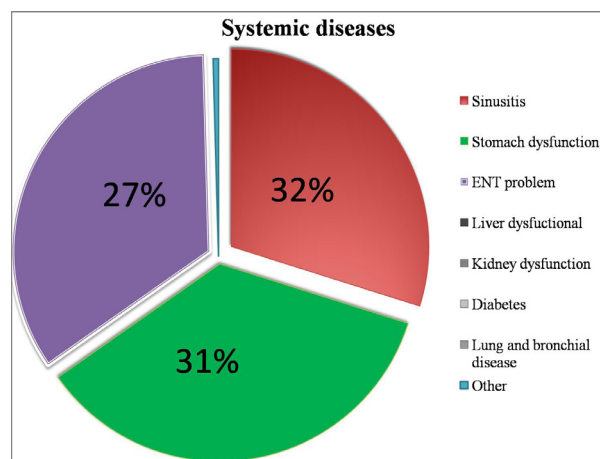
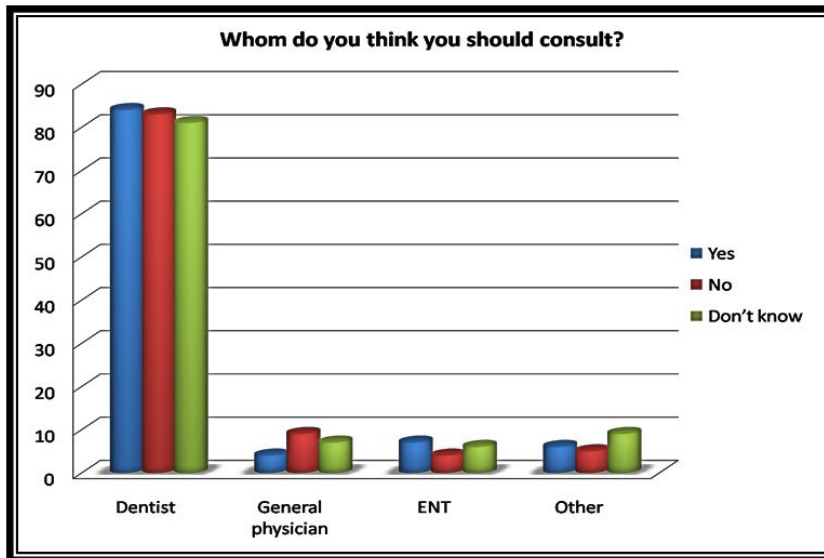


Chart 1: The following graph (Graph 1) shows the response of students for the question, whom they thought they should consult for halitosis



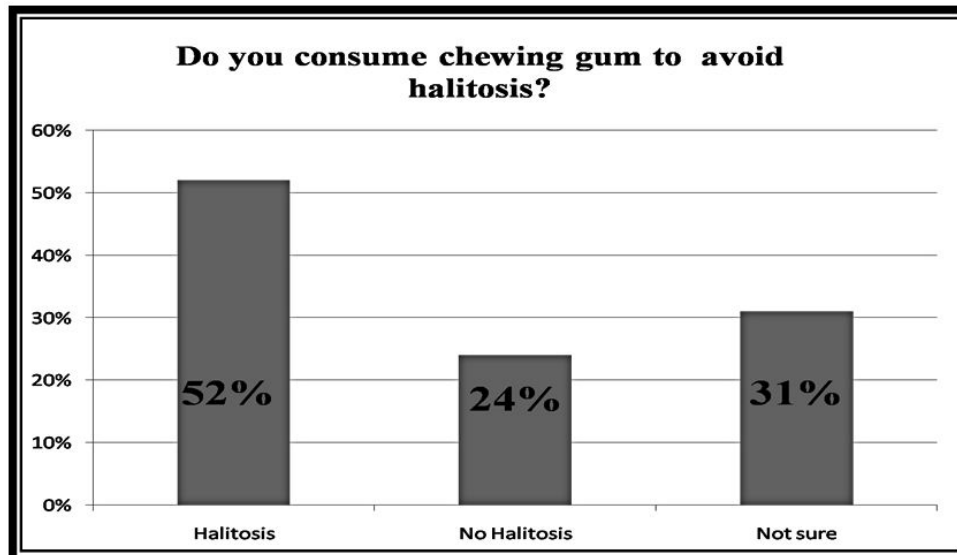
Graph 1: Out of a total of 127 students who thought they had halitosis only 27% had received professional treatment for halitosis

Question	Yes	No	X ²	p value (Bold=Significant)
Do you suffer from any systemic disease	17%	83%	5.1225	0.023618

Table 6: Questions regarding oral hygiene practices are summarized in Table 7

Question	Yes	No	X ²	p value
Do you brush your teeth twice daily?	64%	36%	3.2911	0.069657
Do you use mouthwash?	60%	40%	2.2949	0.129798
Do you use a tongue cleaner every day?	61%	39%	12.4716	0.000413 (Significant)

Table 7: The following graph shows number of students which consume chewing gum to mask halitosis (Graph 2)



Discussion

According to our knowledge this is the first study which is conducted among school, Junior College and preclinical Dental college students regarding self-perceived halitosis in Navi Mumbai region. This is a knowledge, attitude and practice based survey which was done in Navi Mumbai region regarding self-perception of halitosis. Objective of the study was to determine the prevalence of halitosis among students using a questionnaire and creating awareness regarding oral hygiene. The study also aims to relate various factors such as gender and age predilection, time of

occurrence, physiological factors like salivary flow rate, tongue coating, psychological factors, habits, pathology and other systemic disease with halitosis. Use of products like chewing gum and mouthwash are common among the youth to mask halitosis. Questions related to the above mentioned topics were included to relate halitosis to these factors.

The study showed that there is a lack of knowledge among students regarding halitosis and overall oral hygiene. Out of the students who had previously received information about halitosis 45% were dental college students. This shows that there is lack of knowledge about halitosis in preclinical course of Dental College students. The figures were as low as 31% and 10% for junior college students and school students respectively. This shows that as the age advances and social interaction increases, knowledge and self-perception of halitosis increases. International society for bad odour research in the 2nd meeting stated that bad odour should receive recognition at the professional community level, in the medical/dental curriculum and at public level [13].

The students who reported affirmative for halitosis were 37% school students, 48% junior college students and 15% dental college students. The reason for hike among junior college student as compared to school students could be because of social awareness regarding maintaining oral hygiene and a hike in dental college students could be because of knowledge of oral hygiene.

Halitosis shows a slight male predilection which coincides with other studies done by Andrea Z, Marja LL, and Andrea [14], Almas K, Al-Hawish K et al [15], and Al-Atrooshi BA, Al-Rawi AS [16]. It seems that women are more worried than men about their own oral malodor [17]. Volatile Sulphur Compound is higher and salivary flow rate is lower in the menstrual and premenstrual phases when compared with the follicular phase. It was concluded by C. M Calil, P.O Lima et al. that the production of VSC is influenced by menstrual cycle and protein concentration and salivary flow might be involved in this process [18].

For self-examination of halitosis various techniques like cupped hand technique, wrist lick technique, spoon lick technique, dental floss technique etc. can be used [19]. The technique used in this study was a cupped hand technique. Since the study was carried out among students method was convenient although there is a disadvantage of this method which is there is a reduced chance of self-detection of oral malodour. The direction of exhaled air is horizontal while the inhaled air travels primarily vertically therefore [20]. The perception might not be accurate.

It was seen in this study that 75% of total students suffered from halitosis in the morning. These results coincides with the results of study done by José Roberto Cortelli, Mônica Dourado Silva Barbosa, Miriam Ardigó Westphal [21]. The reason for this could be reduced salivary flow rate, increase in the viscosity of saliva, accumulation of bacteria at night. A reduced saliva flow during sleep favors anaerobic bacterial putrefaction, giving rise to so-called "morning breath," a transient condition which disappears after a meal [22,23].

In this study it was found that, 19% felt they suffer from halitosis when they were stressed and 35% when they were hungry. During stress the sympathetic system is activated which leads to reduce salivary flow leading to halitosis [15]. It is also found that anxious situations increase VSC concentration therefore leading to halitosis [24]. In case of Hunger or fasting the mechanical action of tongue is reduced leading to less cleansing action [12] the salivary flow rate is decreased.

In this study 55% of students who suffered from halitosis have noticed a white/yellow coat on their tongue. The surface of the tongue has innumerable depression where bacterial adhesion and growth occurs. Food particles and desquamated epithelial cells accumulate which tend to be consequently putrified by the bacteria [12]. Fissures and crypts of the tongue harbors large number of micro-organism which includes *Prevotella (Bacteroides) melaninogenica*, *Treponema denticola*, *Porphyromonas gingivalis*, *Porphyromonas endodontalis* etc [25,26]. Proteolytic activity by microorganisms residing on the tongue and teeth results in foul-smelling compounds, and is the most common cause of oral malodor [27]. Individuals with a healthy periodontium can show halitosis caused by the impaction of food, bacteria, leucocytes and desquamating epithelial cells on the dorsum of their tongue [28]. Therefore close relation between tongue coating and halitosis has been reported in the previous studies [29,30]. It is seen that halitosis reduces to 75% within 1 week after using tongue scraper [31].

Out of the total students who had halitosis, 43% felt they had dryness of mouth. Dryness of mouth is another important causative factor for halitosis. Reduced amounts of saliva leads to increase in the amount of plaque accumulation, microbial load and the volatile sulphur compound (VSC's) escape as gases when saliva is dries up [32]. Patients with a dry mouth ($0.15 \text{ mL}\cdot\text{min}^{-1}$ instead of $0.25\text{--}0.50 \text{ mL}\cdot\text{min}^{-1}$) show an increased volume of plaque [33]. The lack of salivary flow, leads to the disappearance of the antimicrobial activity of the saliva which in turn leads to accumulation of Gram-positive bacteria to Gram-negative species [21].

In this study it was found that out of the students suffering from halitosis, 39% had dental caries (decay) and 14% had bleeding gums. Deep carious lesion with food impaction and blood clot in case of bleeding gums also serve as a important factor for purification caused by bacteria [12]. There is a positive correlation between bad breath and periodontitis because they usually share the same microbes. The depth of the periodontal pockets correlated to concentrations of VSC in the mouth.

In this study 17% of students reported of having systemic disease. Extra-oral halitosis can be subdivided into non-blood-borne halitosis, such as halitosis from the upper respiratory tract including the nose and from the lower respiratory tract, and blood-borne halitosis. The majority of patients with extra-oral halitosis have blood-borne halitosis. Blood-borne halitosis is also frequently caused by odorous VSCs, in particular dimethyl sulfide (CH_3SCH_3) [21]. Apart from intraoral causes halitosis can also be caused by extra oral causes such as systemic diseases which include ENT diseases like tonsillitis, sinusitis, pharyngitis, bronchial and lung diseases, gastrointestinal disease, liver disease, kidney disease, systemic metabolic disorders like uncontrolled diabetes mellitus because of accumulation of ketones, trimethylaminuria and hormonal causes [12,16]. A study done by Shuji Awano et al. established a significant relationship between volatile sulfur compounds (VSCs), including hydrogen sulphide (H_2S), methyl mercaptan (CH_3SH) and dimethyl sulphide [$(\text{CH}_3)_2\text{S}$], in mouth air of patients and a history of systemic disease such as hypertension as well as respiratory, cerebrovascular and liver diseases [36].

Smoking and tobacco are an important extrinsic etiology for halitosis as described by Al-Atrooshi and Al-Rawi [37]. Also smoking reduces olfactory sensitivity [38] thus impairing individual's ability for self-perception of halitosis. Since the survey was conducted among a young age in Navi Mumbai the relation between smoking and tobacco consumption and halitosis could not be significantly established.

In this study, 24% of people who suffered from halitosis felt that their bad breath has affected their social life. Halitosis is considered as a sociophobic disease [39]. A special form of halitosis known as halitophobia is recognised as psychiatric condition. Halitosis is always been considered as a social barrier.

When asked the students whom do they think they should consult for halitosis most of most of them reported dentist. From this it can be concluded that the general population considers halitosis to be of dental origin and is not aware about its extra oral causes and only about 27% of people who suffer from halitosis have received professional treatment for it.

This study showed inadequate use of basic oral hygiene habit such as brushing twice daily, use of mouthwash, tongue cleaner around 60%. Halitosis is a reflection of poor oral health. Lack of oral hygiene leads to accumulation of bacteria of plaque and growth of micro-organism ultimately leads to halitosis. Also it has been reported, alcohol free mouthwash proves to have better action against halitosis since alcohol causes dehydration which aggravates halitosis [40]. Studies have shown that exclusive tooth brushing has no appreciable influence on the concentration of VSC's [31].

Out of the students who suffered from halitosis, 48% of consumed gums. The interesting fact was 24% of people who said they did not suffer from halitosis, consumed chewing gum to avoid bad breath and 21% of people were not sure whether they had halitosis or not, consumed chewing gum to mask bad breath. One of the common practice among the youngster to mask halitosis is consumption of chewing gums, peppermint spray, mouth rinses [41]. It was concluded that chewing gums containing probiotics, *Lactobacillus*, zinc acetate and magnolia bark extract, eucalyptus-extract, and AITC with zinc lactate may be suitable for halitosis management [42]. Many of the manufacturers of bad breath remedies claim that their products contain antibacterial mechanisms with sufficient strength to control oral malodor over long periods of time. None, however, effectively eliminate the problem [28].

Limitations

Perception of halitosis may differ in line with the subjectivity of perception [43]. In this study no clinical examination for halitosis, tooth decay, bleeding gums was done. Results were evaluated purely based on perception of the students [44-58].

Conclusion

The knowledge among the young population regarding halitosis and oral hygiene habits is inadequate. Also students are unaware about the different etiological factors for halitosis and end up thinking that it is because of a dental origin. It is important to instigate the importance of oral hygiene maintenance at a young age. Dental camps and regular check-up should be carried out to spread awareness about halitosis and oral hygiene habits.

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