

Prevalence of Periodontitis Detected in Periapical Radiographs in Diabetic Patients Visiting a Private Dental College

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ABSTRACT

BACKGROUND

Diabetes is a well predictable risk factor for periodontal disease and in converse; periodontitis is thought to affect the systemic inflammatory condition, insulin resistance and lipid and glucose metabolism. Periodontal disease is the destruction of the tissues that support the tooth by accumulation and maturation of oral bacteria on teeth. Microorganisms in combination with individual host susceptibility and environmental factors are the main etiologic factors of periodontal diseases. Systemic diseases, steroid hormone variations, nutritional deficiency, the intake of drugs, diabetes, tobacco smoking and other conditions have comprehensive and profound effects on the host, resulting in an increased response to bacterial plaque accumulation. The prevalence of diabetes in India is diverse in different regions of the country.

AIM

To evaluate the prevalence of periodontitis detected in periapical radiographs in diabetic patients visiting a private dental college.

MATERIALS AND METHODS

Data was retrieved from the dental records. Data of diabetic patients was collected from the patient management records. Diabetic patients with periodontitis using periapical radiographs were shortlisted. Data obtained was tabulated in excel and analysed using statistical software.

RESULTS

84.2 % of patients had periodontal problems with diabetes.

CONCLUSION

We can conclude by saying that 84.2 % of diabetic patients had periodontitis.

KEYWORDS

Diabetes, Periodontitis, Periapical radiograph, Prevalence, Systemic disease

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INTRODUCTION

Diabetes mellitus is a well predictable risk factor for periodontal disease, and in converse, periodontitis is thought to affect the systemic inflammatory condition, insulin resistance and lipid and glucose metabolism. In 2020, India (31.7 million) topped the world with the maximum number of people with diabetes mellitus followed by China (20.8 million) with the United States (17.7 million) in second and third place, respectively.¹ The prevalence of diabetes in India is diverse in different regions of the country.² The National urban survey conducted across the metropolitan cities of India reported 11.7 % in Kolkata (East India), 6.1 % in Kashmir valley (North India), 11.6 % in New Delhi (North India), 16.6 % in Hyderabad (South India), 13.5 % in Chennai (South India), 9.3 % in West India (Mumbai), and 12.4 % in Bangalore (South India).^{1,3} The existing prevalence of self reported type 2 diabetes mellitus (T2DM) in Lucknow region (India) is 24.6 %. Periodontitis is responsible for increasing insulin resistance and poor glycemic control, thus worsening the condition of diabetes, and conversely, improvement in glycemic control has been advocated in several studies after periodontal therapy. Consequently, recording prevalence and severity of periodontitis in diabetic patients is the need of the hour.⁴ Dentists has long been aware about the importance of diagnosis of diabetes in their patients. The most striking changes in uncontrolled diabetes are the reduction in defense mechanism and the increased susceptibility to infections, leading to destructive periodontal disease. The glucose content of gingival fluid and blood is higher in individuals with diabetes than in those without diabetes, with similar plaque and GI scores.⁵ The increased glucose in the gingival fluid and blood of diabetic patients could change the environment of the microflora, inducing qualitative changes in bacteria that could contribute to the severity of periodontal disease observed in those with poorly controlled diabetes.⁶ Periodontitis clinical features include clinical attachment loss (CAL), alveolar bone loss (BL), periodontal pocketing and gingival inflammation. In addition, enlargement or recession of the gingiva; increased tooth mobility, drifting, and even tooth exfoliation may occur.^{7,8} Radiographic evaluation will show if alveolar bone that supports tooth roots is lost. In a healthy situation alveolar bone will remain 1 - 2 mm below the crown of the teeth. If bone is located further from the crown, it means that loss has occurred. Despite these facts, periodontal treatment can be successful in diabetic patients.⁹ Short term effects of periodontal treatment are similar in diabetic patients and healthy population but, more recurrence of periodontal disease can be expected in none well controlled diabetic individuals. If diabetic individuals are at a higher risk for periodontitis, it is also important to determine what effects periodontitis and its treatment may have on diabetes. It would be reasonable to think that periodontal inflammation, as any other infections, can have an adverse effect on diabetes glycemic control, compromising diabetes management in these individuals.¹⁰ Our team has extensive knowledge and research experience that has translate into high quality publications.¹¹⁻¹⁶ The aim of this study is to evaluate the prevalence of periodontitis detected in periapical radiographs in diabetic patients visiting a private dental college.

MATERIALS AND METHODS

This retrospective study was conducted as a university setting which includes predominantly South Indian population. In this

study a total of 1414 patients of different age groups and genders with periodontitis visiting Saveetha Dental College and Hospitals were considered (Figure 1).¹⁷⁻²⁰

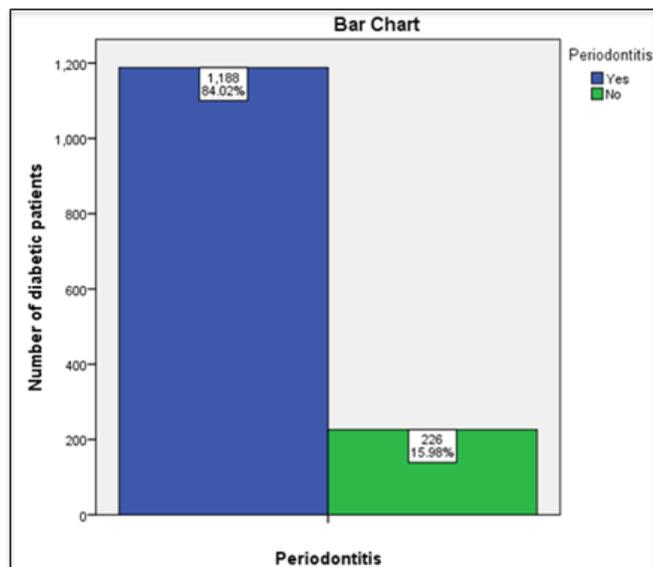


Figure 1. Bar Graph Showing The Prevalence Of Periodontitis Among Diabetic Patients Detected In The Periapical Radiograph Taken. X axis represents the presence or absence of periodontitis and the y axis represents the number of diabetic patients. The Blue Colour Represents The Presence Of Periodontitis And Green Colour Represents The Absence Of Periodontitis. There is a Significantly Higher Incidence of Periodontitis in Patients with Diabetes. Chi Square Statistical Test was Done and the P Value was found to be 0.00(p value ≤0.05, Statistically Significant).

The approval for this study was obtained from the institutional ethical committee. This study had advantages of large data availability, similar ethnicity but it had disadvantages of smaller sample size, geographic limitation and no external validity. Data was collected from the dental records, patient management records of the department of Oral Medicine. Inclusion criteria were the patients with diabetes and periodontitis (Figure 2).²¹⁻²⁹

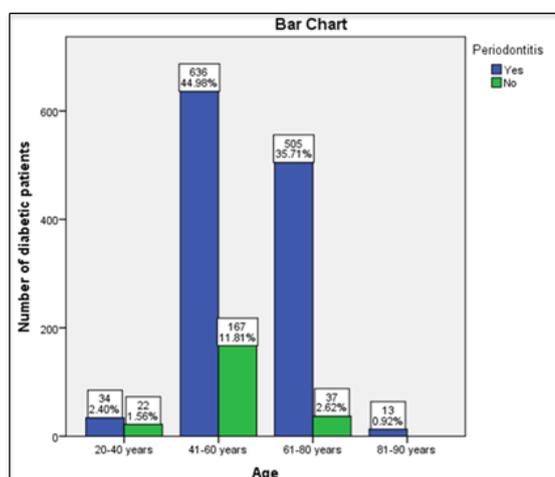


Figure 2: Bar Graph Showing The Age Distribution Of Diabetic Patients With Periodontitis Detected In The Periapical Radiograph Taken. The X-Axis Represents The Age And The Y Axis Represents The Number Of Diabetic Patients. The Blue Colour Represents The Presence Of Periodontitis And Green Colour Represents The Absence Of Periodontitis. There Is A Significantly Higher Incidence Of Periodontitis In Diabetic Patients With 41-60 Years Of Age Than The Other Age Groups. Chi Square Statistical Test Was Done and the P Value Was Found to be 0.1(P Value ≥ 0.05, Statistically N ot Significant).

Patients without diabetes were excluded from this study. All the cases were approved and verified by an external reviewer and cross verification was done using a photographic method to eliminate the errors made while recording. Repeated and incomplete patient data were excluded from this study. The data was obtained and tabulated in excel, imported to SPSS software by IBM, a statistical software with variables defined. The significance of this study was obtained using the statistical test, Chi Square and the results were interpreted (Figure 3).

as, lichen planus, leukoplakia and lichenoid reactions are associated to diabetic subjects due to immunosuppression and/or drugs used. In addition, delayed mucosal wound healing, mucosal neuro-sensory disorders, decay lesions and tooth loss have been reported in diabetic patients. Xerostomia is a frequent symptom found in diabetic patients on oral hypoglycemic agents, and it may facilitate the onset of some fungal opportunistic infection. Candidiasis has been reported in patients with poorly controlled diabetes (Figure 4).³⁰

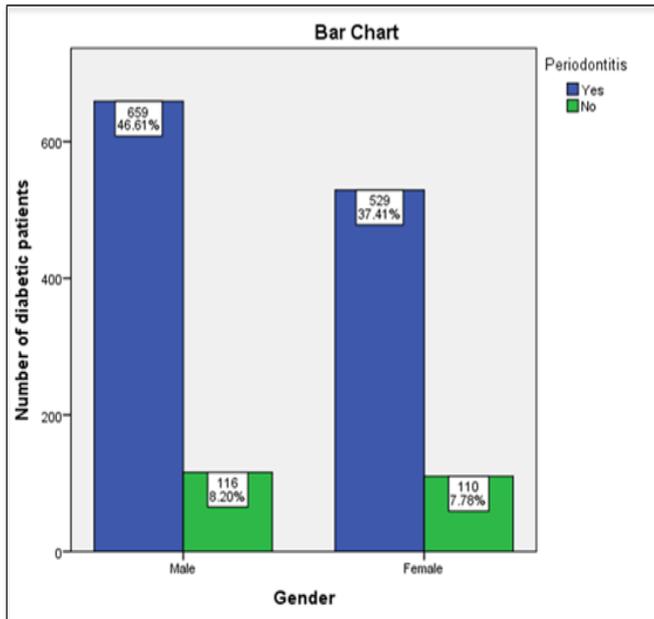


Figure 3. Bar Graph Showing The Gender Distribution Of Diabetic Patients With Periodontitis Detected In The Periapical Radiograph Taken. The X-Axis Represents The Gender And The Y Axis Represents The Number Of Diabetic Patients. The Blue Colour Represents The Presence Of Periodontitis And Green Color Represents The Absence Of Periodontitis. There is a Higher Incidence Of Periodontitis In Male Diabetic Patients Compared To Females. Chi Square Statistical Test Was Done And The P Value Was Found To Be 0.1 (p value \geq 0.05, Statistically not Significant).

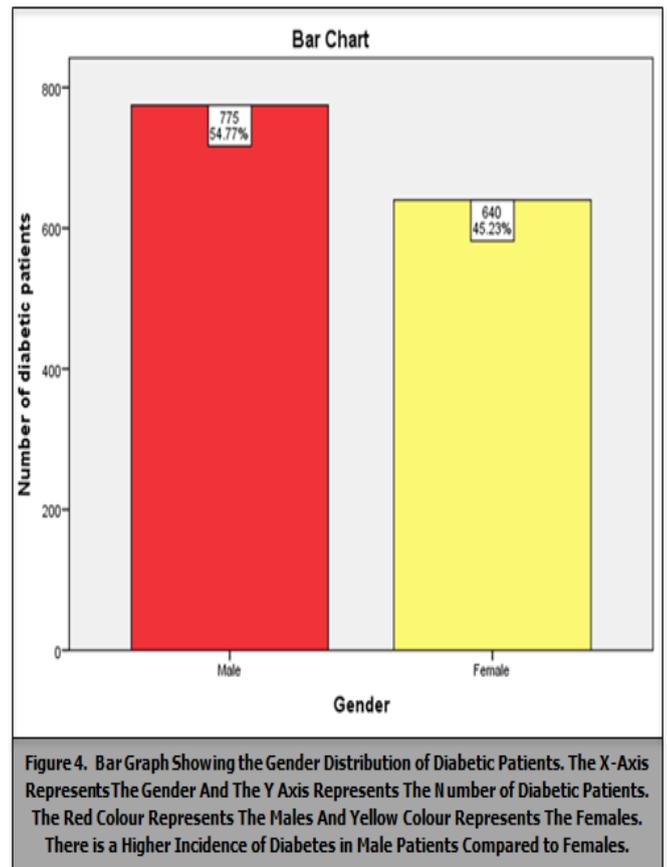


Figure 4. Bar Graph Showing the Gender Distribution of Diabetic Patients. The X-Axis Represents The Gender And The Y Axis Represents The Number of Diabetic Patients. The Red Colour Represents The Males And Yellow Colour Represents The Females. There is a Higher Incidence of Diabetes in Male Patients Compared to Females.

RESULTS AND DISCUSSION

In the hyperglycaemic state, numerous proteins and matrix molecules undergo a non enzymatic glycosylation, resulting in formation of accumulated glycation end products. Collagen is cross linked by AGE formation, making it less soluble and less likely to be normally repaired or replaced. Prevalence of periodontitis increased with age up to the point that 70.1 % of adult's \geq 65 years old were affected by periodontal disease.⁶ Men exhibit worse periodontal status than women [(56.4 % vs. 38.4 %), as well as those with limited education (66.9 %) and income (65.4 %)]. These factors, together with cigarette smoking are increased risk factors for periodontal progression.³¹ Longitudinal studies have demonstrated a two-way relationship between diabetes and periodontitis, with more severe periodontal tissue destruction in diabetic patients and poorer glycemic control in diabetic subjects with periodontal disease.³² Diabetes has been associated to different oral diseases such as salivary and taste dysfunction, oral bacterial and fungal infections (i.e. candidiasis), and oral mucosa lesions (i.e. stomatitis, geographic tongue, traumatic ulcer, lichen planus). Diminished salivary flow and burning mouth are other oral characteristics in diabetic patients with poor glycemic control.³³ Also, different oral pathologies such

Evidence suggests that diabetes leads to worsening of periodontal disease, and a significant association between diabetes and periodontitis has been demonstrated. Periodontal disease has a higher incidence in diabetic patients, and it is more prevalent and severe if compared with a healthy population. Lalla et al. determined the prevalence of periodontitis in different age cohorts.³⁵ It was 4.8 times higher among diabetic patients compared to non-diabetics when the 15 to 24-year age cohort was considered, and 2.3 higher in the 25-34 year group.^{36,37} Also, CAL was higher in diabetic patients when the 15 to 55-year age cohort was considered. Lim et al estimated that the glycemic control was the most important risk factor related to severity and extent of periodontitis.³⁸ Other authors established that the rate of periodontal destruction is related to inappropriate glycemic control in diabetic patients so that accurate metabolic control could be important to prevent periodontal complications. Thus, glycemic control and the diabetes onset are critical factors in periodontal disease progression but it should be considered that substantial heterogeneity exists within diabetics (Figure 5).

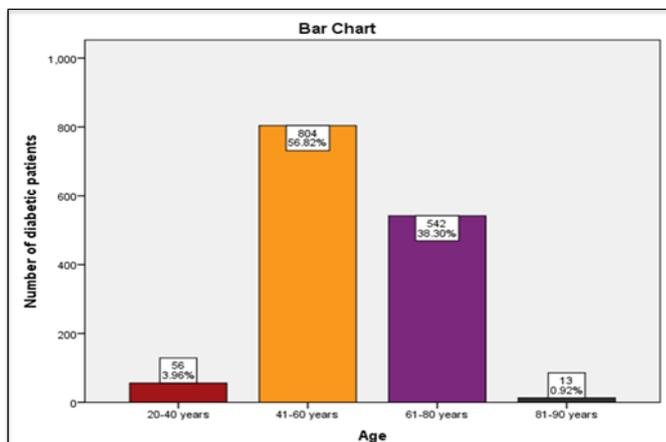


Figure 5. Bar-Graph Showing the Age Distribution of Diabetic Patients. The X-Axis Represents The Age And The Y Axis Represents The Number Of Diabetic Patients. The Brown Colour Represents The Patients with 20-40 Years Old, Orange Colour Represents the Patients with 41-60 Years Old, Purple Colour Represents the Patients with 61-80 Years Old and Black Colour Represents the Patient with 81-90 Years Old. There is a Higher Incidence of Diabetes in Patients 41-60 Years Old. This Might Be Due To Increased Incidence Of Patients Within This Age Group Visiting The Dental Hospital.

CONCLUSION

This single centered cross sectional study examined 1414 patients with diabetes and revealed that more than 84.2 % of total diabetic patients finally recruited had some periodontal destruction.

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