ASSOCIATION OF HALITOSIS IN DIFFERENT AGE GROUPS WITH RESPECT TO MULTIPLE FACTORS

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OBJECTIVE: To find out the association of halitosis in different age groups with oral conditions/oral hygiene maintenance, habits, medical/systematic problems and self-perception

METHODOLOGY: A cross section study was conducted at the Dow Dental College, OPD Karachi. Convenience type sampling was used to collect the data of 450 participants. Data collection was done by using self-administered questionnaires, visual examination and palm test. Data was statistically analyzed using SPSS 20.0 computer software. Chi square test was used to detect statistically significant association of halitosis in different age groups with oral hygiene maintenance/oral conditions, habits, systematic conditions and self-perception.

RESULTS: Four hundred fifty participants, out which 51% participants were males and 49%, were females with mean age of 34.38±13.368. Statistically significant association was found of halitosis in different age groups with factors such as tongue coated with whitish or yellowish deposits, dry mouth, flossing, mouth breathers, raw onion/garlic consumption gastrointestinal problems and palm test.

CONCLUSION: Mouth breathing, poor oral hygiene and gastro-intestinal problems were found to be significantly associated with halitosis.

KEYWORDS: Self-reported halitosis, caries, oral hygiene practices, dental factors, malodour


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INTRODUCTION

Halitosis is referred to as unpleasant odour in expired air. Halitosis may have physiological or pathological causes, the main cause is related to conditions in the oral cavity1. The term is synonymous to foul breath, breath odour, and offensive breath as a result of reasons that consist but not limited to diseases of PDL, coating of tongue with bacteria, various systemic disorders and various type of foods1.

Bad breath has a long history which almost goes 4000 years back. Oral malodour originates in the mouth in 80-90% of cases2. Prevalence of halitosis has been studied, among individuals, in different parts of the world by convenience sampling. Research has indicated that chronic halitosis affects approximately one third of the group, while on the other hand severe halitosis may involve less than 5% of the population2.

There is very limited data which is available in the literature that is concerned with prevalence of halitosis in wide-sample population. Most of the time these studies make use of subjective criteria from questionnaires in estimating the percentage of effected people in the population. A research that undertook in Sweden came to the conclusion that plaque and calculus were major contributing factors in severe halitosis3. Another study in Japan found direct correlation of periodontitis and coating of tongue to scores of volatile sulphur compounds4. This report further concluded high halitosis scores in patients with severe periodontitis then those without any active periodontal disease. Many studies have shown conclusive evidence that majority of the causes of bad breath originate from mouth5,6. Periodontal and gingival diseases are

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responsible for around 60% of oral related factors and tongue was responsible for 40% of them. Thus halitosis has become one of common complaint for which a patient seeks treatment7.

The aim of this study was to find out the association of halitosis in different age groups with respect to oral hygiene maintenance/oral conditions, habits, systematic problems and self-perception.

**METHODOLOGY**

A cross sectional study was done by using convenience sampling technique of four hundred fifty participants. The study was conducted in Dow Dental OPD during the month of July 2015. All participants above the age of twelve were included in the study. All participants excluded from the study were below the age of twelve, had mental problems or any physical disability. Data collection was done by self-reported questionnaire, visual examination with mouth mirror and palm test for oral conditions/oral hygiene maintenance, habits, systemic conditions and self-perception. The questionnaire was made by reviewing the literature (Almas et al8) and modifications were done according to local culture. In palm test participants were asked to put their right hand in front of the mouth and exhale to breathe out. Data analysis was done using SPSS 20.0. Chi square test was used to detect statistically significant association of halitosis of different age groups with oral conditions/oral hygiene maintenance, habits, medical/systematic conditions and self-perception. Permission for the study was taken from Dean of Dentistry of Dow University of Health Sciences and personal consent was also taken from participants.

**RESULTS**

Two hundred twenty seven of the participants were males (50.4%) and two hundred twenty three (40.6%) were females, the male female ratio 1:1 and the mean age 34.38±13.368. Individuals of different age groups were assessed for halitosis with respect to different factors evaluated in oral conditions/oral hygiene maintenance, habits, systemic conditions and self-perception. Factors which showed statistically significant values were dry mouth, tongue coated with white/yellowish deposits and flossing (Table 1), mouth breathers and those who consumed raw onions/garlic daily (Table 2), gastrointestinal problems (Table 3) and palm test. (Table 4)
DISCUSSION

Our study has demonstrated association of halitosis among individuals of different age groups with different factors. Most of our results have shown confinement with previous studies on halitosis and some new observations.

A strong association (p<0.00) was observed, among respondents who had problem of mouth breathing and had halitosis. Out of 57% reporting bad breath and halitosis, 30% were adults aged 50 and above. Contrary to our findings Kara et al. in his study on halitosis and its association with mouth breathing observed among total respondents having mouth breathing and halitosis, almost 70% were children aged 14-16 years old. A similar study was also done by Motta et al. who found 75% of total respondents having oral malodour and breathing via mouth to be children age 12-14 years.

The possible explanation can be as mouth remains open majority of times, reduction in salivary flow/buffering capacity of saliva and water evaporating in saliva among mouth breathers might be a contributing factor to halitosis. As we grow old, we acquire various diseases and weak immune system. Thus older people often have systemic problems and diseases including sinus issues, congestion that force them to breath from their mouth and thus have problem maintaining their oral hygiene resulting in halitosis.

Among different oral conditions statistically significant (P<0.05) was observed among 29% of respondents who had xerostomia accompanied by halitosis. A linear trend was observed with incidence of xerostomia decreasing, with progression of age. From 33% in individuals aged 11-30 years old to 6% in 30-40 years old, decreasing to just 3% in elderly respondents.

Among various other oral hygiene conditions 49% of the respondents had halitosis followed by coating of their tongue with yellowish white deposits. Highest number was 30% observed in respondents age between 40-50 years old. Sterer et al. in their study on oral malodour and halitosis observed 124 of their subjects age 23-24 years to have tongue scrapings associated with halitosis.

Similar studies by Miyazaki et al., Yaegaki et al. and Bosy et al. have shown direct correlation of amount of tongue coatings with halitosis. Chaehoon Lee et al. in his research on halitosis concluded that volatile sulphide compounds produced by tongue coatings played a major role in severity of oral malodour. He further suggested species found on dorsum of tongue included Atopiumporulum, E.sulci and Fusobacterium. In individuals with oral malodour, tongue coating samples have been shown to hydrolyze N-benzoyl-Dl-Arginine-2-maphthylamide "BANA". Since "BANA" test detects arginine hydrolase produced by proteolytic bacteria. This test confirms presence of bacterial flora on dorsum of tongue with coatings in individuals with oral malodour.

When asked about habits 77% respondents agreed (P<0.05) to have halitosis and consuming tea and coffee. Highest number of 28%-30% of respondents were between age 11-30 years old. Although various researches like from X.xuy et al. and Lodhia et al. suggested catechins in tea extracts acting as natural suppressors of oral malodour. Milk in tea can aggravate halitosis. A report by Joe Graedon in Chron magazine suggested that patient having lactose intolerance have symptoms of oral malodour accompanied by other symptoms after consuming milk tea. Coffee is worse than usual because of its sulphurous content, which certain bad breath-causing bacteria can break down to produce odour. One final reason that drinking coffee can give you bad breath is simply that coffee has a very strong odour that smells worse than it tastes. Combined with the other bad-smelling odours, this can result in terrible smelling breath.

When respondents were asked regarding medical problems, 29% replied to have oral malodour as result of Gastro-Intestinal (GI) problems. Among them 29.5% (29-30 years and 50+yrs old) had the most complaint. Likewise Moshkowitz et al. studied an association between halitosis and GERD (Gastro eosophageal reflux disease) in 132 participants and found 55% of them to be between the age of 20-87 years old. Diseases of GI system results in presence of odorous gases in the air expelled from the

Table 4: Association between self perception of halitosis and different age groups

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<tr>
<th>Age Groups</th>
<th>Self-Perception</th>
<th>Yes</th>
<th>No</th>
<th>Yes</th>
<th>No</th>
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<td>7</td>
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Association of halitosis in different age groups
oral cavity and mouth. Scully et al\textsuperscript{16} suggested GERD extra-esophageal manifestation of gastro esophageal reflux disease as possible cause of halitosis. He further suggested that GERD might be a possible predisposing factor which act as breeding ground for bacteria in the oropharynx. Irwin et el\textsuperscript{17} suggested several mechanisms via which GERD may be contributing to halitosis. One is direct damage to oropharyngeal mucosa by gastroesophageal refluxate, that eject out into upper oesophageal sphincter and into oral cavity. Mamede de et al\textsuperscript{18} demonstrated that prevalence of severe hypertrophy of lymphoid follicles at base of tongue greatly increases in patients with GERD. Schroedor et al\textsuperscript{19}, suggested halitosis as a result of dental erosion, which is a common complication of GERD.

Among other factors in habits 35% of respondent consumed raw Onion/Garlic. Among these 159 participants, 33% were between age 20-30 years old. This suggests that halitosis induced due to raw onion and garlic is frequently seen in younger population. According to Lee et al\textsuperscript{2}\textsuperscript{7} both onion and garlic also contain high concentrations of sulphur, which can pass through the lining of intestine into the bloodstream, and subsequently be released into the lungs and then exhaled. Xiao-Jia et al\textsuperscript{6} so found direct correlation of garlic/onion with halitosis. He suggested ingestion of garlic (Allium Satium) is well known to cause bad breath. He suggested garlic breath odour comes from lungs not from particles retained in the mouth. He identified selenoamino acids found in garlic. He suggested that these compounds are the source of exhaled Se compounds found in garlic breath. He said Se compounds in garlic breath originate from hydrolysis of initially formed thiosulphanides such as allicin,in GIT, affording odorous compounds which then absorbed in the blood and exchange exhaled gases in the lungs.

We also observed correlation between halitosis and use of dental floss daily. The findings can be suggestive due to the fact that flossing daily have a masking effect, without really eliminating the real cause. Lastly correlation was also found in individuals whose social life was effected as a result of halitosis. In the past many researches have demonstrated effects of halitosis on social life. According to Hine Mk et al\textsuperscript{2}\textsuperscript{0}, halitosis can be considered as a social impediment. Sanz Mk etet al\textsuperscript{2}\textsuperscript{1} in his studies on halitosis suggested it to be an essential factor in social relationship and concerns not only with health aspects but also psychological changes which often leads to personal and social isolation. Individuals who self perceived halitosis, it was observed 21.5% had their social life affected as a result of it. With 32-40% from 97 being between age of 20-40 years old. This can be explained as younger population often socialize more than older people and so have more chances to perceive negative impact of halitosis when socializing.

Interestingly, Al-Ansari et al\textsuperscript{2}\textsuperscript{2} assessed the prevalence and factors associated with self-reported halitosis in 1,551 Kuwaiti patients. The prevalence of self-reported halitosis was 23.3% which was contraindicatory to our result, as accessed by Palm Test which was 70%.

Self perception of halitosis have been widely studied in previous question-based study.In France out of 4817 subjects, 22% reported halitosis. In Japan among 2762 subjects 23% had diagnosed halitosis.A report by American Dental Association suggested 50% to have perceived oral Malodour. Limitation of the study is that data was collected from one site and palm test is not an accurate diagnostic test when compared to Halimeter or Oralchroma.

**CONCLUSION**

Halitosis by itself produces symptoms that can itself cause social anxiety and problem in personal interactions. The study demonstrated younger participants, ranging from age 15 to 25 and those acquiring less level of education been more prone to self-perceived halitosis with presence of other underlying associated factors. Halitosis therefore requires not only the professional care provided by dentists, but also psychological support. The study recommends further investigations using the standard clinical methods available to assess the bad breath problem.

**Authors Contribution:**

RN conceived the idea, designed the objective (research question), did data collection and contributed to writing results. HB wrote the discussion and KA contributed to abstract, introduction and proof reading.

**Disclosure:** No conflict of interest reported.

**REFERENCES**