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Clinical research on the association between diabetes mellitus, and periodontal disease

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Abstract

Introduction: Results that have been connected with diabetes mellitus and periodontal disease in patients who have reported being hospitalized are controversial.

Design: Collection of blood samples from patients who have been reported to the department of dentistry for the purpose of assessing their blood glucose levels and correlating those results with the periodontal disease index.

Results: The link between periodontal disease and type 2 diabetes has been studied extensively and shown to be significant. Based on the evidence that was presented, it was fair to infer that diabetics had a higher risk of developing periodontal disease compared to people who did not have diabetes.

Conclusion: Patients with diabetes have a higher prevalence of periodontal disease, and the severity of the illness worsens with increasing age.

Keywords: Glucose levels, periodontal disease, nephropathy, cardiovascular disease

Introduction

Periodontitis is a common chronic inflammatory illness that can result in the loss of connective tissue attachment. It is characterized by the degradation of the periodontal tissues, which can lead to tooth loss. In point of fact, aggressive periodontitis is acknowledged as being the sixth consequence of diabetes. The other five problems of diabetes are retinopathy, neuropathy, nephropathy, cardiovascular disease, and peripheral vascular disease [1, 2]. However, the prevalence of periodontal disease, tissue deterioration, and tooth loss increases with age. Periodontitis can occur in infancy, adolescence, and early adulthood, but the risk increases with age [3].

The periodontal disease is caused by a variety of causes, including those that are localized to the periodontium itself as well as those that are systemic in nature and arise from the overall health of the patient. Regardless of one's age. In any thorough discussion of periodontal diseases, diabetes mellitus should be given specific attention. Diabetes mellitus and periodontitis are both conditions that impact a large number of people and are both more common as people get older. Diabetes mellitus is also associated with periodontitis [4].

Diabetes mellitus (DM) refers to a set of metabolic illnesses that are defined by hyperglycemia and caused by abnormalities in insulin secretion, insulin action, or both. Diabetes mellitus is a metabolic disease [5]. The high rates of morbidity and mortality that are brought on by this disease are another significant component of it. Chronic hyperglycemia is the primary symptom of poorly managed diabetes, and it is associated with a wide variety of acute and chronic consequences that can damage all of the organs and systems of the body, including the gingival and periodontal tissues. These problems can be life-threatening [6, 7]. Between 2% and 10% of the total human population is afflicted with it [5]. However, there is a lack of consensus about the precise nature of the connection between diabetes mellitus and the manifestation of periodontal disease. Regarding the connection between diabetes and periodontal disease, there is still some debate among experts. There was no correlation between the severity of diabetic periodontal disease and the number of local irritants that were present, according to the findings of one study.

According to their findings, the severity of periodontitis in diabetic individuals is observed to be closely associated with angiopathy, aberrant collagen metabolism, abnormal polymorphonuclear cell (PMN) activity, and altered sulcular microbial ecology. These variables lower the tissues' ability to defend themselves against local irritants and may also disrupt the tissues' reaction to those irritants.⁸⁻¹¹ According to the findings of another study, there is no correlation between diabetes and periodontal disease. The authors of this study claim that the presence of two disorders at the same time is more likely a coincidence than a direct result of one ailment causing the other. They claim that the prevalence of local irritants and the degree to which they cause irritation are factors in the severity of periodontal disease in diabetics^[12-16]. Different schools of thought regarding the nature of the cause-and-effect relationship between diabetes and periodontal disease inspired me to conduct research on a patient population while applying a variety of periodontal measures and diabetic factors.

Objectives

The study was undertaken in diabetic patients with the following objectives.

1. To find out prevalence and severity of periodontal disease.
2. To determine age influence on the prevalence and severity of periodontal disease.

Materials and Methods

After obtaining approval from the relevant authorities, a total of 700 patients in XXXX, both male and female, ranging in age from 20 to 60 years and older, were chosen at random from the outpatient department. Patients were chosen to participate in the study based on a set of inclusion and exclusion criteria that had been established in advance.

Inclusion requirements for points are as follows:

1. Have been receiving treatment for diabetes mellitus or have been diagnosed with the condition for at least the past year or more.
2. Being free of any other disorders affecting the body's systems.
3. Having no previous history of diabetes problems, such as neuropathy, nephropathy, or retinopathy, among other possible issues.
4. Abstaining from the use of medications such as phenytoin, nifedipine, and similar substances.
5. Have not received any periodontal therapy in the preceding twelve months.
6. A willingness to take part in the research being done.

Every patient's pertinent medical history was meticulously documented. With the assistance of a mouth mirror and a graduated periodontal probe, a thorough oral examination was performed. Each patient's Ramfjords periodontal disease index score was recorded, which takes into account factors such as plaque, calculus, and disease severity.

The process of collecting a blood sample in order to determine the quantity of glucose in the blood.

Following an overnight fast and one and a half hours after a meal, venous blood was drawn from all of the patients in accordance with the rigorous protocols of the laboratory. The levels of glucose in the blood during fasting and after eating were measured using an auto analyzer.

Results

Out of 800 patients, 4.4% of patients had insulin-dependent diabetes mellitus (IDDM) and 95.6% had non-insulin-dependent diabetes mellitus (NIDDM). A statistical analysis was done on the data that was collected. The Karl Pearson correlation coefficient was used to study the association between the prevalence and severity of periodontal disease and a variety of other characteristics like age, gender, glycemic status, and the length of time that a person has had diabetes mellitus. 451 male patients and 349 female patients made up the total number of 700. The patients' ages ranged from 20 to 76 years, with the mean age being 51 years and the standard deviation being 8.2 years. The patients were divided up into the five different categories listed in the table^[1].

Table 1: Distribution of patient according to age and sex

Groups	Age groups	Male patients	Female patients
Group I	20-30	10	11
Group II	31-40	30	21
Group III	41-50	40	46
Group IV	51-60	121	124
Group V	60&above	250	147
Total population	800	451	349

Table 2: Severity of periodontal disease according to age groups

Group	Age groups	Severity
Group I	20-30	0.5+0.40
Group II	31-40	2.3+0.82
Group III	41-50	3.3+1.4
Group IV	51-60	3.5+1.1
Group V	60&above	4.5+0.9
Total population	800	3.7+1.2

Discussion

Diabetes is becoming more common as the population as a whole lives longer. Diabetes mellitus is one of these systemic illnesses that plays an essential role in the etiology of periodontal disease. Systemic disorders can modify the severity of periodontal disease^[17].

In the current study, patients with IDDM made up a very tiny fraction (4.4%), while patients with NIDDM made up 95.6% of the total. The current study had also revealed that the prevalence and severity of periodontal disease increased with the age of the diabetic patient. This was one of the main findings of the study. These findings are consistent with those of a study conducted by Eke and colleagues, which confirmed a significant prevalence of periodontitis in persons aged 30 and older living in the United States.¹⁸ According to Nanaiah *et al.* (2013), only 1.5% of 1100 participants between the ages of 15 and 18 suffered from chronic periodontitis. Additionally, the author indicated that the presence of gingivitis began to increase in adolescence (16 years old)^[19]. This distribution of chronic gingivitis and periodontitis demonstrates that there is a tendency for the severity of periodontal diseases to grow in the older age group, which is consistent with the findings of prior studies. The severity of periodontal disease is not due to an increase in the pace of damage in periodontal tissues; rather, it is due to an accumulation of damage in periodontal tissues over time^[20]. In addition, as people get older, the mitotic activity and metabolic rate of the oral epithelial cells gradually decrease. It is hypothesized that this disease would result in a weakened immune system, which will make a patient more predisposed to contracting bacterial infections. The general decline in immune activities and tissue integrity that occurs with

advancing age is one possible explanation for why periodontal disease becomes more prevalent with age [21].

Conclusion

The present study allows for the following assumptions to be drawn: the prevalence and severity of periodontal disease rose with increasing age; the prevalence and severity of periodontal disease was strongly connected to Duration of diabetes mellitus; and the prevalence and severity of periodontal disease increased with increasing duration of diabetes mellitus.

Conflict of Interest

Not available

Financial Support

Not available

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