

The Prevalence of Self – reported Halitosis and Oral Hygiene Practices in Urban and Peri – Urban Population in Lucknow City (U. P.), India

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A B S T R A C T

Introduction: Halitosis is an unpleasant odor of the mouth. It can be caused by several intra-oral and extra-oral factors. The aim of the study is to determine the prevalence of self-reported halitosis and assess oral hygiene practices in urban and peri-urban population.

Materials and methods: A total of 500 subjects (311 males and 189 females) from the urban and peri-urban areas in Lucknow city and who are willing to participate, were included for the study. A self-administered questionnaire was used to obtain the data, the questionnaire divided into two parts. Part one consisting basic demographic details of the subjects, part two consisted of a set of eleven questions.

Result: 65.3% of male and 50.7% of female reported the self-perception of oral breath and the difference was statistically significant ($p < 0.05$). 53.4% males and 26.5% females was reported malodor during wake up time. 92% females and 86.2% males were brushing teeth every day. 55% males and 72% females used toothpick regularly. 5.5% males and 20.6% females used dental floss regularly. The smoking habit was significantly ($p=0.001$) higher among the males. The coated tongue was noticed in 47% of the males and about 40% of the females. 80.1% male and 67.8% females had bleeding gums. 17.4% males and 2.1% females had dry mouth. This was significantly ($p=0.001$) higher among the males.

Conclusion: The results of this study indicate higher prevalence of halitosis among the males. The females had better oral hygiene practices and its care in comparison to the males.

Keywords: Halitosis, Oral Hygiene Practices, Gum Bleeding

INTRODUCTION

Halitosis is the common term used to define an unpleasant or an offensive odor in expired air, regardless of whether it originates from oral or non-oral sources. Other terms include bad breath, foul breath, breath odor, foul smells, breath malodor, oral malodor or offensive breath. Halitosis can be caused by several intra-oral and extra-oral factors. Oral sources of halitosis are tongue coating, periodontal disease, extensive carious lesions with exposed tooth pulps, pericoronitis, mucosal ulcerations and diseases, impacted food and debris, unclean dentures, decreased salivary flow rate, and habitual mouth breathing, the latter especially in children.^{1,2}

Halitosis has been classified into three main categories: genuine, pseudo-halitosis, and halitophobia halitosis.³ There is a general agreement that malodour originates in the mouth in 80-90% of cases⁴. There is evidence that on waking up in the morning most healthy adults have socially unacceptable bad breath.⁵ Several factors may cause oral malodour which

may include tongue coating, deep carious lesions, exposed necrotic tooth pulps, impacted food or debris, imperfect dental restorations, periodontal disease, healing oral mucosa wounds, pericoronitis, mucosal ulcerations, peri-implant disease, unclean dentures and oral carcinoma.⁶⁻⁷

It occurs worldwide and has a multifactorial etiology.⁹ Delusional halitosis is referred as psychosomatic halitosis occur in apparently healthy individuals who complain of chronic bad breath that no one else can smell, for which no local or systemic disease causing oral malodor could be found.¹⁰ Generally, halitosis is classified as either primary or secondary. Primary halitosis refers to respiration exhaled by the lungs, whereas secondary halitosis originates either in the mouth or upper airways.¹¹

Some studies have estimated the prevalence of halitosis to be between 22% and 50%, others between 6% and 23%). 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.¹² Volatile sulphur compounds (VSC) such as hydrogen sulphide (H₂S) and methyl mercaptan (CH₃SH) are the main cause of oral malodour.¹³ These substances are by-products of the action of bacteria on proteins. A recent study demonstrated that mercaptan is the main contributor of intra-oral halitosis, while dimethyl sulphide (C₂H₆S) is the main contributor of extra-oral or blood borne halitosis.¹⁴ However, other substances, such as organic acids, ammonia and amines, have also been implicated in oral malodour.¹ The aetiologies of non-oral malodour include upper respiratory tract problems, particularly sinusitis and polyps, gastrointestinal tract disturbances¹⁵, and some metabolic disorders such as diabetes mellitus. Oral malodour is also noticed after eating certain foods and among heavy smokers. It may also manifest as a side-effect of some drugs that reduce salivary flow, such as antidepressants, antihistamines, antipsychotics, anti-hypertensives, decongestants and narcotics.¹⁶

The problem of oral malodor has been shown to originate in the oral cavity, where conditions favor the retention of anaerobic bacteria. Research has shown that the vast majority of patients with halitosis, approximately 80–90% originate within the oral cavity and not in the stomach, which many individuals believe. Increased production of VSC may represent a further mechanism of increased susceptibility to periodontitis in smokers and also help to explain the reported association between smoking and halitosis. The percentage of sites per subject with high levels of sulphides detected in moderate (4–6 mm) and deep (± 7 mm) periodontal pockets was found to be significantly higher in smokers, compared with non-smokers. Darby and Walsh describe health as a state of well-being with both objective and subjective aspects that exists on a continuum from maximal wellness to maximal illness.⁹

A study has demonstrated that VSC levels in the mouth correlate with the depth of periodontal pockets, and that the amount of VSCs in the breath increase with the number, depth and bleeding tendency of the periodontal pockets (Quirynen et al. 2002). However, not every case of malodour is associated with symptoms of gingivitis and/or periodontitis. In particular, the dorsum of the tongue has long been considered a primary source of oral malodour, as its irregular and deeply fissured surface provides an excellent site for the entrapment and growth of micro-organisms. Therefore, the most effective malodour amelioration strategies focus on reducing the tongue coating and the prevention and/or reduction of gingivitis, periodontitis and associated plaque (Quirynen et al. 2002).

From a biological standpoint, saliva performs essential roles of enzymatic digestion, antimicrobial action, and regulation of pH, protection of oral tissues, lubrication and assistance in swallowing, potentiation of taste, elimination of the food bolus and facilitation of the removal of carbon. The normal salivary pH is generally 6.5. This slightly acidic pH suppresses the growth and proliferation of Gram-negative and anaerobic bacteria, hindering the activation of the enzymes necessary for the putrefaction of amino acids, the end products of which smell bad because the compounds contain reduced sulfur (SH₂). Among the 50 to 65% of

the population with halitosis, 8% of cases are associated with respiratory problems, and 90% are associated with oral problems. Saliva plays a central role in the development of bad breath, as it provides oxygen and protein substrate that is readily used by bacteria. A reduction in salivary flow has a negative effect on the self-cleaning of the mouth and can generate odoriferous volatile compounds.¹¹ The aim of the study is to determine the prevalence of self-reported halitosis and assess oral hygiene practices in urban and peri-urban population.

MATERIAL AND METHODS

The present study was scheduled in the month of December 2014. An attempt to know the prevalence of self – reported halitosis and oral hygiene practices in urban and peri-urban population of Lucknow city – India consisted of adults of age 18 years or above. Aim of the study was to assess the prevalence of halitosis and oral hygiene practices in the urban and peri-urban population. A multistage simple random sampling technique was planned to conduct the survey in urban and peri-urban areas. Lucknow city is divided in four geographical zones – east, west, north and south. The number of sites for peri-urban and urban areas was determined on the basis of district population statistics (figure 1), according to which 38.57% population resides in rural areas and 65.5% resides in urban and peri-urban areas. Inclusion criteria, Subjects should be 18 year of age or older, Subjects should be willing to participant, Mentally sound subjects whereas Exclusion criteria, Subjects having any lesion in the oral cavity, Subjects having medically compromised condition.

A total of 500 subjects from the urban and peri-urban areas in Lucknow city and who willing to participate were included for the study. A self – administered questionnaire was used to obtain the data. The questionnaire consisted of two parts. Part one consisted of basic demographic data of the subjects. Part two consisted of a set of 11 questions like can you smell your own breath, have you ever had an examination for bad breath by dentist or physician, have you ever treated yourself for bad breath by self – medication or traditional medicine and at what time of the day do you feel your breath is worse?

STATISTICAL ANALYSIS

The results are presented percentages. The Chi-square test was used to compare the study parameters between male and female subjects. The p-value < 0.05 was considered significant. All the analysis was carried out on SPSS 16.0 version (Chicago, Inc., USA).

RESULTS

The present study evaluates the prevalence of self – reported halitosis and oral hygiene practices in urban and peri-urban population in Lucknow city. The study population included 500 participants.

Table-1 shows the age and gender distribution of the subjects. Out of the total 500 subjects, more than half of the subjects were male (62.2%). About one fourth of the subjects were between 25-30 years (25.8%) followed by 41-45 (19.8%) years, >45 (18.8%), 31-35 (17%), 36-40 (13.6%) and <25 (5%) years.

Table-2 presents the perception of the subjects about breathing. In all, 468 (93.6%) of the subjects could smell own breath, of these, 288 (92.6%) males and 180 (95.2%) of females could smell own breath, however, the difference was statistically not significant ($p>0.05$). In 178 (35.6%) of the subjects (34.1% males and 38.1% females), relatives have a breath problem. The difference was statistically not significant. 244 (48.8%) of the subjects had examination about bad breath by dentist. (43.1% males and 58.2% females), and the difference was statistically significant ($p=0.001$). Very few 26 (5.2%) subjects had examination about bad breath by physician. (7.7% males and 1.1% females) and the difference was statistically significant ($p=0.001$). Majority of the subjects 220 (90.2%) had received the treatment by the dentist (97.0% males and 8.8% females) and the difference was statistically significant ($p=0.001$). and 15 (57.7%) had received the treatment by the physician, the difference was statistically not significant ($p>0.05$). 200 (40%) of the subjects (34.1% males and 49.7% females) treated bad breath

by self-medication and 24 (4.8%) of subjects (7.7% males) by traditional medicine. 55 (11%) of the subjects (16.7% males and 1.6% females) realized that breath interfered the social life. Majority of males 166 (53.4%) felt worse breath when wake up. And females 56 (29.6%) felt worse breath in the morning. 460 (92%) of the subjects (98.7% males and 81% females) had bad breath at the time of interview and the difference was statistically significant ($p=0.001$)

Table-3 presents the distribution of oral hygiene practices of the subjects. 450 (90%) of the subjects (92% males and 86.2% females) were brushing teeth every day. However, the percentage of brushing daily was significantly ($p=0.02$) higher among males (92.3%) than females (86.2%). The used of miswak every day was among 221 (44.2%) of the subjects. However, used of miswak every day was significantly ($p=0.03$) higher among females (50.3%) compared to males (40.5%). 91 (18.2%) of the subjects (20.3% males and 14.8% females) were using mouthwash regularly and this practice was almost similar ($p>0.05$) among male and female

Age in year	Male		Female		Total	
	No.	%	No.	%	No.	%
<25	4	16.0	21	84.0	25	5.0
25-30	91	70.5	38	29.5	129	25.8
31-35	23	27.1	62	72.9	85	17.0
36-40	44	64.7	24	35.3	68	13.6
41-45	67	67.7	32	32.3	99	19.8
>45	82	87.2	12	12.8	94	18.8
Total	311	62.2	189	37.8	500	100.0

Table-1: Age and gender distribution of the subjects

Perception	Male				Female				Total				p value ¹
	Yes		No		Yes		No		Yes		No		
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	
Can smell own breath?	288	92.6	23	7.4	180	95.2	9	4.8	468	93.6	32	6.4	0.24
Relatives have a breath problem	106	34.1	205	65.9	72	38.1	117	61.9	178	35.6	322	64.4	0.36
Ever had examination about bad breath													
Dentist	134	43.1	177	56.9	110	58.2	79	41.8	244	48.8	256	51.2	0.001*
Physician	24	7.7	287	92.3	2	1.1	187	98.9	26	5.2	474	94.8	0.001*
Any treatment received by													
Dentist	130	97.0	4	3.0	90	81.8	20	18.2	220	90.2	24	9.8	0.001*
Physician	13	54.2	11	45.8	2	100.0	0	0.0	15	57.7	11	42.3	0.20
Ever treated himself													
Self Medication	106	34.1	205	65.9	94	49.7	95	50.3	200	40.0	300	60.0	0.001*
Traditional medicine	24	7.7	287	92.3	0	0.0	189	100.0	24	4.8	476	95.2	0.001*
Breath interfered the social life	52	16.7	259	83.3	3	1.6	186	98.4	55	11.0	445	89.0	0.001*
Time of feeling worse breath#													
When wake up	166	53.4	145	46.6	50	26.5	139	73.5	216	43.2	284	56.8	0.001*
When hungry	20	6.4	291	93.6	15	7.9	174	92.1	35	7.0	465	93.0	0.52
When thirsty	0	0.0	311	100.0	20	10.6	169	89.4	20	4.0	480	96.0	0.001*
While talking with others	107	34.4	204	65.6	47	24.9	142	75.1	154	30.8	346	69.2	0.02*
In the morning	35	11.3	276	88.7	56	29.6	133	70.4	91	18.2	409	81.8	0.22
In the afternoon	15	4.8	296	95.2	5	2.6	184	97.4	20	4.0	480	96.0	0.22
Throughout the day	1	0.3	310	99.7	17	9.0	172	91.0	18	3.6	482	96.4	0.001*
Had bad breath at the time of interview	307	98.7	4	1.3	153	81.0	36	19.0	460	92.0	40	8.0	0.001*

#Multiple response, ¹Chi-square test, *Significant

Table-2: Perception of the subjects about breathing

Oral hygiene practices	Male				Female				Total				p value ¹
	Yes		No		Yes		No		Yes		No		
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	
Brush teeth every day	287	92.3	24	7.7	163	86.2	26	13.8	450	90.0	50	10.0	0.02*
Use miswak every day	126	40.5	185	59.5	95	50.3	94	49.7	221	44.2	279	55.8	0.03*
Use mouthwash regularly	63	20.3	248	79.7	28	14.8	409	81.8	91	18.2	409	81.8	0.12
Use dental floss regularly	17	5.5	294	94.5	39	20.6	150	79.4	56	11.2	444	88.8	0.001*
Use toothpick regularly	171	55.0	140	45.0	136	72.0	53	28.0	307	61.4	193	38.6	0.001*

¹Chi-square test, *Significant

Table-3: Distribution of oral hygiene practices of the subjects

Other practices	Male				Female				Total				p-value ¹
	Yes		No		Yes		No		Yes		No		
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	
Smoking	190	61.1	121	38.9	68	37.8	112	62.2	258	52.5	233	47.5	0.001*
Drink tea regularly	253	81.4	58	18.6	119	63.0	70	37.0	372	74.4	128	25.6	0.001*
drink coffee regularly	60	19.3	251	80.7	41	21.7	148	78.3	101	20.2	399	79.8	0.51

¹Chi-square test, *Significant

Table-4: Distribution of other practices of the subjects

Dental problems	Male				Female				Total				p-value ¹
	Yes		No		Yes		No		Yes		No		
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	
Have tooth decay dental caries	289	92.9	22	7.1	177	93.7	12	6.3	466	93.2	34	6.8	0.75
Have bleeding gum	249	80.1	62	19.9	147	77.8	42	22.2	396	79.2	104	20.8	0.54
Have dry mouth	54	17.4	257	82.6	4	2.1	185	97.9	58	11.6	442	88.4	0.001*
Tongue coated with white or yellowish deposits	40	12.9	271	87.1	41	21.7	148	78.3	81	16.2	419	83.8	0.009*

¹Chi-square test, *Significant

Table-5: Distribution of dental problems of the subjects

subjects. 307 (61.4%) of the subjects (55% males and 72% females) used toothpick regularly. whereas 56(11.2%) of the subjects (5.5% males and 20.6% females) used dental floss regularly. There was significant ($p=0.001$) difference between male and females in used of dental floss and toothpick regularly.

Table-4 shows the distribution of other practices of the subjects. The smoking habit was in 258 (52.5%) of the subjects and this was significantly ($p=0.001$) higher among males (61.1%) than females (37.8%). 372 (74.4%) of the subjects (81.4% males and 63.0% females) drink tea regularly and this was significantly ($p=0.001$) higher among males compared with females.101 (20.2%) of the subjects (19.3%males and 21.7% females) drink coffee regularly thus the difference was statistically not significant ($p>0.05$)

Table-5 depicts the distribution of dental problems of the subjects. 466(93.2%) of the subjects (92.9% males and 93.7% females) had dental caries. There was no significant difference found between male and females ($p>0.05$). 396 (79.2%) of the subjects (80.1% male and 77.8%females) had bleeding gums. And the difference was not significant. 58 (11.6%) of the subjects (17.4% males and 2.1% females) had dry mouth. Tongue coated with white or yellowish deposits was 81(16.2%) of the subjects and this was significantly ($p=0.009$) higher among females (21.7%) than males (12.9%).

DISCUSSION

Halitosis is a common problem among general population and evidence reveal that it forms about 85% of all bad breath.¹⁷ In spite of the wealth of information on the condition, sometimes identification of the actual cause remains difficult. Halitosis is common among all ages.¹⁸ In many studies, the assessment of halitosis relies on the subject's self-perception. In present study, In all, 93.6% of the subjects could smell own breath. Of these 92.6% males and 95.2% of females could smell own breath. Thus, the difference was statistically not significant ($p>0.05$).

This study correlate with the study conducted by Eldarrat A, Alkhabuli J and Malik A, reported that 44% of the males and 54% of the females could smell own breath.¹⁶ The study conducted by Almas K et al, according to this 44% males and 32% females could smell own breath.¹⁹ The study conducted by Bosy A, according to this 58% males and 62% females could smell own breath.²⁰ The differences are not significant, it appears that females were more capable of detecting halitosis than males.

The study conducted by P. Youngnak-Piboonratanakit, T. Vachirarojpisan found a 65% prevalence of self-perceived halitosis.²¹ This study is also correlates with the study conducted by Eldarrat A. et al, in this Self-perception of malodour was reported by 23.4% males and 31.7% females.¹⁶

Whereas, the study conducted by Settineri S et al found a 19.39% prevalence of self-perceived halitosis²². In contrast, the study conducted by Surekha Bhat et al, according to this, 65.3% of male and 50.7% of female reported self – perception of oral breath.²³

In present study, 55 (11%) subjects (16.7% males and 1.6% females) realized that breath interfered with the social life. Study conducted by Almas K, Al-Hawish A, Al-Khamis W., about 9% study subjects claimed that halitosis had interfered with their social life, a higher percentage than the 4–6% of individuals in Saudi Arabia who claimed that bad breath had interfered with social interactions at work.¹⁹ Eli et al concluded that self – perception of malodour is a multifactorial, psycho-physiological issue, related closely to one's body image and psychopathological profile.²⁴ In present study, 93.6% population suffers from halitosis. And the study conducted by Meskin LH, has shown that 10–30% population of United States of America suffers from halitosis on regular basis.²⁵ A survey done in Japan showed that 24% of the individuals suffered from the bad breath²⁶ while in Sweden only 2.4% of the study subjects suffered from halitosis.²⁷ Another study done in French general population showed prevalence of halitosis around 22%.

In present study, 244(48.8%) of the subjects had examination about bad breath by dentist. (43.1% males and 58.2% females), and the difference was statistically significant ($p=0.001$). The study done by Almas K. which reported that more males (7%) had received treatment for bad breath than females (2%).¹⁹ In present study very few 26 (5.2%) subjects had examination about bad breath by physician.(7.7% males and 1.1% females) and the difference was statistically significant ($p=0.001$). Majority of the subjects 220(90.2%) had received the treatment by the dentist (97.0% males and 8.8% females) and the difference was statistically significant ($p=0.001$). and 15 (57.7%) had received the treatment by the physician. The difference was statistically not significant ($p>0.05$). According to the study conducted by Eldarrat A et al. showed that 14% of the respondents were diagnosed by dentists, who provided treatment for approximately 10% of these subjects. Very few respondents 2–2.5% approached physicians for diagnosis, and an even lesser number 1.8% were given treatment or advice by physicians.¹⁶

In present study, Majority of males 166 (53.4%) felt worse breath when waking- up. And females 56 (29.6%) felt worse breath in the morning. 460 (92%) of the subjects had bad breath at the time of interview. 10.6% females and no male reported halitosis when they were thirsty or hungry.

This finding is comparable with a study in Baghdad which reported that the majority of male (78%) and female (62%) had halitosis after waking up in the morning.²⁸ This is quite normal, since salivary flow decreases during sleep allowing the proliferation of oral bacteria that release unpleasant gases in awakening breath.²⁹ Malodor due to thirst and hunger were reported by 28% and 12% of participants, respectively.³⁰ But the study conducted by Eldarrat A et al. showed that 66–70% reported malodour on awakening and 20–23% when they were thirsty or hungry. Sleeping, being thirsty or hungry would certainly reduce salivary flow and lead to oral malodour. This is noticeable during the fasting in

month of Ramadan, when people abstain from drinking and eating for hours. However, in these conditions the bad breaths are temporary and disappear once food or drinks are taken, and should not be regarded as true malodour. Only 10% of the participants revealed malodour during talking, in the morning, afternoon or throughout the day.¹⁶ In the study conducted by Almas K., 78% males and 62% females reported malodour on awakening.¹⁹

It has been estimated that in developed world, 8–50% of people perceived oral malodour¹⁸. According to Al-Ansari JM et al, more females 95.2% reported oral malodour than males 92.6%. These differences are related to the common trend observed among females and their frequent seeking of treatment. Lack of oral hygiene, including brushing, use of antiplaque mouthwashes and flossing, has been implicated in oral malodour.^{15,31,32}

In the present study, the frequency of brushing was 86.2% in females and 92% in males. This difference between females and males do not correlate with the prevalence of self-perceived malodour of the females. The study conducted by P. Youngnak-Piboonratanakit and T. Vachirarojpisan the frequency of brushing was 70.8% in females and 85.3% in males.²¹ In the present study the floss and mouth washes have been used by 5.5% males, 20.6% females and 20.3% males, 14.8% females respectively. The study conducted by Eldarrat A et al, according to this study the floss and mouth washes had been used by 19.6% males, 22.2% females and 14.5% males, 15.8% females respectively.¹⁶

In the present study, 55% males and 72% females used tooth picks regularly. But the study conducted by Surekha Bhat et al, in this 17.1% of males and 23.3% of females used tooth picks regularly. Miswak was a traditional chewing stick or a natural toothbrush made from twigs of the *Salvadora Persica* tree. It is widely used in the Middle East countries, particularly in Saudi Arabia. It has an antibacterial effect and is as good as tooth brush in removing dental plaque and reducing gingivitis.³³

Dental caries and periodontal diseases are potential factors contributing to the malodour. In the present study, 92.9% males and 93.7% females had dental caries. The study conducted by P. Youngnak-Piboonratanakit and T. Vachirarojpisan, 81% males and 56.7% females had bleeding gums.²¹

CONCLUSION

In conclusion, results of our study indicate that the prevalence of self-perceived halitosis is within the range reported by other studies. However, these findings need to be corroborated by objective examination to ascertain the prevalence of malodour. The public is probably not fully aware of the potential causes of halitosis and its treatment.

Dental professional's plays an important role in maintaining good oral health thus measures to provide good oral health should be emphasized in the community. To control and reduce the incidence of the dental caries and periodontal diseases in the community preventive measures has to be taken.

Recommendations

The smokers should be encouraged to refrain from smoking

and practice brushing.

The study recommends further investigations using the standard clinical methods available to assess the bad breath problem.

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