Main Article

Halitosis: Its Aetiology and Psychosocial Impact- A Hospital Based Study

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ABSTRACT

Introduction

Halitosis means bad or unpleasant odour from oral cavity. It causes embarrassment to the patients and affects their social life and communication. This study aims to find the causes of halitosis and to assess its psychosocial impact.

Materials and Methods

A prospective study was conducted in the department of Otorhinolaryngology and Head Neck Surgery in a tertiary care hospital. It included 165 patients, presenting to the ENT OPD with chief complains of oral malodour for at least 3 months. The patients in the age above 15 years and below 75 years, irrespective of gender, were included in the study.

Results

The age of the patients ranged from 15 to 75 years with a mean age of 52.24 ± 15.67 with male: female ratio of 7:10. The most common cause of halitosis in the present study included chronic rhinosinusitis (38.7%), gingivitis/periodontitis (19.39%), tonsillitis (4.84%), laryngopharyngeal reflux (2%), deep neck space infections (1.2%). In 23.56%, the halitosis was a symptom of an underlying malignancy.

Conclusion

Halitosis from an extra oral origin can be the sign of an underlying systemic disease or malignancy. The consultation should be done with the periodontist, ENT specialist and a physician.

Keywords

Halitosis

The term Halitosis means bad or unpleasant odour from oral cavity. It is a Latin word which is derived from term halitus (breathed air) and the osis (pathologic alteration).[1] The other terms used to describe and characterise the halitosis include foetor oris, oral malodour, mouth odour, bad breath and bad mouth odour.[2-4] More than 50% of the general population has halitosis.[5] Cause of halitosis in 90% of the patients is oral cavity and 9% is non-oral in origin. In 1% cases, the cause is diet or the drugs.[6,7] It has a large socioeconomic impact. It causes embarrassment to the patients and affects their social life and communication.

The main 'oral' causes of halitosis are bad oral hygiene, tongue biofilm, food impactions, candidiasis, gingival and periodontal diseases (gingivitis, periodontitis), dental abscess, decreased salivation due to medications, Sjogren's syndrome, bone diseases (alveolitis, osteomyelitis). Halitosis have their origin at the tonsils in 3% of cases. Parotid abscess, Ludwig's abscess and deep neck space infections have also been found to be the cause in many cases.

Nasal and paranasal sinus causes like chronic sinusitis, postnasal drip contacting the dorsum of tongue, foreign bodies in the nasal cavity, cleft palate and atrophic rhinitis with bacterial superinfection also cause malodour. In the case of chronic sinusitis, 50%-70% of the patients complain of oral malodour.[8] Various malignancies like carcinoma of nasopharynx, paranasal sinuses, oral cavity, oropharynx and laryngopharynx also cause halitosis.

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Keeping these facts in view, the present study was conducted with the aim to find the causes of halitosis and to assess its psychosocial impact.

Materials and Methods

The present cross-sectional study was conducted in the Department of Otorhinolaryngology and Head Neck Surgery, a tertiary care multi-speciality teaching hospital. The study included 165 patients, presenting to the ENT OPD with chief complains of oral malodour for at least 3 months. The patients in the age above 15 years and below 75 years, irrespective of gender, were included in the study. Exclusion criteria included any history of intake of antibiotics for at least three weeks prior to assessment and respiratory tract infection at the time of assessment

An informed consent was taken from all the patients. A detailed history was taken from the patients regarding the duration of oral malodour, time of appearance within a day; after meals or any diurnal variations, whether others have identified the problem, list of any medications if taken, progression, aggravating and relieving factors, any medical or dental history, information about diet and habits. A special ENT history was also taken to find out the cause in the region. Patients were asked if they had experienced nasal obstruction/ discharge, mouth breathing, post nasal drip, dysphagia, change in voice, any history suggestive of recurrent or chronic tonsillar infection or foreign body sensation in the throat. History regarding anosmia, cough, pyrexia, weight loss and questionnaire for psychosocial impact was also noted. The questionnaire was taken from the study conducted by Troger et al., 2014, with permission.[9]

The questionnaire had four questions about the impact of halitosis that addressed the emotional impact of halitosis. The questions about psychological aspects were:

1. Did you use any product to hide unpleasant mouth odour in the last 4 weeks?
2. Did you seek any specialized treatment in the last 4 weeks?
3. Did your breath make you feel worried in the last 4 weeks?
4. Did you feel tense, irritated, depressed, embarrassed and/or ashamed, have smiling difficulties, difficulties in dating, feel uncomfortable talking to others or avoid the company of others because of your breath in the last 4 weeks?

A detailed oral and nasal examination with anterior and posterior rhinoscopy, diagnostic nasal endoscopy and indirect laryngoscopy was done in all the patients. Routine blood investigations (CBC, PT, PTI, LFT, RFT, blood sugar fasting and post-prandial, thyroid profile, lipid profile, X-Ray chest, ECG) and radiological investigations i.e., X-Ray paranasal sinuses, X-Ray Soft tissue neck were done in all the patients. Barium swallow X-ray of the oesophagus, upper gastro-intestinal endoscopy, lung function tests, sputum culture, urine routine examination, computed tomography of neck, paranasal sinuses and chest was done as and when indicated.

Statistical Analysis: All the collected data was entered in the Microsoft excel sheet and then analysed using computer software Open Epi (version3) for window. The qualitative data and quantitative data were reported as proportions and mean (±SD), respectively. $\chi 2$-test was used to test the association. A p-value less than 0.05 was considered as significant. All p-values had two tails.

Results

A total of 165 patients were included in the study who presented to the ENT OPD with oral malodour for at least 3 months. The age of the patients ranged from 15 to 75 years with a mean age of 52.24 ± 15.67. Most of the cases had duration of symptoms between 6 months and 3 years.

Among the studied population, the most common cause of halitosis was an extra-oral pathology with the oral pathology being the cause in comparatively a smaller number of patients. (Table I)

Table II depicts the relationship of gender with halitosis due to malignancy. Risk of halitosis due to malignancy is 3.54 times higher among the males compared to the females. Among the studied population there were 76 males and 89 females. Out of which 35.53% and 13.48% were malignant cases in males

Table I: Age distribution of cases according to the oral or extra-oral cause

AGE GROUP (YEARS)	NO. OF CASES (N=165)	
	ORAL	EXTRA-ORAL
15-30	11(6.66%)	11(6.66%)
30-45	10(6.06%)	19(11.5%)
45-60	17(10.30%)	36(21.8%)
60-75	24(14.5%)	39(23.6%)

and females respectively. Females predominated in the non-malignant group while males predominated in the malignant group.

The most common cause of halitosis in our study included chronic rhinosinusitis (38.7%), gingivitis/periodontitis (19.39%), tonsillitis (4.84%), laryngopharyngeal reflux (2%), parotid abscess/ Ludwig's angina (1.2%). (Table III) In 23.56%, the halitosis was a symptom of an underlying malignancy, with 6.06% had malignancy of oral cavity, 6.06% had malignancy of oropharynx, 4.84% had malignancy of nose and paranasal spaces and the malignancy of laryngopharynx, lung (because of release of volatile organic compounds) and oesophagus was present in 3.63%, 1.21%, and 1.81% of patients respectively. The conditions like hiatus hernia, LPR and achalasia cardia also cause halitosis because of release of volatile sulphur compounds due to interaction of anaerobic intraoral bacteria with specific amino acid substrates within the mouth.[6]

Regarding psychosocial impact of halitosis, in the present study, 19 (11.51%) patients complained of depression for which they had at least once consulted a psychiatrist, 23 (13.93%) patients avoided socialization and even talking to other people and preferred isolation, 55(33.3%) patients felt embarrassment and 89(53.93%) patients had feeling of anxiety.

Discussion

Halitosis is caused by volatile molecules which are formed because of pathological or nonpathological reasons, and it originates from an oral or a non-oral source. These volatile compounds are sulphur compounds, aromatic compounds, nitrogen-containing compounds, amines, short-chain fatty acids, alcohols or phenyl compounds, aliphatic compounds, and ketones.[10-14] The odour emanating from the oral cavity is produced by microbial putrefaction of the debris left in the mouth, resulting in the production of malodorous volatile sulphur compounds (VSCs). Systemic or extra-oral conditions may also produce volatile compounds that are eliminated through exhaled air, contributing to halitosis.[6]

Halitosis is a common disorder with varied aetiology; however, the present study showed that 65% of the patients had pathology in head and neck region other than oral cavity, with 23.6 % being malignant causes. Oral halitosis accounts for over 90% of the causes of halitosis, however in our study only 37.6% of the patients had oral causes of halitosis. (In the present study, we have included, gingivitis/periodontitis,

Table II: Distribution of cases according to gender and association between gender and halitosis due to malignancy

SEX	NO OF CASES		TOTAL	ODDS RATIO (95% C I)
	MALIGNANT N(%)	NON-MALIGNANT N(%)		
Males	27(35.53)	49(64.47)	76	3.54 (1.64-7.63)
Females	12(13.48)	77(86.52)	89	
Total	39	126	165	

Chi- square ($\chi 2$) = 11.04, P < 0.0 01

Table III: Diagnosis of halitosis with respect to aetiology

CAUSES	NO OF CASES (165)	PREVALENCE (95% C I)
Gingivitis/ periodontitis	32	19.39 (14.09-26.09)
Tonsillitis/quinsy	8	04.85 (2.48-9.27)
Parotid abscess / Ludwig's angina	2	01.21 (0.33-4.31)
Chronic rhinosinusitis	64	38.79 (31.69-46.4)
ENT Malignancy		
Ø nose and PNS	8	04.85 (2.48-9.27)
Ø oral cavity	10	06.06 (3.33-10.8)
Ø oropharynx	10	06.06 (3.33-10.8)
Ø laryngo-pharynx	6	03.64 (1.68-7.71)
Respiratory system		
Ø bronchiectasis	4	02.42 (0.95-6.07)
Ø CA lung	2	01.21 (0.33-4.31)
GIT causes		
Ø Hiatus hernia	2	01.21 (0.33-4.31)
Ø LPR	8	04.85 (2.48-9.27)
Ø Achalasia cardia	1	0.61 (0.11-3.35)
Ø CA oesophagus	3	01.82 (0.62- 5.21)
Systemic causes		
Ø Renal failure	2	01.21 (0.33-4.31)
Ø Hepatic failure	1	0.61 (0.11-3.35)
Ø Uncontrolled Diabetes	2	01.21 (0.33-4.31)

tonsillitis/quinsy, parotid abscess/ Ludwig's angina, malignancy of oral cavity and oropharynx in the oral causes of halitosis, with 62/165 = 37.6%.)

The present study is consistent with the study of Aliyu et al. 2018[15] in view of gender distribution; which reported a female predominance; in his study, there were 31 (20.7%) males and 119 (79.3%) females, with male to female ratio 1:4. In the present study only 19.3% of patients had periodontitis/gingivitis as possible cause of halitosis; this observation was similar to that of Nwhator et al. 2015[16] who reported only 6.9% of respondents with such perception.

The present study reported that 38.1% of people over age of 60 had halitosis which is consistent with study conducted by Loeshe et al. 1996.[17] in the United States who found that 43% of people over 60 years of age has breath problems and Bornstein et al. 2009[18] found the incidence to be around 28% in Swiss city of Bern. These studies suggest that this oral malodour is caused by tongue coating in the younger generation and by periodontitis with tongue coating in the older age groups. However, Miyazaki et al.1995[19] reported that no difference in the age distribution between females and males was found, and no association between age and breath malodour was noticed.

In contrast to the present study, the most common cause of halitosis were oral causes in the study conducted by Afolabi et al. 2009,[20] where tongue (21.2%), teeth (20.7%), and saliva (16.1%) were main sources. 40% of patients needed psychiatric assessment. Systemic causes were diabetes mellitus (16.1%), respiratory (14.5%), gastrointestinal (12.3%) and liver (10.1%) disorders.

Other studies[3,6,21] concluded that obesity, rural residence compared to city residence, poor health status, high stress, and low socioeconomic level demonstrated positive relations with halitosis.

Nachnani. 2011[5] in his study showed that saliva functions as a buffering or cleaning agent and keeps bacteria at a manageable level in the mouth. Stressful situations diminish salivary flow which leads to the degeneration of retained proteins in the mouth, and consequently VSCs could increase causing halitosis which was concluded in the study conducted by Queiroz et al . 2002.[22] In a study conducted by Kayombo et al.

2017,[23] it was concluded that halitosis was significantly associated with bleeding gums, hard dental deposits, mobile teeth and smoking.

The present study revealed that halitosis has a large psychosocial impact which has also been concluded by other studies. Eli et al. 2001[24] reported that patients suffering from halitosis have significantly elevated scores for obsessive compulsive symptoms, depression, anxiety, phobic anxiety, and paranoid ideation. The study conducted by Iwakura et al.1994[25] showed that person who has halitosis may not be aware of this situation because this person may have developed tolerance or olfactory disturbance, due to this the person generally cannot identify his halitosis and it is identified by his partner, family member or friends. Halitosis thus has a negative effect on a person's social life.

Romero et al. 2019[26] conducted a study to determine the effectiveness of phototherapy regarding the regarding the reduction of halitosis in adults. Tis protocol received approval from the Human Research Ethics Committee of Universidale Nove de Julho.

Conclusion

Halitosis is not essentially caused by oral pathology, but also other causes in head and neck region and systemic causes. When a patient presents with complaints of halitosis with a normal oral cavity, he may be prescribed by healthcare workers with mouth rinses or self-care products like chewing gums, mints and sprays to decrease the odour, but they should pay more attention if it is not resolving; as it can even be an indicator of underlying malignancy. Halitosis from an extra-oral origin can be the sign of an underlying systemic disease or malignancy. Thus, consultation should be done with the periodontist, ENT specialist and a physician to rule out any sinister cause.

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