

Original Research Article

An Online Survey about Knowledge and Awareness Regarding Periodontal Health among Under-Graduate Medical Students

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Abstract: **Background:** Periodontal health is a critical component of overall well-being, yet its importance often remains underexplored among future healthcare providers. This study aimed to assess the knowledge, awareness, and practices regarding periodontal health among undergraduate medical students in Puducherry. **Methods:** A descriptive, cross-sectional online survey was conducted among 660 undergraduate medical students (aged 18–25) at Sri Venkateshwara Medical College Hospital and Research Centre. Data were collected using a validated 25-item close-ended questionnaire covering knowledge, attitudes, and oral hygiene practices. Statistical analysis was performed using SPSS version 27. **Results:** While 94.7% of participants recognized that oral hygiene is mandatory for overall health, significant gaps in practice and specific knowledge were identified. Although 53.94% of respondents reported brushing twice daily, 49.09% utilized the less effective horizontal brushing technique. Usage of interdental cleaning aids was low, with only 8.64% reporting the use of dental floss. Furthermore, 58.94% of students had never visited a dentist in the past 12 months. Regarding disease progression, 36.36% were unaware that untreated periodontal disease could lead to tooth loss. Awareness of the link between oral health and systemic conditions, such as PCOS (61.21%) and medication-induced gingival enlargement (70.15%), showed room for improvement. **Conclusion:** Despite a general awareness of the importance of oral health, medical students exhibit significant gaps in evidence-based periodontal practices and preventive care. Integrating structured oral health education into the medical curriculum is essential to prepare future clinicians for holistic patient care.

Keywords: Periodontal Health, Oral-Systemic Link, Oral Hygiene Practices, Medical Education.

INTRODUCTION

Periodontal health plays a crucial role in overall well-being, with its maintenance being essential for preventing systemic complications and promoting quality of life. The interconnection between oral health and systemic diseases, such as diabetes mellitus, cardiovascular diseases, and adverse pregnancy outcomes, underscores the importance of raising awareness about periodontal health, particularly among healthcare professionals [1, 2]. Healthcare professionals, including medical students, are ideally positioned to educate the general population about oral hygiene and preventive care [3]. However, their knowledge and motivation regarding periodontal health often remain underexplored [4].

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Undergraduate medical students form a significant group within the health care system, as they represent future clinicians who can integrate oral health knowledge into their practice. Their awareness and motivation regarding periodontal health can influence their ability to identify oral health conditions, refer patients appropriately, and contribute to holistic patient care [5]. Understanding the current level of knowledge among these students can identify gaps in education and serve as a foundation for targeted interventions [6].

The present study aims to assess the knowledge and awareness of periodontal health among undergraduate medical students in Puducherry. By exploring their understanding, perceptions, and motivation related to oral health, this study seeks to identify key areas for improvement.

METHODOLOGY

Study Design

This is a descriptive, cross-sectional survey designed to assess the knowledge and awareness of periodontal health among undergraduate medical students. The study was conducted using an online survey method to ensure convenience and maximize participation.

Study Setting

The study was carried out among the students at Sri Venkateshwara Medical College Hospital and Research Centre (SVMCH), Puducherry, involving undergraduate medical students aged 18 to 25 years.

Sampling

The minimum required sample size for this study was determined through an a priori power analysis using G*Power software [7]. To ensure the study had sufficient sensitivity to detect a small-to-medium effect, the following parameters were utilized: a significance level of 0.05, a statistical power of 0.80, and a medium effect size based on Cohen's conventions. The analysis indicated that a minimum sample of 500 participants was required to achieve the desired power using convenient sampling. To account for a potential non-response rate or incomplete surveys, the questionnaire was distributed to a total of 850 students.

Inclusion and Exclusion Criteria

Inclusion Criteria: All undergraduate medical students enrolled at SVMCH during the study period were eligible to participate.

Exclusion Criteria: Survey forms where at least one question is left unanswered, or the responses are repetitive and monotonous. Students who were unwilling to participate were excluded.

Data Collection

A 25-item close ended questionnaire was developed based on a validated, pre-tested instrument from a prior study [8]. The questions were tailored to evaluate knowledge and awareness regarding periodontal health. The questionnaire included items covering:

1. Basic understanding of periodontal diseases.
2. Awareness of the link between periodontal and systemic health.
3. Perceptions about the importance of oral health in overall health.
4. Knowledge of preventive measures and treatment options for periodontal diseases.

Data Collection Procedure

The study was conducted entirely online using Google Forms. After obtaining consent from the study subjects the participants were provided with the survey link which contained the structured close ended questionnaire and brief instructions regarding its completion was given. The subjects were asked to complete the form answering all the questions with the best of their knowledge.

Ethical Approval

The study was approved by the Institutional Ethics Committee (IEC) at Sri Venkateshwara Dental College and Hospital. IEC no: SVDC/IEC-CER/2023-24/38. All the participants were included in the study only after obtaining informed consent.

Statistical Analysis

Data were exported to SPSS version 27 [9]. Descriptive statistics were calculated, including frequencies and percentages.

RESULTS

The study included a total of 660 participants as final sample for analysis and excluded 190 samples where respondents have failed to answer at least one of the questions or have provided monotonous, repetitive answers that lack variability. This is to ensure the reliability and validity of the data, as incomplete or non-differentiated responses may not accurately reflect genuine opinions or experiences, potentially compromising the study's overall quality and findings. The study population was predominantly within the age group of 21-25 years (73.9%), followed by 18-20 years (18.9%). The majority of participants were male (64%), with females constituting 36% of the sample (Figure 1 & 2).

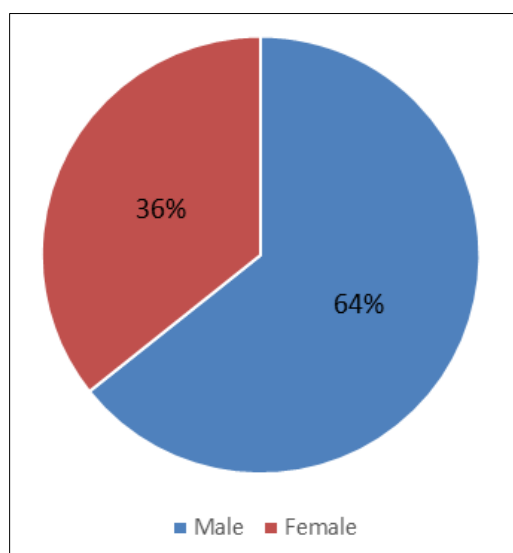


Figure 1: Gender Distribution

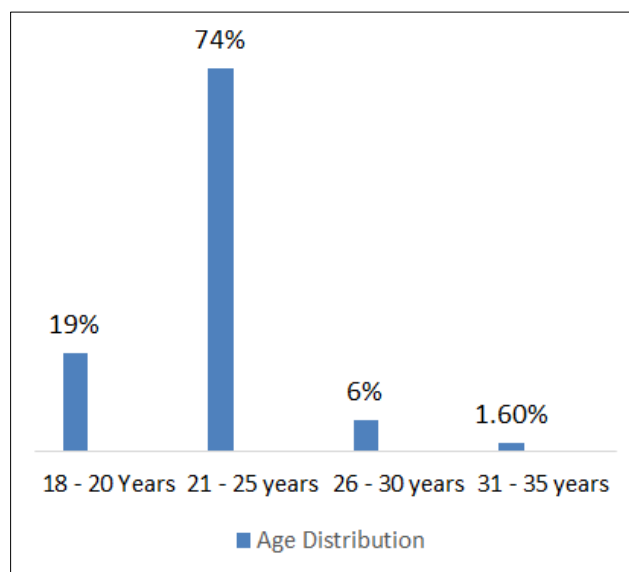


Figure 2: Age Distribution

Brushing Frequency

Most respondents (53.94%) clean their teeth twice daily, adhering to standard oral hygiene recommendations, while 41.67% clean their teeth only once a day, suggesting a need for better education on optimal dental practices. Only 3.94% clean their teeth after every meal, indicating limited adherence to intensive oral care routines, which could be emphasized in awareness programs.

Tools for Cleaning Teeth

An overwhelming majority (97.12%) use a toothbrush and toothpaste, reflecting widespread accessibility and acceptance of modern cleaning methods. Alternatives like tooth powder (2.12%), neem sticks (0.3%), and finger cleaning (0.3%) are minimally used, demonstrating a significant decline in traditional cleaning practices.

Brushing Technique

Horizontal brushing is the most common method (49.09%), though it is less effective for gum and enamel health. Circular brushing, recommended for comprehensive cleaning, is practiced by 22.12%, indicating moderate adherence to best practices. Vertical brushing (18.33%) shows some presence, while random motion brushing was not reported, which may indicate awareness of proper brushing techniques in the population.

Duration of Brushing

Most participants (81.97%) brush for 1-2 minutes, aligning with the recommended duration for effective cleaning. A smaller group (15.61%) brushes for 3-5 minutes, while only 2.27% exceed 5 minutes, reflecting limited engagement in prolonged oral hygiene routines that could ensure thorough cleaning.

Toothbrush Replacement Frequency

Over half (51.21%) replace their toothbrush every 3 months, in line with dental guidelines. However, 25.3% replace their toothbrush every 6 months, which may indicate some neglect in hygiene maintenance. A smaller proportion (20.3%) changes monthly, suggesting higher vigilance, while very few (0.61%) replace their toothbrushes yearly, showcasing gaps in understanding or adherence.

Type of Toothbrush Used

The majority of respondents (89.85%) use soft toothbrushes, which are recommended for gum health and safety. Hard toothbrushes are used by 8.03%, which could potentially cause damage to gums and enamel. Ultra-soft brushes, which are gentle and effective, are used by 12.42%, indicating a smaller but aware subset of individuals.

Use of Additional Cleaning Aids

Tongue cleaners are used by 35.15%, reflecting moderate awareness of tongue hygiene. Mouthwash, another supplementary cleaning method, is used by 26.97%, indicating a growing trend. However, flossing, an essential practice for interdental cleaning, is performed by only 8.64%, suggesting significant room for improvement. Additionally, 14.39% do not use any cleaning aid beyond a toothbrush, highlighting a gap in comprehensive oral care practices. (Table 1&2)

Table 1: Knowledge Regarding Periodontal Health among Study Subjects

Variable		Number	Frequency
How many times do you clean your teeth?	Once	275	41.67
	Twice	356	53.94
	After every meal	29	3.94
What do you use for cleaning teeth?	Tooth brush & tooth paste	641	97.12
	Tooth brush & tooth powder	14	2.12
	Finger and tooth paste	2	0.3
	Neem stick	2	0.3
How do you brush your teeth?	Horizontal	324	49.09
	Vertical	121	18.33
	Circular	146	22.12
	Random motion	-	-
How much time do you take for cleaning your teeth?	1 – 2 min	541	81.97
	3 – 5 min	103	15.61
	>5 min	15	2.27
How often do you change your tooth brush?	Once every month	134	20.3
	Once every 3 months	338	51.21
	Once every 6 months	167	25.3
	Once every year	4	0.61
What type of tooth brush you use?	Hard	53	8.03
	Soft	593	89.85
	Ultra soft	82	12.42

Table 2: Attitude and Practice Regarding Periodontal Health among Study Subjects

Variable		Number	Frequency
Do you use any other cleaning aid?	Floss	57	8.64
	Tongue cleaner	232	35.15
	Mouth wash	178	26.97
	No	95	14.39
Is it possible to prevent gum disease	Yes	240	36.36

Variable		Number	Frequency
with tooth brushing alone?	No	416	63.03
	Don't know	116	17.58
Do you think oral hygiene is mandatory to overall health of body?	Yes	625	94.7
	No	31	4.70
How often have you visited a dentist in the last 12 months?	Once	246	37.27
	Twice	175	26.52
	3 times	76	11.52
	Never	389	58.94
	Don't require	32	4.85
What was the reason of your last visit to the dentist?	Pain/ trouble with teeth	206	31.21
	Pain/ trouble with Gums	39	5.91
	Follow up	51	7.73
	Regular checkup	161	24.39
Do you seek routine dental visit for oral hygiene maintenance?	Once in a year	227	34.39
	Twice in a year	71	10.76
	Only if problem is there	244	36.97
	Never	107	16.21

Oral Hygiene Knowledge and Perception

Approximately 63.03% of participants believed gum disease could not be prevented with tooth brushing alone, while 36.36% believed otherwise. A vast majority (94.7%) considered oral hygiene essential for overall health. Awareness of the relationship between oral hygiene and systemic conditions such as PCOS was reported by 61.21% of participants, and 70.15% were aware that certain medications could cause gingival enlargement.

Dental Visits and Self-Perception

Nearly 37.27% of respondents had visited a dentist once in the last year, while 26.52% reported visiting twice, and 11.52% three times. However, 58.94% reported never visiting a dentist, with 36.97% seeking dental care only when issues arose. Approximately 33.48% reported experiencing halitosis (bad breath), with 81.52% attributing it to gum disease or poor oral hygiene.

Periodontal Disease Awareness

Most participants (84.09%) associated bleeding gums with gum problems, and 81.52% believed periodontal diseases were preventable. However, 21.06% were unaware of the causes of periodontal disease, and 36.36% lacked awareness of its progression leading to tooth loss. (Table 3).

Table 3: Attitude and perception regarding periodontal health among study subjects

Variable		Number	Frequency
Self- perception for halitosis (bad breath)	Yes	221	33.48
	No	427	64.70
	Don't know	99	15
Do you feel that bad breath can be caused by gum disease or poor oral health?	Yes	538	81.52
	No	113	17.12
	Don't know	55	8.33
Bleeding gum is related to gum problems	Yes	555	84.09
	No	99	15
	Don't know	42	6.36
Do you think periodontal diseases (disease of gums and bone lining the tooth socket) are preventable?	Yes	538	81.52
	No	113	17.12
	Don't know	80	12.12
Dental plaque/ tartar build up on the tooth surface causes periodontal disease	My dentist has explained this to me	326	49.39
	Don't know anything about this	216	32.73
	Have learnt on TV, magazine and internet	98	14.85
Periodontal disease is caused by?	Plaque	394	59.70
	Vitamin C deficiency	94	14.24
	Don't know	139	21.06
When the gum disease is not treated, it can progressively cause tooth loss	Don't know anything about this	240	36.36
	Explained by dentist	257	38.94

Variable		Number	Frequency
	Have learnt on TV, magazine	142	21.21
Does smoking affect the healing of periodontal tissues?	Yes	542	82.12
	No	105	15.91
	Don't know	75	11.36
Do you think scaling can cause removal of enamel?	Yes	267	40.45
	No	375	56.82
	Don't know	133	20.15
Do u know there is a relation between periodontal disease and	Diabetes Mellitus	43	6.52
	hormonal changes like pregnancy/puberty	120	18
	Cardio vascular disease	21	3.18
	Pre-term low weight	13	1.97
	All of these	230	34.8
	Don't know anything about this	210	31.82
Are you aware about the relationship between oral hygiene maintenance and improvement in health conditions in vastly growing PCOS condition?	Yes	404	61.21
	No	235	35.76
Do you know certain medicines prescribed for hypertension/ epilepsy/ immunosuppression can cause gingival enlargement?	Yes	463	70.15
	No	179	27.1
How many times have you referred patients to periodontist?	Many	192	29.09
	Never	256	38.79
	Sometimes	193	29.24

DISCUSSION

This study aimed to assess the knowledge, awareness, and practices regarding periodontal health among undergraduate medical students, focusing on critical behaviors, perceptions, and gaps. The results highlight significant areas for improvement in periodontal health education and align with findings from previous studies, providing a foundation for targeted interventions.

Most participants in this study understood the importance of oral hygiene in maintaining systemic health, with 94.7% recognizing its relevance. This aligns with findings from Baseer *et al.*, who reported a high level of awareness among medical students regarding the importance of oral health in systemic conditions, albeit with some gaps in detailed knowledge [10]. However, a substantial proportion of respondents lacked awareness about specific conditions linked to periodontal health. For instance, only 61.21% recognized the association between oral hygiene and PCOS, and 70.15% were aware of medication-induced gingival enlargement. These findings mirror those of Al Habashneh *et al.*, who noted limited awareness about the systemic implications of periodontal diseases despite overall positive attitudes toward oral hygiene [11].

The study also revealed that while 81.52% of respondents recognized periodontal diseases as preventable, 21.06% were unaware of their causes, and 36.36% did not know that untreated periodontal diseases could lead to tooth loss. This is consistent with Ghasemi *et al.*, who found that gaps in knowledge about periodontal disease progression and prevention are common among medical students [12].

Brushing frequency and technique are critical factors in maintaining periodontal health. In this study, 53.94% of participants brushed twice daily, which aligns with recommendations from the American Dental Association. However, 41.67% brushed only once daily, suggesting room for improvement. Similar findings were reported by Petersen *et al.*, who observed that while medical students generally adhere to basic oral hygiene practices, adherence to optimal recommendations is inconsistent. Horizontal brushing, the least effective method for gum and enamel health, was the most commonly reported technique (49.09%), with only 22.12% practicing circular brushing. This mirrors the results of Yee and Sheiham, who found that knowledge of correct brushing techniques is often superficial among medical students. Educational programs emphasizing correct techniques could bridge this gap.

The use of additional cleaning aids, such as floss and mouthwash, was low in this study, with only 8.64% reporting regular flossing. These findings are consistent with those of Chestnutt *et al.*, who highlighted limited awareness and utilization of interdental cleaning aids among medical students. The low rate of flossing underscores the need for targeted education about the importance of comprehensive oral hygiene practices.

Nearly 59% of respondents reported not visiting a dentist in the past year, with most seeking dental care only when issues arose. This reactive approach aligns with the findings of Daly *et al.*, who reported that medical students often prioritize dental visits only in the presence of symptoms, reflecting a lack of emphasis on preventive care. Regular dental visits should be promoted as a key component of oral health maintenance.

Several studies have reported similar findings regarding the knowledge and attitudes of medical students toward periodontal health. For example, Baseer *et al.*, found that while medical students are generally aware of the importance of oral hygiene, detailed knowledge about specific practices and systemic implications is lacking. Similarly, another study showed that medical students in Jordan exhibited positive attitudes but had significant gaps in knowledge about periodontal-systemic disease links.

Unlike some studies, this research explored not only knowledge but also self-reported practices, such as brushing techniques and the use of cleaning aids. These findings provide a more comprehensive understanding of the behaviors and beliefs that underlie oral health practices among medical students. Future studies could further explore the role of curriculum integration in bridging these gaps.

Strength and Limitation

One of the study's strengths is its focus on undergraduate medical students, a critical demographic for shaping future healthcare practices. Using a validated questionnaire ensures the data's reliability, and including a relatively large sample size enhances generalizability within the studied population. However, the study has limitations. It did not account for socioeconomic factors or prior exposure to dental education, which could influence knowledge and practices. Future research should address these gaps by including diverse populations and exploring the impact of structured oral health education in medical curricula.

CONCLUSION

This study underscores significant gaps in knowledge, attitude, awareness, and practices related to periodontal health among undergraduate medical students, despite their critical role as future healthcare providers. While most participants recognized the importance of oral hygiene for overall health, misconceptions and inadequate practices, such as limited use of interdental cleaning aids and suboptimal brushing techniques, were evident. The low frequency of preventive dental visits further highlights the reactive approach to oral health within this cohort. These findings emphasize the urgent need for integrating structured oral health education into medical curricula, fostering a deeper understanding of the systemic implications of periodontal diseases, and promoting evidence-based practices. Addressing these gaps through tailored educational interventions and interdisciplinary collaboration can empower medical students to advocate for and integrate oral health into holistic patient care, ultimately improving public health outcomes.

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