

Oral hygiene practices and self-perceived halitosis among dental students

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ABSTRACT

Background: Halitosis represents a common dental condition, although sufferers are often not conscious of it. It is common among humans around the world and is usually caused by an accumulation of bacteria in the mouth as a result of gum disease, food, or plaque. This study aimed to determine the prevalence of oral hygiene practices, smoking habits and halitosis among undergraduate dental students and correlate the oral hygiene practices, oral health conditions to the prevalence of self perceived oral malodor.

Materials and Methods: Clinical examination of 250 dental students and a self-administered questionnaire were included in this study. A questionnaire was developed to assess the self-reported perception of oral breath, awareness of bad breath, timing of bad breath, oral hygiene practices, caries and bleeding gums, dryness of the mouth, smoking and tongue coating.

Results: The results indicated that female students had better oral hygiene practices. Significantly less self-reported oral bad breath ($P = 0.000$) was found in female dental students (40%) as compared to male (70%). It was found that smoking had statistically highly significant correlation with halitosis ($P = 0.000$). Presence of other oral conditions such as dental caries and filled carious lesions also showed higher prevalence of halitosis in dental students.

Conclusion Oral hygiene practices and oral health conditions are very important factors in halitosis. Females exhibited better oral hygiene practices and less prevalence of halitosis as compared to male students.

Key words: Halitosis, oral hygiene, oral malodor, smoking. (J Bagh Coll Dentistry 2014; 26(3):58-62)

INTRODUCTION

Halitosis is the general term used to describe any disagreeable odor in expired air regardless of whether the odorous substances originate from oral or non-oral sources. Other names used are fetor ex ore, fetor oris, bad or foul breath, breath malodor and oral malodor⁽¹⁾.

Loesche and Kazor⁽²⁾ had demonstrated that the mouth is the origin for the majority of halitosis. Halitosis is a common complaint of both genders. It occurs worldwide and has a multifactorial etiology⁽³⁾. In vitro and in vivo studies demonstrated the ability of putative periodontal pathogens and products of inflammation to produce volatile odoriferous compounds^(4,5). Therefore, the presence of periodontal inflammation needs to be considered in the management of halitosis. Tongue coating, including bacteria, desquamated cells, and saliva, among others, is one of the important etiological factors of halitosis.

A study demonstrated that tongue coating was associated with halitosis in more than 60% of 2000 patients of a breath clinic, whether present alone, or with periodontal inflammation⁽⁶⁾. The intensity of bad breath is significantly associated with the level of volatile sulfur compounds (VSCs) in the oral cavity⁽⁷⁾.

Increased production of VSC may represent a further mechanism of increased susceptibility to periodontitis in smokers and

also help explain the reported association between smoking and halitosis. The percentage of sites per subject with high levels of sulphides detected in moderate and deep periodontal pockets was found to be significantly higher in smokers, compared with non-smokers⁽⁸⁾. The saliva performs essential roles in protection of oral tissues, lubrication and assistance in swallowing, potentiating of taste, and elimination of the food bolus. A reduction in salivary flow has a negative effect on the self-cleaning of the mouth and can generate odoriferous volatile compounds⁽³⁾.

According to the American Dental Association, 50% of the adult population has suffered from an occasional oral malodor disorder, while 25% appear to have a chronic problem. However, there are other extrinsic causes e.g. smoking, alcohol, bad diet and socio-demographic factors⁽⁹⁾. Tooth brushing and dental flossing constitute the most common self-care behaviors for the preservation of human oral health⁽¹⁰⁾. Other predisposing factors causing halitosis included poor oral hygiene, gingival and periodontal disease, disorders of the oral mucosa, reduced salivary flow and the wearing of dental appliances⁽¹¹⁻¹⁵⁾.

The objectives of the study were to determine the prevalence of oral hygiene practices, smoking habits and their relations with halitosis among undergraduate dental students

MATERIALS AND METHODS

A questionnaire based study was carried out at diagnostic clinic of Oral Diagnosis Department / College of Dentistry/ University of Baghdad

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between 2011 and 2013). The final sample consisted of 250 (150 females and 100 males) dental students. Those students were examined clinically by the author for the presence of dental caries, bleeding on probing, dryness of the mouth and tongue coating.

A self-administered questionnaire was developed to assess the prevalence of oral hygiene habits including brushing, flossing, use of mouthwash, self-perception of oral health, awareness of bad breath (by asking student: are you have bad breathing and how do you know you have bad breathing, someone told you or you just know), timing of bad breath, asking the student if he/she noticed bleeding when you brush your teeth or in saliva when you spit), dryness of mouth (by visual examination to notice if there was a dry tongue and cracked lips or by asking student if there was a sticky or dry feeling in the mouth or trouble chewing or tasting), smoking habits, and coating over tongue (by visual examination to notice a coating area or discoloration on tongue's dorsum).

The questionnaire was made by reviewing the literature, and making modifications according to local culture oral hygiene practices and habits⁽¹⁶⁾.

Questionnaire

- Do you brush your teeth every day?
- Do you brush once daily?
- Do you brush twice daily?

- Do you brush three times daily?
- Do you brush more than three times daily?
- Do you change your toothbrush every 3 months?
- Do you change your toothbrush every 6 months?
- Do you change your toothbrush after 6 months?
- Are you using a dental floss?
- Are you using a mouth wash?
- Are you smoker?
- At what time of day is your breath worst:-
 - After waking up?
 - When hungry?
 - When thirsty?
 - While talking with other people?
 - All day?

Statistical Analysis

The data was entered into Statistical Package for Social Sciences (SPSS) version 19.0 and was utilized for data analysis. Chi-square test was used detect the genders difference regarding the halitosis and to investigate the relation between the halitosis and other parameters. The significance level (*p* value) was set at 0.05.

RESULTS

Two hundred and fifty students filled the questionnaire and responded. The results indicated the presence of high significant genders difference with males had higher percentage than females (Table 1).

Table 1: The prevalence of self-perceived halitosis and gender difference among dental students

Halitosis	Males (N=100)		Females (N=150)		Total (N=250)		Genders Difference	
	No.	%	No.	%	No.	%	X ²	p-value
Present	70	70	60	40	130	52	21.635	0.000
Absent	30	30	90	60	120	84		

The majority of students (70% of males and 80% of females) experienced bad breath after wake up, while the equal percentage in males (5%) of bad breath occurred when they hungry and while talking with other people and increased to 10 % when thirsty and in all day. Females

demonstrated equal percentages of halitosis (4.3%) when they were thirsty and all day and this percentage increased up to 10 % while talking with other people. Generally, there was non-significant gender difference (Table 2).

Table 2: The timing of self perceived bad breath during the day

Timing of self-perceived bad breath during the day	Males (N=100)		Females (N=150)		Total (N=250)		Genders difference	
	No.	%	No.	%	No.	%	X ²	p-value
After wake up	42	70	56	80	98	75.4	5.865	0.209
When hungry	3	5	1	1.4	4	3.1		
When thirsty	6	10	3	4.3	9	6.9		
While talking with other people	3	5	7	10	10	7.7		
All day	6	10	3	4.3	9	6.9		

Regarding the relation between the halitosis and the frequency of brushing, the results revealed

that there was highly significant relation between the increase of the frequency of brushing and absence of halitosis (Table 3).

Table 3: The halitosis presence to brushing

Brushing	Halitosis				Relation	
	Present		Absent		X ²	p-value
	No.	%	No.	%		
Daily brushing habit (250 students)	130	52	120	48	35.91	0.000
Brushing once daily (64 students)	50	78.1	14	21.9		
Brushing twice daily (140 students)	70	50	70	50		
Brushing three times daily (40 students)	10	25	30	75		
Brushing more than three times daily (6 students)	0	0	6	100		

Relating the frequency of changing the tooth brush with halitosis revealed high significant relation being higher percentage of absence of halitosis if the student changed his/her tooth brush within 3 months (Table 4). On the other hand, 100

student used dental floss and mouth wash and reported no halitosis and this confirmed by the significant relation between the use of dental floss and mouth wash with the absence of halitosis (Table 5).

Table 4: The relation between halitosis and the frequency of changing tooth brush

Frequency of changing the brush	Halitosis				Relation	
	Present		Absent		X ²	p-value
	No.	%	No.	%		
Changing brush within 3 months (100 students)	40	40	60	60	11.396	0.003
Changing brush within 6 months (90 students)	50	55.6	40	44.4		
Changing brush after 6 months (60 students)	40	66.7	20	33.3		

Table 5: The relation between halitosis and the use of dental floss and mouth wash

Use of dental floss and mouth wash	Halitosis				Relation	
	Present		Absent		X ²	p-value
	No.	%	No.	%		
Use of dental floss (40 students)	20	50	20	50	9.091	0.011
Use of mouth wash (50 students)	25	50	25	50		
Use of dental floss and mouth wash (10 students)	0	0	10	100		

Table 6 demonstrated the relation between halitosis with other predisposing factors and the results revealed highly significant relation. Generally, 45 students (90%) out of 50 smoker

students reported halitosis. Dry mouth ranked secondly then the carious lesion, coating over tongue, etc.

Table 6: The relation between halitosis and smoking, dry mouth, caries, bleeding gums and coated tongue

Oral hygiene practices	Halitosis				Relation	
	Present		Absent		X ²	p-value
	No.	%	No.	%		
Smoking habit (50 students)	45	90	5	10	22.607	0.000
Presence of dryness of mouth (25 students)	20	80	5	20		
Presence of filled carious lesions (70 students)	40	57.1	30	42.9		
Presence of dental caries (75 students)	50	66.7	25	33.3		
Presence of bleeding gums (40 students)	20	50	20	50		
Presence of coating over the tongue (25 students)	15	60	10	40		

Self-reported prevalence of dryness of mouth, dental caries, bleeding gums and coating over tongue were assessed among males and females

dental students. Statistically, there was highly significant gender difference in the results (Table7).

Table 7: The prevalence of self- assessed presence of dry mouth, dental caries, coating over the tongue and bleeding gums amongst dental students

Oral hygiene	Males (N=100)		Females (N=150)		Genders difference	
	No.	%	No.	%	X ²	p-value
Dryness of mouth N=25	15	15	10	6.7	11.42	0.009
Dental caries N=70	35	35	35	23.3		
Bleeding gums N=40	10	10	30	20		
Coating over the tongue N=25	15	15	10	6.7		

DISCUSSION

Bad breath can be a social handicap for an individual. Self-perception is important for diagnosing and controlling bad breath. A recent study of United States dentists reported that chronic bad breath was diagnosed by 41% of practicing dentists in one week⁽¹⁷⁾. Studies conducted in Sweden⁽¹⁸⁾ and France⁽¹⁹⁾ have also reported the prevalence of oral malodor in the population. From such studies it can be concluded that halitosis is a problem that is perceived in different cultures and societies of the world.

In this study the health care professionals such as dental students were studied for the prevalence of halitosis by correlating it to oral hygiene practices being followed by the students, the oral conditions such as dental caries, dryness of mouth, smoking, bleeding gums and coating over tongue. It had been suggested that students who brush their teeth with a frequency of more than three times daily, changed their brush within 3 months, used both dental floss and mouthwash did not reported halitosis as compared to the ones who did not follow such oral hygiene practice.

The oral hygiene practices were better among the female students and also the prevalence of self reported oral malodor was less in the female dental students. These results coincide with the results of other studies^(20,21).

Dry mouth is also highly correlated with oral malodor. In this study, almost 15% males and 10% females reported dry mouth. It has been suggested that 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^(1,22).

Halitosis was most prominent soon after wake up in most of the individuals (75.4%) who complaint of self perceived oral malodor. This can be attributed to the reduced salivary flow at night or to the lack of brushing habit at night. Females (80%) as compared to males experience halitosis after wake up.

In the present study, 0.7% of females and 49% of males were smokers. A history of smoking has been implicated in decreasing olfactory sensitivity⁽²⁰⁾. It has been found that prevalence of halitosis (90%) was more in presence of smoking habit

with statistically highly significant correlation ($p=0.000$), this result agrees with Al-Atrooshi and Al-Rawi⁽²¹⁾ who found that smoking has been defined as an extrinsic cause of oral halitosis. Suarez *et al.*⁽²²⁾ suggested oral malodor in younger generations could be ascribable mainly to tongue coat deposition. Furthermore, a positive correlation between levels of VSC on the tongue's dorsum surface and whole oral malodor has been demonstrated⁽²³⁾.

Kishi *et al.*⁽²⁴⁾ indicated several VSC producing bacteria have the ability to colonize on the coat of the tongue in peridontally healthy subjects. It was also suggested oral malodor could be related to not only the amount of tongue coating but also the colonization of *P. gingivalis* in the coating. 60% of the students who experienced tongue coating reflected the perception of bad breath.

From this study, it has been concluded that female dental students maintained better oral hygiene practices than male dental students and had less prevalence of halitosis as compared to the male student population. The oral health care providers are responsible for sound oral health of the nation. They cannot be role models for their patients until they maintain good habits themselves. This can be done by greater emphasis during their undergraduate dental training could improve their oral self-care behaviors. Halitosis is a reflection of poor oral health. In this study, it can be concluded that good oral hygiene habits such as using of both dental floss and mouth wash tend to decrease the prevalence of halitosis, while the presence of smoking habit tend to increase the prevalence of halitosis.

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