

Comparative Assessment of Knowledge and Attitude Among Dental Students Towards the Effect of Smoking on Periodontal Health- Questionnaire Survey

Nandhini Balasubramani¹, Dr. Deepshika Saravanan², Dr. Maria Subash Aaron³, Dr. Vaishnavi⁴,
Nandhitha Venkat⁵, Mughilan Rajeshwaran⁶, Mubeena Abdul Rahman⁷

^{1,5,6,7}Intern, Department of Periodontology and Implantology, RVS Dental College and Hospital,
Coimbatore, Tamil Nadu - 641402

²Prof and Hod, Department of Periodontology and Implantology, RVS Dental College and Hospital,
Coimbatore, Tamil Nadu - 641402

³Reader, Department of Periodontology and Implantology, RVS Dental College and Hospital,
Coimbatore, Tamil Nadu - 641402

⁴Senior Lecturer, Department of Periodontology and Implantology, RVS Dental College and Hospital,
Coimbatore, Tamil Nadu - 641402

Abstract: Background: Smoking is a well-established environmental risk factor for periodontal disease, influencing disease initiation, progression, and treatment outcomes. Dental students, as future oral health professionals, play a crucial role in tobacco cessation counselling; therefore, adequate knowledge and positive attitudes toward the effects of smoking on periodontal health is essential.

Aim: To assess and compare the knowledge and attitude of dental students regarding the effects of smoking on periodontal health.

Materials and Methods: A descriptive comparative study was conducted among dental students [Category 1 - 1st year, 2nd year and 3rd year students & Category 2 – 4th year, Interns and PG's using a structured, self-administered questionnaire. The questionnaire assessed Knowledge of smoking-related periodontal effects, Attitudes toward smoking cessation, Periodontal care and Self-reported practice & Preparedness for the cessation counselling. Data was analysed using descriptive statistics and chi-square tests to determine associations, with the level of significance set at $p \leq 0.05$.

Results: The majority of participants demonstrated awareness that smoking adversely affects periodontal health. However, gaps were observed in the understanding of specific periodontal manifestations such as reduced gingival bleeding, increased pocket depth, and impaired healing in smokers. Attitudes toward counselling patients for smoking cessation were generally positive but varied significantly based on academic year.

Conclusion: Although dental students showed acceptable general awareness regarding smoking and periodontal disease, deficiencies remain in detailed periodontal knowledge and counselling confidence. Incorporation of focused tobacco-related periodontal education into the undergraduate curriculum is recommended.

Keywords: Smoking, Periodontal disease, Dental students, Knowledge, Attitude

I.INTRODUCTION

Smoking is a well-established modifiable risk factor for periodontal disease and has been shown to adversely affect gingival tissues, periodontal attachment, alveolar bone levels, and response to periodontal therapy. A comparative study by Gautam DK et al. (2011) demonstrated significantly poorer periodontal health status among smokers compared to non-smokers, reinforcing the detrimental role of tobacco in periodontal destruction and impaired healing outcomes. [1]

Dental professionals play a crucial role in tobacco cessation counselling and early detection of smoking-related oral changes. However, the effectiveness of such interventions depends largely on their knowledge and attitude toward tobacco use. A study conducted by Komar K et al. (2018) reported variations in knowledge and attitudes regarding the impact of

smoking on oral health among Croatian dentists and dental students, emphasizing the need for strengthened educational strategies. [2]

Similarly, Nagarajappa R et al. (2013) evaluated knowledge and attitudes toward smoking among Indian dental students and found that although general awareness was satisfactory, gaps existed in cessation practices and counselling preparedness.³ In another study, Shah SLS et al. (2022) observed differences in awareness levels between medical and dental students regarding the adverse effects of smoking on periodontal health, highlighting the importance of targeted educational interventions. [4]

Beyond knowledge, students' personal attitudes and smoking behaviours may also influence their professional practices. Rodakowska E et al. (2020) assessed smoking prevalence, attitudes, and behaviours among dental students and reported that educational exposure significantly influenced students' perceptions toward tobacco cessation. [5] Furthermore, Campo L et al. (2022) emphasized the importance of assessing smoking habits, attitudes, and knowledge among university students to design effective preventive and counselling programs. [6]

Although previous studies have evaluated knowledge and attitudes toward smoking among dental students, limited research has comparatively assessed these variables across different academic levels within dental education. Therefore, the present study was undertaken to comparatively assess the knowledge and attitude of dental students toward the effects of smoking on periodontal health.

II. MATERIALS AND METHODS

A cross-sectional comparative questionnaire-based study was conducted to assess the knowledge and attitude of dental students toward the effects of smoking on periodontal health. The overall study design was formulated based on previously published comparative studies evaluating the impact of smoking on periodontal health and tobacco-related awareness among dental students [1-4].

The study population included undergraduate dental students from first year, second year, third year, fourth

year, internship (fifth year), and postgraduate dental students. Participants were selected using a convenience sampling method. Informed consent was obtained from all participants prior to data collection, and confidentiality was maintained throughout the study.

A structured, self-administered questionnaire was developed after reviewing earlier studies that assessed smoking-related periodontal knowledge, attitudes, and behavioural practices among dental and medical students [2,3,5,6]. Knowledge-based questions evaluating the effects of cigarette smoking on periodontal tissues, gingival bleeding, disease progression, and treatment outcomes were framed based on evidence demonstrating the adverse periodontal effects of smoking [1,4]. Attitude-based statements assessing professional responsibility, smoking cessation counselling, and perceived barriers were adapted from previous surveys conducted among dental students and healthcare professionals [2,3,5].

The questionnaire consisted of three sections: demographic details (age, gender, and year of study), knowledge-based questions with response options of true, false, and don't know, and attitude-based statements assessed using a Likert scale. Content validity was evaluated by subject experts in Periodontology and Public Health Dentistry, and a pilot study was conducted to ensure clarity and reliability of the questionnaire.

Data collection was carried out either through printed questionnaires or an online platform. Knowledge responses were scored as correct or incorrect, and cumulative knowledge scores were calculated. Attitude responses were scored according to Likert scale values. Data were entered into Microsoft Excel and analysed using SPSS software. Descriptive statistics were used to calculate frequencies and percentages, while comparative analysis between different academic levels was performed using the Chi-square test. A p-value of less than 0.05 was considered statistically significant. Ethical clearance was obtained from the Institutional Ethics Committee prior to the commencement of the study.

III.RESULTS

The comparison of knowledge and attitude toward the effects of smoking on periodontal health between Category 1 and Category 2 is presented in Table X. A statistically significant difference was observed between the two categories for most study variables.

| Study Variable | Option | Category 1 (%) | Category 2 (%) | P-value (Avg) |
|----------------------------------|-------------------|----------------|----------------|---------------|
| Formal Training Received | No | 64.70% | 29.30% | 0.0003 |
| | Yes | 35.30% | 70.70% | |
| Smoking & Periodontal Knowledge | TRUE | 96.70% | 99.30% | 0.0001 |
| | Don't know | 2.00% | 0.00% | |
| | FALSE | 1.30% | 0.70% | |
| Gingival Bleeding Knowledge | FALSE | 48.00% | 11.30% | 0.0001 |
| | TRUE | 32.70% | 88.00% | |
| | Don't know | 19.30% | 0.70% | |
| CO & Oxygen Delivery Knowledge | TRUE | 90.70% | 94.70% | 0.0001 |
| | Don't know | 6.70% | 1.30% | |
| | FALSE | 2.70% | 4.00% | |
| E-cigarettes/ Vaping Knowledge | FALSE | 52.00% | 54.00% | 0.0001 |
| | TRUE | 26.70% | 32.00% | |
| | Don't know | 21.30% | 14.00% | |
| Cessation Improves Health | TRUE | 66.70% | 80.00% | 0.0001 |
| | FALSE | 19.30% | 2.00% | |
| | Don't know | 14.00% | 18.00% | |
| Professional Responsibility | Agree | 48.00% | 48.00% | 0.0001 |
| | Strongly agree | 38.00% | 40.70% | |
| | Neutral | 7.30% | 6.70% | |
| | Disagree | 1.30% | 4.00% | |
| | Strongly Disagree | 5.30% | 0.70% | |
| Confidence in Explaining Effects | Agree | 48.70% | 54.70% | 0.0001 |
| | Strongly Agree | 24.70% | 32.00% | |
| | Neutral | 20.00% | 8.00% | |
| | Strongly Disagree | 4.00% | 5.30% | |
| | Disagree | 2.70% | 0.00% | |
| Support for Curriculum | Agree | 51.30% | 58.00% | 0.0001 |
| | Strongly agree | 36.70% | 34.00% | |
| | Neutral | 8.70% | 5.30% | |
| | Strongly disagree | 3.30% | 2.70% | |
| Frequency of Asking Patients | Never | 41.30% | 1.30% | 0.0001 |
| | Sometimes | 21.30% | 20.70% | |
| | Rarely | 17.30% | 4.00% | |
| | Often | 11.30% | 37.30% | |
| | Always | 8.70% | 36.70% | |

| | | | | |
|------------------------------|-------------------------------|--------|--------|--------|
| Preparedness for Counselling | Not Prepared | 27.30% | 0.70% | 0.0121 |
| | Moderately Prepared | 25.30% | 45.30% | |
| | Slightly Prepared | 22.00% | 6.00% | |
| | Well Prepared | 16.00% | 40.70% | |
| | Very Well Prepared | 9.30% | 7.30% | |
| Barriers to Counselling | Lack of training | 40.70% | 14.70% | 0.0001 |
| | Fear of offending the patient | 36.70% | 57.30% | |
| | Lack of time | 20.00% | 26.00% | |
| | Not my responsibility | 2.70% | 2.00% | |

Formal training on smoking cessation was reported by a significantly higher proportion of participants in Category 2 (70.7%) compared to Category 1 (35.3%) ($p = 0.003$). Knowledge regarding the association between smoking and periodontal disease was high in both groups; however, Category 2 demonstrated marginally better awareness (99.3%) than Category 1 (96.7%), with the difference being statistically significant ($p = 0.001$).

Significant differences were noted in knowledge related to gingival bleeding in smokers, where only 32.7% of Category 1 correctly identified the relationship compared to 88.0% of Category 2 ($p = 0.001$). Awareness regarding the effect of carbon monoxide on oxygen delivery was also higher among Category 2 participants (94.7%) than Category 1 (90.7%) ($p = 0.001$). Knowledge about e-cigarettes and vaping showed relatively lower awareness in both groups, with a considerable proportion responding incorrectly or reporting uncertainty, although the difference remained statistically significant ($p = 0.001$).

Attitudinal assessment revealed that a greater proportion of Category 2 participants believed that smoking cessation improves overall health (80.0%) compared to Category 1 (66.7%) ($p = 0.001$). Most participants in both groups agreed or strongly agreed that dental professionals have a responsibility to counsel patients regarding smoking, though stronger agreement was observed in Category 2.

Confidence in explaining the effects of smoking on periodontal health was significantly higher among Category 2 participants, with 86.7% either agreeing or strongly agreeing, compared to 73.4% in Category 1

($p = 0.001$). Support for the inclusion of smoking cessation training in the dental curriculum was high in both groups, with slightly higher agreement among Category 2 ($p = 0.001$).

With regard to clinical practice, Category 2 participants reported asking patients about smoking habits more frequently, with 74.0% reporting often or always, compared to only 20.0% in Category 1 ($p = 0.001$). Preparedness for smoking cessation counselling was significantly greater among Category 2 participants, whereas a substantial proportion of Category 1 students reported being not prepared or only slightly prepared ($p = 0.012$). The most commonly reported barrier to counselling in Category 1 was lack of training, while fear of offending patients was more frequently reported in Category 2 ($p = 0.001$).

IV.DISCUSSION

The present study assessed and compared the knowledge and attitudes of dental students regarding the effects of smoking on periodontal health across different academic levels. The results were interpreted in the context of existing literature, particularly the study by Komar K et al. (2018) published in Impact of Smoking on Oral Health: Knowledge and Attitudes of Croatian Dentists and Dental Students, which evaluated smoking-related knowledge and attitudes among Croatian dentists and dental students.

In the current study, overall awareness of the association between smoking and periodontal disease was high among both junior and senior students, with significantly greater knowledge scores observed among senior students and postgraduates. Comparable

findings were reported by Komar et al., where both dental students and practicing dentists demonstrated satisfactory general awareness of the detrimental effects of smoking on oral health. However, their study also noted variations in the depth of knowledge and counseling practices based on professional experience. This observation is consistent with the present findings, wherein students at advanced stages of training displayed superior understanding and greater preparedness compared to those in earlier academic years.

An important observation in this study was the deficiency in knowledge concerning specific periodontal manifestations, particularly the phenomenon of reduced gingival bleeding in smokers. While most senior students correctly identified this altered inflammatory response, a considerable proportion of junior students lacked clarity. Similarly, Komar et al. reported that although participants acknowledged smoking as a major risk factor for oral disease, detailed comprehension of underlying pathophysiological mechanisms and clinical implications was variable. These findings suggest that general awareness alone does not necessarily translate into a comprehensive understanding of smoking-induced periodontal changes, particularly among early-year students.

With respect to attitude, the majority of participants in the present study recognized their professional obligation to provide smoking cessation counseling. This parallels the findings of Komar et al., who also reported strong agreement among dentists and dental students regarding the importance of tobacco cessation interventions in dental practice. Nevertheless, both studies identified a discrepancy between positive attitudes and actual clinical practice. In the present study, many junior students reported infrequent inquiry about patients' smoking habits, whereas senior students were more consistent in incorporating such discussions into clinical interactions. Komar et al. similarly observed that although respondents supported cessation counseling, routine implementation remained inconsistent.

The influence of formal training was particularly evident in the present study. Students who had undergone structured tobacco-related education

demonstrated higher levels of confidence and were more proactive in engaging patients in cessation discussions. Komar et al. also emphasized the significance of ongoing education and professional development in strengthening tobacco intervention practices. These comparable findings highlight the critical role of curriculum design in enhancing preventive competencies and clinical readiness among dental students.

Barriers to counseling identified in the current study included inadequate training among junior students and apprehension about offending patients among senior students. Similar concerns were reported in the Croatian study, where insufficient practical exposure and patient-related factors limited the implementation of cessation counseling. This underscores the need for educational approaches that extend beyond theoretical instruction to include communication skills training and behavioral counseling strategies.

In summary, both studies indicate that while dental students generally demonstrate adequate awareness of the harmful effects of smoking, the depth of periodontal-specific knowledge, confidence in counseling, and practical application improve significantly with academic advancement. These findings reinforce the importance of integrating structured tobacco cessation education early in the dental curriculum, supplemented by clinical training that promotes effective real-world application.

V.CONCLUSION

The present comparative study demonstrates a statistically significant difference in knowledge and attitude toward the effects of smoking on periodontal health among dental students across different levels of education. Students in advanced academic years and postgraduate programs exhibited greater awareness, more positive attitudes, higher confidence, and better preparedness for smoking cessation counselling compared to junior students.

Although overall awareness regarding the association between smoking and periodontal disease was satisfactory, notable gaps were observed in specific areas, particularly among early-year students. The findings highlight the need for early integration of structured tobacco education, clinical exposure, and

communication training within the undergraduate dental curriculum. Strengthening tobacco cessation training at all levels of dental education may enhance students' competence and confidence in addressing smoking-related periodontal issues in clinical practice

CONFLICT OF INTEREST

There is no conflict of interest to declare.

ACKNOWLEDGEMENT

1. Dr. Deepshika Saravanan, Prof. & HOD, Department of Periodontology & Implantology, RVS Dental College & Hospital.
2. Dr. Maria Subash Aaron, Reader, Department of Periodontology & Implantology, RVS Dental College & Hospital.
3. Dr. Vaishnavi. S, Senior Lecturer, Department of Periodontology & Implantology, RVS Dental College & Hospital.

REFERENCES

- [1] Gautam, D. K., Jindal, V., Gupta, S. C., Tuli, A., Kotwal, B., & Thakur, R. (2011). Effect of cigarette smoking on the periodontal health status: A comparative, cross-sectional study. *Journal of Indian Society of Periodontology*, 15(4), 383–387. <https://doi.org/10.4103/0972124X.92575>
- [2] Komar K, Glavina A, Vučićević Boras V, Verzak Ž, Brailo V. Impact of smoking on oral health: Knowledge and attitudes of dentists and dental students. *Acta Stomatol Croat*. 2018;52(2):148–155. doi:10.15644/asc52/2/8
- [3] Nagarajappa, Ramesh; Daryani, Hemasha; Sharda, Archana J.; Asawa, Kailash; Batra, Mehak; Sanadhya, Sudhanshu; and Ramesh, Gayathri: Knowledge and attitude towards smoking among Indian students of dentistry. *International Dental Journal*. 2013;63: 244-248. doi:10.1111/idj.12033
- [4] Shah SLS, Shujaat N, Fatima M. Association of awareness in medical and dental students regarding adverse effects of smoking on periodontal health. *Pak J Med Health Sci*. 2022;16(11):29-31. doi:10.53350/pjmhs2022161129. □
- [5] DOC-20250711-WA0011.Rodakowska E, Mazur M, Baginska J, Sierpinska T, La Torre G, Ottolenghi L, D'Egidio V, Guerra F. Smoking Prevalence, Attitudes and Behavior among Dental Students in Poland and Italy. *Int J Environ Res Public Health*. 2020 Oct 13;17(20):7451. doi: 10.3390/ijerph17207451. PMID: 33066192; PMCID: PMC7602041.