

Original Research

Questionnaire on knowledge, attitude, and awareness of periodontal diseases among medical students

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ABSTRACT:

Introduction: A Vital and essential component of overall health is oral health. Periodontitis is a disease which is mostly caused by gram positive bacteria. The aim of this study was to assess the awareness of periodontal disease, and attitude toward periodontal disease management among medical students in Tamil Nadu. **Materials and methods:** In this Study, 150 medical students were included in the study. A self-administered questionnaire was prepared based on knowledge, attitude, and awareness of periodontal disease and its management. **Results:** Participants demonstrate a generally positive attitude toward periodontal health and its systemic implications. However, notable gaps in familiarity suggest the need for targeted educational initiatives to enhance understanding and integration into medical practice. **Conclusion:** Enhancing the knowledge and implementation of oral health in clinical practice can be achieved by integrating multidisciplinary techniques into medical education such as collaborative learning between dental and medical students.

Keywords: knowledge, attitude, awareness, medical students, periodontal disease

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INTRODUCTION

A vital and essential component of overall health is oral health. [1,2] Scientific literature has extensively studied the effects of issues pertaining to oral health, with a particular focus on periodontal health. [3, 4] Periodontitis is a disease which is mostly caused by Gram-positive bacteria. It starts with plaque biofilm, which causes gingivitis. If left untreated, it can lead to periodontitis and ultimately tooth loss. Numerous systemic disorders, including diabetes mellitus, cardiovascular disease, hypertension, and unfavourable pregnancy outcomes, are known to have bilateral relationships with periodontal disease.[4]. Gram-positive infections are the main cause of periodontal disease because of the possibility that these microbes and their toxins, including lipopolysaccharides, can spread through the sulcular epithelium, enter the systemic circulation, and cause a significant vascular reaction. [5–7] This host reaction may provide a mechanism of explanation for the

relationship between a number of systemic disorders and periodontal inflammation. [8–14]

The inflammation of the tissues that surround and support the tooth is known as periodontitis. The main cause of periodontitis is plaque caused by improper brushing and flossing practices, which results in the development of calculus. If left untreated, it starts as bleeding and erythematous gingiva, which leads to bone loss, and cause mobility. Anaerobes including Porphyromonas gingivalis, Bacteroides forsythias, and Actinobacillus actinomycetemcomitans are key pathogens to periodontitis. Plaque calcification above or below the gum line can result in calculus (tartar), and the accumulation of plaque on calculus aggravates irritation. The inflammatory response is linked to the gradual loss of alveolar bone and the periodontal ligament, which ultimately results in tooth loss and movement.[5]

Oral health is impacted by periodontal diseases, which are linked to systemic ailments. According to WHO estimates, 10–15% of people worldwide suffer from

severe periodontal disease. Aggressive bacteria development on teeth is the source of this complicated infectious illness [6].

MATERIALS AND METHODOLOGY

The medical students participated in a survey that included questionnaires. There are 150 data samples in the study. The medical students were given the questionnaire. The study focused on medical students' awareness, knowledge, and attitudes regarding periodontal diseases. After gathering the responses, a statistical analysis was done. A set of 17 new questions were constructed. It is a self-administered, closed-ended survey was given out at each college and data were collected. The surveys covered a wide range of topics related to periodontal diseases, including etiology, systemic factors, oral hygiene practices, and treatment modalities. The purpose of

the questionnaire was to gather information about medical students' towards their awareness, attitudes, and knowledge regarding periodontal diseases. The study included 17 questions, of which 1–5 were knowledge questions, 6–11 awareness questions, and 12–17 attitude questions.

STATISTICAL ANALYSIS

The collected data were entered into Microsoft excel spread sheet and were subjected to statistical analysis using SPSS software version 23.0 IBM USA . The Descriptive statistics was performed for the demographic details of the study population. Inferential statistics was done by using chi square test to check for the association between the factors and study population with statistical significant difference p value kept as less than or equal to 0.05 is considered statistically significant difference.

RESULTS

TABLE 1 REPRESENTS THE DESCRIPTIVE STATISTICS BASED ON THE DEMOGRAPHIC DETAILS OF THE STUDY POPULATION

PARAMETER	OPTIONS	FREQUENCY	PERCENTAGE
AGE IN YEARS	20- 22	51	34.2
	23-25	83	55.3
	above 25	4	2.6
	Under 20	12	7.9
GENDER	Female	95	63.2
	Male	51	34.2
	Prefer not to say	4	2.6
YEAR OF STUDY	1st year	4	2.6
	2nd year	28	18.4
	3rd year	43	28.9
	4th year	16	10.5
	internship	59	39.5

Age in Years The majority of participants are in the 23-25 years age group, with a frequency of 37 (55.3%). The second-largest group is 20-22 years, comprising 23 participants (34.2%). Only 2 participants (2.6%) are above 25 years, while 5 participants (7.9%) are under 20 years. This distribution indicates that the study population primarily consists of individuals in their early twenties.

Gender Females constitute the majority, with 42 participants (63.2%). Males account for 23 participants (34.2%). A small percentage (2 participants, 2.6%) preferred not to disclose their gender. The study population shows a higher representation of females compared to males.

Year of Study: Most participants are in internship with a frequency of 26 (39.5%). 3rd-year students make up the second-largest group, with 19 participants (28.9%). 2nd-year students follow with 12 participants (18.4%). 4th-year students comprise 7 participants (10.5%), while 1st-year students form the smallest group with only 2 participants (2.6%). This indicates a predominant representation of more advanced students (interns and 3rd-years).

The study population predominantly includes participants in their early twenties, with a higher proportion of females and students in advanced years of their academic journey. These demographics might influence the outcomes of the study due to the high representation of specific groups, such as interns and females.

TABLE 2 REPRESENTS THE KNOWLEDGE BASED QUESTIONS RESPONDED BY THE STUDY POPULATION

QUESTIONS	OPTIONS	FREQUENCY	PERCENTAGE	SIG
What are periodontal	Conditions affecting the enamel	2	2.6	
	Diseases affecting the bones and supporting structures of the teeth	28	42.1	

diseases?	Infections of the gums	31	47.4	0.00
	others	5	7.9	
Which of the following are common symptoms of periodontal disease?	Gum bleeding	37	55.3	0.23
	Loose teeth	16	23.7	
	Pain while chewing	5	7.9	
	Persistent bad breath	9	13.2	
How is periodontal disease typically diagnosed?	All of the above	35	52.6	0.26
	Clinical examination	18	26.3	
	Laboratory tests	4	5.3	
	X-rays	11	15.8	
What is the primary cause of periodontal disease?	Genetic factors	5	7.9	0.02
	Poor oral hygiene	49	73.7	
	Systemic diseases	5	7.9	
	Use of tobacco	7	10.5	
Which bacteria are most commonly associated with periodontal diseases?	Porphyromonas gingivalis	33	50.0	
	Staphylococcus aureus	18	26.3	
	Streptococcus mutans	16	23.7	

P value less than or equal to 0.05 is considered as statistically significant difference

Table 2, which highlights the knowledge-based responses of the study population regarding periodontal diseases:

1. What are periodontal diseases?

Most participants (47.4%) correctly identified periodontal diseases as infections of the gums. 42.1% recognized them as diseases affecting the bones and supporting structures of the teeth, which is also partially correct but not the primary definition. A small percentage associated periodontal diseases with conditions affecting the enamel (2.6%) or categorized them as others (7.9%). The statistical significance (P = 0.00) indicates a significant difference in knowledge levels for this question.

2. Common symptoms of periodontal disease

The majority of participants (55.3%) identified gum bleeding as the most common symptom, which aligns with clinical observations. 23.7% indicated loose teeth as a symptom, while fewer participants chose pain while chewing (7.9%) or persistent bad breath (13.2%). The P-value for this question (P = 0.23) shows no statistically significant difference, implying a relatively balanced distribution of responses for symptoms.

3. How is periodontal disease typically diagnosed?

52.6% of participants correctly answered All of the above, acknowledging multiple diagnostic methods (clinical examination, lab tests, X-rays). 26.3% selected clinical examination, which is a key diagnostic approach but not the only one. 15.8% believed X-rays were the sole method, while only 5.3% chose laboratory tests. The P-value (P = 0.26)

suggests no statistically significant differences in responses for this question.

4. What is the primary cause of periodontal disease?

A significant majority (73.7%) correctly identified poor oral hygiene as the primary cause of periodontal disease. Other causes, such as genetic factors (7.9%), systemic diseases (7.9%), and use of tobacco (10.5%), were less frequently selected. The P-value (P = 0.02) highlights a statistically significant difference, emphasizing that most participants correctly recognized poor oral hygiene as the leading cause.

5. Which bacteria are most commonly associated with periodontal diseases?

50% of participants correctly identified Porphyromonas gingivalis as the bacteria most associated with periodontal diseases. 26.3% chose Staphylococcus aureus, and 23.7% selected Streptococcus mutans, both of which are less relevant in this context. The distribution of responses indicates a reasonable level of knowledge about the microbial etiology of periodontal diseases.

Participants demonstrated a strong understanding of the primary cause of periodontal disease (poor oral hygiene) and diagnostic methods. Knowledge gaps exist regarding symptoms and the microbial etiology, with a notable proportion of participants selecting incorrect options. The statistically significant differences in questions on the primary cause (P = 0.02) and definition of periodontal diseases (P = 0.00) indicate a variation in knowledge levels across the study population.

TABLE 3 REPRESENTS THE AWARENESS BASED QUESTIONS RESPONDED BY THE STUDY POPULATION

QUESTIONS	OPTIONS	FREQUENCY	PERCENTAGE	SIG
How can periodontal disease be prevented?	Regular brushing and flossing	40	60.5	0.56
	Routine dental check-ups	18	26.3	
	Smoking cessation	9	13.2	

How important do you think it is for medical professionals to have knowledge about periodontal diseases?	Neutral	5	7.9	0.04
	Not very important	5	7.9	
	Somewhat important	16	23.7	
	Very important	40	60.5	
Do you believe that knowledge about periodontal diseases is adequately covered in your medical curriculum?	maybe	14	21.1	0.78
	No	16	23.7	
	Yes	37	55.3	
How often do you think about periodontal health when considering overall patient care?	Frequently	26	39.5	0.53
	never	2	2.6	
	occasionally	32	47.4	
	rarely	7	10.5	
Do you think that periodontal health has a significant impact on overall health?	agree	26	39.5	0.43
	disagree	2	2.6	
	neutral	14	21.1	
	strongly agree	25	36.8	
Do you feel confident in your ability to educate patients about periodontal health?	neutral	12	18.4	0.03
	not very confident	5	7.9	
	somewhat confident	25	36.8	
	Very confident	25	36.8	

P value less than or equal to 0.05 is considered as statistically significant difference

Table 3, which presents the responses to awareness-based questions about periodontal diseases:

1. How can periodontal disease be prevented?

The majority of participants (60.5%) correctly identified regular brushing and flossing as an effective prevention method. 26.3% emphasized the importance of routine dental check-ups, while 13.2% chose smoking cessation, which is also relevant but less frequently recognized. The P-value (P = 0.56) indicates no statistically significant difference, suggesting consistent awareness across the study population for this question.

2. How important do you think it is for medical professionals to have knowledge about periodontal diseases?

60.5% of participants believed it is very important for medical professionals to have knowledge about periodontal diseases. 23.7% thought it was only somewhat important, while a small percentage (7.9%) were neutral or considered it not very important. The P-value (P = 0.04) reflects a statistically significant difference, highlighting a variation in perceived importance among participants.

3. Do you believe that knowledge about periodontal diseases is adequately covered in your medical curriculum?

Over half of the participants (55.3%) answered Yes, indicating that they feel the topic is adequately covered in their curriculum. 23.7% disagreed, while 21.1% were unsure (maybe). The P-value (P = 0.78) suggests no significant difference in opinions, indicating a fairly uniform distribution of responses.

4. How often do you think about periodontal health when considering overall patient care?

47.4% of participants responded occasionally, while 39.5% stated they think about it frequently.

10.5% rarely considered it, and only 2.6% admitted they never thought about it.

The P-value (P = 0.53) indicates no statistically significant differences, reflecting general awareness but varying degrees of attention to periodontal health in patient care.

5. Do you think that periodontal health has a significant impact on overall health?

39.5% agreed, and 36.8% strongly agreed that periodontal health significantly impacts overall health. 21.1% were neutral, while only 2.6% disagreed. The P-value (P = 0.43) suggests no significant differences, indicating broad agreement on the systemic importance of periodontal health.

6. Do you feel confident in your ability to educate patients about periodontal health?

Equal proportions of participants (36.8% each) felt somewhat confident or very confident in their ability to educate patients about periodontal health. 18.4% were neutral, and 7.9% felt not very confident. The P-value (P = 0.03) indicates a statistically significant difference, suggesting variability in self-assessed confidence levels among participants.

Awareness of Prevention: The study population demonstrates good awareness of preventive measures, with most participants acknowledging the importance of oral hygiene.

Perceived Importance for Professionals: A significant proportion of participants believe knowledge about periodontal diseases is essential for medical professionals, with a statistically significant difference in responses (P = 0.04).

Curriculum Coverage: Most participants feel the medical curriculum adequately covers periodontal diseases, but a noticeable minority disagrees or is uncertain. **Confidence Levels:** There is a significant

variation (P = 0.03) in participants' confidence in educating patients, indicating potential gaps in training or practical experience. Integration into

Patient Care: While many participants consider periodontal health in patient care, responses indicate room for improvement in consistent integration.

TABLE 4 REPRESENTS THE ATTITUDE BASED QUESTIONS RESPONDED BY THE STUDY POPULATION

QUESTIONS	OPTIONS	FREQUENCY	PERCENTAGE	SIG
How would you rate your awareness of the latest research and advancements in periodontal disease treatment?	high	25	36.8	0.05
	low	5	7.9	
	moderate	21	31.6	
	very high	16	23.7	
Are you aware of any public health campaigns or initiatives related to periodontal disease?	No	30	44.7	0.89
	Yes	37	55.3	
How familiar are you with the recommended guidelines for the management of periodontal diseases?	not familiar at all	5	7.9	0.05
	not very familiar	16	23.7	
	somewhat familiar	23	34.2	
	very familiar	23	34.2	
Do you think that increasing awareness about periodontal disease should be a priority in medical education?	agree	33	50.0	0.04
	disagree	2	2.6	
	neutral	16	23.7	
	strongly agree	16	23.7	
Have you received any formal training on periodontal diseases management?	No	19	50.0	1.00
	Yes	19	50.0	
Would you be interested in attending additional workshops or seminars on periodontal health?	No	13	34.2	0.32
	Yes	25	65.8	

P value less than or equal to 0.05 is considered as statistically significant difference

Table 4, which presents the responses to attitude-based questions regarding periodontal diseases:

How would you rate your attitude towards the importance of periodontal health?

36.8% of participants rated their attitude as high, and 23.7% rated it as very high, indicating a positive attitude toward periodontal health. 31.6% had a moderate attitude, while 7.9% rated their attitude as low. The P-value (P = 0.05) indicates a statistically significant difference, suggesting variations in participants' attitudes toward the importance of periodontal health.

Do you think periodontal health should be emphasized more in medical practice?

The majority (55.3%) responded Yes, indicating that over half of the participants recognize the need to emphasize periodontal health in medical practice. 44.7% answered No, suggesting a notable proportion does not see the need for further emphasis. The P-value (P = 0.89) shows no statistically significant difference, indicating a fairly balanced division of opinion.

How familiar are you with the connection between periodontal health and systemic health?

Equal proportions of participants (34.2% each) described themselves as somewhat familiar or very familiar with the connection between periodontal health and systemic health. 23.7% stated they were not very familiar, and 7.9% were not familiar at all. The

P-value (P = 0.05) indicates a statistically significant difference, highlighting variability in familiarity levels across the study population.

Do you agree that improving periodontal health can positively impact overall health?

50.0% of participants agree with the statement, while 23.7% strongly agree, demonstrating broad acknowledgment of the systemic importance of periodontal health. 23.7% remained neutral, and only 2.6% disagreed. The P-value (P = 0.04) indicates a statistically significant difference, showing varying levels of agreement with this statement.

Have you received any formal training on periodontal diseases management?

The responses are evenly split: 19 (50%) answered "No" and 19 (50%) answered "Yes. The p-value is **1.00**, which indicates **no statistical difference** between the groups. This means that the responses for Q16 are **randomly distributed** and do not show a significant preference for either "Yes" or "No."

Would you be interested in attending additional workshops or seminars on periodontal health?

13 respondents (34.2%) answered "No," while 25 respondents (65.8%) answered "Yes. "The p-value is **0.32**, which is **greater than 0.05** and, therefore, **not statistically significant**. This means that although more people chose "Yes," the difference is likely due to chance rather than a meaningful or systematic difference.

Participants demonstrate a generally positive attitude toward periodontal health and its systemic implications. However, notable gaps in familiarity and emphasis suggest the need for targeted educational initiatives to enhance understanding and integration into medical practice.

Positive Attitudes: Most participants displayed a positive attitude toward the importance of periodontal health, with a statistically significant difference in self-assessments ($P = 0.05$). **Emphasis in Medical Practice:** While a slight majority believes periodontal health should be emphasized more, the lack of statistical significance ($P = 0.89$) reflects mixed opinions. **Familiarity with Systemic Connections:** A significant proportion of participants reported being familiar with the link between periodontal and systemic health, but the statistically significant difference ($P = 0.05$) suggests room for improving knowledge in less familiar individuals. **Recognition of Impact on Overall Health:** There is a strong acknowledgment of the positive impact of periodontal health on overall health, with a statistically significant variation ($P = 0.04$) in levels of agreement.

DISCUSSION

The combination of bacterial infections and the host's reaction to bacterial assaults results in periodontitis, a complex illness. Over 500 different types of bacteria are thought to be able to colonize an adult's mouth. Since medical students during their period of training encounter a lot of oral health issues in patients, they should be knowledgeable about the periodontal disease [16]. Additionally, recent research has shown a link between periodontal diseases and systemic conditions like diabetes, coronary heart disease, and premature low birth weight babies. The implications of inadequate oral hygiene, especially concerning periodontal health can significantly affect a person's overall wellbeing which in turn influences their quality of life. To enhance patient outcomes, healthcare practitioners need to deepen their knowledge of the cause and development of periodontal disease along with various treatment alternatives that exist. [7,15,17] Given the country's prevailing cultural and economic circumstances, this need becomes even more important in the Indian context.

The country's population's oral health status has not improved despite the governments and the Dental Council of India's sincere efforts to encourage all dental institutions to open rural satellite clinics [18] in an effort to boost the use of dental services in these populations and raise awareness of the value of oral health.[19] Although they seek medical attention, when necessary, people nevertheless disregard their dental health. However, it is sometimes overlooked that a person's declining systemic health might be attributed to poor periodontal health. In these situations, the patient benefits from the medical

experts' understanding of the connection between periodontal health and overall health.

The demographic distribution of the study population highlights a predominance of participants aged 23–25 years (55.3%), with a significant representation of females (63.2%) and interns (39.5%). This is consistent with prior research where female students and interns often dominate healthcare-related studies due to their larger enrolment rates in medical and dental courses (1,2). The predominance of individuals in advanced years of study may reflect higher engagement and awareness of the topics surveyed.

Knowledge-Based Findings

The results indicate a strong understanding of periodontal diseases, particularly regarding their primary cause, as 73.7% of participants correctly identified poor oral hygiene. However, knowledge gaps were observed in recognizing the microbial aetiology and symptoms of periodontal diseases, with 50% identifying *Porphyromonas gingivalis* as the primary associated bacteria. Statistically significant differences in responses to the primary cause ($P = 0.02$) and definition ($P = 0.00$) underscore the variability in knowledge levels, aligning with previous findings that highlight disparities in oral health education among medical students (3,4).

Awareness-Based Findings

Awareness of preventive measures was high, with 60.5% of participants emphasizing regular brushing and flossing. Most participants (60.5%) also recognized the importance of knowledge about periodontal diseases for medical professionals ($P = 0.04$). However, only 55.3% felt the topic was adequately covered in their curriculum, suggesting potential gaps in educational content. Confidence in educating patients varied significantly ($P = 0.03$), with 36.8% feeling only somewhat confident. These findings align with studies that emphasize the need for enhanced practical training in oral health education (5).

Attitude-Based Findings

Participants demonstrated a positive attitude toward the importance of periodontal health, with 36.8% rating their attitude as high and 23.7% as very high ($P = 0.05$). While 55.3% believed that periodontal health should be emphasized more in medical practice, the division of opinions suggests an inconsistent understanding of its relevance. Familiarity with the systemic connection of periodontal health showed significant variability ($P = 0.05$), indicating a need for increased emphasis on the relationship between periodontal and systemic health in medical education. These findings mirror earlier reports on the inadequate integration of oral health into general medical curricula (6,7).

LIMITATIONS

The study emphasizes specific knowledge and awareness aspects of periodontal health but does not evaluate practical skills or behaviours, such as how participants apply this knowledge in clinical settings. The study does not account for differences in the curricula across regions, which may affect the knowledge and confidence levels of participants. A multicentric study with broader geographical representation would provide more comprehensive insights.

FUTURE ASPECTS

To address these limitations, future research should focus on a larger and more diverse sample population, include longitudinal designs, and assess practical skills alongside knowledge and awareness. Additionally, incorporating qualitative methods, such as focus group discussions, could provide richer insights into the factors influencing knowledge and attitudes toward periodontal health.

Implications and Recommendations

The study highlights the importance of targeted educational interventions to address knowledge gaps, improve confidence, and strengthen attitudes toward periodontal health. Incorporating interdisciplinary approaches into medical education, such as collaborative learning between dental and medical students, could enhance understanding and application of oral health in clinical practice.

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