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Original Research Article

To evaluate knowledge, awareness and attitude about periodontal disease among medical interns: A questionnaire based study

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Abstract

Introduction: Periodontal disease starts with the deposition of dental biofilm, leading to gingivitis, which, if not addressed, can advance to periodontitis and ultimately result in tooth loss. Prevalence rate is 90 % in Indian population and it is widespread. Primary care physicians serve as the first point of contact for the community, and having adequate knowledge of periodontal disease enable them to make significant contribution to society.
Aim and objective: To assess the knowledge, awareness and attitude of periodontal disease among medical interns.
Material and Methods: Total of one hundred and twenty-three medical interns participated in this survey. A questionnaire form comprising of seventeen questions were distributed through a Google Form and data collected through it.
Result: 66.67% of respondents were aware about the primary cause of periodontal disease and recognized bleeding from gingiva as one of its significant and tangible signs.66.67% of respondents were aware that there is an association between systemic health and periodontal disease and smoking can affect periodontal tissues. 48.78% of respondents were aware of toothpicks, 25.20% were familiar with floss, and 17.07% recognized the importance of a proxa brush in maintaining good oral hygiene.83.3% of respondents referred to dentists when patients have periodontal problems.50% agreed that there is a need for increased emphasis on periodontal education during medical internships. Results showed statistically significant values for responses at $p<0.05$.
Conclusion: In summary, the survey revealed a moderate level of awareness about periodontal health. While respondents showed understanding in certain aspects like primary cause of periodontal disease and the importance of regular check-ups, there are gaps in knowledge regarding advanced treatment options and use of interdental cleaning aids.

Keywords: Periodontal disease, Oral health, General health

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1. Introduction

Oral health is an important and integral part of general health, and influenced by various systemic conditions likes diabetes mellitus, cardiovascular disease, hypertension, and poor pregnancy outcomes which have been linked to periodontal disease.[1,2] Periodontal disease is considered as the sixth complication of diabetes mellitus.[3]

Periodontitis is a multifactorial inflammatory disease affects the tissues supporting the teeth in response to bacterial accumulations, known as dental plaque.[4] Plaque-induced inflammation causes gingivitis, if left untreated, it can progress to periodontitis, which is the primary cause of tooth loss and a major risk to oral health.[1] Periodontal disease is estimated to impact 5-20% of the global population, making it one of the most frequent health concerns.[5] These associations highlight the importance of maintaining good oral health to prevent systemic disease and its complications.

Medical professionals are the primary caretakers for the vast majority of health-related concerns, and they also take an active role in oral health promotion, screening for oral illnesses, providing emergency treatment, and managing pain.[6] Periodontis frequently express concerns that general medical practitioners may possess limited knowledge regarding the diagnosis and treatment of periodontal disease, often constrained by what was briefly covered in their

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medical education. Private General Practitioners primarily focus on addressing patients' immediate complaints, which may not always include oral health concerns. When it comes to periodontal disease, symptoms typically become noticeable only in its advanced stages, at which point patients may be referred to dentists or periodontists. Consequently, it is crucial for general medical practitioners to recognize the early signs of periodontal disease as part of their holistic patient assessments. A comprehensive health evaluation, including an examination of oral health, should be an integral part of routine checkups to ensure better patient outcomes. If any periodontal issues are suspected, referring the patient to a dental specialist for further evaluation and treatment is essential. Studies have shown that family physicians and paediatricians, in particular, can significantly contribute to better oral health outcomes with adequate knowledge and training.[7] Accordingly, education of oral health is essential in the prevention of periodontal diseases, therefore, bridging this knowledge gap is imperative.

This underscores the urgent need to evaluate the attitudes and perceptions of general medical practitioners regarding periodontal care, as they are integral to fostering overall health and wellness. General practitioners play a pivotal role in raising awareness about periodontal disease through patient education and proactive health assessments. By informing patients about the disease's causes, symptoms, and risk factors, and by incorporating oral health screenings into routine care, they contribute to early detection and prevention.

The aim of this study was to assess the knowledge, awareness and attitude about periodontal diseases among medical interns. By understanding their current level of knowledge, targeted educational strategies can be developed to improve their understanding of periodontal health and its systemic implications. This study seeks to fill the gap in literature regarding the knowledge of periodontal health among medical interns, ultimately contributing to better oral health education and patient care.

2. Materials and Methods

This descriptive cross-sectional study was conducted to assess the knowledge, awareness, and attitude of periodontal disease among medical interns in Ahmedabad city, employing a convenience sampling method to select participants. A total of 123 medical interns were included in the study. A structured questionnaire was used as the primary data collection tool, developed based on a reference article and supplemented with self-prepared questions. The questionnaire on periodontal disease consists of sections focusing on Awareness, Knowledge, and Attitude, with several questions adapted from existing studies. In the Awareness section, Q1, Q3, and Q4 are sourced from Gaganashree and Savita's study on knowledge about periodontal diseases among medical students.[8] Q2 is taken from the study by Bipin Kumar Yadav and Rajesh Kumar Thakur on knowledge and awareness of periodontal diseases among medical students.[9]

In the Knowledge section, Q1 is derived from the study by Narendran et al. on the awareness of the influence of periodontitis on systemic health among medical professionals,[10] while Q3 is sourced from the study by Bipin Kumar et al.[9] Q2 and Q5 are again adapted from Gaganashree and Savita's study.[8] The Attitude section incorporates Q1 and Q2 from Gaganashree and Savita's study,[8] while Q3 is sourced from Ponugubati et al.'s survey on periodontal awareness among medical students.[11] Q4 is taken from Sudhakar et al.'s study on knowledge of periodontal disease among various healthcare professionals,[12] and Q5 is derived from study conducted by Sujatha et al. for assessing oral health awareness among undergraduate medical students.[6] Remaining questions has been independently formulated. To ensure validity, a pilot study was conducted before the main study, for a duration of 5 days, helping to assess the clarity, reliability, and feasibility of the questionnaire. The validated questionnaire consisted of 17 questions, categorized as follows: 5 closed-ended questions to evaluate awareness, 6 closed-ended questions to assess knowledge, and 6 closed-ended questions to assess attitude. The questionnaire was distributed via Google Forms, ensuring ease of access and completion. Responses were collected within a period of 10 days, after which a master chart was prepared for data organization. The responses from the pilot study were included in the main study. Statistical tests were performed to analyze the collected data and draw meaningful conclusions. Before participating, all interns were briefed on the study's rationale and objectives, and informed consent was obtained from each participant to ensure ethical compliance.

3. Results

The result of the study revealed varied levels of attitude, knowledge and awareness among medical interns regarding periodontal health. A significant 66.67% of respondents correctly identified bacterial plaque as the primary cause of periodontal disease, and the same percentage recognized bleeding as a key symptom. Additionally, an overwhelming 91.87% were aware that poor oral hygiene can negatively impact general health. Similarly, 67.48% of respondents were aware about the association between systemic health and periodontal disease Figure 1, and various medicines are responsible for gingival enlargement.(**Table 1)**

Only 33.3% of respondents were aware that periodontal therapy helps to reduce systemic inflammatory markers, indicating a breach in their understanding of the benefits of periodontal treatment. **Table 2** on the other hand, 67.48% acknowledged the detrimental effects of smoking on periodontal tissues. (**Table 1)**

Knowledge of proper oral hygiene practices also varied amongst the study population. While 42.28% knew about

circular brushing techniques, only 16.26% were familiar with vertical brushing techniques. Regarding interdental cleaning aids, 48.78% were aware of toothpicks, 25.20% knew about floss, and 17.07% recognized the importance of a proxa brush for maintaining good oral hygiene. **Figure 2**.

Table 1: Awareness based questions

Questions	Responses	N	%	Total N (%)
Are you aware about the primary cause of periodontal disease?[8]	Yes	82	66.67	123(100%)
	No	41	33.33	
Are you aware that poor oral hygiene affects general health?[9]	Yes	113	91.87	123(100%)
	No	10	8.13	
Are you aware there is an association between systemic health and periodontal disease?[8]	Yes	83	67.48	123(100%)
	No	20	16.26	
	May be	20	16.26	
Are you aware about various medicines which are responsible for gingival enlargement?[8]	Yes	113	91.87	123(100%)
	No	0	0	
	May be	10	8.13	
Do you know that smoking can affect periodontal tissues?	Yes	83	67.48	123(100%)
	No	10	8.13	
	May be	30	24.39	

Table 2 : Knowledge based questions

Questions	Responses	N	%	Total N (%)
Are you aware about the signs and symptoms of periodontal disease?[10]	Bleeding	82	66.67	123(100%)
	Mobility	0	0	
	Oral Malodor	41	33.33	
Do you know that periodontal therapy can effectively reduce systemic inflammatory markers?[8]	Yes	41	33.33	123(100%)
	No	20	16.26	
	May be	62	50.41	
Are you aware about the different brushing techniques for maintenance of oral health?[9]	Horizontal	10	8.13	123(100%)
	Vertical	20	16.26	
	Circular	52	42.28	
	Not aware	41	33.33	
Are you aware of the various inter-dental cleansing aids used for the maintenance of good oral hygiene?	Floss	31	25.2	123(100%)
	Toothpick	60	48.79	
	Unitufted brush	11	8.94	
	Proxa brush	21	17.07	
Are you aware about the various treatment modalities for periodontitis?[8]	Yes	72	58.54	123(100%)
	No	51	41.46	
Are you aware of advanced treatment modalities used in dentistry?	Yes	42	34.15	123(100%)
	No	81	65.85	

Table 3 : Attitude based questions

Sr. No.	Questions	Responses	N	%	Total N(%)
1	How will you treat your patients who are having periodontal problems?[8]	Give antibiotics	11	8.94	123(100%)
		Refer to dentist	102	82.93	
		Ignore/Leave alone	10	8.13	
2	How often do you recommend your patients for dental checkups[8]	1 month	32	26.02	123(100%)
		3 months	31	25.2	
		6months	40	32.52	
		Do not recommend	20	16.26	
3	What resources do you currently use to stay informed about advancements in periodontal care? [11]	Internet	92	74.8	123(100%)
		Journal	11	8.94	
		Lectures	16	13.01	
		Workshops	4	3.25	
4	Do you agree that there is a need for increased emphasis on periodontal education during medical internships?[12]	Strongly disagree	0	0	123(100%)
		Disagree	10	8.13	
		Neutral	20	16.26	
		Agree	62	50.41	
		Strongly agree	31	25.20	
5	How do you perceive the impact of periodontal health on overall patient well-being?[6]	Highly significant	10	8.13	123(100%)
		Moderately significant	40	32.52	
		Significant	63	51.22	
		Not significant	10	8.13	
6	How significant do you believe early detection and intervention are in the management of periodontal disease?	Highly significant	52	42.28	123(100%)
		Moderately significant	40	32.52	
		Significant	21	17.07	
		Not significant	10	8.13	

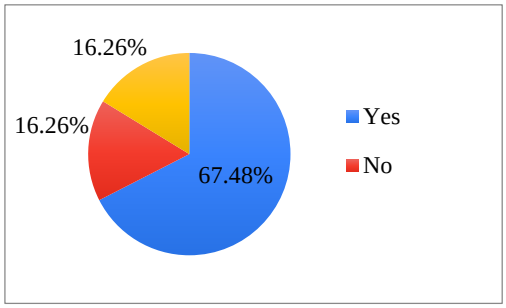

Figure 1: The pie chart shows responses of question "Are you aware about an association between systemic health and periodontal disease?". Note: Types of responses are 'Yes' (67.48%, blue), 'No' (16.26%, red), and 'Maybe' (16.26%, yellow).

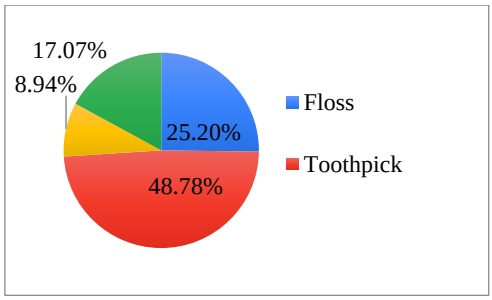

Figure 2: The pie chart shows responses of question "Are you aware of the various inter-dental cleansing aids used for the maintenance of good oral hygiene?". Note: The responses are toothpick (48.78%, red), floss (25.20%, blue), Proxa brush (17.07%, green) and unitufted brush (8.94%, yellow).

Awareness of treatment options for periodontitis stood at 67.48%, though only 34.15% were knowledgeable about advanced treatment modalities in dentistry. **Table 2** when it came to managing periodontal problems, 82.93% of interns chose to refer their patients to a dentist. Recommendations for the frequency of dental check-ups varied, with 26.02% suggesting monthly check ups, another 25.20% recommending every three months, and 32.52% advising six-month intervals **Figure 3**.

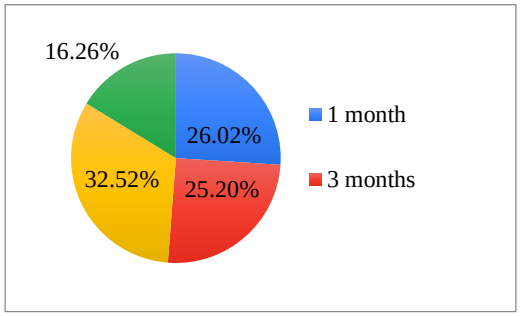

Figure 3: The pie chart shows responses of question "How often do you recommend your patients for dental check-ups". Note: The responses are 1 month (26.02%, blue), every three months (25.20%, red), six-month (32.52%, yellow) and do not recommend dental check-ups (16.26%, green).

A substantial 74.8% of respondents used the internet to stay updated on advancements in periodontal care. (**Table 3**) Half of the interns (50.41%) agreed on the necessity of increasing the emphasis on periodontal education during medical internships.

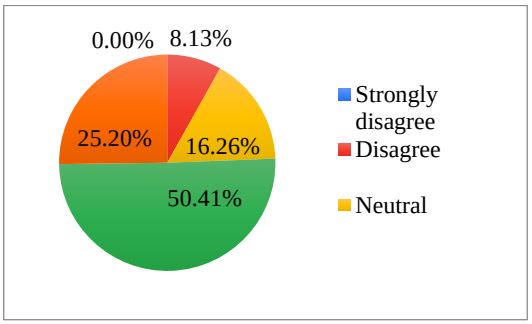

Figure 4) Another 51.22% significantly acknowledged the significant impact of periodontal health on overall patient well-being, and 42.28% believed strongly in the importance of early detection and intervention in managing periodontal disease. **(Figure 5).**

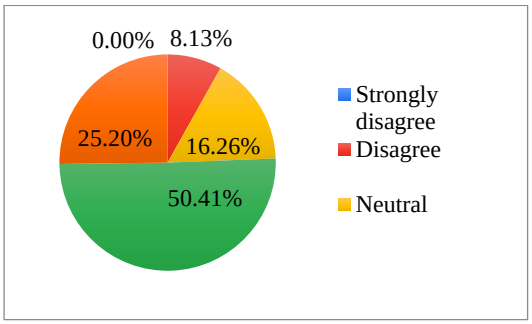

Figure 4: This pie chart shows responses to the question: "Do you agree that there is a need for increased emphasis on periodontal education during medical internships?" The responses are Agreed (50.41%, green), strongly agreed (25.20%, orange). Neutral responses (16.26%, yellow), disagreed (8.13%, red) and strongly disagreed (0.00%, blue).

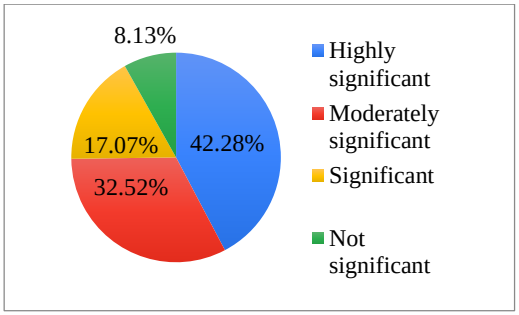

Figure 5: This pie chart illustrates responses to the question "How significant do you believe early detection and intervention are in the management of periodontal disease?" The responses are highly significant (42.28%, blue), moderately significant (32.52%, red), Significant (17.07%, yellow), while Not significant (8.13%, green).

4. Discussion

Oral cavity has been rightly described as "*the window to general health*",[13] and many recent studies have proven the correlation between dental and systemic diseases. For

decades, research has established a link between periodontitis and numerous systemic diseases, identifying periodontal disease as a significant risk factor for overall systemic health. The oral cavity is also the intersection of dentistry and medicine, two semi-independent professions with the same goal: to improve patient's overall health and quality of life. Garcia et al. found that the higher the number of missing teeth, the lower the quality of life.[14] As future practitioners, medical interns must have a thorough understanding of oral health concerns in order to provide optimal care to patients.

In this study, 66.67% of respondents identified the primary cause of periodontal disease, which has shown similar findings of Ponugubati,[11] where 58.5% of participants demonstrated similar knowledge. The results indicate consistency between the two studies.

Regarding the impact of poor oral hygiene on general health, 91.87% of respondents in this study believed that poor oral hygiene affects overall health, while 8.13% did not. In contrast, Bipin et al.[9] reported that only 61.66% of medical professionals acknowledged this relationship, showing a notable difference in awareness. In terms of the association between systemic and periodontal diseases, 67.48% of respondents in this study were aware of the connection, while 16.26% were not. Comparatively, the studies conducted by Narendran[10] showed a higher proportion of respondents recognizing this link, indicating better awareness in their study population.

In this study, 66.67% of respondents recognized bleeding gums as a sign and symptom of periodontal disease. In contrast, the study conducted by Raghavendra et al.[15] reported a significantly lower awareness level, with only 22.4% identifying bleeding gums as a symptom. This comparison highlights a notable difference in awareness levels between the two study populations.

Only 33.3% of respondents knew that periodontal therapy aids in reducing systemic inflammatory markers, highlighting a gap in their understanding of its benefits. In contrast, the study by Dhulipalla et al.[16] found that 76% of respondents believed periodontal disease influences systemic inflammation markers.

Awareness of proper oral hygiene practices showed some variation across studies. In this study, 42.28% of respondents were aware of circular brushing techniques, which was not reported in Bipin et al.'s study.[9] Regarding vertical brushing, this study reported a lower awareness level (16.26%) compared to Bipin et al.'s findings,[9] where 37.66% knew about this technique. Additionally, Bipin et al.[9] found that 31.1% of respondents were familiar with the roll technique, and 26.33% knew about horizontal brushing, which were not assessed in this study. These differences highlight variations in knowledge across different study populations.

In this study, 65.85% of respondents were unaware of advanced treatment modalities in dentistry. In contrast, the study conducted by Gaganashree[8] reported a significantly lower percentage, with only 24% of respondents lacking awareness about these advancements. This comparison highlights a greater knowledge gap in the current study population.

Management of periodontal problems showed notable differences across studies. In this study, 82.93% of interns preferred referring patients to a dentist, 8.94% opted to prescribe antibiotics, and 8.13% chose to leave the patient untreated. In contrast, Dhulipalla et al.[16] study revealed a significantly lower referral rate, with only 30% referring patients to a dentist, while a considerable 70% left the patient untreated. These findings demonstrate considerable variation in the management of periodontal issues among different study populations.

In 2019, Uma et al. carried out a study to evaluate healthcare professionals' knowledge and attitudes towards periodontal disease and its prevention. Their findings revealed that understanding of periodontal disease was inadequate in healthcare professionals. The result was similar to Baseer et al (2012), Gur et al.(2011) and Usman et al (2007).[12,17-19]

Baseer et al. (2012), conducted a study amongst health professionals to assess their oral health knowledge, attitude and practices and although it substantiated their poor awareness regarding oral health, it displayed their positive attitude towards opting professional dental care.[17] Gur et. al.(2011) conducted study to assess the level of awareness regarding systemic effects of periodontal disease among medical interns and concluded that they had inadequate awareness regarding the systemic effects of periodontal disease. Therefore, they recommended an integrated teaching of medical and dental sciences.[18]

The study conducted by Usman et al. (2007) regarding knowledge on oral health and behaviour amongst the medical, paramedical and dental students concluded that the medical and paramedical students have considerably lesser knowledge about oral health as compared to dental students, which was similar to this study.[19]

Jinay et al. (2024)[20] and Vandana et al. (2015)[21] investigated awareness regarding interdental aids. While Jinay et al. found that general population awareness was low, Vandana et al. reported that medical professionals were aware of interdental aids but lacked knowledge about their proper use. Our study aligns with these findings, as knowledge of interdental aids among medical interns was moderate, with only 17.07% recognizing the importance of a proxa brush.

Medical interns may lack awareness, knowledge and attitude about periodontal diseases due to several factors. The

medical curriculum often places greater emphasis on systemic diseases, with minimal focus on oral and periodontal health. Additionally, limited interdisciplinary training between medical and dental fields reduces exposure to periodontal topics. Interns often prioritize general health conditions over oral health, viewing periodontal issues as less critical. This is compounded by inadequate practical experience and limited interaction with dental professionals during internships. Time constraints and demanding schedules further restrict opportunities for self-study or participation in oral health workshops. Misconceptions about the link between periodontal health and systemic diseases, such as diabetes and cardiovascular conditions, can lead to undervaluing its importance. Lack of understanding regarding detrimental effects of smoking on periodontal health leads to increase in prevalence of periodontal disease **Figure 6**.

Figure 6: Effect of Smoking on Periodontium

A lack of emphasis on preventive care and insufficient awareness campaigns targeting medical students also contribute to this knowledge gap. Moreover, the assumption that periodontal diseases are exclusively the responsibility of dentists discourages medical interns from engaging with the topic. Addressing these gaps through enhanced interdisciplinary education, curriculum improvements, and targeted awareness programs specifically like oral hygiene, in which various brushing techniques and uses of interdental aids are included, is crucial to improving their understanding of periodontal health.

With all these efforts medical interns not emphasizing on chief complain rather they will explore oral cavity for the association that will help in early diagnosis and prevention of periodontal disease.

5. Conclusion

The study reveals a moderate level of awareness about periodontal health among medical interns. While they demonstrated a good understanding of the primary causes of periodontal disease, symptoms like bleeding, the impact of poor oral hygiene on general health, and the importance of regular dental check-ups with referrals to dentists when necessary, significant gaps were identified in their knowledge. Encouragingly, a majority of respondents recognized the association between periodontal and systemic health and expressed a willingness to refer patients to dentists for specialized care. These include limited awareness of advanced treatment options, interdental cleaning aids, and the systemic benefits of periodontal therapy.

The findings highlight to address the lack of awareness and knowledge regarding periodontal diseases among medical interns, several steps can be implemented. First, integrating comprehensive periodontal health education into the medical curriculum will ensure that interns receive foundational knowledge about the causes, symptoms, and systemic implications of periodontal diseases. Additionally, fostering interdisciplinary collaboration between medical and dental departments through joint lectures, workshops, and case studies will help interns recognize the strong connection between oral health and overall health. Providing hands-on training, clinical exposure, and encouraging participation in periodontal care alongside dental professionals will further enhance practical knowledge. Organizing educational workshops and seminars led by experts in the field can help address key areas such as oral hygiene practices and treatment options. The development of online learning resources will make learning more flexible and accessible, while peer-to-peer learning can foster knowledge-sharing among interns. Integrating periodontal health discussions into daily clinical rounds and conducting awareness campaigns will promote the inclusion of oral health in overall patient assessments. Regular evaluation through quizzes and feedback will allow for continuous improvements in educational interventions. These initiatives will ensure that medical interns gain a thorough understanding of periodontal health, leading to better patient care and greater interdisciplinary collaboration.

6. Source of Funding

None.

7. Conflict of Interest

None.

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