

To Evaluate and Compare Knowledge and Awareness Among Medical Students Regarding the Relationship Between Periodontal Disease and Diabetes: A Cross-Sectional Survey

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Abstract

Background: Periodontal disease and diabetes mellitus share a well-established bidirectional relationship. Diabetes is a major risk factor for periodontal disease, while periodontal inflammation adversely affects glycemic control. Medical students, as future healthcare providers, play a crucial role in early identification, patient education, and interdisciplinary management of diabetic patients.

Aim: To assess and compare the knowledge and awareness among medical students regarding the relationship between periodontal disease and diabetes mellitus.

Materials and Methods: A descriptive cross-sectional questionnaire-based survey was conducted among undergraduate medical students. A structured, pre-validated questionnaire assessed knowledge of periodontal disease, awareness of its relationship with diabetes, and attitudes toward referral and interdisciplinary care. Data were analyzed using descriptive and inferential statistics.

Results: A total of **200 medical students** participated in the study. While **76.5%** were aware that diabetes increases the risk of periodontal disease, only **48.0%** recognized that periodontal disease can adversely affect glycemic control. Senior medical students demonstrated significantly higher awareness compared to juniors ($p < 0.05$).

Conclusion: Although general awareness regarding the association between diabetes and periodontal disease was satisfactory, comprehensive understanding of the bidirectional relationship was limited. Incorporation of oral health education into the medical curriculum is essential to promote holistic management of diabetic patients.

Keywords: Periodontal disease, Diabetes mellitus, Medical students, Knowledge, Awareness, Cross-sectional survey

Introduction

Periodontal disease is a chronic inflammatory condition affecting the supporting structures of teeth and is primarily caused by microbial plaque and host-mediated inflammatory responses. Diabetes mellitus, a prevalent metabolic disorder characterized by chronic hyperglycemia, is known to influence the onset and progression of periodontal disease.

Numerous studies have demonstrated a bidirectional relationship between periodontal disease and diabetes mellitus. Poor glycemic control exacerbates periodontal destruction, while periodontal inflammation contributes to increased systemic inflammatory burden, negatively affecting glycemic control. Effective periodontal therapy has been shown to improve glycemic outcomes in diabetic patients.

Medical students, as future physicians, are expected to possess adequate knowledge regarding oral-systemic health relationships to ensure early diagnosis, patient counseling, and timely referral. However, limited emphasis on oral health in medical education may lead to gaps in knowledge and awareness.

Therefore, the present study was undertaken to compare and evaluate the knowledge and awareness among medical students regarding the relationship between periodontal disease and diabetes mellitus.

Materials and Methods

Study Design

A descriptive cross-sectional questionnaire-based survey.

Study Population

MBBS graduates and postgraduate medical students.

Sample Size

The study comprised 200 medical students in total.

Inclusion Criteria

- MBBS graduate and postgraduate medical students

- Students willing to participate in the study

Exclusion Criteria

- Students absent on the day of survey

Study Tool

A structured, pre-validated questionnaire consisting of **18 questions** divided into four sections:

1. Demographic details
2. Knowledge regarding periodontal disease
3. Awareness of the relationship between periodontal disease and diabetes
4. Attitude toward oral examination and referral practices

Data Collection

The questionnaire was distributed in printed/online format after obtaining informed consent. The privacy of participants was protected, and all responses were kept confidential.

Analysis of Statistics

Microsoft Excel was used to enter the data, and SPSS software (version XX) was used for analysis. Frequencies and percentages were computed using descriptive statistics. The **Chi-square test** was applied to assess differences in knowledge and awareness between MBBS graduates and postgraduate medical students. A p-value of **< 0.05** was considered statistically significant.

Results

Demographic Distribution of Participants

Out of 200 participants, **54% were male** and **46% were female**. Based on academic year, **45%** were junior students (MBBS graduates) and **55%** were senior students (Postgraduate students) (Table 1).

Variable	Category	Frequency (n)	Percentage (%)
Gender	Male	108	54.0
	Female	92	46.0
Academic Year	MBBS graduate	90	45.0
	Postgraduate students	110	55.0

Knowledge Regarding Periodontal Disease

About **72.0%** of students correctly identified periodontal disease as an inflammatory condition, and **68.5%** recognized dental plaque as its primary etiological factor. However, only **61.0%** were aware that bleeding gums indicate periodontal disease, reflecting moderate clinical awareness (Table 2).

Questions on Knowledge regarding Periodontal Disease	Correct Response (%)
Periodontal disease is inflammatory	72.0
Dental plaque is primary cause	68.5
Bleeding gums are a sign	61.0

Awareness Regarding Relationship Between Periodontal Disease and Diabetes

A majority of students (**76.5%**) were aware that diabetes increases the risk of periodontal disease. However, only **48.0%** recognized that periodontal disease can adversely affect glycemic control, and **42.5%** were aware that periodontal treatment can help improve glycemic status (Table 3).

Questions on Relationship between Periodontal disease and Diabetes	Aware (%)
Diabetes increases periodontal risk	76.5
Periodontitis worsens glycemic control	48.0
Periodontal therapy improves diabetes control	42.5

Comparison Between MBBS graduate Postgraduate Medical Students

Postgraduate medical students demonstrated significantly higher awareness regarding the bidirectional relationship between periodontal disease and diabetes compared to MBBS graduates ($p < 0.05$) (Table 4).

Questions on Comparison between Junior and Senior Medical Students	Junior (%)	Senior (%)	p-value
Aware of diabetes–periodontitis link	65.6	85.4	<0.05
Aware of effect on glycemic control	36.7	56.4	<0.05

Discussion

The present cross-sectional survey evaluated the knowledge and awareness among medical students regarding the relationship between periodontal disease and diabetes mellitus. The findings demonstrated a moderate level of awareness among the participants, indicating that although students possess some knowledge of the association, their understanding of the bidirectional relationship remains limited.

A positive finding of the study was that many participants were aware that diabetes mellitus increases the risk of periodontal disease. This observation is consistent with studies conducted by Harald Loe and Philip M. Preshaw, . Likewise, Robert J. Genco emphasized that diabetes plays a significant role as a risk factor in the development of periodontal conditions, individuals with poorly controlled diabetes have a higher prevalence and severity of periodontal disease. Similarly, Robert J. Genco highlighted that diabetes is an important risk factor for periodontal disease, demonstrating a positive correlation between poor glycemic control and periodontal destruction.

When comparing the two groups, postgraduate students demonstrated higher awareness than MBBS graduates. This difference may be attributed to greater clinical exposure, advanced

academic training, and a better understanding of systemic disease management among postgraduate students.

However, the study also revealed gaps in awareness, particularly regarding the reverse relationship. A smaller proportion of participants recognized that periodontal disease can negatively affect glycemic control. Studies by George W. Taylor and Brian L. Mealey have emphasized that periodontal inflammation can worsen glycemic control and increase the risk of diabetic complications, indicating a negative correlation when periodontal disease remains untreated.

Furthermore, awareness regarding the role of periodontal therapy in improving glycemic control was limited in both groups, although postgraduate students demonstrated relatively better understanding than MBBS graduates. Similar observations have been reported by Iain L. C. Chapple and Steven Offenbacher, who highlighted the importance of periodontal treatment in improving systemic health outcomes in diabetic patients.

Overall, the findings highlight both strengths and gaps in knowledge among medical students. While postgraduate students showed better awareness compared to MBBS graduates, the limited understanding of the bidirectional relationship between periodontal disease and diabetes underscores the need to incorporate oral health education into medical curricula to enhance interdisciplinary knowledge and improve patient care

Conclusion

The present study concludes that while medical students possess basic knowledge regarding periodontal disease and its association with diabetes mellitus, awareness of the bidirectional relationship remains insufficient. Enhancing oral health education within the medical curriculum and encouraging interdisciplinary learning can improve future physicians' role in holistic management of diabetic patients.

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