Research Article

Prevalence of Halitosis and Validation of an Instrument to Compare Self-Perceived Halitosis and Measured Halitosis in Senior Secondary School Children of North India

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How to cite this article:
Mehta N, Kumar M, Singh A. Prevalence of Halitosis and Validation of an Instrument to Compare Self-Perceived Halitosis and Measured Halitosis in Senior Secondary School Children of North India. *Int J HealthCare Edu & Med Inform* 2016; 3(2): 34-38.

ISSN: 2455-9199

Abstract

Introduction: Halitosis is a very common problem and is experienced by majority of the population, but few persons perceive this problem whereas they actually do not suffer from it. Halitosis not only becomes a disease but also poses a social and psychological problem.

Objective: To ascertain the prevalence of halitosis, document various measures to control halitosis and to validate an instrument used to measure the levels of halitosis against self-perceived levels of halitosis among school children.

Materials and Methods: A descriptive cross-sectional study was conducted in a senior secondary school of Panchkula (Haryana). Data was collected using self-structured questionnaires that consisted of items on knowledge and perceptions on halitosis. An instrument was used to measure and compare levels of halitosis.

Results: Majority of the subjects experienced self-perceived halitosis, among which 61% rated their problem of halitosis as weak, and 9% as intense. 34.3% associated their problem of halitosis with dental caries. 38.7% thought that halitosis was due to their problem of bleeding gums, whereas 18.9% associated their problem with food lodgment. Majority of subjects, i.e., 33% practiced flossing to eliminate bad breath, followed by 24% subjects who went in for scaling and curettage, followed by 20% who used tongue scrapers, followed by 15% who went in for restorative treatment for dental caries, followed by 8% who used interdental brushes.

Conclusion: The present study shows that majority of people have haitophobia, i.e., pseudo halitosis. Also, improvement is needed in schools regarding dental awareness.

Keywords: CHX (Chlorhexidine), Dental caries, Gingivitis, Halimeter, Halitophobia, Halitosis, Periodontitis, TANITA breath analyser, VSC (Volatile Sulfur Compounds).

Introduction

Halitosis, *fetororis*, oral malodor, or bad breath are the general terms used to describe an unpleasant breath from a person's mouth. Halitosis is an oral health condition, which is characterized by continuous emanating foul odors from a person's mouth.[1] The odors may be from an oral source or from a non-oral source. The etiology of halitosis has been subject to a historical controversy.[2] Dentists have so far claimed that oral factors are responsible for halitosis but there are a variety of non-oral factors attached to the problem of halitosis. Among the oral etiological factors, the main factor attributed to halitosis is the presence of periodontal disease, deep carious lesions, tongue coating, oral infections, peri-implant disease, mucosal ulcerations, impacted food or debris, factors causing decreased salivary flow rate, etc. The non-oral factors mainly stress upon stomach as the causative

factor, but there are many other systemic diseases that may cause halitosis. Gastroenterological problems often are related with halitosis. ENT problems such as tonsillitis, sinusitis and rhinitis are frequently associated with non-oral halitosis.[3,4]

Often some patients complain of oral malodor, yet do not have confirmable halitosis, even with objective testing. This symptom may be attributable to a form of delusion or monosymptomatic hypochondriasis (self-oral malodor) and this condition is termed as halitophobia.[5]

The oral microorganisms most likely to cause oral malodor are Gram-negative bacteria species, including *Treponemadenticola*, *Porphyromonasgingi valis*, *Porphyromonasendodontalis*, *Prevotellainter media*, *Bacteroidesloescheii*, Enterobacteriaceae, *Tannerellaforsythensis*, *Centipedaperiodontii*, *Eikenell acorrodens*, *Fusobacterium nucleatum.*[6]

The principal components of bad breath are volatile sulfide compounds (VSC), especially hydrogen sulfide (H_2S), methyl mercaptan (CH_3SH), and dimethyl sulfide $[(CH_3)_2S]$[10] or compounds such as butyric acid, propionic acid, putrescine, and cadaverine.[5] VSC monitors have been developed, such as the halimeter, which is used chair-side and provides both the patient and the professional an idea of the breath situation. A halimeter score of >75 ppb is recognized as clearly detected halitosis.

Successful treatment of halitosis depends on a correct diagnosis and the implementation of a cause-related therapy.

Mechanical cleaning of teeth, such as brushing the teeth and flossing reduced the amount of oral bacteria and substrates, thereby presumably reducing oral malodor. Interdental cleaning and tooth brushing are essential mechanical means of oral hygiene.[7]

The need of this study was felt because of the fact that halitosis is a very common problem that has both a physiological as well as psychosocial aspect. In this era, where social aspect of life is given prime importance, subjects often feel the need to get rid of their problems of bad breath. Only a few studies have stated certain important facts regarding halitosis; rest of the population is still unaware of the problem, its effects and solutions. The benefit this study will provide to the society will be of utmost importance. It will not only detect the prevalence of halitosis among the population, but also portray certain measures to eliminate halitosis and also depict certain measures of detection of halitosis so that subjects may themselves be aware of their problems.

Materials and Methods

A senior secondary school in the urban locality of Panchkula was selected as the study area for gathering data on halitosis. A sample size of 267 students was selected on the basis of simple random sampling method. The study had two aspects-one that was gathering information on the prevalence of halitosis, measures of treatment that were taken by the subjects and their knowledge regarding the problem, and the other was the examination, i.e., the subjects were examined for levels of halitosis using objective methods of measuring halitosis, which were thereafter compared with the self-perceived levels of halitosis A self-structured questionnaire was used for collecting information on subjects' knowledge and perceptions about halitosis. An instrument for measuring levels of halitosis among subjects was used. A portable breath analyzer of Japanese make was used for the purpose (TANITA portable breath analyzer). The data collected was analyzed using Microsoft Excel. Percentages, tables, pie charts, graphs were used for interpretation of data. As incentives, fluoride toothpastes and mouthwashes were distributed among the student.

Table 1.Organoleptic Scoring Scale

Category	Description
0: Absence of odor	Odor cannot be detected
1: Questionable odor	Odor is detectable, although the examiner could not recognize it as malodor
2: Slight malodor	Odor is deemed to exceed the threshold of malodor recognition
3: Moderate malodor	Malodor is definitely detected
4: Strong malodor	Strong malodor is detected, but can be tolerated by examiner
5: Severe malodor	Overwhelming malodor is detected and cannot be tolerated by examiner (examiner instinctively averts the nose)

 ISSN: 2455-9199

Results

Majority of the subjects experienced self-perceived halitosis, followed by the subjects whose bad breath was noticed by others, followed by the subjects who were told about their halitosis by their dentist.

Majority of the subjects, i.e., 61% rated their problem of halitosis as weak, followed by subjects who had moderate halitosis, i.e., 30%, followed by subjects who felt that they had very intense bad breath. Majority of the subjects, i.e., 50% experienced that bad breath is maximum in the mornings, followed by subjects who experienced it maximum in afternoons, i.e. 20%, followed by subjects who experienced it maximum at bedtime, i.e. 17%, and in evenings, i.e., 13%.

Table 2.Number of Subjects as per the Systemic Problems faced

Systemic Problems	Number of Subjects
Common cold	43
Sinusitis	8
Gastric problems	5
Liver disease	0
Lung disease	0

Majority of the subjects, i.e., 90% felt that the pathway of bad breath was through mouth, followed by subjects who felt the pathway of bad breath was through both nose and mouth, i.e., 6%, and the least number of subjects, i.e., 5% felt the pathway was through nose.

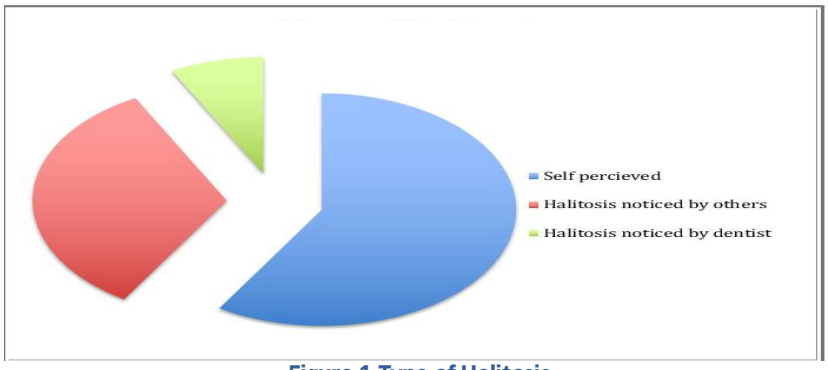

Figure 1.Type of Halitosis

Despite the fact that 68.5% of the subjects suffered from halitosis, only 13.5% among them visited their dentist for treating their problem.

Probable Causes of Halitosis

Table 3.Probable Causes of Halitosis

Dental Problems	Number of Subjects
Dental caries	47
Bleeding gums	53
Food lodgment	26

Intensity of Halitosis

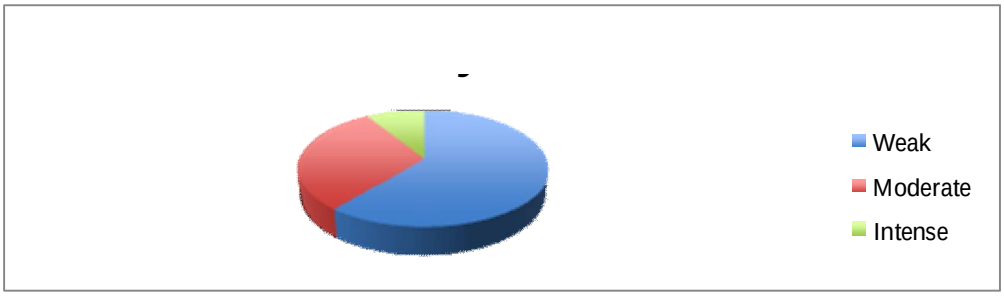

Figure 2.Intensity of Halitosis

Figure 3.Measures of eliminating Halitosis

Majority of subjects, i.e., 33% practiced flossing to eliminate bad breath, followed by 24% subjects who went in for scaling and curettage, followed by 20% who used tongue scrapers, followed by 15% who went in for restorative treatment for dental caries, followed by 8% who used interdental brushes.

Table 4.Number of Subjects as per the Grades of Halitosis

Grades of Halitosis	Number of Subjects (Self-perceived)	Number of Subjects (Instrument)
Grade 0	68	118
Grade 1	123	63
Grade 2	9	17
Grade 3	0	2
Grade 4	0	0

Discussion

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. In the developed world, 8-50% of people perceive that they have persistent recurrent episodes of oral halitosis.[5] Up to 50% of the US population reports that their own "bad breath" has concerned them during some point in the course of their lifetime. Half of this group is indeed likely to have an ongoing sporadic or a chronic breath problem.[8] Al-Ansari et al.[9] assessed the prevalence and factors associated with self-reported halitosis in 1551 Kuwaiti patients. The prevalence of self-reported halitosis was 23.3%. Loesche et al.[10] assessed the prevalence and factors associated with self-reported halitosis in 270 adults in U.S.A. The prevalence of self-reported halitosis was 31%. Yokoyama et al.[11] assessed the prevalence and factors associated with self-reported halitosis in 474 senior high school students in Japan, and the prevalence of self-reported halitosis was found to be 42%.

In the present study, taking senior secondary schoolchildren, majority of the children were found to be having bad breath. Self-reported halitosis was maximum among these students. Our study stands unique in the fact that it covers all three aspects or categories of halitosis, i.e., first, self-reported halitosis; second, informed by others; and third, informed by dentist. Other studies covered only two aspects, either first and second, or first and third.

In the present study, we found out that majority of the subjects, i.e., 73.5% believed that their problem of halitosis had a lot to do with the social aspect of life. Social embarrassment was one such consequence of halitosis. Social life thus gets hampered for subjects who had an intense problem.

The presence of microorganisms and the inflammatory products present in gingivitis/ periodontitis are capable of producing odoriferous substances. Cross-sectional studies associated halitosis to the presence of either gingivitis or periodontitis.[3,4,12-14] In vitro and in vivo studies demonstrated the ability of putative periodontal pathogens and products of inflammation to produce volatile odoriferous compounds.[8,15-17] Therefore, the presence of periodontal inflammation needs to be considered in the management of halitosis. Similarly, in the present study, most of the subjects associated their problem of halitosis with dental caries. They thought that their problem of halitosis was due to the cavities present in their mouths. Some (38.7%) thought that halitosis was due to their problem of bleeding gums. They believed that gingivitis could be a possible cause of halitosis, whereas least (18.9%)

 ISSN: 2455-9199

associated their problem with food lodgment. A commercial product containing 0.12% CHX-gluconate has been demonstrated as an effective anti-VSC product, and showed kinetics similar to that of the 0.2% CHX solution.[16]

Although being considered the gold standard, mouth-rinse for halitosis treatment, CHX has undesirable side effects. The safety of an effective agent that might be used repeatedly needs to be established. Ninety of 101 patients who used the 0.2% CHX rinse for 1 week responded to a questionnaire concerning adverse reactions.[11]

Conclusion

In this study, 68.5% of the subjects presented with halitosis. Among them, 59% reported with self-perceived halitosis, 33% reported with halitosis noticed by others and 8% reported with halitosis noticed by clinician. A number of subjects related their problem with dental problems like caries, gingivitis and periodontitis. Also subjects related their problem with systemic diseases like sinusitis, gastric problems, and the commonest of them was common cold. The subjects took various measures to eliminate foul smells. Among them were mechanical measures like tongue scrapers, flossing, interdental brushes, scaling and curettage. Among the non-mechanical measures were chewing gums, mints and mouthwashes. Majority of the subjects suffered from halitophobia.

Conflict of Interest: Nil

References

1. Cortelli JR, Barbosa MDS, Westphal MA. Halitosis: A review of associated factors and therapeutic approach. *Braz Oral Res* 2008; 22: 44-54.
2. Loesche WJ, Kazor C. Microbiology and treatment of halitosis. *Periodontol* 2002; 28: 256-79.
3. Delanghe G, Ghyselen J, Feenstra L et al. Experiences of a Belgian multidisciplinary breath odour clinic. *Acta Otorhinolaryngol Belg* 1997; 51(1): 43-48.
4. Quirynen M, Dadamio J, Van den Velde S et al. Characteristics of 2000 patients who visited a halitosis clinic. *J Clin Periodontol* 2009; 36(11): 970-75.
5. Porter SR, Scully C. Oral malodour (halitosis). *BMJ* 2006; 333: 632-35.
6. Awano S, Gohara K, Kurihara E et al. The relationship between the presence of periodontal-pathogenic bacteria in saliva and halitosis. *Int Dent J* 2002; 52(Suppl 3): 212-26.
7. Tanaka M, Anguri H, Nishida N et al. Reliability of clinical parameters for predicting the outcome of oral malodor treatment. *J Dent Res* 2003; 82: 518-22.
8. Lee SS, Zhang W, Li Y. Halitosis update: A review of causes, diagnoses, and treatments. *J Calif Dent Assoc* 2007; 35(4): 258-60, 262, 264-68.
9. Al-Ansari JM, Boodai H, Al-Sumait N et al. Factors associated with self-reported halitosis in Kuwaiti patients. *J Dent* 2006; 34(7): 444-49.
10. Loesche WJ, Grossman N, Dominguez L et al. Oral malodor in the elderly. In: van Steenberghe D, Rosenberg M (Eds.). Bad Breath: A Multidisciplinary Approach. Leuven: *Leuven University Press*, 1996: 181-94.
11. Yokoyama S, Ohnuki M, Shinada K et al. Oral malodor and related factors in Japanese senior high school students. *J Sch Health* 2010; 80(7): 346-52.
12. Miyazaki H, Sakao S, Katoh Y et al. Correlation between volatile sulphur compounds and certain oral health measurements in the general population. *Journal of Periodontology* 1995; 66: 679-84.
13. Bornstein MM, Kislig K, Hoti BB et al. Prevalence of halitosis in the population of the city of Bern, Switzerland: A study comparing self-reported and clinical data. *Eur J Oral Sci* 2009; 117(3): 261-67.
14. Bornstein MM, Stocker BL, Seemann R et al. Prevalence of halitosis in young male adults: a study in Swiss army recruits comparing self-reported and clinical data. *J Periodontol* 2009; 80(1): 24-31.
15. Yoneda M, Masuo Y, Suzuki N et al. Relationship between the β-galactosidase activity in saliva and parameters associated with oral malodor. *J Breath Res* 2010; 4(1): 17-18.
16. Kleinberg I, Codipilly M. Modeling of the oral malodor system and methods of analysis. *Quintessence Int* 1999; 30(5): 357-69.
17. Salako NO, Philip L. Comparison of the use of the Halimeter and the Oral Chroma in the assessment of the ability of common cultivable oral anaerobic bacteria to produce malodorous volatile sulfur compounds from cysteine and methionine. *Med Princ Pract* 2011; 20(1): 75-79.

Date of Submission: 11th Jun. 2016

Date of Acceptance: 19th Jul. 2016