Awareness and Knowledge of Dental Students Towards Oral Malodor: A Questionnaire based Survey

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Abstract—**Background: Halitosis, commonly referred to as oral malodor, is a common oral health condition that may negatively affect an individual's social interactions and psychological well-being. Dental professionals play a crucial role in identifying the etiology of halitosis and providing appropriate preventive and therapeutic measures. Therefore, adequate knowledge and awareness among dental students are essential for effective diagnosis and management.**

Aim: To assess the knowledge and awareness regarding halitosis among dental students of different academic levels.

Materials and Methods: A cross-sectional questionnaire-based study was conducted among dental students, including third year students, final year students, interns, and postgraduate students. A structured questionnaire containing questions related to awareness, causes, diagnosis, and management of halitosis was distributed. The collected data were analyzed using statistical methods, and the association between the level of awareness and academic year was evaluated using the Chi square test.

Results: The majority of participants demonstrated good awareness regarding halitosis. Awareness of the term halitosis was observed in 97.1% of third-year students, 98.4% of final-year students, 98.9% of interns, and 100% of postgraduate students. Most participants were aware that volatile sulfur compounds are responsible for oral malodor (82.40%), while 90.22% recognized the association between tongue coating and halitosis. Furthermore, 84.11% agreed that halitosis can be objectively verified, and 91.20% were aware that systemic diseases may also contribute to oral malodor.

Conclusion: Dental students demonstrated a good level of knowledge and awareness regarding halitosis. Higher awareness was observed among students in advanced academic years, possibly due to increased theoretical knowledge and clinical exposure.

Index Terms—**Halitosis, oral malodor, awareness, dental students, oral hygiene**

I. INTRODUCTION

Halitosis, commonly known as oral malodor, is a common condition that affects many individuals and may negatively influence social interactions and psychological well-being. It is mainly caused by volatile sulfur compounds produced by oral bacteria. The majority of halitosis cases originate from the oral cavity and are often associated with poor oral hygiene, tongue coating, periodontal disease, and food debris.[1,2] Proper oral hygiene practices such as tooth brushing, tongue cleaning, and the use of mouthwashes play an important role in the prevention and management of halitosis.[3,4] Awareness regarding the causes and management of halitosis is essential among dental students, as they play an important role in educating patients and managing oral health conditions in clinical practice.[5] Several studies have evaluated the knowledge and awareness of halitosis among dental and university students and have reported varying levels of awareness and self-perception regarding oral malodor.[1,2,3,4,5,6] Therefore, the present study was conducted to assess the awareness and knowledge regarding halitosis among dental students

II. MATERIALS AND METHODS

2.1 Study Design and Population

A descriptive cross-sectional study was conducted among dental students at RVS DENTAL COLLEGE AND HOSPITAL during 2025. The study population consisted of undergraduate dental students including third-year students, final-year students, interns, and

postgraduates. A total of 409 dental students voluntarily participated in the study. Students who provided informed consent and completed the questionnaire were included in the study. Incomplete responses were excluded from the analysis.

2.2 Survey Instrument

Data were collected using a structured self-administered questionnaire designed after reviewing relevant literature on oral malodor.

The questionnaire consisted of two sections:

Section 1: Demographic details

- Age
- Gender
- Year of study

Section 2: Awareness and knowledge regarding oral malodor

The questions assessed students' knowledge regarding:

- Awareness of oral malodor
- Causes of halitosis
- Association with tongue coating
- Role of volatile sulphur compounds
- Diagnostic methods such as the organoleptic test
- Psychological impact of halitosis
- Treatment and management methods

Participants responded to the questions such as Yes/No/I don't know or Agree/Disagree/I don't know.

III. DATA ANALYSIS

All responses were compiled and entered into Microsoft Excel and analyzed using SPSS software.

Descriptive statistics were used to calculate frequencies and percentages for each response. The Chi-square test was applied to determine the association between the level of education and awareness regarding oral malodor.

A p-value < 0.05 was considered statistically significant.

IV. RESULTS

A total of 409 dental students participated in the study. The participants included students from different academic years, including third-year students, final-year students, interns and Post graduate.

Table 1 Questionnaire regarding awareness and knowledge of oral malodor among dental students and the responses in % including the p value

$p < 0.05$ – statistically significant

S. NO	QUESTIONS	RESULTS	P value
1	Heard of Oral Malodor / Halitosis	Yes: 98.29% No: 1.47% I don't know: 0.24%	0.7617
2	Halitosis can be verified objectively	Agree: 84.11% Disagree: 7.09% I don't know: 8.80%	0.0009
3	Persistent anxiety or fear of oral malodor after treatment	Yes: 69.44% No: 17.85% I don't know: 12.71%	0.00001
4	Dry mouth is a major cause of halitosis	Agree: 93.89% Disagree: 2.20% I don't know: 3.91%	0.1464
5	Association between tongue coating and oral malodor	Yes: 90.22% No: 1.47% I don't know: 8.31%	<0.001
6	Volatile sulphur compounds cause oral malodor	Agree: 82.40% Disagree: 1.71% I don't know: 15.89%	<0.001
7	Organoleptic test is the gold standard for halitosis detection	Agree: 75.31% Disagree: 1.71% I don't know: 22.98%	<0.001
8	Chlorine dioxide mouthwash reduces volatile sulphur compounds	Agree: 82.40% Disagree: 1.96% I don't know: 15.65%	0.0103
9	Systemic diseases can be associated with oral malodor	Agree: 91.20% Disagree: 3.91% I don't know: 4.89%	0.0275
10	Treatment of systemic conditions can reverse halitosis	Agree: 86.31% Disagree: 3.67% I don't know: 10.02%	0.0662

Table 1 shows the responses in percentage and p values regarding the awareness and knowledge of oral malodor among dental students.

V. AWARENESS OF ORAL MALODOR

The majority of participants across all academic years reported that they had heard about oral malodor or halitosis. There was no statistically significant association between year of study and awareness of

the term halitosis (p = 0.7617), indicating that students from all academic levels were familiar with the term.

VI. KNOWLEDGE REGARDING OBJECTIVE VERIFICATION OF HALITOSIS

A statistically significant association was observed between the year of study and knowledge that halitosis can be verified objectively (p = 0.0009). Final-year students, interns, and postgraduates demonstrated higher levels of awareness compared to third-year students.

1. Psychological Impact of Halitosis

When asked whether patients may experience persistent anxiety or fear of oral malodor even after successful treatment, a significant association was observed with the year of study (p = 0.00001). Higher awareness was observed among final-year students and interns compared to third-year students.

2. Dry Mouth as a Cause of Halitosis

Most participants agreed that dry mouth is a major cause of halitosis. However, no statistically significant association was observed between year of study and this knowledge (p = 0.1464).

3. Association Between Tongue Coating and Halitosis

A large proportion of participants across all academic years recognized the association between tongue coating and oral malodor. A statistically significant association was observed (p < 0.001), indicating that awareness increased with academic level.

4. Role of Volatile Sulphur Compounds

Knowledge regarding the role of volatile sulphur compounds in causing halitosis showed a highly significant association with the year of study (p < 0.001). Postgraduates, interns, and final-year students demonstrated greater knowledge compared to third-year students.

5. Organoleptic Test as Gold Standard

Regarding diagnostic methods, a significant association was observed between year of study and awareness that the organoleptic test is the gold standard for halitosis detection (p < 0.001). Higher knowledge levels were seen among interns and postgraduates.

6. Chlorine Dioxide Mouthwash

Awareness regarding the use of chlorine dioxide mouthwash in reducing volatile sulphur compounds showed a statistically significant association with year of study (p = 0.0103).

7. Systemic Diseases Associated with Halitosis

Most participants agreed that systemic diseases can be associated with oral malodor, and a significant association was observed between knowledge and year of study (p = 0.0275).

VII. REVERSAL OF HALITOSIS AFTER TREATING SYSTEMIC CONDITIONS

Although most students agreed that treating systemic conditions may reverse halitosis, no statistically significant association was observed with year of study (p = 0.0662).

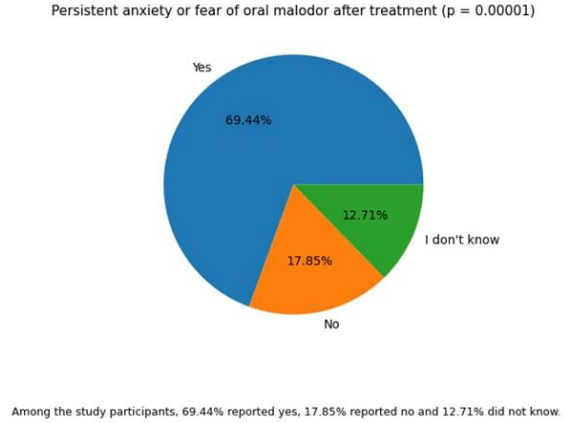

Figure 1: Among the study participants, 69.44% reported yes, 17.85% reported no, and 12.71% reported that they did not know regarding persistent anxiety or fear of oral malodor after treatment (p = 0.00001).

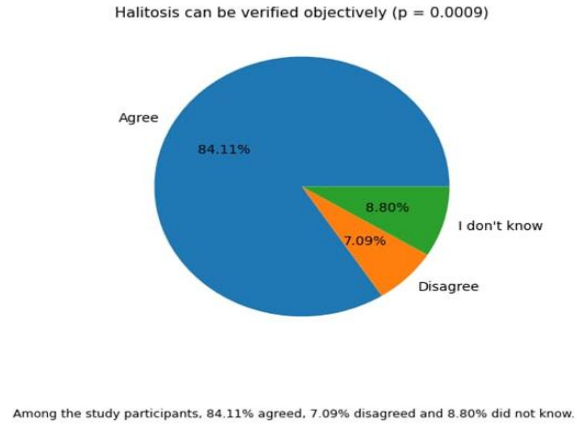

Figure 2: Among the study participants, 84.11% agreed, 7.09% disagreed, and 8.80% reported that they did not know that halitosis can be verified objectively (p = 0.0009).

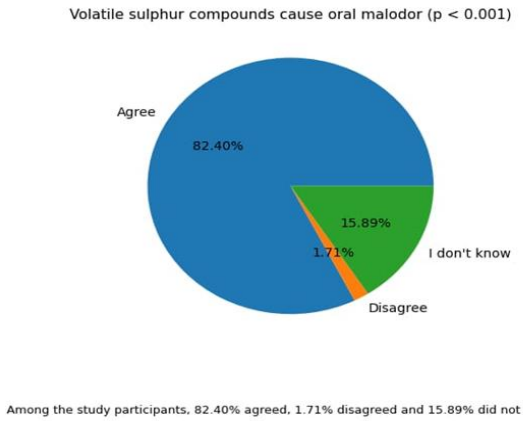

Figure 3: Among the study participants, 82.40% agreed, 1.71% disagreed, and 15.89% reported that they did not know that volatile sulphur compounds cause oral malodor ($p < 0.001$)

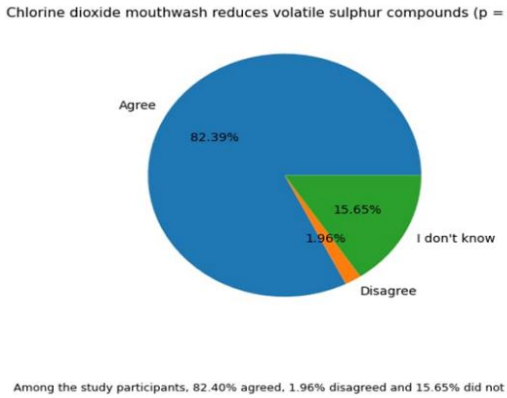

Figure 4: Among the study participants, 82.40% agreed, 1.96% disagreed, and 15.65% reported that they did not know that chlorine dioxide mouthwash reduces volatile sulphur compounds ($p = 0.0103$).

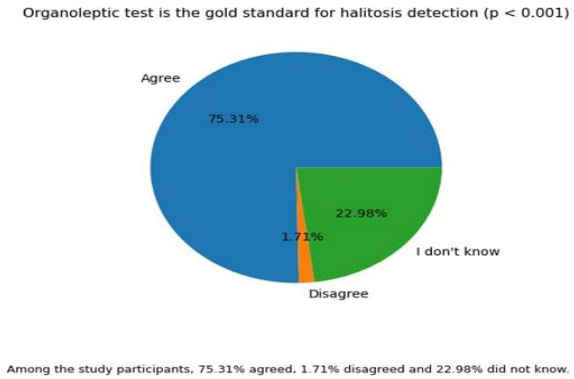

Figure 5: Among the study participants, 75.31% agreed, 1.71% disagreed, and 22.98% reported that they did not know that the organoleptic test is the gold standard for halitosis detection ($p < 0.001$)

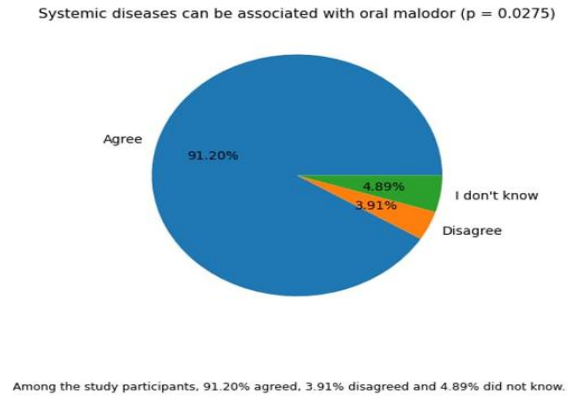

Figure 6: Among the study participants, 91.20% agreed, 3.91% disagreed, and 4.89% reported that they did not know that systemic diseases can be associated with oral malodor ($p = 0.0275$).

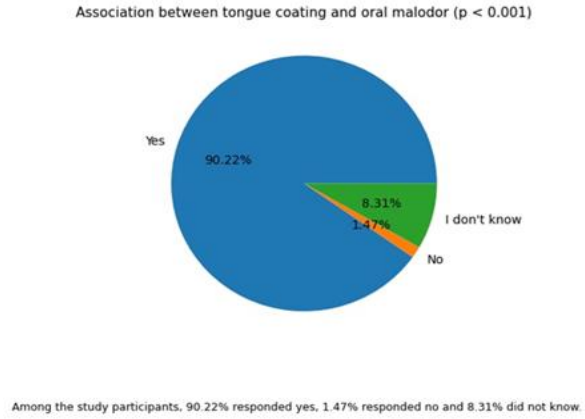

Figure 7: Among the study participants, 90.22% reported yes, 1.47% reported no, and 8.31% reported that they did not know about the association between tongue coating and oral malodor ($p < 0.001$).

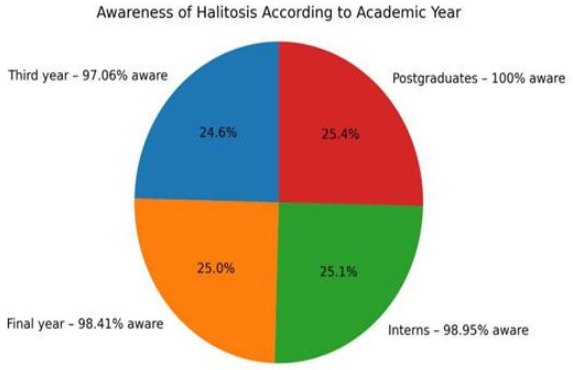

Figure 8: Awareness and knowledge regarding halitosis among students according to the year of study showed that 97.1% of third-year students, 98.4% of final-year students, and 98.9% of interns were aware

of halitosis, while 100% of postgraduate students demonstrated awareness.

VIII. DISCUSSION

In the present study, the majority of participants demonstrated a good level of awareness regarding oral malodor. Most students across different academic years reported that they were familiar with the term halitosis. The association between the year of study and awareness of halitosis was not statistically significant ($p = 0.7617$), suggesting that knowledge of the term was relatively uniform among the students. Similar findings were reported in previous studies where dental students exhibited good awareness regarding halitosis and its causes. [1, 6] in the present study, 69.44% of the participants agreed that patients may continue to experience anxiety or fear of oral malodor even after successful treatment, while 17.85% disagreed and 12.71% reported that they did not know. A statistically significant association was observed with the year of study ($p = 0.00001$). These findings indicate that students in advanced academic years had greater awareness regarding the psychological impact of halitosis. Similar findings have been reported in earlier studies where halitosis was found to negatively affect self-confidence, social interaction, and quality of life. [3, 4] Regarding the objective verification of halitosis, 84.11% of participants agreed that halitosis can be verified objectively, whereas 7.09% disagreed and 8.80% were uncertain, with a statistically significant association with the year of study ($p = 0.0009$). This suggests that most dental students possess adequate knowledge regarding the diagnosis of oral malodor. Similar observations were reported in previous studies where senior dental students showed greater awareness regarding the diagnostic methods used for halitosis. [1, 5] the present study also assessed knowledge regarding the etiological factors responsible for halitosis. 82.40% of the participants agreed that volatile sulphur compounds are responsible for oral malodor, whereas 1.71% disagreed and 15.89% reported that they were not aware of this association. A statistically significant association was observed with the year of study ($p < 0.001$), with postgraduate students and interns demonstrating higher knowledge compared to third-year students. Similar findings have been reported in earlier studies where dental students recognized volatile sulphur compounds produced by oral bacteria as a major cause of halitosis. [1, 3] Tongue coating is considered one of the most important intraoral causes of oral malodor. In the present study, 90.22% of participants agreed that tongue coating is associated with halitosis, while 1.47% disagreed and 8.31% were uncertain, showing a statistically significant association with the year of study ($p < 0.001$). This indicates that the majority of dental students were aware of the role of tongue coating in the development of oral malodor. Previous studies have also reported similar findings where tongue coating was identified as a major contributing factor for halitosis. [1, 2] with regard to diagnostic methods, 75.31% of the participants agreed that the organoleptic test is considered the gold standard for halitosis detection, while 1.71% disagreed and 22.98% reported that they were not aware. A statistically significant association was observed between knowledge and the year of study ($p < 0.001$). Higher awareness was noted among interns and postgraduate students, which may be attributed to increased clinical exposure during advanced stages of dental education. Similar observations were reported in previous studies where senior dental students demonstrated better knowledge regarding diagnostic techniques for halitosis. [1, 5] in the present study, 82.40% of participants were aware that chlorine dioxide mouthwash can reduce volatile sulphur compounds, while 1.96% disagreed and 15.65% were uncertain, demonstrating a statistically significant association with the year of study ($p = 0.0103$). This finding suggests that most dental students possess adequate knowledge regarding the management of oral malodor. Previous studies have also reported that mouthwashes and chemical plaque control agents are commonly used for controlling bad breath. [4, 6] Furthermore, 91.20% of the participants agreed that systemic diseases may be associated with oral malodor, while 3.91% disagreed and 4.89% were uncertain, showing a statistically significant association with the year of study ($p = 0.0275$). This indicates that the majority of dental students recognize that halitosis may originate from both oral and systemic causes. Similar findings have been reported in earlier studies where systemic conditions and medications were identified as potential contributing factors for halitosis[2, 3]

IX. CONCLUSION

The present study assessed the awareness and knowledge of dental students regarding oral malodor, its causes, diagnosis, and management. The findings indicate that most dental students have a good level of awareness, particularly regarding factors such as tongue coating, volatile sulphur compounds, and systemic diseases. Many participants were also aware of diagnostic methods like the organoleptic test and treatment approaches including chlorine dioxide mouthwash. However, a small proportion of students showed uncertainty regarding certain aspects of halitosis. Therefore, further educational reinforcement and clinical training are necessary to improve knowledge and effective management of oral malodor among dental students.

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