



## Prevalence and cause's of bad breath in patients attended Shiraz dentistry school. A cross sectional study

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### ABSTRACT

**Purpose:** Halitosis is defined as an unpleasant odor that emanates from the oral cavity with intra-oral and/or extra-oral origins. The present study assessed factors influenced halitosis using different diagnostic modalities.

**Methods:** 360 patients who attended shiraz dentistry school participate in this study. A total of 100patients aged 10-56years old included 58women& 42men complained of chronic halitosis. Organoleptic assessment was used to measure intensity of halitosis. The patients were divided into 6 groups according to their age & educational levels. Descriptive analysis was carried out regarding the degree of halitosis in each group. The chi-square test was used for the comparison between groups.

**Result:** prevalence of halitosis was 27.8% of all subjects. Halitosis was multi factorial in this group & more than one factor could be seen in these patients. Dental caries was the most common cause of halitosis(62%) followed by periodontal disease (55%), highly protein diet (28%),smoking(13%) , inadequate root canal therapy & filling(12%) xerostomia(9%), Pseudo-halitosis(6% ) ,sinusitis & nasal polyp(4%),constipation & gastric reflux (4%) hormonal factors (%4) medication(4%) dentures(2%).there was no significant correlation between patients age , sex &educational level with halitosis(p=0.05).

**Conclusion:** In this study, intra oral factors were the most common causes of halitosis. This problem can be prevented by appropriate dental care, suitable oral hygiene &increased public awareness.

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### Introduction

Halitosis or bad breath is a taboo subject that is a widespread problem in the general population. Causes of bad breath can be multifactorial and long time sufferers can be marred from deep psychological stress. Because nine out of ten cases have an oral cause, the initial inquiry should be with a dentist.

Bad breath occurs when noticeably unpleasant odors are exhaled in breathing. Halitosis is estimated to be the third most frequent reason for seeking dental aid, following tooth decay and periodontal disease (1)

In most cases (85–90%), bad breath originates in the mouth itself. The simplest way to distinguish oral from non oral etiologies is to compare the smell coming from the patient mouth with that exiting the nose. If the odor is primarily from the mouth ,an oral origin may be inferred. (2 ). The intensity of bad breath differs during the day, due to eating certain foods (such as garlic, onions, meat, fish, and cheese), obesity, smoking, and alcohol consumption.(3,4) .Since the mouth is exposed to less oxygen and is inactive during the night, the odor is usually worse upon awakening ("morning breath"). Bad breath may be transient, often disappearing following eating, brushing one's teeth, flossing, or rinsing with specialized mouthwash.

Bad breath may also be persistent (chronic bad breath), which is a more serious condition, affecting some 25% of the population in varying degrees (5) Halitosis did not become a clinical entity until1874, when it was described by Howe.( 6 )

Recognition of this condition is simple, but diseases which cause halitosis may produce distinctly different smells. The distinct smell which each disease produces may offer some help in differentiating the etiology of halitosis if various factors causing this condition are understood. Halitosis can be divided into the following categories:(1) halitosis due to local factors of the pathological origin, (2) halitosis due to local factors of no pathological origin, (3) halitosis due to systemic factors of pathologic origin, (4) halitosis due to systemic factors of non pathologic origin, (5) halitosis due to systemic administration of drugs, and (6) halitosis due to xerostomia. Halitosis may be caused by local conditions such as poor oral hygiene, extensive caries, gingivitis, periodontitis, open contacts allowing food impaction, Vincent's disease, hairy or coated tongue, fissured tongue, excessive smoking, healing extraction wounds, and necrotic tissues from ulceration. (6-8) In adults, chronic periodontal disease is a major cause of halitosis. Periodontal pockets produce hydrogen sulfides which give off an offensive odor; these pockets encourage trapping of food(8 ,9, 10) Halitosis may also be related to an increase of gram-negative filamentous organisms, an increase in pH to 7.2, and the formation of indoles and amines in the oral cavity (11) Other conditions which may produce halitosis include chronic sinusitis with postnasal drip, rhinitis, lethal granuloma pharyngitis, tonsillitis, syphilitic ulcers, cancrum oris, tumors of the nose, abscess ulcerogangrenous processes, cancerous tumors of the trachea and bronchi, chronic fetid bronchitis, and infectious

malignant neoplasms of the oral and pharyngeal cavities(10,12,13)

Stagnation of saliva associated with food debris which causes the halitosis, most often experienced in the morning is due, in part, to lack of movement of the cheek and tongue and also to a decrease in the basal metabolic rate during sleep which leads to a reduction in salivary flow which inhibits self-cleansing of the oral cavity(14-15). Odor intensity of the breath increases with age(16). During meals, the chewing movement involving the tongue, cheek, teeth, and other structures increases salivary flow; this helps to remove food debris, which helps to decrease the intensity of halitosis (14)

Excessive smoking, especially cigar smoking, not only causes fetid breath but also encourages the hairy tongue condition, which traps food debris and tobacco odor. It also decreases the salivary flow and further increases the severity of the condition.( 17-18)

The etiology of halitosis can be of systemic (extra-oral) or intra-oral origins. Halitosis is often caused by food debris and biofilm buildup on the teeth and tongue. The odor emanating from the oral cavity is produced by microbial putrefaction of the debris left in the mouth, resulting in the production of malodorous volatile sulfur compounds (VSCs). Systemic or extra-oral conditions may also produce volatile compounds that are eliminated through exhaled air, contributing to halitosis (19). Extra-oral halitosis can be further categorized by origin, either respiratory tract or blood-borne. Confirmation of upper and lower respiratory tract halitosis is largely based on medical assessments of these systems. Infections of the respiratory tract create discharge from the nasal and sinus cavities, which in turn can contribute to halitosis and tonsillitis (19).

A literature search was conducted volatile sulfur compounds(VSCs) produced in the mouth by bacterial putrefaction, which is the breakdown of substances such as food debris, cells, saliva and blood by enzymes produced from the bacteria. Amino acids are metabolized through this process, creating malodorous gases. Most common compounds are hydrogen sulfide, methyl mercaptan and dimethyl sulfide(19,20,21)The most common bacteria to produce these compounds are gram-negative anaerobic bacteria, such as *Porphyromonas gingivalis*, *Prevotella intermedia*, *Fusobacterium nucleatum*, *Bacteroides forsythus* and *Treponema denticola*(19,21). Many sites harbor these bacteria, such as teeth, buccal mucosa, periodontal pockets faulty restorations and removable partial dentures. However, the posterior dorsal surface of the tongue is considered the primary site in cases of halitosis (19,20,21)

#### Assessment

There are 3 primary assessment measurements for genuine halitosis:

1. Organoleptic: a sensory test that is scored by a trained judge or clinician based on the perception of the judge or clinician
2. Gas chromatography: considered the method of choice for researchers, it makes a distinction between VSCs that contribute to halitosis and helps the clinician determine intra- or extra-oral origin
3. Sulfide monitoring: a portable device for monitoring VSC. These monitors are better at measuring total VSCs instead of determining individual compounds (22,23)

#### Materials and Methods

In this study (March 2010- June2010), 360 patients (150 males & 210 females) were examined in oral medicine department of Shiraz University of medical sciences, Shiraz,

Iran. Among them 100 patients aged 10-56 years old included 58 women & 42 men complained of halitosis. The patients were divided into 6 groups according to their age & educational levels. Group 1 (11 patient) aged 10-20 years old, Group 2 (49 patients) aged 20-40 years old & Group 3 (40 patient) aged more than 40 years old. According to educational level, Group A (26 patients) include patients who attend primary or high school, Group B (54 patients) include patients who graduate from high school (diploma) & group C (20 patients) include patients who attended or graduated from the university. Diagnostic strategies were categorized according to health history, clinical findings & systemic problems. Within this period, 2 dentists performed the examinations. Each patient was given a special designed questionnaire. The questionnaire includes general and local factors affect halitosis. History of all systemic disease & certain drug consumption upper respiratory tract disease, hormonal status, GI problem, constipation, H Pylori infection, Diabetes, psychological problems, Liver dysfunction, kidney diseases, blood borne disease & any special condition were made complete information about type, frequency, time of day, extent of halitosis, therapies previously carried out & psychological stress as well as typical halitosis co-factors such as dietary and smoking habits were taken.

Oral cavity examined carefully by the dentists. The recorded clinical findings focused on common halitosis sites. These include an examination of the oral and pharyngeal soft tissue (Particularly a coated tongue, Waldeyer's ring, salivary ducts, (the presence of mucosal moisture) as well as dental fillings and restorations. A periodontal screening and assessment of oral hygiene was also evaluated. If signs of periodontal disease or pericoronitis were present, an orthopantomogram (OPG) was taken for further periodontal therapy or extraction. All fillings, dentures, crown & bridges quality & hygiene were evaluated carefully. Plaque index & pocket depth measured by using periodontal probes and disclosing tablets patients oral hygiene were categorized from poor to excellent (poor, fair, good & excellent).

At the time that appointment was made, patients were instructed not to eat, smoke, drink coffee or perform any oral hygiene at least 4 hours before the examination, as well as to refrain from any activity that could mask their bad breath (perfumed cosmetic products, chewing gum, candy or mouthwash) on the day prior to their appointment. Onion and garlic should be avoided two days before and any treatment with antibiotic must have been completed at least four weeks or more before visiting the clinic.

Organoleptic measurement carried out simply by sniffing the patient's breath and scoring the level of oral malodour. By inserting a translucent tube (2.5 cm diameter, 10 cm length) into the patient's mouth and having the person exhale slowly, the breath, undiluted by room air, can be evaluated and assigned an organoleptic score (24). An organoleptic evaluation was carried out during the initial consultation with the distance of operator to patient (1 m = grade 3) and the (30 cm = grade 2 and 10 cm = grade 1)

#### Results

In the majority of patients with a true halitosis (94%) an oral cause was diagnosed in 76% of the cases. Non oral cause was diagnosed in 18% of them and 6% of these patients complain of Pseudo-halitosis. These are patients who consider to have bad breath, but who does not have it, and finally get convinced during diagnosis and therapy. Halitosis was multi

factorial in this group & more than one factor could be seen in these patients

Most frequent contributing factors were extensive dental caries (62%) followed by periodontal disease (mild gingivitis to severe periodontitis) (55%). inadequate crown, bridge, root canal therapy & fillings were seen in 12 patients(12%) .In the study group, 9patients (9%) complain of xerostomia &3patients (3%) had aphtous ulcer and recurrent intra oral herpes.

Two patients (2%) complain of halitosis after using removable dentures. highly protein diet specially sea foods consumption had a major role in oral bad breath of 28 patients (28%),among them 27 patients gave history of frequently consumption of onion, garlic & spicy foods. Hormonal changes (menopause, pregnancy, menstruation & hormonal imbalance) were seen in four patients (4%) of the true halitosis group. Four patients (4%) who seeking from halitosis gave history of psychological disease, diabetes mellitus & hypertension. They used lithium, methformin hydrochloride& beta blockers. Nine patients (9%) were heavy smokers.

Four patients (4%) of the studying group complain of upper respiratory tract problem such as Acute sinusitis(3%) & nasal polyp(1%). Four patients (4%) of the halitosis group complain of Gastrointestinal disorders such as constipation (3%) & gastric reflux (1%) 37% of theses patients brushing their teeth twice a day, 28% one a day, 15% sometimes & 20% never used toothbrushes. There was no significant correlation between patients age, sex & educational level with halitosis( $p=0.05$ ).

#### Discussion

Bad breath has been recorded in the literature for thousands of years. The problem is discussed in length in the Jewish Talmud In as well as by Greek and Roman writers .Islam also stresses fresh breath in the context of good oral hygiene .The profit Mohamad is said to have thrown a congregant from the mosque for having the smell of garlic on his breath. many as 85% of patients the bad breath originate from oral cavity .several indications can suggest that the problem originate from the mouth.(24)

There is scanty information in the literature regarding the relative frequency of halitosis.

In our research prevalence of bad breath was 27.8% of all subjects.

Sulser et al reported that the prevalence of halitosis to be as high as 50%. However, only a few patients visit dental clinicians to seek help for halitosis. This fact suggests that the patients who do visit clinicians may have different psychological characteristics or values concerning their own breath than other individuals (16).

Quiryne et al reported that nearly 85% of all halitosis cases, the origin is found in the oral cavity. A clinical evaluation of malodor on 2 000 patients in Belgium, showed that 76% of these patients had oral causes: tongue coating (43%), gingivitis/periodontitis (11%) or a combination of the two (25)

In current study oral mal odor accounted for 76% of all cases, and 55% of presented periodontal disease

It may be impossible to determine the cause of minor degrees of halitosis.

Chronic halitosis in both adults and children should not go unexplained.

Brian & co workers reported that Extensive dental caries and periodontal disease are the commoner causes of oral sepsis.

Occasionally acute respiratory tract infections may cause halitosis though more often it is a feature of chronic suppurative lung disease (lung abscess, bronchiectasis). It is an unusual but

occasional complaint in normal children, except during acute infectious diseases (Vincent's angina, tonsillitis, infectious mononucleosis, diphtheria (26)

In our study 62% of the patients had extensive dental caries& (55%) presented periodontal disease. sinusitis & nasal polyp accounted for 4% of all cases with halitosis. Rosenberg reported that the tongue ,interdental and sub gingival area are the most common sites of malodor production ,other sites included faulty restorations such as overhang & leaking crowns, sites of food impaction & abscess .caries usually is not particularly malodorous ,unless large enough to entrap foods .Dentures are another important cause of malodor ,particularly if they are worn overnight.(24)

In our research faulty restoration were seen in 12 patients and accounted for 12% of oral malodor, denture breath were seen in two patients (2%) of all cases.

Porter & scully reported that Longstanding oral malodor is usually caused by oral, or sometimes nasopharyngeal disease. they reported that most likely cause of oral malodor is the accumulation of food debris and dental bacterial plaque on the teeth and tongue, resulting from poor oral hygiene and resultant gingival (gingivitis) and periodontal (gingivitis/ periodontitis) Inflammation. Although most types of gingivitis and periodontitis can give rise to malodor, adult periodontitis and loss of periodontal attachment, can cause variable degrees of oral malodors. Aggressive periodontitis, typified by rapid loss of periodontal bone and resultant tooth mobility, can cause intense oral malodors. Lack of oral cleansing because of xerostomia (dryness of the mouth) also has the potential to cause or enhance malodor, and some evidence indicates that wearing dentures may sometimes cause halitosis, possibly by virtue of increased tongue coat.(19)

In our study 55 patients (55%) complain of oral malodors due to periodontal disease and four of them had a movable tooth. Nine patients (9%) complain of halitosis seeking from xerostomia.

Hoshi K & co workers reported that a range of systemic disorders may rarely cause oral malodour). The halitosis of such disorders is unlikely to be an early feature of such disease (including undiagnosed type 1 diabetes mellitus) and is an incidental finding during clinical examination. Of interest, *Helicobacter pylori* infection has been suggested to cause a subjective change in oral odor. A range of drugs may rarely cause oral malodors.(27)

In current study five patients (5%) with halitosis complain of constipation and two patients (2%) from gastric reflux and one patient (1%) had under controlled diabetes mellitus.

These are patients who consider to have bad breath (pseudo halitosis), but who does not have it, and finally get convinced during diagnosis and therapy. Seemann describes data collected from a multidisciplinary breath consultation in Germany. According to this research, 28% of these patients complaining of bad breath did not show signs of bad breath—meaning that their concern of halitosis was exaggerated (28)

#### In our research 6 patients (6%) complain of pseudo halitosis without any sign & symptoms.

The role of tonsils in chronic bad breath is not at all clear. A transient odor associate with tonsil infections in children is common.(29)

In this study three patients(3%) with oral malodor complain of sinusitis and one(1%) from nasal polyp. eating certain foods (such as garlic, onions, meat, fish, and cheese can cause bad breath (3,4).in this research 28 patients seeking from halitosis

gave history of highly protein diet, a among them 27 patients gave history of frequently consumption of onion, garlic & spicy foods .

Bad breath originating in the gasterointestinal tract is considered to be extremely rare .The esophagus is normally collapsed and closed ,although the occasional belch may carry odor up from stomach .Cigarette odor can linger for more than a day after smoking.(19)

In this study 13 patient (13%) were smoker s, five patients (5%) with halitosis complain of constipation and two patients (2%) seeking from gastric reflux halitosis due to systemic administration of drugs were seen in four patients (4%) participated in this study Bollen & co workers advised that Since periodontitis is one of the main causes of oral malodour, a professional periodontal therapy should be performed. A one-stage full-mouth disinfection, as described by Bollen et al combining scaling and rootplaning in combination with chlorhexidine, has a significant microbiological improvement \and reduces the organoleptical scores (30).

Gentle but effective deep tongue cleaning should be come apart of daily hygiene routine. Inter dental cleanser such as toothpicks can be effective in cleaning sites of odor production. (19)

Toothpastes, containing stannous fluoride, zinc or triclosan, seem to have proved their beneficial effect in reducing the oral malodour for a limited period of time. (31) in this study scaling , root planning & improvement oral hygiene remarkably reduced patients bad breath.

Peruzzo & coworkers reported that Zinc, another active ingredient in mouthwash, has been shown to be effective by inhibiting bacterial breakdown of proteins, thus inhibiting VSC production. Chlorine dioxide solution (0.1% solution) has also been shown to maintain VSCs at lower levels when compared to a placebo mouth rinse (32) we did not use these products in our research ,but improvement of oral hygiene by using toothbrush, toothpaste ,mouthwashes &dental floss reduced oral halitosis.

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