

Perceived Impact of Halitosis on Individual's Social life and Marital Relationship in Qassim Province, KSA

Nabila Ahmed Sedky*

*Department of Community Dentistry and Oral Epidemiology, College of Dentistry, Qassim University, KSA
Dr.nabila.sedky@qudent.org

Abstract: Objectives: To assess self-perception of halitosis, oral hygiene practices and the impact of bad breath on individual's social life and marital relationship among male and female visitors of commercial malls in Qassim Province, KSA. **Materials and Methods:** Self-administered anonymous questionnaire was administered to the visitors of two grand commercial malls in the city of Buraidah in Qassim. The questionnaire was completed by 2490 subjects. Data were subjected to descriptive statistics and chi-square tests, as well as regression analysis. **Results:** More than 69.00% and 53.00% of males and females had coatings on their tongue. About 67.00% and 59.00% of males and females self-perceived that they had bad breath. Social embarrassment due to bad breath was sensed by 74.81% and 66.95% of males and females. About 70.00% and 68.51% of males and females emphasized that their spouses experiencing bad breath. The vast majority of females asserted that there is impact of bad breath on the marital relationship. Sag relationship between the couple was reported by 53.61% of the participants, while 36.52% of the studied group were tolerating from spacing and 9.87% became divorced. **Conclusion:** Halitosis is an annoying social problem causing some social difficulties. An impact of bad breath on the marital relationship was found in the form of sagging or spacing in the relation between partners.

[Nabila Ahmed Sedky. **Perceived Impact of Halitosis on Individual's Social life and Marital Relationship in Qassim Province, KSA.** *J Am Sci* 2015;11(3):187-196]. (ISSN: 1545-1003). <http://www.jofamericanscience.org>. 23

Key words: halitosis, self-perceived, social problems, marital relationship, bad breath.

Introduction

Halitosis, a common cause for dentist consultation provokes a lot of attention among sufferer as it adversely impacts on everyday life behaviors as communication with other people,(1) self-respect, self-possession, social and intimate rapport like marriage, work opportunities, and career ambitions.(2) It causes embarrassment, impedes social interaction, and also reduces quality of life among aggrieved individuals. The effect of halitosis expands beyond the afflicted individuals, as it is likewise a source of embarrassment for families and friends of individuals distressed with halitosis. These effects together with improper beliefs and worldwide spread feature halitosis and worry about it as a major health issue.(3)

Halitosis or bad breath is a generic term used to depict disagreeable breath that releases from a person's mouth regardless of whether the odorous substances in the breath originate from oral or non-oral sources.(4) It is a crippling social problem with a familiar disorder of up to one-third of the general population.(5) It affects one out of four adults, where 25 to 85 million American suffer from chronic bad breath.(6, 7) Halitosis originates in 90% of the cases within the oral cavity and merely a small percentage of cases may be due to non-oral causes.(8) It is predominantly caused by bacteria infecting the dorsal surface of the tongue and producing volatile sulfur compounds (VSC).(9) It was found that 60% of bacteria are present on the dorsum of the tongue, in which fissures create a low oxygen micro-environment preserved from the

cleansing action of saliva, and particularly get worse with dry mouth as during sleeping.(10-12)

Halitosis has been classified into three main categories: genuine, pseudo-halitosis, and halitophobia halitosis.(13) In genuine halitosis, the malodor intensity is outside the socially tolerable level. If malodor is not observed by others but the patient constantly complains of its presence, it is diagnosed as pseudo-halitosis. If after prosperous treatment of genuine halitosis or pseudo-halitosis the patient still complains of halitosis, the diagnosis is referred to halitophobia.(14)

There are proofs that on waking up in the morning most healthy adults have socially unacceptable bad breaths.(15) This problem is referred to reduced salivary flow during sleep, and it is usually put at end after washing and eating breakfast. Several factors may participate in oral malodor, including tongue coating, impacted food or debris, deep carious lesions, imperfect dental restorations, periodontal disease, pericoronitis, exposed necrotic tooth pulps, healing oral mucosa wounds, mucosal ulcerations, peri-implant disease, unclean dentures and oral carcinoma.(16-23) Furthermore, Halitosis may act as a biomarker for a group of systemic diseases, as diabetes mellitus (acetone breath), unbalanced insulin-dependent diabetes (rotten apple), kidney insufficiency (fish odor), liver insufficiency (dead mice), lung abscess or bronchiectasis (rotten meat smell), rheumatic fever (acid sweet smell).(24-26) Consequently, knowledge of the factors causing halitosis may be effective in early diagnosis of specific systemic condition.(8)

A relationship was detected between social anxiety disorder and halitosis. The need for oral malodor treatment to put social anxiety disorder into consideration will be elucidated. It usually has an early onset, and has critical effects on social communications and quality of life.(27, 28)

It was verified that applying oral hygiene measures in the form of brushing twice daily along with tongue cleaning can minimize malodor to a great extent.(26, 29) Additionally, oral rinses containing antimicrobial agents such as chlorhexidine, essential oils, hydrogen peroxide and triclosane can be suggested.(8)

Because of the extensive accumulation of bacteria on the tongue, tongue cleaning has been accentuated(5) to reduce the amount of tongue coating and the bacterial load on the tongue surface.(29) Cleaning of the tongue can be carried out with a normal toothbrush, but it is preferred to be with a tongue scraper if a coating is ascertained.(26) When tongue cleaning is performed on a daily basis, the process becomes easier. Ultimately, the person senses unclean when tongue debris has not been removed.(30)

The worry about halitosis elicits behavioral reaction specifically increased oral self-care, self-consciousness and social isolation, typically because of social, psychological, and relationship impairments.(31) The fact that oral sources are mainly responsible for bad breath disorders(32) specifies that oral self-care and lifestyle are the chief contributors to the beginning of this condition and early predictable behavioral response would be alterations in an individual's oral hygiene practices. While, there has been determined association between inadequate oral hygiene practices and halitosis,(33) the impact of halitosis on the social life style appears not to have been investigated scientifically in the literature.

The aim of the present survey was to assess self-perception of halitosis, oral hygiene practices and the impact of bad breath on individual's social life and marital relationship among male and female visitors of commercial malls in Qassim Province, KSA.

Material and Methods

This cross-sectional survey was conducted in Qassim Province among people who visited two grand commercial malls in Buraidah city, every weekend between March and May, 2014. The study sample was randomly selected. After being told the nature of the research, two thousand four hundred and ninety subjects (46.56% males and 53.44% females, mean age: 35.3 ± 10.5 years, age range 16-65 years), signed the approval to participate in the survey through an informed consent form and participated in the survey by completing an anonymous self-administered questionnaire. The sample size was calculated

according to the population census of Buraidah city (614093) with confidence level 95% and confidence interval 1.96. All the questionnaires were reviewed after have been received from the participants to ensure their completion. Questionnaires with missing data were excluded from the study and substituted by another. The study protocol was approved by the Dental Ethical Committee.

The questionnaire consisted of 20 questions. The first section of the questionnaire designed to assess information on participants' demography which included gender, age and marital status. Then a question was asking about current smoking condition. The following section was enquiring about the subjects' medical history. The subsequent section asked about the oral hygiene measures followed by the persons in the form of describing the oral hygiene habits they follow, whether they have tongue coating or not, as well as how do they clean their tongues. The next section was planned to enquire about the perception of the community attitude towards halitosis. The last section was concerned with married persons only to evaluate the impact of bad breath on the marital relationship.

The questionnaire, pre-tested on randomly selected 249 subjects (10%) from the two malls to ensure its practicability, validity, interpretation of responses, and reliability (Cronbach's $\alpha=0.821$).

Statistical analysis

Statistical analysis was conducted using the SPSS program (SPSS 19.0 for windows, SPSS Inc., Chicago, USA). The data were analyzed for frequency distributions. Data were subjected to descriptive statistics like frequencies, percentages, and cross-tabulation. The data and group comparison was done with Pearson chi square test and Fisher's exact test. The level of significance was set at 95% confidence interval. All statistical analyses were carried out at a significance level less than 0.05 & 0.01. The higher frequencies were considered influence in this study. Regression analysis was conducted to figure out which factors that have the main effect on the studied condition.

Results

Among the two thousand four hundred and ninety subjects surveyed, 46.25% were married, while 51.25% were single and 2.50% were divorced, **table (1)**.

Concerning smoking, medical condition and suffering from bad breath (**table 2**), only one third of the studied group reported that they are currently smoking; the majority of the smokers (82.52%) stated that they are suffering from bad breath. Moreover, about 59.00% of the studied subjects had stomach problems, 12.50% had sinusitis and approximately 11.00% are tolerating from diabetes, among this group

of participants 32.28%, 77.50 and 62.86, respectively registered that they are experiencing bad breath.

Table (3) reveals the oral hygiene practices and tongue coating among the investigated group. With regard to the oral hygiene habits, almost 61.40% of the females and 36.24% of males reported that they regularly brushing their teeth twice/day, with a statistically significant difference ($\chi^2=54.729^*$, $P=0.001$). Moreover, the majority of the males and females (69.11% and 53.19%, respectively) registered that they suffered from coatings on their tongues. A statistically significant difference was found ($\chi^2=8.444^*$, $P=0.003$). On the other hand, 50.99% of the studied group of sharing males and 36.81% of the females disclosed that they didn't clean their tongues, with a statistically significant difference ($\chi^2=8.448$, $P=0.038$).

Table (1): Demography of the studied group

Variable		Frequency	Percent
Gender (N=2490)	Male	1159	46.56
	Female	1331	53.44
Age (N=2490)	< 20	93	3.75
	20 - < 30	669	26.88
	30 - < 40	973	39.06
	40 - < 50	482	19.38
	50 - < 60	257	10.31
	60 and more	16	0.63
	Mean	35.3	
	SD	+10.5	
Marital Status (N=2490)	Single	1152	46.25
	Married	1276	51.25
	Divorced	62	2.50
	Range	16-65	

Table (2): Smoking, Medical Condition and Suffering From Bad Breath of the studied group

Variable	N (%)	Suffering From Bad Breath			
		Yes N (%)	No N (%)	I Don't Know N (%)	
Do you smoke now? (N=2490)	Yes	801 (32.19)	661 (82.52)	39 (4.85)	101 (12.62)
	No	1689 (67.81)	475 (28.11)	942 (55.76)	272 (16.13)
Did you ever suffer from one or more of the following diseases or conditions? (N=2490)	No disease	78 (3.13)	0 (0.00)	54 (70.00)	23 (30.00)
	Diabetes	272 (10.94)	171 (62.86)	31 (11.43)	70 (25.71)
	Sinusitis	311 (12.50)	241 (77.50)	31 (10.00)	39 (12.50)
	Stomach Problems	1471 (59.06)	475 (32.28)	833 (56.61)	163 (11.11)
	Kidney Diseases	31 (1.25)	31 (100.00)	0 (0.00)	0 (0.00)
	Liver Diseases	132 (5.31)	31 (23.53)	23 (17.65)	78 (58.82)
	Xerostomia	179 (7.19)	179 (100.00)	0 (0.00)	0 (0.00)
	Sinusitis & Kidney Disease	8 (0.31)	8 (100.00)	0 (0.00)	0 (0.00)
Diabetes, Sinusitis & Liver Diseases	8 (0.31)	0 (0.00)	8 (100.00)	0 (0.00)	

Table (3): Oral Hygiene Practices, and Tongue Coating among Males and Females

Variable		Stat	Oral hygiene habits (Multiple Response)*						2 (P)	
			Regular teeth brushing twice/day	Irregular teeth brushing	Regular dental flossing twice/day	Use miswak every day	Regular use of mouthwash every day	No mouth cleaning		
Gender (N=2490)	Male	Count (%)	420 (36.24)	412 (35.55)	86 (7.42)	327 (28.21)	132 (11.39)	101 (8.71)	54.729* (0.000)	
	Female	Count (%)	817 (61.38)	428 (32.16)	163 (12.25)	280 (21.04)	296 (22.24)	36 (2.70)		
Variable		Stat	Tongue coatings				2 (P)			
			Yes				No			
Gender (N=2490)	Male	Count (%)	801 (69.11)				358 (30.89)			8.444* (0.003)
	Female	Count (%)	708 (53.19)				623 (46.81)			
	Total	Count (%)	1509 (60.60)				981 (39.40)			
Variable		Stat	Tongue cleaning				2 (P)			
			Rinse with water only	Brush with my tooth brush every day	Using tongue scraper every day	Don't clean my tongue				
Gender (N=2490)	Male	Count (%)	257 (22.17)	233 (20.10)	78 (6.73)	591 (50.99)			8.448* (0.038)	
	Female	Count (%)	296 (22.24)	428 (32.16)	117 (8.79)	490 (36.81)				
	Total	Count (%)	553 (22.21)	661 (26.55)	195 (7.83)	1081 (43.41)				

P<0.001 & <0.05 a. Percentages and totals are based on respondents.

Enquiry about the perception of bad breath among the studied group, about 58.45% as well as 49.01% of both females and males, respectively, stated that they strongly agreed that there is a difficulty in talking with a person having bad breath. No statistical difference was detected ($\chi^2=4.715$, $P=0.318$). Moreover, 47.33% of the females and 36.24% of males reported that they also strongly agreed that bad breath leads to spacing between spouses. A statistically significant difference was observed between the studied groups ($\chi^2=12.252^*$, $P=0.016$). On the other hand, 43.66% of the male and 47.34% of the female studied group affirmed that they

suffer from bad breath, while 25.55% of the males reported that they didn't know that they have malodor, registering a statistically significant difference ($\chi^2=25.871^*$, $P=0.000$). Around 67.00% of the male subjects and 59.32% of the females knew by themselves that they had bad breath, with no statistical difference ($\chi^2=0.952$, $P=0.621$), while 64.09% of the males and 61.58% of the females experienced halitosis most often after awakening. Similarly no statistical difference was found ($\chi^2=11.649$, $P=0.234$), **table (4)**.

Table (4): Perception of bad breath among Males and Females

Variable		Stat	Difficulty in talking with a person having bad breath					²
			Strongly agree	Agree	Neutral	Disagree	Strongly Disagree	(P)
Gender (N=2490)	Male	Count (%)	568 (49.01)	272 (23.47)	241 (20.79)	39 (3.36)	39 (3.36)	4.715 (0.318)
	Female	Count (%)	778 (58.45)	202 (15.18)	257 (19.31)	54 (4.06)	40 (3.01)	
	Total	Count (%)	1346 (54.06)	474 (19.04)	498 (20.00)	93 (3.73)	79 (3.17)	
Variable		Stat	Bad breath leads to spacing between spouses					²
			Strongly agree	Agree	Neutral	Disagree	Strongly Disagree	(P)
Gender (N=2490)	Male	Count (%)	420 (36.24)	350 (30.20)	265 (22.86)	70 (6.04)	54 (4.66)	12.252* (0.016)
	Female	Count (%)	630 (47.33)	195 (14.65)	366 (27.50)	93 (6.99)	47 (3.53)	
	Total	Count (%)	1050 (42.17)	545 (21.89)	631 (25.34)	163 (6.55)	101 (4.06)	
Variable		Stat	Suffering From Bad Breath			²		
			Yes	No	I Don't Know	(P)		
Gender (N=2490)	Male	Count (%)	506 (43.66)	358 (30.89)	296 (25.55)	25.871* (0.000)		
	Female	Count (%)	630 (47.34)	623 (46.81)	78 (5.85)			
	Total	Count (%)	1136 (45.60)	981 (39.40)	374 (15.00)			
Variable		Stat	knowing that you have bad breath			²		
			Myself	Someone Told Me	My Doctor	(P)		
Q1 Gender (N=1510)	Male	Count (%)	529 (66.96)	218 (27.18)	55 (6.86)	0.952 (0.621)		
	Female	Count (%)	420 (59.32)	226 (31.92)	62 (8.76)			
	Total	Count (%)	949 (62.85)	444 (29.40)	117 (7.75)			
Variable		Stat	Time of experiencing halitosis (Multiple Response) ^a				²	
			After awakening	When I'm hungry or thirsty	Constantly over the whole day	After Fatigue & Exhaustion	When talking with Others	(P)
Gender (N=1510)	Male	Count (%)	514 (64.09)	179 (22.32)	101 (12.59)	86 (10.72)	62 (7.73)	11.649 (0.234)
	Female	Count (%)	436 (61.58)	140 (19.77)	70 (9.89)	70 (9.89)	117 (16.53)	

$P < 0.001$ & < 0.05

a. Percentages and totals are based on respondents.

Results of the present survey in **table 5** illustrates that 74.81% of males and 66.95% of female participants were suffering from social embarrassment

due to bad breath, and the findings revealed no statistical difference ($\chi^2=1.404$, $P=0.152$). About the most common problems the studied subjects

encountered due to bad breath, the highest percentage of males (34.91%) stated that they can't talk with friends, while 28.18% of the males and 26.41% of the females registered that they feeling ashamed, with no statistical difference between groups ($\chi^2=6.338$, $P=0.275$). Then asking about the action taken to overcome halitosis, 84.41% of males and 80.23% of females affirmed that they were interested in visiting

dentist seeking treatment for halitosis. Among those who were interested in seeking treatment, 83.13% of the studied group confirmed that they feel improvement after treatment. No statistical difference was distinguished regarding both seeking treatment for halitosis and improvement after treatment in both males and females ($\chi^2=0.603$, $P=0.278$, $\chi^2=0.434$, $P=0.329$, respectively).

Table (5): Effect of bad Breath on social life and the Action Taken

Variable		Stat	Social embarrassment due to bad breath					² (P)
			Yes	No				
Gender (N=1510)	Male	Count (%)	600 (74.81)	202 (25.19)				1.404 (0.152)
	Female	Count (%)	474 (66.95)	234 (33.05)				
	Total	Count (%)	1074 (71.13)	436 (28.87)				
Variable		Stat	Most common problems encountered due to bad breath					² (P)
			Can't face the Community	Can't Talk with Friends	Feeling Ashamed	Shame from husband / wife	None of these problems	
Gender (N=1510)	Male	Count (%)	117 (14.59)	280 (34.91)	234 (29.18)	132 (16.46)	39 (4.86)	6.338 (0.275)
	Female	Count (%)	124 (17.51)	156 (22.03)	187 (26.41)	171 (24.15)	70 (9.89)	
	Total	Count (%)	241 (15.96)	436 (28.87)	421 (27.88)	303 (20.07)	109 (7.22)	
Variable		Stat	Visiting dental office for halitosis treatment				² (P)	
			Yes		No			
Gender (N=1510)	Male	Count (%)	677 (84.41)		125 (15.59)		0.603 (0.278)	
	Female	Count (%)	568 (80.23)		140 (19.77)			
	Total	Count (%)	1245 (82.47)		265 (17.53)			
Variable		Stat	Improvement in halitosis after treatment			² (P)		
			Yes		No			
Gender (N=1245)	Male	Count (%)	529 (78.14)		148 (21.86)	1.493 (0.474)		
	Female	Count (%)	506 (89.08)		62 (10.92)			
	Total	Count (%)	1035 (83.13)		210 (16.87)			

$P < 0.001$ & < 0.05

Table (6) portrays the impact of bad breath on the marital status. By asking the 895 married subjects who shared in the study and were suffering from bad breath whether their spouses are suffering from bad breath, 70.28% of the males and 68.51% of the females confirmed that their spouses suffered from bad breath, registering no statistical difference ($\chi^2=0.038$, $P=0.502$). Furthermore, the majority of the studied group (71.28%) affirmed that there is an impact of bad breath on the marital relationship with the females registered the highest percentage (86.15%), with a

statistically significant difference ($\chi^2=10.037$, $P=0.002$). With regard to the kind of impact on the marital relationship, 53.61% of the studied group (60.47% of males and 47.66% of females) said that chill (sag relationship between the couple) was the problem they faced as a consequence of bad breath, whereas 36.52% of them (23.65% and 47.66% of the male and female contributors, respectively) were suffering from aversion (spacing in the relationship). Finally only 9.87% (15.88% males and 4.68% females) got divorced due to halitosis.

Table (6): Impact of Bad Breath on Marital Relationship

Variable		Stat	Your spouse suffers from Bad Breath			
			Yes	No	² (P)	
Gender (N=895)	Male (n=498)	Count (%)	350 (70.28)	148 (29.72)	0.038 (0.502)	
	Female (n=397)	Count (%)	272 (68.51)	125 (31.49)		
	Total	Count (%)	622 (69.50)	273 (30.50)		
Variable		Stat	Impact of Bad Breath on the marital relationship			
			Yes	No	² (P)	
Gender (N=895)	Male (n=498)	Count (%)	296 (59.44)	202 (40.56)	10.037* (0.002)	
	Female (n=397)	Count (%)	342 (86.15)	55 (13.85)		
	Total	Count (%)	638 (71.28)	257 (28.72)		
Variable		Stat	Type of impact on the marital relationship			
			Chill (Sag relationship between the couple)	Aversion (Spacing in the relationship)	Divorce	Total
Gender (N=638)	Male	Count (%)	179 (60.47)	70 (23.65)	47 (15.88)	296 (46.39)
	Female	Count (%)	163 (47.66)	163 (47.66)	16 (4.68)	342 (53.61)
	Total	Count (%)	342 (53.61)	233 (36.52)	63 (9.87)	638 (100.00)

P<0.001 & <0.05

Table (7) portrays the effect of each independent variable in relation to halitosis assessed by current smoking, oral hygiene measures and society perception. Out of the **eleven** variables studied, only **three** variables were statistically associated with suffering from bad breath. The first best predictor variable for halitosis was “**Tongue coatings**”, where those subjects who had coating on their tongues were suffering from halitosis 57.8 times more than those with no tongue coatings. Furthermore, “**Tongue cleaning**” was the second negative predictor variable

that likely to cause halitosis 6.0 times more for the studied subjects who didn't clean their tongues. The last predictor statistically associated with the social effect of halitosis was “**The most common problems encountered due to bad breath**”, in which those subjects who have tongue coatings and didn't clean their tongues are 1.7 times at risk of encountering social problems as they can't face the community, they can't talk with their friends, also they sometimes feeling ashamed from their mouths' bad odor in addition to be shamed from their husbands / wives.

Table (7): Significant variables related to Halitosis assessed by current smoking, oral hygiene measures and society perception based on linear regression analysis

Model	variables	Unstandardized Coefficients	Standardized Coefficients	R ²	R ² Change	t	P-value
		B	Beta				
1	(Constant)	0.492		0.578	0.578	5.490	0.000
	Tongue coatings	0.825	0.760			20.864	0.000
2	(Constant)	0.374		0.637	0.060	4.408	0.000
	Tongue coatings	0.785	0.724			21.163	0.000
	Tongue cleaning (Multiple Response)	-0.117	-0.247			7.216	0.000
3	(Constant)	0.719		0.654	0.017	5.954	0.000
	Tongue coatings	0.736	0.678			19.141	0.000
	Tongue cleaning (Multiple Response)	-0.126	-0.266			7.860	0.000
	Most common problems encountered due to bad breath	0.100	0.138			-3.933	0.000

Dependent Variable: Do You Suffer From Bad Breath?

Furthermore, **table (8)** illustrates the effect of each independent variable in relation to marital relationship. It was detected that out of **four** variables studied, only **two** variables were statistically associated with the impact of halitosis on the marital relationship. The first best predictor variable for halitosis and marital relationship was “**your spouse suffers from**

bad breath”. The person whose spouse is suffering from bad breath was 1.9 times at higher risk of threatened marital relationship. The second predictor variable was the “**Type of impact on the marital relationship**”. The subjects whose partner experiences halitosis were 3.3 times prone to suffer from sag, spacing or divorce in his/her marital relationship.

Table (8): Significant variables related to Halitosis assessed by Marital Relationship based on linear regression analysis

Model	variables	Unstandardized Coefficients	Standardized Coefficients	R ²	R ² Change	t	P-value
		B	Beta				
1	(Constant)	2.546		0.019	0.019	19.699	0.000
	Your spouse suffers from Bad Breath	0.103	0.136			-2.450	0.015
2	(Constant)	2.297		0.052	0.033	15.583	0.000
	Your spouse suffers from Bad Breath	0.546	0.723			-3.926	0.000
	Type of impact on the marital relationship	0.328	0.614			3.338	0.001

Dependent Variable: Do You Suffer From Bad Breath?

Discussion

Halitosis is a reason of worry, embarrassment, and disappointment and can lead to social isolation and divorce(31, 34) also it appears to be as an important deleterious factor in social communication.(35)

Oral malodor is a prevalent problem among general population and proofs reveal that it forms about 85% of all bad breath.(32) Despite the prosperity of evidence on the condition, detection of the definite cause remains occasionally problematic.(14) In this study, bad breath was assessed through a questionnaire and no clinical examination was performed. In many studies, including the current one, the assessment of halitosis depends on the subject's self-perception. Many professionals do not believe this method to be reliable because it is subjective, and obviously, the method is not standardized among participants.(36)

In the present survey, the overall prevalence of oral malodor was 45.60%. This character is higher than the results reported in other populations including studies performed in France,(37) and the estimations of the general population of the USA(36), and similar to the results reported in Japan.(38) This outcome may be due to the results that the participating individuals were suffering from some health problems as about 59.06% of the studied subjects had stomach problems, 12.50% experiencing sinusitis and approximately 11.00% are suffering from diabetes, also 32.19% of the studied group are currently smoking, all these findings resulting in an increase in the overall prevalence of malodor in the current study.

Although the majority of the studied group stated that they follow good oral hygiene habits in the form

of tooth brushing, dental flossing, using miswak and rinsing with mouth wash, still a considerable percentage of them suffering from halitosis. This may be referred to the high percentage of them (60.60%) that experienced tongue coating which affords a perfect environment for volatile sulfur compounds origination.(39, 40) In addition, tongue cleaning has an important effect on oral malodor diminution,(29, 41) and the present results revealed that the majority of the studied subjects (43.41%) didn't clean their tongues. Also, the findings of the present study illustrated that tongue coating is the first predictor variable that significantly related to halitosis, whereas, tongue cleaning is the second one.

Self-perception of malodor was reported by 66.96% of male and 59.32% of female participants, though no significant difference was reported between the studied groups. These results are to somewhat higher than the figures registered in previous studies.(14, 42, 43) Furthermore, the results of the present study are counter to a previous study that recorded that females had higher percentage of self-perception of malodor (54%) than males (44%).(14) On the other hand, only 7.75% of the respondents were diagnosed by their dentists. These findings are lesser than that found in a previous study in which it was reported that 14.0% of the sharing subjects were diagnosed by dentists.(14) Using of self-reporting for oral hygiene measures in the present study may indicate that the magnitude of this oral health problem in Saudian is higher than the universally reported rates, and that it therefore requires more attention by dental care providers in this region. Furthermore, concerning the small percentage (7.75%) of bad breath diagnosed by dentists and the high percentage self-

perceived (62.85%) by the studied subjects; this occurrence reflects the negative role of dentists in detection of the condition.

With regard to the time of experiencing halitosis, although no significant difference was reported between the studied participants, a substantial percentage of the contributing subjects in the present study (62.00% - 64.00%) reported bad breath after awakening and about 20.00% -22.00% of the participating subjects feeling halitosis when they were hungry or thirsty. This may be due to the fact that salivary flow reduced during sleeping, particularly being hungry or thirsty, that may definitely lead to bad breath, and this is also obvious during the fasting month Ramadan, when people refrain from drinking and eating for hours. However, in those conditions the bad breaths are momentary and disappear as soon as food or drinks are taken, and should not be considered as true halitosis. Only about 10.00% - 13.00% of the studied subjects reported that they had bad breath constantly over the whole day, and around 8.00% - 17.00% of the participants revealed that they feel bad breath during talking with others. These findings are comparable with previous studies carried out in Saudi Arabia(43) and Lybia.(14)

Among those subjects who perceived that they had malodor, while no significant difference was found between groups, 82.47% were interested in visiting a dental office for seeking treatment for halitosis, and between this group of subjects, 83.13% observed improvement after treatment. This finding is much higher than that recorded previously, where dentists provided treatment for approximately 10% of malodor subjects.(14) These results reflect the extent of the suffering faced by this group of people and hence they are motivated to search for a treatment for the problem that they are concerned with.

In the present survey, a high percentage (71.13%) of the participants confronted social embarrassment due to oral malodor. Although these findings are not significant, but they are in accord with previous outcomes reported that personal discomfort and social embarrassment, in western countries, are the main reasons for seeking oral malodor treatment by professionals.(14, 35, 44) Bad breath can actually develop a strong constraint to interpersonal relations, directing those who experience it to preclude any intimate contact with other people. Some individuals go so far as to prevent societal occasions, maintain what are supposed as safe spaces from others or curving their head to some extent when speaking to persons and even speak sideways when involved in conversation. Some cover their mouths during conversations.(31) Additionally, the contributors in this survey declared that they encountered some social problems as a result of their oral malodor represented

in the form of that they cannot talk with their friends (28.87%), they feeling ashamed of their bad breath (27.88%), also some of them mentioned that they undergoing shame from their husband / wife (20.07%), and group of them revealed that they cannot face the community (15.96%). The results of this survey, even though they have no statistically significance, are in line with a previous survey reported that 34% of participants that have halitosis had made them cautious to speak to others and 12.6% completely avoids others.(45) Halitosis can be considered as an obstructing social problem,(9) a social impairment that causes social inconsistency, social embarrassment and social obstacle between themselves and their friends, relatives, partners or colleagues at work.

The current findings demonstrated that the majority of the respondents strongly agree (54.06%) as well as agree (19.04%) that there is a difficulty in talking with a person having bad breath. Inappropriately, persons are insensible of their personal odor as it cannot be smelled by oneself nor seen as an image in a mirror. Classic manners on how persons attempt to preclude and safeguard themselves against the malodor without notifying the person are by actions and body language. This may be in the form of opening windows, repositioning themselves away; making forgives for not having to talk at close distances.

Additionally, the results of the present study illustrated that the first predictor variable that is significantly related to halitosis assessed by marital relationship of the participants was that one of the married couples is suffering from bad breath, and the second best predictor was the type of impact on the marital relationship. The majority of the participants in the present study strongly agreed as well as agreed (42.17% and 21.89%, respectively) that bad breath leads to spacing between spouses. Furthermore, the outcomes of the present study revealed that the vast majority of the married contributors (69.50%) confirmed that their spouses suffer from bad breath, and among the sufferers 71.28% affirmed that bad breath comprised an impact on the marital relationship. With regard to the impact on the marital relationship, 53.61% of the married participants registered that bad breath resulted in sag relationship between couples, while, 36.52% stated that spacing in the relationship is the consequence, and 9.87% reported that divorce is the inevitable impact of bad breath. These results are in agreement with a previous review(31) that concluded that clinical proficiency has confirmed that some affected persons with bad breath have additional problems in getting married. Halitosis produces embarrassment, frustration and depression

and frequently leading to marital difficulties, spouse refusal and marital repulsion.

Conclusion

Based on the findings of the current survey, halitosis is a disrupting societal problem. It is obvious that tongue coatings and negligence of tongue cleaning contribute to intensify the extent of the problem. Individuals' perception of the problem is not enough despite the fact that most of those who affirmed that they suffer from halitosis reported that they knew their problem by themselves. Also, halitosis causes social troubles in the form of difficulty in facing the community, obscurity in talking with friends, feeling ashamed from the mouth bad odor and the subject feels embarrassed from his/her spouse. Furthermore, the mainstream of contributors verify that they visit dental offices seeking for treatment for halitosis and the vast majority feel improvement for their problem after treatment. Moreover, the preponderance of the participants asserted that there is an impact of bad breath on the marital relationship as a consequence of their responses that their spouses suffer from bad breath, which leads to threatening of marital relationship. This impact is represented in the form of sagging or spacing in the relation between partners.

Recommendations

- Since the majority of halitosis reasons are oral, so dentists should be the crucial health professionals on screening and managing halitosis in patients who suffer from it.

Lower health educational levels may lead to denial and loss of confidence by dental professionals and disappointing response to patients' requisites.

In order to tackle this, dental schools should be committed to provide their students a strong emphasis on this situation.

Raising the awareness about self-evaluation examination may be a commencing point of view.

- The responsibility of dental professionals in maintaining good oral health should be intensified in the community.

- There is need to raise the public knowledge and awareness about the importance of tongue cleaning, as it was realized that when there is a complaint of oral malodor, regular tongue brushing, chiefly targeting at eliminating the coating on the dorsum of the tongue, has found to be prosperous.

- Within its limitations, the significance of this survey is that this is the first study to explore the relationship between perceived impact of halitosis on individual's social life and marital relationship, so the study recommends further researches using the standard clinical methods available to assess the bad

breath problem in order to establish the appropriate preventive measures thus reducing the associated oral dilemma.

References

1. Yanagisawa T, Shinada K, Kawaguchi Y. [The questionnaire survey on oral malodor and teeth stains of male high school students]. Kokubyo Gakkai zasshi The Journal of the Stomatological Society, Japan. 2005 Mar;72(1):56-61. PubMed PMID: 15856772.
2. Ongole R, Shenoy N. Halitosis: much beyond oral malodor. Kathmandu University medical journal. 2010 Apr-Jun;8(30):269-75. PubMed PMID: 21209551.
3. Azodo CC, Onyeagba MI, Odai CD. Does concern about halitosis influence individual's oral hygiene practices? Nigerian medical journal : journal of the Nigeria Medical Association. 2011 Oct;52(4):254-9. PubMed PMID: 22529509. Pubmed Central PMCID: 3329096.
4. Innocent-Ituah I. Halitosis: hindrance or hint? Journal of the Mississippi State Medical Association. 2009 Dec;50(12):422-5. PubMed PMID: 20806813.
5. Kazor CE, Mitchell PM, Lee AM, Stokes LN, Loesche WJ, Dewhirst FE, et al. Diversity of bacterial populations on the tongue dorsa of patients with halitosis and healthy patients. Journal of clinical microbiology. 2003 Feb;41(2):558-63. PubMed PMID: 12574246. Pubmed Central PMCID: 149706.
6. Scully C, Rosenberg M. Halitosis. Dental update. 2003 May;30(4):205-10. PubMed PMID: 12830698.
7. Haraszthy VI, Zambon JJ, Sreenivasan PK, Zambon MM, Gerber D, Rego R, et al. Identification of oral bacterial species associated with halitosis. Journal of the American Dental Association. 2007 Aug;138(8):1113-20. PubMed PMID: 17670880.
8. Veerasha KL, Bansal M, Bansal V. Halitosis: A frequently ignored social condition. Journal of International Society of Preventive & Community Dentistry. 2011 Jan;1(1):9-13. PubMed PMID: 24478947. Pubmed Central PMCID: 3894075.
9. Krespi YP, Shrimme MG, Kacker A. The relationship between oral malodor and volatile sulfur compound-producing bacteria. Otolaryngology--head and neck surgery : official journal of American Academy of Otolaryngology-Head and Neck Surgery. 2006 Nov;135(5):671-6. PubMed PMID: 17071291.
10. Tonzetich J. Production and origin of oral malodor: a review of mechanisms and methods of analysis. Journal of periodontology. 1977 Jan;48(1):13-20. PubMed PMID: 264535.
11. Messadi DV. Oral and nonoral sources of halitosis. Journal of the California Dental Association. 1997 Feb;25(2):127-31. PubMed PMID: 9534442.
12. Washio J, Sato T, Koseki T, Takahashi N. Hydrogen sulfide-producing bacteria in tongue biofilm and their relationship with oral malodour. Journal of medical microbiology. 2005 Sep;54(Pt 9):889-95. PubMed PMID: 16091443.
13. Yaegaki K, Coil JM. Examination, classification, and treatment of halitosis; clinical perspectives. Journal. 2000 May;66(5):257-61. PubMed PMID: 10833869.
14. Eldarrat A, Alkhabuli J, Malik A. The Prevalence of Self-Reported Halitosis and Oral Hygiene Practices among Libyan Students and Office Workers. The Libyan journal of medicine. 2008;3(4):170-6. PubMed PMID: 21499469. Pubmed Central PMCID: 3074308.

15. Sanz M, Roldan S, Herrera D. Fundamentals of breath malodour. *The journal of contemporary dental practice*. 2001 Nov 15;2(4):1-17. PubMed PMID: 12167916.
16. Yaegaki K, Sanada K. Volatile sulfur compounds in mouth air from clinically healthy subjects and patients with periodontal disease. *Journal of periodontal research*. 1992 Jul;27(4 Pt 1):233-8. PubMed PMID: 1640345.
17. Yaegaki K, Sanada K. Biochemical and clinical factors influencing oral malodor in periodontal patients. *Journal of periodontology*. 1992 Sep;63(9):783-9. PubMed PMID: 1474480.
18. Spielman AI, Bivona P, Rifkin BR. Halitosis. A common oral problem. *The New York state dental journal*. 1996 Dec;62(10):36-42. PubMed PMID: 9002736.
19. Delanghe G, Ghyselen J, Feenstra L, van Steenberghe D. Experiences of a Belgian multidisciplinary breath odour clinic. *Acta oto-rhino-laryngologica Belgica*. 1997;51(1):43-8. PubMed PMID: 9105483.
20. Morita M, Wang HL. Relationship between sulcular sulfide level and oral malodor in subjects with periodontal disease. *Journal of periodontology*. 2001 Jan;72(1):79-84. PubMed PMID: 11210077.
21. Kleinberg I, Wolff MS, Codipilly DM. Role of saliva in oral dryness, oral feel and oral malodour. *International dental journal*. 2002 Jun;52 Suppl 3:236-40. PubMed PMID: 12090460.
22. Hinode D, Fukui M, Yokoyama N, Yokoyama M, Yoshioka M, Nakamura R. Relationship between tongue coating and secretory-immunoglobulin A level in saliva obtained from patients complaining of oral malodor. *Journal of clinical periodontology*. 2003 Dec;30(12):1017-23. PubMed PMID: 15002886.
23. Liu XN, Shinada K, Chen XC, Zhang BX, Yaegaki K, Kawaguchi Y. Oral malodor-related parameters in the Chinese general population. *Journal of clinical periodontology*. 2006 Jan;33(1):31-6. PubMed PMID: 16367853.
24. Preti G, Clark L, Cowart BJ, Feldman RS, Lowry LD, Weber E, et al. Non-oral etiologies of oral malodor and altered chemosensation. *Journal of periodontology*. 1992 Sep;63(9):790-6. PubMed PMID: 1474481.
25. Pramod JR. *Textbook of Oral Medicine*. 2005;2nd ed. New Delhi: JP Brothers:81 - 5.
26. Newman MG, Takei, H.H., Carranza, F.A. *Clinical Periodontology*. 2009;10th ed. Noida: Saunders:330 - 42.
27. Magee WJ, Eaton WW, Wittchen HU, McGonagle KA, Kessler RC. Agoraphobia, simple phobia, and social phobia in the National Comorbidity Survey. *Archives of general psychiatry*. 1996 Feb;53(2):159-68. PubMed PMID: 8629891.
28. Kessler RC. The impairments caused by social phobia in the general population: implications for intervention. *Acta psychiatrica Scandinavica Supplementum*. 2003 (417):19-27. PubMed PMID: 12950433.
29. Quirynen M, Avontroodt P, Soers C, Zhao H, Pauwels M, van Steenberghe D. Impact of tongue cleansers on microbial load and taste. *Journal of clinical periodontology*. 2004 Jul;31(7):506-10. PubMed PMID: 15191584.
30. Christen AG, Swanson BZ, Jr. Oral hygiene: a history of tongue scraping and brushing. *Journal of the American Dental Association*. 1978 Feb;96(2):215-9. PubMed PMID: 342578.
31. Azodo CC, Osazuwa-Peter, N., Omili, M. Psychological and social impacts of halitosis: A review. *J Soc Psychol Sci*. 2010;3:74 - 91.
32. Rosenberg M. Clinical assessment of bad breath: current concepts. *Journal of the American Dental Association*. 1996 Apr;127(4):475-82. PubMed PMID: 8655868.
33. Al-Ansari JM, Boodai H, Al-Sumait N, Al-Khabbaz AK, Al-Shammari KF, Salako N. Factors associated with self-reported halitosis in Kuwaiti patients. *Journal of dentistry*. 2006 Aug;34(7):444-9. PubMed PMID: 16309815.
34. Rosenberg M. Halitosis--the need for further research and education. *Journal of dental research*. 1992 Feb;71(2):424. PubMed PMID: 1556302.
35. van den Broek AM, Feenstra L, de Baat C. A review of the current literature on aetiology and measurement methods of halitosis. *Journal of dentistry*. 2007 Aug;35(8):627-35. PubMed PMID: 17555859.
36. Affairs ACoS. Oral malodour. *Journal of the American Dental Association*. 2003;134:209 - 14.
37. Frexinos J, Denis P, Allemand H, Allouche S, Los F, Bonnelye G. [Descriptive study of digestive functional symptoms in the French general population]. *Gastroenterologie clinique et biologique*. 1998 Oct;22(10):785-91. PubMed PMID: 9854203. Etude descriptive des symptomes fonctionnels digestifs dans la population generale francaise.
38. Miyazaki H, Sakao S, Katoh Y, Takehara T. Correlation between volatile sulphur compounds and certain oral health measurements in the general population. *Journal of periodontology*. 1995 Aug;66(8):679-84. PubMed PMID: 7473010.
39. Loesche WJ, Kazor C. Microbiology and treatment of halitosis. *Periodontology 2000*. 2002;28:256-79. PubMed PMID: 12013345.
40. Lee CH, Kho HS, Chung SC, Lee SW, Kim YK. The relationship between volatile sulfur compounds and major halitosis-inducing factors. *Journal of periodontology*. 2003 Jan;74(1):32-7. PubMed PMID: 12593593.
41. Pham TA, Ueno M, Zaitso T, Takehara S, Shinada K, Lam PH, et al. Clinical trial of oral malodor treatment in patients with periodontal diseases. *Journal of periodontal research*. 2011 Dec;46(6):722-9. PubMed PMID: 21762407.
42. Bosy A. Oral malodor: philosophical and practical aspects. *Journal*. 1997 Mar;63(3):196-201. PubMed PMID: 9086681.
43. Almas K, Al-Hawish A, Al-Khamis W. Oral hygiene practices, smoking habit, and self-perceived oral malodor among dental students. *The journal of contemporary dental practice*. 2003 Nov 15;4(4):77-90. PubMed PMID: 14625597.
44. Pham TA, Ueno M, Shinada K, Kawaguchi Y. Comparison between self-perceived and clinical oral malodor. *Oral surgery, oral medicine, oral pathology and oral radiology*. 2012 Jan;113(1):70-80. PubMed PMID: 22669066.
45. Ashri N. Self-assessment of halitosis among diabetic Saudi female patients. *Official Journal of the Egyptian Dental Association*. 2007;53(1.2).