

**ASSESSMENT OF KNOWLEDGE, AWARENESS AND PRACTICE ABOUT HALITOSIS
AND ITS MANAGEMENT AMONG THE PATIENTS VISITING DENTAL COLLEGES
IN BANGALORE, SOUTH – A SURVEY****¹Dr. Suchetha Aghanashini, ²*Dr. Tushar Udaykumar Nadagadalli, ³Dr. Sapna Nadiger, ⁴Dr. Darshan Basavaraj Mundinamane, ⁵Dr. Apoorva Sokke Mallikarjunappa and ⁶Dr. Anusha D.**¹MDS, Professor and Head Department of Periodontics, D A P M R V Dental College Bangalore.²Postgraduate, Department of Periodontics, D A P M R V Dental College Bangalore.^{3,4,5}MDS, Reader, Department of Periodontics, D A P M R V Dental College Bangalore.⁶Postgraduate, Department of Periodontics, D A P M R V Dental College Bangalore.***Corresponding Author: Dr. Tushar Udaykumar Nadagadalli**

Postgraduate, Department of Periodontics, D A P M R V Dental College Bangalore.

Article Received on 23/04/2023

Article Revised on 13/05/2023

Article Accepted on 03/06/2023

ABSTRACT

Aim: The aim of the present study was to assess the Awareness, knowledge and practice measures about Halitosis and its management among the patients visiting dental colleges in Bangalore, south through a printed questionnaire. **Materials & Method:** A total of 340 patients were included in the study. Knowledge, awareness and practice about halitosis was assessed with the help of a structured questionnaire composed of eleven questions allotted in three categories: Awareness, Knowledge and practice. A consent form and patient information sheet were provided to the patients after a brief explanation about the study and its purpose. All the patients were given the questionnaire in a printed form. Once the patient had marked the answer, the collected data were tabulated and analyzed statistically. **Results:** A total of 340 patients were assessed on the Awareness, Knowledge and practice about halitosis. The results revealed that of the selected 340 patients, mean age distribution was 34.75 years (range 18- 50 years). Among them 54.4% were males and 45.6% were females. Majority of the respondents agreed that following all oral causes - gum diseases, improper oral hygiene habits and decayed tooth leads to halitosis and also 53.2% of respondents agreed that halitosis is caused by non-oral problems. On the attitude towards people with halitosis, majority (37.1%) answered that they hesitate to talk to other people. On the practice of respondents towards managing the condition of halitosis, 34.4% of them used mouthwashes to manage halitosis. The study revealed that respondents were aware of halitosis as well as measures towards managing the condition. **Conclusion:** Oral malodor in an individual can significantly affect their self-confidence and social interaction with others. Although in general, people are aware of perceiving bad breath themselves, there is still a need for public awareness campaigns to disseminate more knowledge and management options regarding halitosis. Frequent visits to dental and medical healthcare professionals should be encouraged to mitigate this problem.

KEYWORDS: Halitosis; Bad breath; oral malodor; self-awareness; questionnaire.**INTRODUCTION**

Oral hygiene is the practice of keeping the mouth and teeth clean to prevent dental problems, most commonly, dental cavities, gingivitis, periodontal (gum) diseases, and bad breath.^[1] Halitosis, or breath malodour, is a common problem, which is multifactorial in which 80-90% of the cases it is caused by oral conditions. Oral malodor arises from microbial degradation of organic substrates. It is estimated that about 30% of the population suffer from halitosis.^[2-3]

Halitosis is not merely a reflection of the physical condition.^[4] but it also has a psychological influence due to social isolation.^[5] Therefore, oral malodor has been recognized as one of the most common disorders for

which people seek dental care, ranking third after tooth decay and periodontal disease.^[6]

Halitosis' significance is strongly correlated with its psychological and social consequences. A person's daily life is negatively impacted by halitosis.^[7] It can have a detrimental effect on self-esteem, self-confidence, and social participation, and it has been related to mental illnesses like phobias and depression. and it has been related to mental illnesses like phobias and depression.^[8] It's interesting to note that when asked to assess their own oral odor, only a relatively small percentage of people about 5% indicate that they have halitosis.^[9]

There are numerous ways to directly or indirectly identify halitosis, in addition to gas chromatography, organoleptic (hedonic) testing, sulphide monitoring, the BANA test, and the usage of chemical sensors.^[10]

NEED FOR THE STUDY

A questionnaire for the assessment of breath malodor has also been developed for use in addition to these strategies.^[11] A questionnaire is of help to examine the psychologic status of halitosis patients.^[12] Because of the substantial social impact of halitosis in general, understanding this entity is essential for reducing its impact on one's quality of life. Individuals are frequently aware of having terrible breath, with their peers also recommending it. Most of the time, the population's inadequate dental hygiene has been the primary cause of the development of foul breath, with few people with underlying medical disorders.^[13]

Lack of awareness regarding one's own impression of halitosis results in neglect in seeking treatment. Therefore, from a social, medical, and psychological standpoint, it is essential to enhance the general public's awareness of self-perception of halitosis in order to provide them with a permanent solution to their issue. To lessen this issue, frequent visits to dental and medical professionals should be encouraged.^[14]

There are many studies assessing the knowledge, awareness and practice about halitosis and its management among undergraduate and postgraduate dental students but only few studies assessing the knowledge, awareness and practice about halitosis and its management among patients. Hence the present survey aimed at assessing the knowledge, awareness and practice about halitosis and its management among the patients visiting dental colleges in Bangalore south.

AIMS AND OBJECTIVES OF STUDY

Our study aimed to assess the participants' awareness, knowledge and practice on halitosis and its management.

MATERIALS AND METHODS

Outpatients visiting the Departments of Dental Colleges, Bangalore south.

INCLUSION CRITERIA

- 18- 50 years of age of both the sexes.
- Patients complaining of halitosis.

EXCLUSION CRITERIA

- Patient not willing to participate in the study.

METHOD OF COLLECTION OF DATA

The Ethical clearance for the study was obtained from the ethical committee and review board of the institution. A patient information sheet and consent form were provided to the patients after a brief explanation about the study and its purpose. A total of 340 patients were included in the study. Halitosis knowledge, awareness

and practice was assessed with the help of a structured questionnaire composed of eleven questions allotted in three categories: Awareness, Knowledge and practice (Annexure III). All the patients were given the questionnaire in a printed form. Once the patient had marked the answer. The collected data was tabulated and analysed statistically.

STATISTICAL ANALYSIS

Statistical Package for Social Sciences [SPSS] for Windows Version 22.0 Released 2013. Armonk, NY: IBM Corp., was used to perform **Descriptive and Inferential** statistical analyses using Chi Square Test to compare the gender based responses to the study questionnaire. The level of significance was set at $P < 0.05$.

RESULTS

Of the selected 340 patients, mean age distribution was 34.75 years (range 18- 50 years). (**Table-1, Graph 1**), 54.4% were males and 45.6% were females (**Table-1, Graph 2**)

According to the questionnaire,

1. "Are you suffering from bad breath odour?"
2. When did you first become aware that you had bad breath?

Statistically significant differences were noted when the responses were compared with each other, (p-value < 0.001) and between genders the differences was found to be statistically insignificant. (Table 2 & 3; Graph 3)

3. "How did you come to know that you have bad breath?"

Statistically significant differences between genders was found for response "through someone" (p-value 0.01). (Table 2 & 3; Graph 3)

4. "If by yourself, when do you notice bad breath?"

When each response was compared between genders the differences was found to be statistically insignificant. (Table 2 & 3; Graph 3)

5. "What do you think is or are the main reason for bad breath?"

"Bad breath is caused by other than oral problems?" statistically insignificant difference was found when compared between genders. (Table 2 & 3; Graph 4)

7. "If Yes, which of the following can result in bad breath?"

statistically significant differences was found when each response was compared between genders for the "Liver diseases" (p-value 0.01). (Table 2 & 3; Graph 4)

8. "Do you face any of the following difficulties because of your bad breath

statistically significant differences were noted when the responses were compared with each other, (p-value < 0.001) and between genders the differences was found to be statistically insignificant. (Table 2 & 3; Graph 5)

9. “Did you receive any treatment for the same?”
statistically insignificant differences was found when the responses were compared with each other and compared between genders (Table 2 & 3; Graph 5)

10. “If self, choice of treatment remedies you opted?”

11. “If consulted dentist, treatment option advised?”

12. “Did you benefit from your choice of treatment?”

statistically insignificant differences was found When each response was compared between genders. (Table 2 & 3; Graph 6)

DISCUSSION

Dentists are first-line health professionals in case of bad breath and play an important role in diagnosis, treatment, and referral the patients to a physician or a medical specialist if needed. Halitosis is the most common reason for referral to dentists after dental caries and periodontal diseases.^[15] Epidemiological studies report the prevalence of halitosis is estimated to range between 2.4–78%.^[16-17]

It is estimated that 10–20% of halitosis has non-oral causes.^[18] According to one study, halitosis is amongst the top 100 most distressful diseases in humans.^[19] Other than the clinical method of diagnosis, halitosis can be assessed through subjective self-reported questionnaires developed by various researchers which found to be reliable method.^[20]

In this study, it was revealed that majority of the respondents were males with 54.4% while females accounted for 45.6%. This may reflect males have more prevalence or perception of bad breath. This is in accordance with the study by Khalid Almas (2003) where in 44% of male and 32% of female students could perceive oral breath.^[21] On the age of the respondents, those within the age bracket of 21-40 years were the majority with 62.4%, 41-60 years accounted for 30%, while those in the age bracket of 18-20years accounted for 7.6% of the respondents.

The study findings further reveals that majority of the respondents were self-aware of the halitosis condition. Majority of them were females though the differences between the genders was not significant. However most of the males became aware about their halitosis through someone else which was statistically significant and very few were diagnosed of halitosis by their dentist. When the knowledge based question related to oral causes of halitosis was asked, majority of respondents opted all the oral causes mentioned in questionnaire (gum diseases, decayed teeth and improper hygiene habits) however when individual responses were chosen very few opted

gum disease as the cause of the halitosis. Thus we can infer that we need to increase awareness about gum diseases in causing oral halitosis.

Also when the responses were compared between genders, little differences were observed with females opted mainly “improper oral hygiene habits” followed by “gum diseases” as the main cause of halitosis. When compared between genders, both genders opted “all of the above” in equal proportion followed by “improper oral hygiene habits” to be the cause for halitosis. Thus we can infer that the females are having slightly more knowledge on oral related cause for halitosis.

Surprisingly most of the respondents agreed that halitosis is also caused by non-oral factors. Further when compared between genders, males were the most who agreed that halitosis is caused by non-oral factors although significant differences were not observed when compared between the genders. Thus we can infer that males are having slightly more knowledge on non-oral related cause for halitosis. According to current data, there is no difference in prevalence or intensity of halitosis between men and women (Miyazaki et al. 1995, Quirynen et al. 2009, Yokoyama et al. 2010, Zürcher & Filippi 2012, Amou et al. 2014).^[22-26]

However, it is known that women have a higher awareness of health, and thus brush and floss their teeth and come to check-ups more often (Ronis et al. 1993, Furuta et al. 2011, Stadelmann et al. 2012). Only one study done in Brazil discovered that being male and above the age of 20 were risk factors for halitosis (Nadanovsky et al. 2007).^[27-30]

Further, when asked for choosing various non-oral causes for halitosis, most of the respondents opted acidity as the major non-oral factor causing halitosis. Many people still consider the stomach to be the source of halitosis, but the gastrointestinal tract is in fact involved in only 1% of the cases (Delanghe et al. 1997, Seemann et al. 2006, Quirynen et al. 2009, Zürcher & Filippi 2012).^[31-33]

The results of our study are also in accordance with past studies wherein majority of the respondents agreed that they hesitated to talk to other people and also chose response that other people may avoid them because of their bad breath. Thus we can say that halitosis affects a person's daily life negatively and for this reason individuals (both males and females) with halitosis seek dental care more frequently.

When a question about receiving the treatment for their halitosis was asked it was found that, the percentage of study population who received and the percentage of study population who didn't receive the treatment was fairly even (50.9% and 49.1%). Similar trend was noted between the genders although statistically significant differences was not found. We can infer that although

halitosis causes considerable problems in the subject, it is often not treated but ignored or denied by the subjects. So dental professionals can be a key resource for patients seeking treatment by proper diagnosis and increasing the knowledge and awareness about the various causes and the benefits of undergoing treatment for halitosis. In the present study, among the self-treatment remedies, majority of them used mouthwashes followed by chewing gums/cloves/fennel seeds to mask their problem.

When the subjects visited or consulted dentist for the treatment of halitosis dentist advised majorly about regular cleaning of teeth followed by oral hygiene instructions and very few dentist reviewed about respondents medical health. Majority of the respondents were satisfied with the type of treatment they received as with self-treatment or as suggested by their dentist.

TABLES AND GRAPHS

Variable	Category	n	%
Age	18-20 yrs.	26	7.6%
	21-40 yrs.	212	62.4%
	41-60 yrs.	102	30.0%
	Mean	34.75	SD
	Range	18-60	
Gender	Males	185	54.4%
	Females	155	45.6%

Table 2: Comparison of distribution of responses to the study questionnaire using Chi Square Goodness of Fit Test.

Questions	Responses	n	%	χ^2 value	p-value
Are you suffering from bad breath odour?	Yes	339	99.7%	336.012	<0.001*
	No	1	0.3%		
If yes, when did you first become aware that you had bad breath?	Years ago	112	33.0%	13.929	0.001*
	Months ago	142	41.9%		
	Weeks ago	85	25.1%		
How did you come to know that you have bad breath?	Through Someone	134	39.4%
	Through my dentist	65	19.1%		
	By Myself	180	52.9%		
If by yourself, when do you notice bad breath?	When you first wakeup	120	35.3%
	After having food	110	32.4%		
What do you think is or are the main reasons for bad breath?	Gum diseases	45	13.2%
	Decayed Teeth	75	22.1%		
	Improper oral hygiene habits	108	31.8%		
	All of the above	138	40.6%		
Bad breath is caused by other than oral problems	Agree	181	53.2%	1.424	0.23
	Disagree	159	46.8%		
If yes, which of the following can result in bad breath?	Acidity	95	27.9%
	Alcohol consumption	64	18.8%		
	Smoking	60	17.6%		
	ENT infections	15	4.4%		
	Diabetes	20	5.9%		
	Liver diseases	7	2.1%		
Do you face any of the following difficulties because of your bad breath?	Kidney diseases	4	1.2%	100.494	<0.001*
	I hesitate to talk to other people	126	37.1%		
	Other people may avoid me because of my bad breath	11	3.2%		
	Both a & b	122	35.9%		
Did you receive any treatment for the same?	Yes	173	50.9%	0.106	0.75
	No	167	49.1%		
If self, choice of treatment remedies you opted -	Mouth Washes	117	34.4%
	Chewing gums /cloves / fennel seeds	47	13.8%		

Table 2: Comparison of distribution of responses to the study questionnaire using Chi Square Goodness of Fit Test.

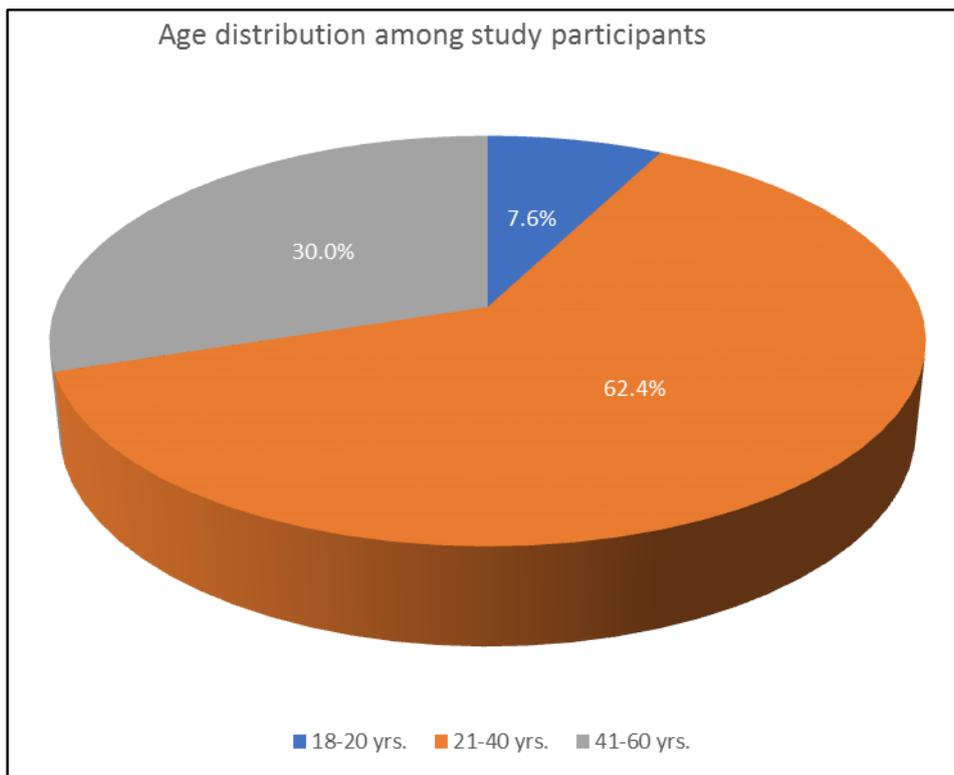
Questions	Responses	n	%	χ^2 value	p-value
If consulted dentist, treatment option advised -	Regular cleaning of teeth	103	30.3%
	Oral hygiene instructions	72	21.2%		
	Dentist review about your medical health?	28	8.2%		
Did you benefit from your choice of treatment -	Self-treatment	88	71.5%
	Dentist	118	93.7%		

* - Statistically Significant

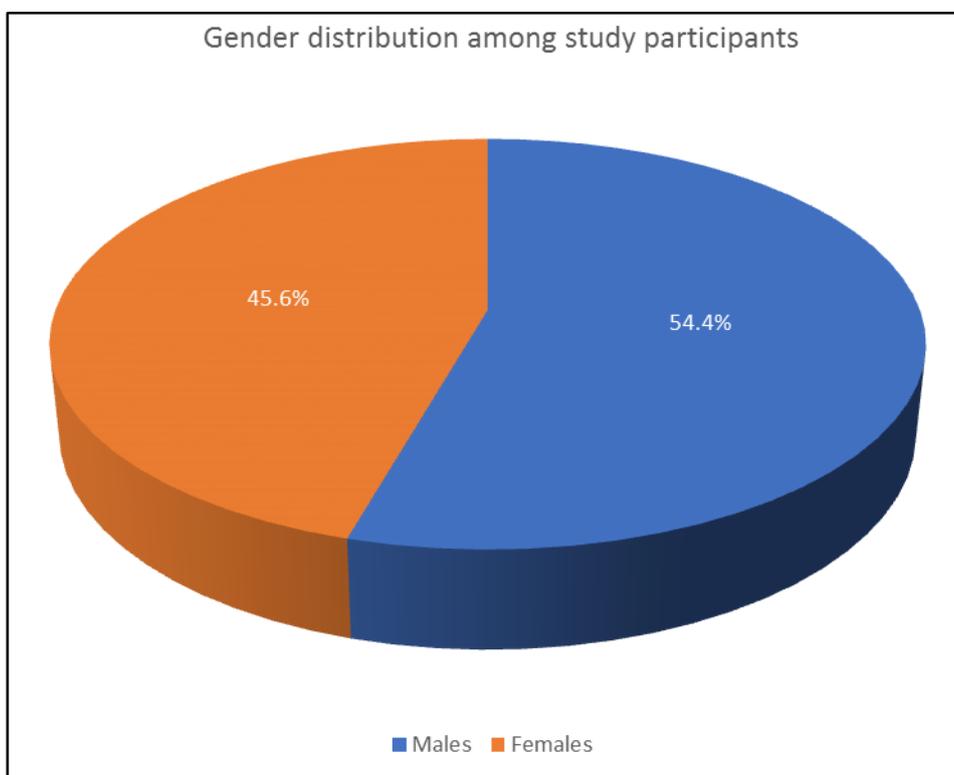
Table 3: Gender wise comparison of distribution in the responses to the study questionnaire using Chi Square test.

Questions	Responses	Males		Females		p-value
		n	%	n	%	
Are you suffering from bad breath odour?	Yes	184	99.5%	155	100.0%	0.98
	No	1	0.5%	0	0.0%	
If yes, when did you first become aware that you had bad breath?	Years ago	69	37.5%	42	27.1%	0.12
	Months ago	70	38.0%	72	46.5%	
	Weeks ago	45	24.5%	41	26.5%	
How did you come to know that you have bad breath?	Through Someone	85	45.9%	49	31.6%	0.007*
	Through my dentist	31	16.8%	34	21.9%	0.23
	By Myself	96	51.9%	84	54.2%	0.67
If by yourself, when do you notice bad breath?	When you first wakeup	63	34.1%	57	36.8%	0.60
	After having food	60	32.4%	50	32.3%	0.97
What do you think is or are the main reasons for bad breath?	Gum diseases	23	12.4%	22	14.2%	0.63
	Decayed Teeth	41	22.2%	34	21.9%	0.96
	Improper oral hygiene habits	57	30.8%	51	32.9%	0.68
	All of the above	75	40.5%	63	40.6%	0.98
Bad breath is caused by other than oral problems	Agree	104	56.2%	77	49.7%	0.23
	Disagree	81	43.8%	78	50.3%	
If yes, which of the following can result in bad breath?	Acidity	54	29.2%	41	26.5%	0.58
	Alcohol consumption	40	21.6%	24	15.5%	0.15
	Smoking	38	20.5%	22	14.2%	0.13
	ENT infections	9	4.9%	6	3.9%	0.66
	Diabetes	11	5.9%	9	5.8%	0.96
	Liver diseases	7	3.8%	0	0.0%	0.01*
	Kidney diseases	3	1.6%	1	0.6%	0.41
Do you face any of the following difficulties because of your bad breath?	I hesitate to talk to other people	65	35.1%	61	39.4%	0.75
	Other people may avoid me because of my bad breath	7	3.8%	4	2.6%	
	Both a & b	66	35.7%	56	36.1%	
	Neither a & b	47	25.4%	34	21.9%	
Did you receive any treatment for the same?	Yes	91	49.2%	82	52.9%	0.49
	No	94	50.8%	73	47.1%	
If self, choice of treatment remedies you opted -	Mouth Washes	62	33.5%	55	35.5%	0.70
	Chewing gums /cloves / fennel seeds	27	14.6%	20	12.9%	0.65
If consulted dentist, treatment option advised -	Regular cleaning of teeth	55	29.7%	48	31.0%	0.81
	Oral hygiene instructions	34	18.4%	38	24.5%	0.17
	Dentist review about your medical health?	14	7.6%	14	9.0%	0.63
Did you benefit from your choice of treatment -	Self-treatment	46	68.7%	42	75.0%	0.44
	Dentist	59	90.8%	59	96.7%	0.17

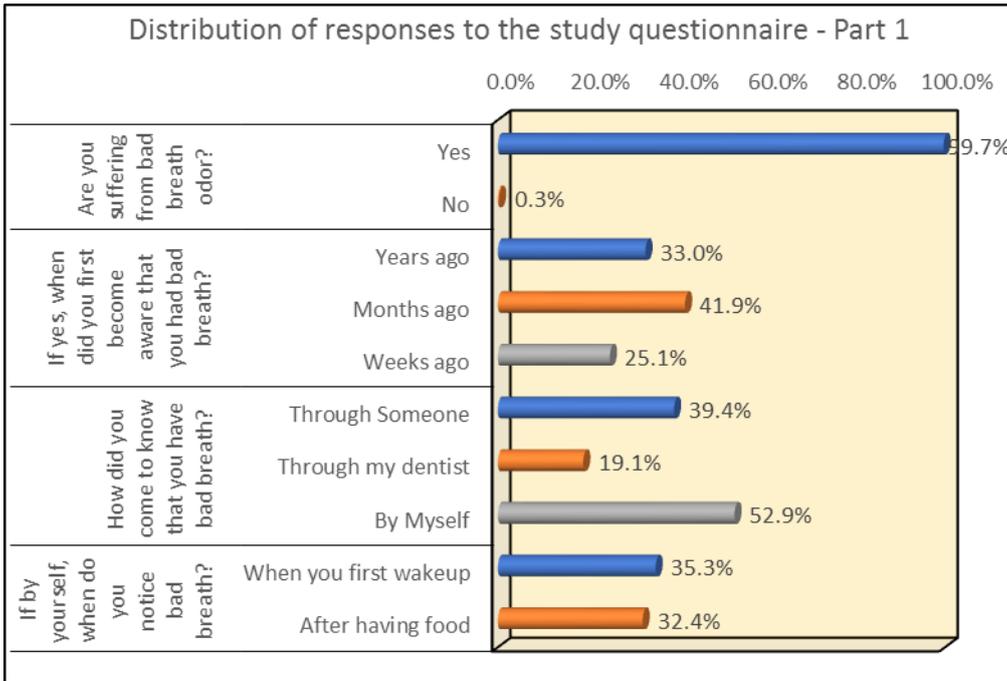
* - Statistically Significant



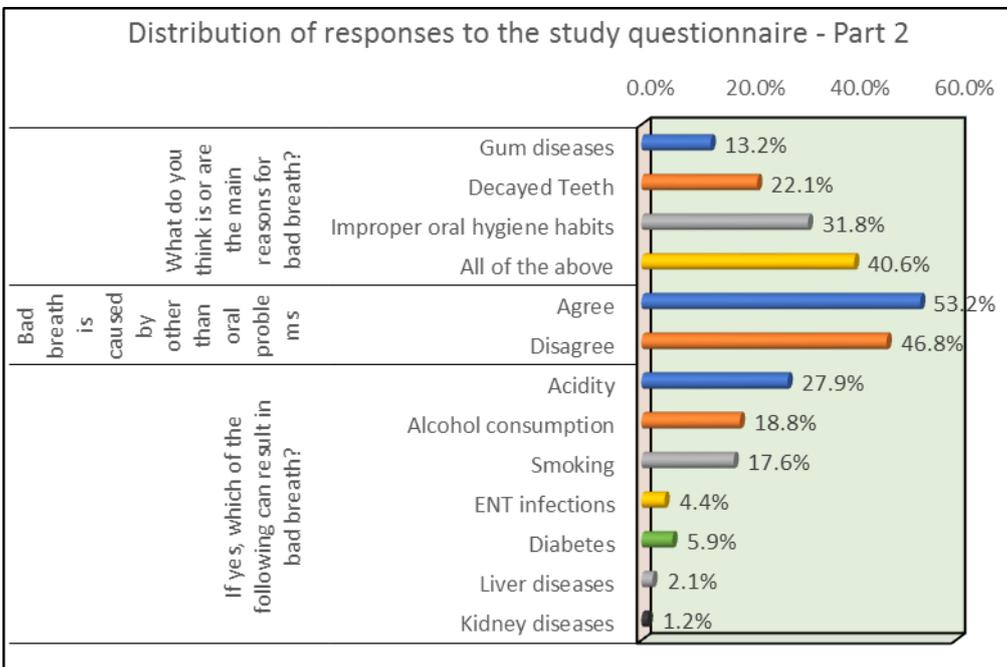
Graph 1: Age distribution among study participants.



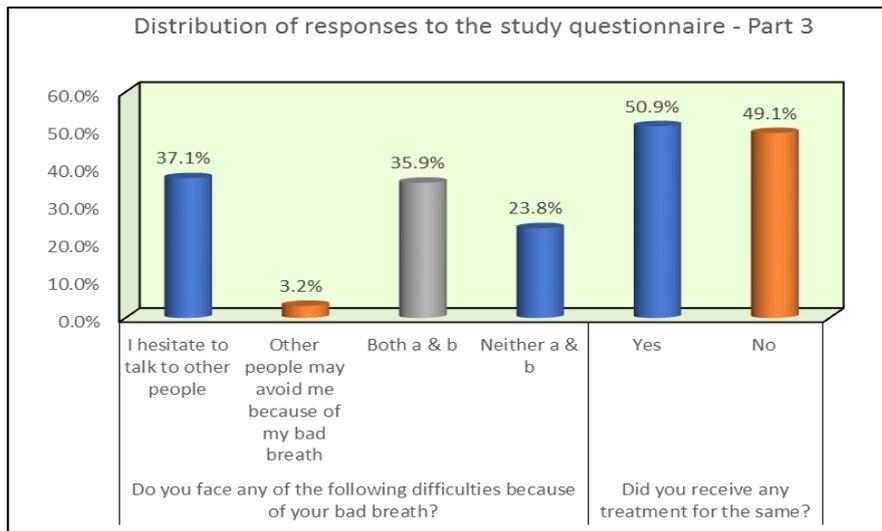
Graph 2: Gender distribution among study participants.



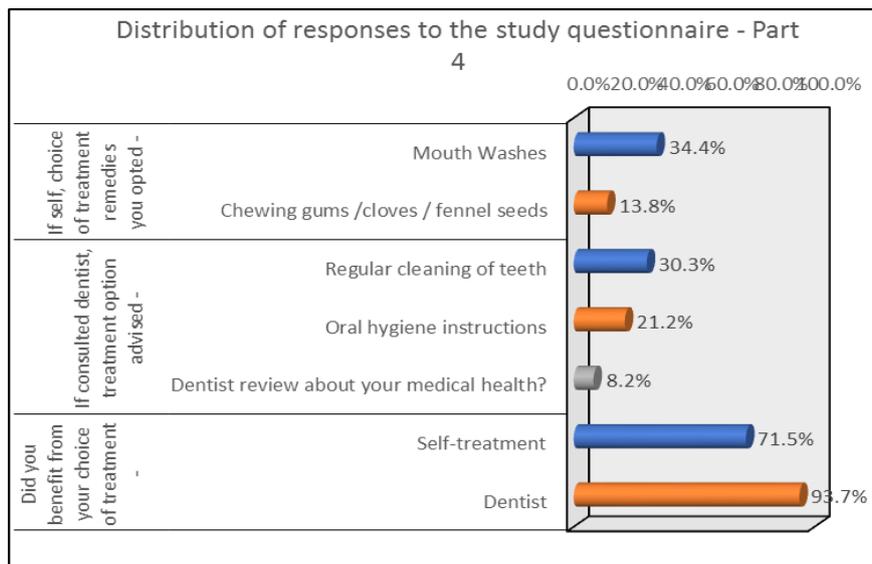
Graph 3: Distribution of responses to the study questionnaire – Part 1.



Graph 4: Distribution of responses to the study questionnaire – Part 2.



Graph 5: Distribution of responses to the study questionnaire – Part 3.



Graph 6: Distribution of responses to the study questionnaire – Part 4.

CONCLUSION

From our study we can conclude that halitosis is common problem in developing and developed nation. It is a psychological problem and, in the present study self-reported halitosis was present. It was interesting to know all knew about oral hygiene methods. However, the proper oral hygiene methods were lagging. Proper need of oral hygiene education and awareness campaign is therefore necessary. Education on halitosis was also necessary.

LIMITATIONS OF THE STUDY

The limitations of the study were the use of questionnaire to perceive the bad breath. The clinical examination was not done. Since it was questionnaire-based study, the issue of recall bias and information bias cannot be ignored. The information bias may be with those participants who were having halitosis but did not state it due to fear of embarrassment.

REFERENCES

1. World Health Organization (WHO), *Health Topics: OralHealth*, 2015.
2. 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 1; 35(8): 627-35.
3. McNab R. Oral malodour—a review. *archives of oral biology*, 2008 Apr 1; 53: S1-7.
4. Gulsahi A, Evirgen Ş, Öztaş B, Genç Y, Çetinel Y. Volatile sulphur compound levels and related factors in patients with chronic renal failure. *Journal of clinical periodontology*, 2014 Aug; 41(8): 814-9.
5. Zaitsu T, Ueno M, Shinada K, Wright FA, Kawaguchi Y. Social anxiety disorder in genuine halitosis patients. *Health and Quality of Life Outcomes*, 2011 Dec; 9(1): 1-7.
6. Rayman S, Almas K. Halitosis among racially diverse populations: an update. *International journal of dental hygiene*, 2008 Feb; 6(1): 2-7.

7. Mubayrik AB, Al Hamdan R, Al Hadlaq EM, AlBagieh H, AlAhmed D, Jaddoh H, Demyati M, Shryei RA. Self-perception, knowledge, and awareness of halitosis among female university students. *Clinical, cosmetic and investigational dentistry*, 2017; 9: 45.
8. McKeown L. Social relations and breath odour. *International journal of dental hygiene*, 2003 Nov; 1(4): 213-7.
9. Bornstein MM, Kislig K, Hoti BB, Seemann R, Lussi A. Prevalence of halitosis in the population of the city of Bern, Switzerland: a study comparing self-reported and clinical data. *European journal of oral sciences*, 2009 Jun; 117(3): 261-7.
10. Aylıkçı BU, Çolak H. Halitosis: From diagnosis to management. *Journal of natural science, biology, and medicine*, 2013 Jan; 4(1): 14.
11. Yaegaki K, Coil JM. Clinical application of a questionnaire for diagnosis and treatment of halitosis. *QUINTESSENCE INTERNATIONAL-ENGLISH EDITION-*, 1999 May 1; 30: 302-6.
12. Rosenberg M, Kozlovsky A, Gelernter I, Cherniak O, Gabbay J, Baht R, Eli I. Self-estimation of oral malodor. *Journal of Dental Research*, 1995 Sep; 74(9): 1577-82.
13. Ziaei N, Hosseinpour S, Nazari H, Rezaei M, Rezaei K. Halitosis and its associated factors among Kermanshah High school students (2015). *Clinical, cosmetic and investigational dentistry*, 2019; 11: 327.
14. Saleem MK, Lal A, Masood S, Ghandhi D, Sitai AA, Ahmed N. Perception of Halitosis among General Population. *Journal of Bahria University Medical and Dental College*, 2021; 11(1): 35-9.
15. Bicak DA. A current approach to halitosis and oral malodor-a mini review. *The open dentistry journal*, 2018; 12: 322.
16. Lopes RG, de Godoy CH, Deana AM, de Santi ME, Prates RA, França CM, Fernandes KP, Mesquita-Ferrari RA, Bussadori SK. Photodynamic therapy as a novel treatment for halitosis in adolescents: study protocol for a randomized controlled trial. *Trials*, 2014 Dec; 15(1): 1-7.
17. Loesche WJ. Microbiology and treatment of halitosis. *Current Infectious Disease Reports*, 2003 May; 5(3): 220-6.
18. Tangerman A, Winkel EG. Intra-and extra-oral halitosis: finding of a new form of extra-oral blood-borne halitosis caused by dimethyl sulphide. *Journal of clinical periodontology*, 2007 Sep; 34(9): 748-55.
19. Bollen CM, Beikler T. Halitosis: the multidisciplinary approach. *International journal of oral science*, 2012 Jun; 4(2): 55-63.
20. Rosenberg M, Kozlovsky A, Wind Y, Mindel E. Self-assessment of oral malodor 1 year following initial consultation. *Quintessence international*, 1999 May 1; 30(5).
21. Almas K, Al-Hawish A, Al-Khamis W. Oral hygiene practices, smoking habit, and self-perceived oral malodor among dental students. *J Contemp Dent Pract*, 2003 Nov 15; 4(4): 77-90.
22. 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.
23. Quirynen M, Dadamio J, Van den Velde S, De Smit M, Dekeyser C, Van Tornout M, Vandekerckhove B. Characteristics of 2000 patients who visited a halitosis clinic. *Journal of clinical periodontology*, 2009 Nov; 36(11): 970-5.
24. Yokoyama S, Ohnuki M, Shinada K, Ueno M, Clive Wright FA, Kawaguchi Y. Oral malodor and related factors in Japanese senior high school students. *Journal of School Health*, 2010 Jul; 80(7): 346-52.
25. Zürcher A, Laine ML, Filippi A. Diagnosis, prevalence, and treatment of halitosis. *Current Oral Health Reports*, 2014 Dec; 1: 279-85.
26. Amou T, Hinode D, Yoshioka M, Grenier D. Relationship between halitosis and periodontal disease-associated oral bacteria in tongue coatings. *International journal of dental hygiene*, 2014 May; 12(2): 145-51.
27. Ronis DL, Lang WP, Farghaly MM, Passow E. Tooth brushing, flossing, and preventive dental visits by Detroit-area residents in relation to demographic and socioeconomic factors. *Journal of public health dentistry*, 1993 Sep; 53(3): 138-45.
28. Furuta M, Ekuni D, Irie K, Azuma T, Tomofuji T, Ogura T, Morita M. Sex differences in gingivitis relate to interaction of oral health behaviors in young people. *Journal of periodontology*, 2011 Apr; 82(4): 558-65.
29. Stadelmann P, Zemp E, Weiss C, Weiger R, Menghini G, Zitzmann NU. Dental visits, oral hygiene behaviour, and orthodontic treatment in Switzerland. *Schweizer Monatsschrift für Zahnmedizin*, 2012; 122(2): 104-26.
30. Nadanovsky PA, Carvalho LB, Ponce de Leon A. Oral malodour and its association with age and sex in a general population in Brazil. *Oral diseases*, 2007 Jan; 13(1): 105-9.
31. Delanghe G, Ghyselen J, van Steenberghe D, Feenstra L. Multidisciplinary breath-odour clinic. *The Lancet*, 1997 Jul 19; 350(9072): 187.
32. Seemann R, Bizhang M, Djamchidi C, Kage A, Nachnani S. The proportion of pseudo-halitosis patients in a multidisciplinary breath malodour consultation. *International dental journal*, 2006 Apr; 56(2): 77-81.
33. Filippi A. Findings, diagnoses and results of a halitosis clinic over a seven year period. *Schweiz Monatsschr Zahnmed*, 2012; 122(3): 205-10.

**ANNEXURE III
ASSESSMENT OF KNOWLEDGE, AWARENESS
AND PRACTICE ABOUT HALITOSIS AND ITS
MANAGEMENT AMONG THE PATIENTS
VISITING DENTAL COLLEGES IN
BANGALORE, SOUTH – A Survey**

AWARENESS ON HALITOSIS

1. Are you suffering from bad breath odor?
 - a. Yes
 - b. No
2. If yes, when did you first become aware that you had bad breath?
 - a. Years ago
 - b. Months ago
 - c. Weeks ago
3. How did you come to know that you have bad breath odor?
 - a. Through someone
 - b. Through my dentist
 - c. By myself
4. If by yourself, when do you notice bad breath odor?
 - a. When you first wake up
 - b. After having food
 - c. Others (specify)

KNOWLEDGE ON HALITOSIS

5. What do you think is or are the main reasons for bad breath?
 - a. Gum diseases
 - b. Decayed teeth
 - c. Improper oral hygiene habits
 - d. All of the above
6. Bad breath odor is caused by other than oral problems.
 - a. Agree
 - b. Disagree
7. If yes, which of the following can result in bad breath?
 - a. Alcohol consumption
 - b. Smoking
 - c. ENT infections
 - d. Diabetes
 - e. Liver diseases
 - f. Kidney diseases
 - g. All of the above
 - h. None of the above
8. Do you face any of the following difficulties because of your bad breath?
 - a. I hesitate to talk to other people
 - b. Other people may avoid me because of my bad breath
 - c. Both a and b
 - d. Neither a nor b

PRACTICE ON HALITOSIS.

9. Did you receive any treatment for the same?
 - a. Yes
 - b. No
10. Did you self-treat or consult a dentist for it?
 - A. If self, choice of treatment remedies you opted,
 - a. Mouthwashes
 - b. Chewing gums /cloves / fennel seeds
 - c. Anything else
 - B. If consulted dentist, treatment option advised,
 - a. Regular cleaning of teeth
 - b. Oral hygiene instructions
 - c. Dentist review about your medical health?
11. Did you benefit from your choice of treatment
 - a. Self-treatment – yes / no
 - b. Dentist – yes / no