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RESEARCH ARTICLE

AWARENESS OF PERIODONTAL PROBLEMS ASSOCIATED WITH DIABETES PATIENTS: A STUDY BASED ON A QUESTIONNAIRE-BASED SURVEY

Dr. Divya Alexander[1], Dr. Jayan Jacob Mathew[2], Dr. Majo Ambooken[3]*

[1] Degree: MASTER OF DENTAL SURGERY IN PERIODONTICS Department: Department of Periodontics Designation: Senior Lecturer, Department of Periodontics Institution// affiliation: Sri Rajiv Gandhi College of Dental Sciences and Hospital, Bengaluru, Karnataka, Pin No: 560032 ORCID ID: 0009-0003-9611-7771

[2] MASTER OF DENTAL SURGERY IN PERIODONTICS Department: Department of Periodontics and Oral Implantology Designation: Professor and Head of Department Institution// affiliation: Mar Baselios Dental College, Kothamangalam, Ernakulam, Kerala, Pin No.686691 ORCID ID:0000-0002-5453-5719

[3] MASTER OF DENTAL SURGERY IN PERIODONTICS, Department of Periodontics and Oral Implantology Designation: Professor Institution// affiliation: Mar Baselios Dental College, Kothamangalam, Ernakulam, Kerala, Pin No.686691 ORCID ID:0000-0002-7152-4464

*Corresponding Author
Dr. Divya Alexander

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Abstract: ***Background:*** Diabetes mellitus is a well-established risk factor for periodontal disease, yet the awareness of this association among the patients remains poorly documented in many populations. Understanding this knowledge gap is essential for designing many preventive strategies & improving multidisciplinary managements of diabetic patients. ***Aim:*** The study aimed to evaluate the awareness of periodontal problems among diabetic patients through a questionnaire-based survey ***Materials and Methods:*** A questionnaire-based cross-sectional survey was carried out among patients visiting the outpatient department. A validated structured questionnaire with 20 closed-ended questions assessed participants awareness of periodontal complications associated with diabetes. Responses were analyzed using descriptive statistics. ***Results:*** Only 15.5% of diabetic participants reported awareness of periodontal problems, while 53.5% had no knowledge of such risks. Notably, the majority were visiting a dental clinic for the first time, highlighting both limited exposure to dental care and a critical deficit in preventive awareness. ***Conclusions:*** Awareness of periodontal complications among diabetic patients remains unacceptably low. These findings underscore for the need of integrated educational initiatives within diabetes care protocols enabling both medical and dental professionals to collaborate in early identification & prevention of periodontal disease. Such approaches may improve long-term oral & systemic health outcomes in this high-risk group.

Keywords: Periodontitis, Diabetes Mellitus, Hyperglycemia, Patient Awareness, Preventive Dentistry.

INTRODUCTION

Periodontitis is a chronic multifactorial inflammatory disease affecting the supporting tissues of the teeth, primarily triggered by microorganisms within dental biofilm. As the condition progresses, it results in periodontal pocket formation, connective tissue attachment loss, alveolar bone resorption, & increased tooth mobility that may lead in tooth loss. Importantly, periodontitis is not confined to the oral cavity, its association with various systemic diseases has been well recognized making this relationship an area of increasing scientific interest [1,2].

Diabetes mellitus (DM), one of the most prevalent metabolic disorders worldwide, is characterized by persistent hyperglycemia due to impaired insulin secretion, action, or both. This metabolic imbalance influences carbohydrate, protein, and lipid metabolism, predisposing individuals to complications involving the cardiovascular system, kidneys, retina, and peripheral nerves [3]. The interrelationship between DM and periodontitis is bidirectional: diabetes increases the risk and severity of periodontal disease, while periodontal inflammation adversely impacts glycemic control. This association is mediated through mechanisms such as altered host immune response, persistent low-grade inflammation, and shifts in the subgingival microbiome [4,5].

Strong evidence indicates that DM is a major risk factor for periodontal disease & optimal glycemic control is essential to delay or prevent periodontal complications [6,7]. However, early periodontal changes are often clinically not seen and may not result in immediate tooth loss, making them less perceptible to patients. Despite the increasing number of diabetic patients encountered in routine dental practice the extent of their awareness regarding the periodontal risks associated with DM remains poorly investigated. Periodontal diseases and diabetes are both highly prevalent, chronic, comorbid conditions that mutually influence each other in terms of incidence, progression and severity. In clinical practice, effective communication between dentists, periodontists & physicians is critical to providing comprehensive care for this population [8,9]. Patient education is particularly important as individuals with DM who receive regular dental

treatment demonstrate improved glycemic control [10]. By identifying the knowledge gaps, this study aimed to evaluate the awareness of periodontal problems among diabetic patients through a questionnaire-based survey & inform strategies that integrate periodontal health into diabetes management improving the patient outcomes.

METHODOLOGY & MATERIALS

Study Design

A cross-sectional, questionnaire-based survey was conducted in the Department of Periodontics and Implantology, Mar Baselios Dental College (MBDC), Kothamangalam, India. Data collection was carried out over a period of four-month from June to September 2022.

Ethical Considerations

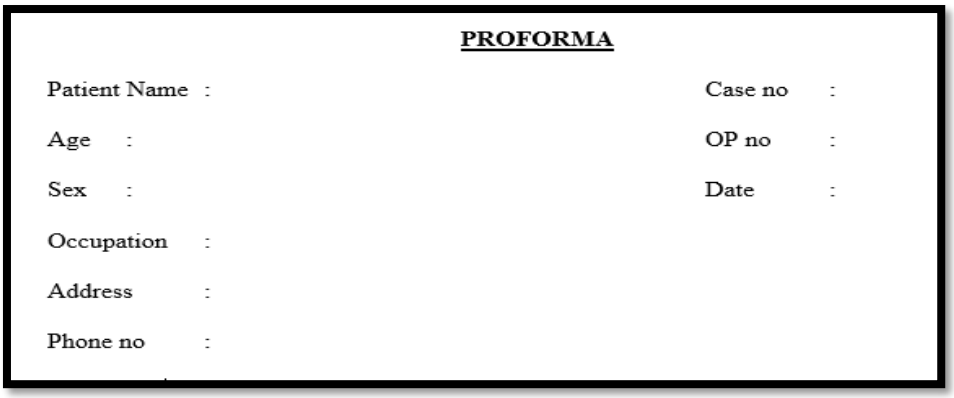
Ethical clearance was obtained from the Institutional Ethics Committee of MBDC (IEC/MBDC/PERIO/PG/01/2020/SS). All participants provided written informed consent before inclusion in the study. They were assured of the confidentiality and anonymity of their responses & the data were used exclusively for research purposes.

Study Participants

Patients clinically diagnosed with diabetes mellitus and reporting for the first time to the outpatient department were invited to participate. Inclusion criteria were adults with a confirmed diagnosis of diabetes mellitus and willingness to provide informed consent. Exclusion criteria included individuals unable to read or write, as well as medical and dental students. Participants were recruited consecutively from the outpatient population during the study period.

Questionnaire Development

Data were collected using a structured, self-administered questionnaire comprising 20 closed-ended questions. The questionnaire was originally prepared in English and translated into Malayalam for participant convenience. A pilot study was conducted to assess its acceptability, validity, and reliability. Content validity was evaluated by assessing whether the items comprehensively r eflected the intended construct. Acceptability was tested by asking the participants about the ease of answering and time taken to complete the questionnaire. A cover letter outlining the purpose and confidentiality statement was included [Figure 1].



PROFORMA

Patient Name	:	Case no	:
Age	:	OP no	:
Sex	:	Date	:
Occupation	:		
Address	:		
Phone no	:		

Figure 1: Proforma for personal details and demographic information

2.5. Statistical Analysis

Descriptive statistics were used to analyze the data. The proportion of responses for each item was calculated as a percentage by dividing the number of positive responses by the total number of responses and multiplying by 100. The required sample size was estimated using the formula:

$$n = \frac{(Z_\alpha)^2 \times P \times (1 - P)}{e^2}$$

where Z_α =1.96 (95% confidence), P = 0.77, and margin of error (e) = 0.10.

$$n = (1.96)^2 \times 0.77 \times (1 - 0.77) / (0.10)^2$$

n = 68.03

The calculated minimum sample size was 69 participants.

RESULTS

A total of 69 diabetic patients participated in the study, and they were screened during the four-month survey period. The majority of participants were visiting a dental clinic for the first time & consequently, their perception and awareness of periodontal problems were limited. Among the respondents, 15.5% reported having dental and periodontal problems, while 53.5% did not report such concerns.

Diabetes-related characteristics are presented in Table 1. Most participants (n = 35) had been diagnosed with diabetes for more than 10 years, while 34 had been diagnosed within the past 10 years. A family history of diabetes was reported by 45 participants. Only 8 participants indicated that their diabetes was well controlled, whereas 53 reported poor control and 8 were unaware of their glycemic status. Regarding the therapy 35 participants were on oral medications, 11 on insulin therapy, 12 on combination therapy & 11 were not undergoing any treatment. Awareness of gingival and periodontal problems is summarized in Table 2. A minority of participants reported noticing spacing between teeth and gums (n = 11), increased tooth length (n = 6), lip entrapment between teeth (n = 6). Loosening of teeth was reported by 9 participants, while 20 noticed gingival swelling. Sensitivity of teeth was experienced by 32 participants and only 11 reported previous gum-related treatment. Ten participants noticed pus discharge from the gums & 20 reported experiencing bad breath. Incidence of periodontal problems after diabetes diagnosis is shown in Table 3. Twenty participants reported gingival problems after being diagnosed with diabetes, 18 noted increased food deposits in the gingival region and 20 experienced tooth loss following their diabetes diagnosis. Awareness and attitudes toward the diabetes–periodontal relationship are detailed in Table 4. Only 22 participants believed that diabetes can lead to gum problems, while 26 thought that treatment of gum problems could help in diabetes control. Thirty-four participants agreed that diabetic patients should undergo more frequent dental check-ups & 45 acknowledged that blood sugar levels need to be controlled prior to dental treatment.

1.How long have you been diagnosed with diabetes?	**Within 10 years**	**More than 10 years**		
	34	35		
2.Does anyone in your family have diabetes?	Yes	No		
	45	24		
3.What is your current diabetic status?	Controlled	Not controlled	Unaware of diabetic status	
	8	53	8	
4.What type of therapy you are undergoing for diabetes	Oral Medications	Insulin Therapy	Both	Not under any treatment
	35	11	12	11

Table 1: Questions based on Diabetes status of patients

Questions	Yes	No
1.Have you noticed any spacing between teeth and gums?	11	58
2.Have you noticed any increase in the length of teeth?	6	63
3.Have you noticed your lip getting trapped between teeth?	6	63
4.Have you noticed any loosening of your teeth?	9	60
5.Have you noticed any swelling in the gum region?	20	49
6.Have you undergone any sensitivity of teeth	32	37
7. Have you undergone any gum related treatment previously	11	58
8.Have noticed any pus/discharge from gums?	10	59
9.Have you noticed any bad odour from your mouth?	20	49

Table 2: Questions based on awareness of patients on gingival and periodontal problems during first dental visit

Questions	Yes	No
1. Have you noticed any gum problem after being diagnosed with diabetes?	20	49
2.Have you experienced increasing of food deposits in gum region after being diagnosed with diabetes?	18	51
3.Have you experienced any tooth loss after being diagnosed with diabetes?	20	63

Table 3: Incidence of periodontal problems after diabetic diagnosis

Questions	Yes	No
1.Do you think diabetes can lead to gum problems?	22	47
2.Do you think treatment of gum problems can help in diabetes control?	26	43
3.Do you think diabetic patients should undergo more frequent dental check -up?	34	35
4. Do you think blood sugar levels need to be controlled for undergoing dental treatment?	45	24

Table 4: Awareness and attitude towards diabetic-periodontal interrelationship

DISCUSSION

The present study assessed the awareness and attitudes of patients with diabetes mellitus regarding the interrelationship between diabetes and periodontal disease. Our findings revealed that only about half of the respondents (50.2%) recognized the bi-directional link between the two conditions, while 37.7% of diabetic participants were entirely unaware of this association. Moreover, only 15.5% of diabetic patients reported having periodontal problems, whereas more than half reported no dental or periodontal concerns, despite clinical evidence that the prevalence is higher. These results indicate a significant gap between disease burden and patient awareness. The lack of awareness identified in this survey parallels the findings of Weinspach et al., who reported that 56% of participants were uninformed about the mutual influence of diabetes and periodontitis [11,12]. Similarly, Aggarwal and Panat observed that only 10.8% of patients with diabetes underwent regular dental check-ups, with oral hygiene practices often being suboptimal in the Indian population [13]. These data, together with the present findings, underscore a systemic neglect of oral health within diabetes care pathways. The pathophysiological explanation for the strong association between diabetes and periodontitis lies in impaired host defenses and increased susceptibility to infection, which promote destructive periodontal breakdown. Diabetic patients with poor oral hygiene often present with more severe gingival inflammation, rapid bone loss, and periodontal abscesses [14,15]. Our study adds to this evidence by showing that patients often remain unaware of these oral manifestations until advanced stages, which may explain the under-reporting of periodontal problems in our survey.

Comparisons with earlier studies further contextualize our results. Takanori and Fusanori demonstrated that severe periodontitis exacerbates diabetes through systemic microinflammation, impairing insulin action [16]. Systematic reviews, including that by Hasuike et al., suggest that periodontal treatment modestly improves glycemic control as reflected by reductions in HbA1c, although the effect size is small [17]. Pediatric and adolescent studies also report greater gingival bleeding and attachment loss among children with diabetes, emphasizing the lifelong impact of this association [18]. On the contrary, Engebretson et al. found no significant glycemic improvement after

nonsurgical periodontal therapy in a large randomized clinical trial [19]. This inconsistency highlights ongoing debate and the need for further high-quality studies to define the magnitude and mechanisms of this interaction. Uncontrolled diabetes is now considered a modifying factor in the latest classification of periodontal diseases [20,21]. Our survey results, showing limited awareness among patients, align with this clinical framework and reinforce the need for routine screening, patient education, and closer collaboration between physicians and dental professionals. The limitations of this study include the exclusion of patients over 70 years due to questionnaire feasibility, reliance on self-reported awareness, and the cross-sectional design, which restricts causal inference. Nevertheless, the data provide valuable insights into patient perceptions and knowledge gaps that can inform both clinical practice and health policy.

CONCLUSION

The study demonstrated a significant lack of awareness among diabetic patients about the link between diabetes and periodontal disease suggesting a multidisciplinary approach, involving physicians, dentists, and allied health professionals, to integrate oral health education into routine diabetic care. Enchancing awareness among the individuals not only prevents oral complications but also improves glycemic control & overall quality of life.

REFERENCES

1. Ummadisetty T, Chava VK, Bhumanapalli VR. Diabetes and periodontitis: How well are the patients aware about an established relation? J Indian Soc Periodontol. 2016 Jul-Aug;20(4):472-475.
2. Chávarry NG, VettoreMV, SansoneC, SheihamA. The relationship between diabetes mellitus and destructive periodontal disease: A meta-analysis. Oral Health Prev Dent 2009;7:107-27.
3. Mealey BL, Moritz AJ. Hormonal influences: Effects of diabetes mellitus and endogenous female sex steroid hormones on the periodontium. Periodontol 2000 2003; 32:59-81.2016;20:472-5
4. Ghallab NA, Amr EM, Shaker OG. Expression of Leptin and Visfatin in Gingival Tissues of Chronic Periodontitis With and Without Type 2 Diabetes Mellitus: A Study Using Enzyme-Linked Immunosorbent Assay and Real-Time Polymerase Chain Reaction. J Periodontol. 2015 Jul;86(7):882-9.
5. Yang Y, Sun X, Yang Y, Qie Y. Insight of the interrelationship and association mechanism between periodontitis and diabetes mellitus. Regen Ther. 2024 Nov 20; 26:1159-1167.
6. Păunică I, Giurgiu M, Dumitriu AS, Păunică S, Pantea Stoian AM, Martu MA, Serafinceanu C. The Bidirectional Relationship between Periodontal Disease and Diabetes Mellitus-A Review. Diagnostics (Basel). 2023 Feb 11;13(4):681.
7. Tse SY. Diabetes mellitus and periodontal disease: awareness and practice among doctors working in public general out-patient clinics in Kowloon West Cluster of Hong Kong. BMC Fam Pract. 2018 Dec 17;19(1):199.
8. Jain A, Chawla M, Kumar A, Chawla R, Grover V, Ghosh S, Pandit N, Chawla P. Management of periodontal disease in patients with diabetes- good clinical practice guidelines: A joint statement by Indian Society of Periodontology and Research Society for the Study of Diabetes in India. J Indian Soc Periodontol. 2020 Nov-Dec;24(6):498-524.
9. Grossi SG, Genco RJ. Periodontal disease and diabetes mellitus: A two-way relationship. Ann Periodontol 1998;3:51-61.
10.Taylor GW. Bidirectional interrelationships between diabetes and periodontal diseases: An epidemiologic perspective. Ann Periodontol 2001; 6:99-112.
11. Mealey BL, Oates TW; American Academy of Periodontology. Diabetes mellitus and periodontal diseases. J Periodontol 2006;77:1289-303.
12. Aggarwal A, Panat SR. Oral health behavior and HbA1c in Indian adults with type 2 diabetes. J Oral Sci 2012;54:293-301.
13. Weinspach K, Staufenbiel I, Memenga-Nicksch S, Ernst S, GeurtsenW, Günay H. Level of information about the relationship between diabetes mellitus and periodontitis – Results from a nationwide diabetes information program. Eur J Med Res 2013;18:6.
14. Lin H, Zhang H, Yan Y, Liu D, Zhang R, Liu Y, et al. Knowledge, awareness, and behaviors of endocrinologists and dentists for the relationship between diabetes and periodontitis. Diabetes Res Clin Pract 2014; 106:428-34.
15.Daniel R, Gokulanathan S, Shanmugasundaram N, Lakshmigandhan M, Kavin T. Diabetes and periodontal disease. J Pharm Bioallied Sci. 2012 Aug;4(Suppl 2):S280-2.
16. Shinjo T, Nishimura F. The bidirectional association between diabetes and periodontitis, from basic to clinical. Jpn Dent Sci Rev. 2024 Dec; 60:15-21.
17. Hasuike A, Iguchi S, Suzuki D, Kawano E, Sato S. Systematic review and assessment of systematic reviews examining the effect of periodontal treatment on glycemic control in patients with diabetes. Med Oral Patol Oral Cir Bucal. 2017;22 (2): e167-76.
18. Lalla E, Cheng B, Lal S, Kaplan S, Softness B, Greenberg E, Goland RS, Lamster IB. Diabetes mellitus promotes periodontal destruction in children. J Clin Periodontol 2007; 34: 294–298.
19. Engebretson SP, Hyman LG, Michalowicz BS et al.The Effect of Non surgical Periodontal Therapy on Hemoglobin A1c Levels in Persons with Type 2 Diabetes and Chronic Periodontitis: A Randomized Clinical TrialJAMA. 2013 December 18; 310(23): 2523–2532.
20. Jepsen S, Caton JG, et al. Periodontal manifestations of systemic diseases and developmental and acquired conditions: Consensus report of workgroup 3 of the 2017 World Workshop on the

Classification of Periodontal and Peri-Implant Diseases and Conditions. J Clin Periodontol. 2018;45(Suppl 20): S219–S229.
21. Tonetti MS, Jepsen S, Jin L, Otomo-Corgel J. Impact of the global burden of periodontal diseases on health, nutrition and wellbeing of mankind: A call for global action. J Clin Periodontol. 2017; 44:456–462.