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Article

Relationship between diabetes mellitus and periodontal diseases in Tikrit City

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Abstract: Context: Both Periodontal diseases and diabetes mellitus are widespread all over the world, and if left untreated they may eventually lead to teeth loss. Iraq has little information on periodontal health and treatment requirements. According to the statistics at hand, periodontal disease is highly prevalent in both diabetic and non-diabetic Iraqi residents of Tikit City.
The study's objective is to assess diabetic patients' periodontal health and compare it to that of non-diabetic patients in order to determine how diabetes affects Iraqi patients' periodontal health in Tikrit City. Materials and methods: From August 2022 to October 2022, a sample of 50 patients, comprising 25 non-diabetic and 25 type 2 diabetic patients, was chosen from the surgical department of Tikrit's specialized dental hospital. These patients were divided into 11 controlled type 2 diabetic patients and 14 uncontrolled type 2 diabetic patients, with ages ranging from 18 to 70. Each patient's clinical attachment loss, bone loss, tooth loss, oral hygiene practices, progression, and diagnosis were all documented. Findings: 24% of patients without diabetes have gingivitis; 8% of patients with managed type 2 diabetes have stage 1 periodontitis; 10% of patients with uncontrolled type 2 diabetes have stage 1 periodontitis; and the same number have stage 2 periodontitis. The findings clearly indicate a significantly elevated risk associated with diabetes. As a result, periodontal disease need to be regarded as a general DM consequence. In conclusion, controlling blood sugar levels greatly improves periodontal health. Public health campaigns should support and promote good dental hygiene and oral care practices. In order to improve oral health behaviors, dentists and dental hygienists should routinely inform, inspire, and evaluate their patients

Keywords:Type 2 diabetic,Oral hygiene, bone loss, tooth loss.

1. Introduction

Periodontal disease has been connected to an increased risk of osteoporosis, diabetes, lung infection, preterm or low-weight delivery, cardiovascular disease, infections at other anatomic sites, and other diseases like rheumatoid arthritis, pancreatic cancer, and chronic diabetes mellitus (DM). metabolic syndrome, neurological conditions, and renal illness. Among the systemic illnesses studied is diabetes mellitus (DM), which has been associated with periodontitis for over 20 years [1]. Diabetes is a collection of metabolic disorders marked by elevated blood sugar levels as a result of In 2019, the International Diabetes Federation reported that the prevalence of diabetes worldwide was estimated to be 463 million patients between the ages of 20 and 79, and that this prevalence was tripled in nearly 20 years [2]. Defects of insulin secretion and/or action are a common health problem that, if left untreated, can have many serious health effects that can lead to lower life expectancy. One of the most prevalent diseases in humans is periodontal disease. Although diabetes and periodontal diseases may seem unrelated, we know that individuals with diabetes have a two-fold or higher risk of developing periodontal diseases due to the increased prevalence and severity of periodontitis seen in diabetic patients with poor glycemic control.

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Periodontitis has been identified as "the sixth complication of diabetes," and dentists have long recognized the significance of diagnosing diabetes in their patients, including xerostomia and candida infections [3]. Severe periodontal disease has also been shown to raise blood sugar levels in both diabetics and those who do not have diabetes. In other words, periodontal disease and diabetes are mutually exclusive [4].Diabetes has been conclusively verified as a major risk factor for periodontitis. The risk of periodontitis in diabetic individuals is approximately three times that of non-diabetic individuals [5].Diabetes management can be complicated by periodontal issues, and poorly controlled diabetes can exacerbate periodontal illnesses. Because the prevalence of chronic periodontitis and diabetes rises with age, establishing a link between the two in the elderly is particularly challenging. Recent studies that account for the age relationship of periodontal disease demonstrate that periodontal disease is more severe and prevalent in type 2 diabetes than in non-diabetics [6]. The Adult diabetes patients have more tooth loss from periodontal disease than non-diabetics of equivalent age,according to research. Adults with well-controlled diabetes, on the other hand, do not have greater gingivitis or destructive periodontitis than non-diabetics.Uncontrolled diabetes mellitus has been linked to an increased risk of acute lateral periodontal abscesses [7]. Clinically, this interaction is relevant even before overt diabetes is diagnosed.Evidence synthesis has shown that individuals with periodontitis, despite not having diabetes, tend to exhibit higher HbAlc levels compared with periodontally healthy individuals,suggesting a link between periodontal inflammation and early metabolic dysregulation and supporting the potential role of dental settings in opportunistic glycaemic screening [8].Interventional studies in non-diabetic populations further indicate that non-surgical periodontal therapy may be associated with modest HbAlc reductions, although outcomes vary according to baseline metabolic risk and study design [9].

Materials and Methods

Study Population

This survey was performed in the period between August 2025 and October 2025 in the Specialized Dental hospital in Tikrit city. The sample included (50) patients,including (25)type 2 diabetic patient

and (25) non-diabetic patient of both gender.Age range between 18 and 70 years. The subjects were randomly selected. The study is a cross-sectional study. The subjects were examined by dental students under the supervision of periodontal seniors which would then reevaluate the examination and make any necessary correction if required. the examination was done with the patient seated on the dental chair with the use of chair light.The standard case-sheet used for recording every patient attending the department was used for recording the general information as well as other information including the practice of glucose level and bleeding on probing other oral hygiene measures. The presence of risk factors for periodontal disease was also recorded including the current status of age and smoking.

Sample Collection

Fasting venous blood samples (5 mmL) were collected between 8:00 and 10:30 AM.Serum was separated by centrifugation and stored at-20℃C until analysis.

Indices used for periodontal disease assessment

Bleeding index

Gingival bleeding is correlated with both the plaque index and sulcular inflammation when probing around teeth. When probing, easily ulcerated sulcular epithelium—a sign of inflammation from plaque—is the main source of bleeding. An indicator of the sulcus's health is the bleeding index.Bleeding may also result from applying too much pressure on the probe.

Statistical Analysis

SPSS version 25 was used to analyze the data. The mean±SD was used to express the results.Group comparisons were conducted using independent t-tests, and correlations between IL-6 and biochemical markers were evaluated using Pearson correlation analysis. A p-value of less than 0.01 was regarded as statistically significant.

Results and Discussion

The study sample consisted of 50 patients. Distribution of the sample subjects by Health statue is shown in figure (1), the percentage of healthy is 25% (25 patients) and the percentage of type 2 diabetic patient is 50% (25 patients) including 22% (11 patient) controlled diabetic patient and 28% (14 patient) uncontrolled diabetic patient.

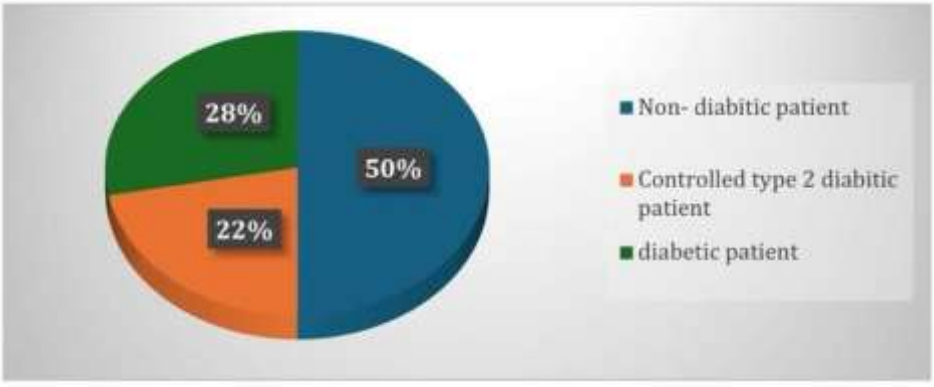

figure (1) Heath statue of all patient's examination

Also we divided the patient in three group to oral hygiene include 46% poor oral hygiene (23patient),34% fair oral hygiene (17 patient) ,and 20% good oral hygiene (10 patient) as shown in figure (2).

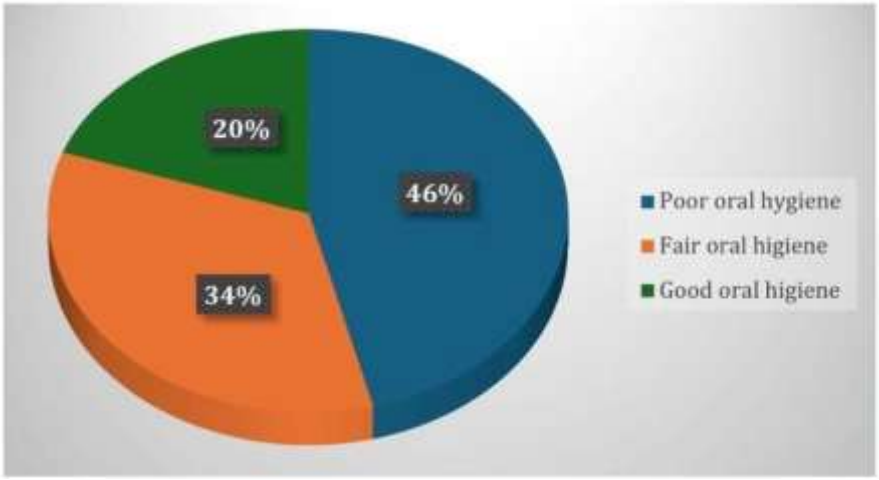

figure (2) Oral hygiene of all patient's examination.

When comparing individuals with type 2 diabetes to non-DM controls, Leung WK found that the prevalence of periodontal disease was considerably greater (50% versus 36%). In addition to its prevalence, diabetes mellitus has an impact on the severity and course of periodontal diseases. Compared to non-DM controls, patients with poorly managed diabetes may be more susceptible to developing severe periodontal disease [10]. Furthermore, hemoglobin Alc (HbAlc) levels are known to be severely impacted by periodontitis, and individuals with this condition typically have worse glycemic control.These two illnesses have reciprocal interactions that exacerbate one another [11]. According to Wu et al.'s meta-analysis, people with periodontitis had a considerably higher prevalence of type 2 diabetes. Patients with T2DM exhibited considerably lower periodontal health, 0.61 mm deeper periodontal pockets, 0.89 mm more attachment loss, and around two more lost teeth [12].

According to cohort studies, persons with type 2 diabetes may have a 34% increased chance of acquiring periodontitis, and a 53% increased risk in cases of severe periodontitis. According to Abidin et al., this interaction is clinically significant even prior to the diagnosis of overt diabetes [13]. Evidence synthesis has shown that individuals with periodontitis, despite not having diabetes, tend to exhibit higher HbAlc levels compared with periodontally healthy individuals,suggesting a link between periodontal inflammation and early metabolic dysregulation and supporting the potential role of dental settings in opportunistic glycemic screening [14].Interventional studies in non-diabetic populations further indicate that non-surgical periodontal therapy may be associated with modest HbAlc reductions,although outcomes vary according to baseline metabolic risk and study design [15]. Nevertheless, a number of surveys have revealed that, in general, persons with diabetes have poor oral health attitudes, little oral health knowledge, and fewer dental visits, despite the strong evidence linking periodontitis and diabetes [16–18].However, due to time restrictions and a lack of understanding in this area, the majority of diabetes care providers do not discuss oral health care during consultations [19–21].

Conclusions

The management of glucose level is significantly improved the periodontal health. As well as the oral hygiene is effective factor in all patient generally and in diabetic patients especially.The patients that have uncontrolled glucose level have more ability to effect with periodontal disease compare with controlled patients. The patients that have good or fair oral hygiene had less ability to effect with periodontal disease compare with poor oral hygiene. The good oral hygiene with control diabetes has approximately the same effect of fair oral hygiene with non-diabetic patients. The most effected group of all patients examined is poor oral hygiene with uncontrolled type 2 diabetes. The most un effected group is good oral hygiene with non-diabetic patients.

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