

ORIGINAL ARTICLE

The Relationship between Diabetes and Periodontal Disease in Thi-Qar province, Iraq

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Abstract

Background and Objective Diabetes not only increases the likelihood of developing periodontitis, but periodontitis can also adversely affect the regulation of blood sugar levels, so that in this study, we will find the possible correlations between diabetes and periodontal Disease that may be associated of the risk factor for the patients.

Methods The study used 50 patients diabetes and periodontal disease and 50 control The control group consisted of people who appeared to be in good health.

Results The results showed the increased severity of the risk factor on the periodontal disease and there are a significant difference at (P.value ≤ 0.05) patients and control group according to the age ,sex and smoke groups and the periodontal Disease in patients was significantly (P.value ≤ 0.05) greater than that of the control and a significant difference find between diabetic and periodontitis was 66% of patients had periodontitis, and 34% had not periodontitis, while in the control group only 16% had periodontitis, and 84% had not periodontitis, Finally, according to gingivitis, the current results investigated a significant difference at p. value < 0.05 , between two groups, was this study recoded 60% of patients had gingivitis, and 40% without gingivitis, while in the control group only 10% had gingivitis, and 90% without gingivitis.

Keywords: Relationship; Diabetes; Periodontal disease

1 Introduction

Diabetes mellitus (DM) is a persistent and advancing condition marked by many metabolic variables that result in elevated blood glucose levels and disruptions in lipid metabolism, primarily caused by insufficient or reduced levels of insulin; There are three primary forms of the disease [1]. Type 1, Type 2, and Gestational Diabetes; Type 1, accounting for approximately 5 to 10 percent of cases, occurs when the body's immune system destroys the insulin-producing β -cells in the pancreas, resulting in a complete loss of insulin secretion but Type 2, is characterized by insulin resistance rather than a complete absence of insulin pro-

duction [2]. The periodontal disease is a condition that affects the tissues surrounding the teeth, causing the loss of attachment and destruction of the bone that supports the teeth. Tooth loss may occur as a consequence of periodontal disease, although not all individuals are affected by this outcome., on the other hand, Periodontal disease include a broader range of disorders than merely periodontitis. Identifying these diseases necessitates a diagnosis [3]. Diabetes mellitus is becoming a widespread in worldwide, and its complications have a considerable impact on the quality of life, lifespan, and healthcare expenses. It is a risk factor for periodontitis, which is a common oral problem [4]. The epidemiological studies have revealed a 2 to 3-fold

increase in the severity of severe periodontitis or existing periodontal disease in individuals with diabetes [5]. Gingivitis and periodontitis are significant mouth indicators of diabetes and the individuals who have not been diagnosed with or have poorly managed diabetes mellitus type 1 or type 2 are more susceptible to developing periodontal disease [6]. The majority of diabetic people who have good control over their condition may effectively maintain the health of their gums and will have positive outcomes from gum treatment although there is disagreement in the scientific literature [7]. The precise relationship between diabetes and periodontitis is not fully comprehended, however, it is known to involve various factors like as inflammation, immunological response, neutrophil function, and cytokine biology [8]. Diabetes can also adversely affect the regulation of blood sugar levels; Hemoglobin that is glycosylated, known as HbA1c, enables the monitoring of glucose levels in the blood over a period of 120 days and is a valuable tool for making informed decisions [9]. On the other hand, the majority of diabetes patients who have their condition well-managed may effectively preserve the health of their gums and will see positive results from periodontal treatment [10]. Various oral disorders have been linked to this condition, including salivary and taste abnormalities, oral bacterial and fungal infections (such as candidiasis), and lesions on the oral mucosa (such as stomatitis, geographic tongue, traumatic ulcer, and lichen planus [11]. The aim of this study is to identify potential links between diabetes and periodontal disorders in Thi-Qar province, Iraq.

2 Materials and Methods

2.1 Design of the research project

This is a large population-based observational study. The current investigation is a case-control investigation.

2.2 Those who will studied

The research population consisted of diabetes patients from both sexes with periodontal ranging in age from 20 to 60 years who attended the Diabetes and Endocrinology Center in Thi-Qar province/Iraq. The control group consisted of people who appeared to be in good health.

2.3 Samples Collection and Preparation

The total samples consisted 50 patient Participants in the study previously diagnosed diabetes with peri-

odontal disease according the clinical definition for the condition. Patients from the Diabetes and Endocrinology Center in Thi-Qar province, Iraq, chosen as study subjects. Total control 50 People recruited from the general community who seemed to be in good health but were not diabetic served as controls. The methods of the oral examination using standardized techniques, for the purpose examine the periodontal health condition of participants from Diabetes and Endocrinology Center in Thi-Qar province, Iraq.

2.4 Discussion using a question

A meeting interview conducted in order to complete a questionnaire that was prepared to fulfill the research requirements for both patients and controls in the Thi-Qar area of Iraq. Users' details about the research study are included in a set of questions age. Sex, information on history of diabetes, Questionnaires health problems periodontal disease are examples of such conditions.

3 Results and Discussion

The findings demonstrated a substantial rise in the glucose levels of the patients in comparison to the control group (198 ± 90.25 vs. 112 ± 15.2 mg/dl, T-value = 12.4, P-value = 0.003). The patients exhibited a substantial rise in HbA1C levels compared to the control group (9.13 ± 2.13 vs. 5 ± 0.7 , T-value = 19.11, P-value = 0.003). As shown by Table 1 in addition to the glucose values levels and average HbA1c were significant increase in patients comparing levels controls, This same outcomes have obtained in another study, as reported by Ejuoghanran, in 2011 [12]. Throughout our research, the levels of HbA1c in the blood indicate the glucose levels exposed over a considerable length of time and it commonly used for the diagnostic of diabetes mellitus patients in contrast to the fasting glucose level (FBG), which provides the glucose level in a short period and cannot be use to confirm the diagnosis of type 2 diabetes, this agree with finding by Jha, in 2010 [13]. The hemoglobin A1C level was employed as an objective measure of chronic glycemic control [14]. The present study, as indicated in Table 2, observed a statistically significant difference ($p < 0.01$) between the patients and control group in terms of age groups. Specifically, the patients were predominantly above 36 years old, whereas the control group consisted mainly of individuals in the first and second age groups. Multiple studies indicate that the frequency and intensity of periodontal disease escalate as individuals grow older [15].

Table 1: Demographic and moth health characteristics in Diabetes patients with Periodontal Disease patients and control group.

	Groups	N	Mean	Std. Deviation	T-value	P-value
Glucose	Patient	50	198.34	90.25	12.4	0.003
	Control	50	112	15.2		
HbA1c	Patient	50	8.78	2.13	19.11	0.003
	Control	50	5	0.7		

The association between the advancement of periodontal disease and age is most likely attributed to the prolonged exposure of the periodontal tissues to bacterial plaque it is thought to be a reflection of an individual's comprehensive oral health record [16].

A similar finding prevalence has been noted even among the geriatric demographic. Research conducted on the senior population has indicated that a relatively small proportion of individuals in this age category are affected with advanced periodontal disease [17]. The study presented in table 3.2 found a statistically significant difference ($P = 0.035$) between the male and female groups in terms of periodontal destruction. This aligns with previous research that has consistently shown higher levels of periodontal damage in males compared to females. The reasons for these sex differences are believed to be associated with the lack of knowledge on oral hygiene, which is typically more prevalent among males [18]. However, the association between sex and the disease is not readily obvious and is not regarded to be robust and consistent. Therefore, sex can be considered a demographic variable that may influence the impact of other variables and should be taken into account when studying the disease [19]. Furthermore, a statistically significant distinction ($p=0.001$) was observed between the patients and control group based on smoking status, with the patients being smokers and the control group consisting of non-smokers. There is a growing body of research indicating a greater prevalence of periodontal disease in individuals who smoke [20], the smoking is a risk factor that alters the way the body responds to microorganisms in tooth plaque [21], smoking excessive force applied to the periodontal tissues has a significant detrimental impact and accelerates the evolution of periodontal disease. However, this is demonstrated in other research as well. A smokers who have periodontal disease exhibit less indications of clinical inflammation and gingival bleeding in comparison to individuals who do not smoke [22]. The patient has diabetes mellitus,. gingivitis and periodontitis are significant mouth indicators of diabetes. Individuals who have not been diagnosed with or have poorly managed

diabetes mellitus are more likely to be at an increased risk for periodontal disease [23]. Current results Table 2 show there was a significant difference between diabetic patients and control group according to periodontitis, was 66% of patients had periodontitis, and 34% had not periodontitis, while in the control group only 16% had periodontitis, and 84% had not periodontitis. Diabetes mellitus (DM) is a medical condition characterised by high levels of sugar in the blood, resulting from a lack of insulin synthesis and/or its effectiveness. Notably, there is evidence in the literature dating back that suggests a connection between DM and periodontitis, a condition affecting the gums and supporting structures of the teeth. Subsequent research have unequivocally shown a connection between diabetes mellitus (DM) and periodontal disease in humans [24]. Finally, according to gingivitis, the current results investigated a significant difference at $p. \text{ value} < 0.05$, between two groups, was this study recorded 60% of patients had gingivitis, and 40% without gingivitis, while in the control group only 10% had gingivitis, and 90% without gingivitis, as show in the Table 2. There is a correlation between inadequate management of blood sugar levels is by the high concentration of red complex organisms (*P. gingivalis*, *T. forsythia*, and *Treponema denticola*) in the periodontal pockets [25]. Diabetes and periodontitis are chronic diseases and People individuals with diabetes are more prone to acquiring periodontal disease compared to individuals without diabetes may be because they have a heightened vulnerability to infections. Diabetic individuals have a roughly threefold higher chance of developing periodontitis compared to non-diabetic individuals [26]. Prevalence of gingivitis and periodontitis in relation to diabetes in current results Table 2 Regarding the topic of dispute data indicate that the occurrence of periodontitis has risen to 6% among various ethnicities, genders, smoking habits, and age groups [27].

Research on gingivitis in individuals with and without diabetes has demonstrated that both diabetic and nondiabetic participants exhibit gingival inflammation in response to experimental plaque buildup.

Table 2: Demographic and moth health characteristics in Periodontal Disease patients and control group.

Characteristics	Categories	Patients		Control		CalX2 & p. value
		No.	%	No.	%	
Age with Periodontal Disease	17 - 26	8	16.0	5	10.0	14.11 0.001
	27 - 36	7	14.0	8	16.0	
		6	12.0	0	0.0	
	47 - 56	6	12.0	0	0.0	
	>56	6	12.0	0	0.0	
	Total	33	66.0	13	26.0	
Sex	Male	25	50.0	31	62.0	1.461 0.035
	Female	25	50.0	19	38.0	
	Total	50	50.0	50	50.0	
Smoking	Smoker	34	68.0	11	22.0	1.268 0.001
	Non	16	32.0	39	78.0	
	Total	50	50.0	50	50.0	
Periodontitis	Yes	33	66.0	8	16.0	25.83 <0.001
	No	17	34.0	42	84.0	
	Total	50	50.0	50	50.0	
Gingivitis	Yes	30	60.0	5	10.0	54.94 <0.001
	No	20	40.0	45	90.0	
	Total	50	50.0	50	50.0	

Nevertheless, individuals with diabetes experience a premature and intensified localised inflammatory reaction when faced with a similar bacterial stimulus [28].

4 Conclusion

Increased the severity of the risk factor of the periodontal disease in patients with diabetic disease.

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Conflict of Interest: No conflicts of interest exist between the authors and the publication of this work.

Ethical consideration: The ethical committee approved the study at University of Thi-Qar, Thi Qar, Iraq.

References

- [1] Association AD. Diagnosis and classification of diabetes mellitus. Diabetes care. 2010;33(Supplement_1):S62-9. doi:10.2337/diacare.28.suppl_1.s37. [Backref page 1]
- [2] Mealey BL, Ocampo GL. Diabetes mellitus and periodontal disease. Periodontology 2000. 2007;44(1). doi:10.1111/j.1600-0757.2006.00193.x. [Backref page 1]
- [3] Loe H, Anerud A, Boysen H, Morrison E. Natural history of periodontal disease in man: rapid, moderate and no loss of attachment in Sri Lankan laborers 14 to 46 years of age. Journal of clinical periodontology. 1986;13(5):431-40. doi:10.1111/j.1600-051x.1986.tb01487.x. [Backref page 1]
- [4] Carranza F, Newman M. Carranza's Clinical Periodontology. London: WB Saunders Company; 1996. [Backref page 1]
- [5] Yalda B, Offenbacher S, Collins JG. Diabetes as a modifier of periodontal disease expression. Periodontology 2000. 1994;6(1):37-49. doi:10.1111/j.1600-0757.1994.tb00025.x. [Backref page 18]
- [6] Campus G, Salem A, Uzzau S, Baldoni E, Tonolo G. Diabetes and periodontal disease: A case-control study. Journal of periodontology.

- 2005;76(3):418-25. doi:10.1902/jop.2005.76.3.418. [Backref page 18]
- [7] Negrato CA, Tarzia O, Jovanović L, Chinellato LEM. Periodontal disease and diabetes mellitus. *Journal of Applied Oral Science*. 2013;21:1-12. doi:10.1590/1678-7757201302106. [Backref page 18]
- [8] Genco RJ, Grossi SG, Ho A, Nishimura F, Murrayama Y. A proposed model linking inflammation to obesity, diabetes, and periodontal infections. *Journal of periodontology*. 2005;76:2075-84. doi:10.1902/jop..76.11-S.2075. [Backref page 18]
- [9] Taylor GW, Burt BA, Becker MP, Genco RJ, Shlossman M, Knowler WC, et al. Severe periodontitis and risk for poor glycemic control in patients with non-insulin-dependent diabetes mellitus. *Journal of periodontology*. 1996;67:1085-93. doi:10.1902/jop.1996.67.10s.1085. [Backref page 18]
- [10] Thorstensson H, Hugoson A. Periodontal disease experience in adult long-duration insulin-dependent diabetics. *Journal of clinical periodontology*. 1993;20(5):352-8. doi:10.1111/j.1600-051x.1993.tb00372.x. [Backref page 18]
- [11] Saini R, Al-Maweri SA, Saini D, Ismail NM, Ismail AR. Oral mucosal lesions in non oral habit diabetic patients and association of diabetes mellitus with oral precancerous lesions. *Diabetes research and clinical practice*. 2010;89(3):320-6. doi:10.1016/j.diabres.2010.04.016. [Backref page 18]
- [12] Ejuoghanran OSO, Chukwu OE, Christopher SL, et al. The effect of diabetic nephropathy on the lipid profile of diabetics in Southern Nigeria. *Journal of Medical sciences*. 2011;11(4):198-202. doi:10.3923/jms.2011.198.202. [Backref page 18]
- [13] Jha P, Das B, Shrestha S, Majhi S, Chandra L, Sharma S, et al. Glycemic status, lipid profile and proteinuria in diabetic nephropathy. *Journal of the Nepal Medical Association*. 2010;49(178). doi:10.3923/jms.2011.198.202. [Backref page 18]
- [14] Beck RW, Bergenstal RM, Cheng P, Kollman C, Carlson AL, Johnson ML, et al. The relationships between time in range, hyperglycemia metrics, and HbA1c. *Journal of diabetes science and technology*. 2019;13(4):614-26. doi:10.1177/1932296818822496. [Backref page 18]
- [15] Genco RJ. Current view of risk factors for periodontal diseases. *Journal of periodontology*. 1996;67:1041-9. doi:10.1902/jop.1996.67.10.1041. [Backref page 18]
- [16] Loe H, Anerud A, Boysen H, Morrison E. Natural history of periodontal disease in man: rapid, moderate and no loss of attachment in Sri Lankan laborers 14 to 46 years of age. *Journal of clinical periodontology*. 1986;13(5):431-40. doi:10.1111/j.1600-051x.1986.tb01487.x. [Backref page 19]
- [17] Borrell LN, Crawford ND. Socioeconomic position indicators and periodontitis: examining the evidence. *Periodontology 2000*. 2012;58(1):69-83. doi:10.1111/j.1600-0757.2011.00416.x. [Backref page 19]
- [18] Thomson WM, Slade GD, Beck JD, Elter JR, Spencer AJ, Chalmers JM. Incidence of periodontal attachment loss over 5 years among older South Australians. *Journal of Clinical Periodontology*. 2004;31(2):119-25. doi:10.1111/j.0303-6979.2004.00460.x. [Backref page 19]
- [19] Albandar JM, Kingman A. Gingival recession, gingival bleeding, and dental calculus in adults 30 years of age and older in the United States, 1988-1994. *Journal of periodontology*. 1999;70(1):30-43. doi:10.1902/jop.1999.70.1.30. [Backref page 19]
- [20] Zini A, Sgan-Cohen HD, Marcenes W. Socioeconomic position, smoking, and plaque: a pathway to severe chronic periodontitis. *Journal of clinical periodontology*. 2011;38(3):229-35. doi:10.1111/j.1600-051X.2010.01689.x. [Backref page 19]
- [21] Özçaka Ö, Bıçakcı N, Pussinen P, Sorsa T, Köse T, Buduneli N. Smoking and matrix metalloproteinases, neutrophil elastase and myeloperoxidase in chronic periodontitis. *Oral diseases*. 2011;17(1):68-76. doi:10.1111/j.1601-0825.2010.01705.x. [Backref page 19]
- [22] BERGSTRÖM J. Oral hygiene compliance and gingivitis expression in cigarette smokers. *European Journal of Oral Sciences*. 1990;98(6):497-503. doi:10.1111/j.1600-0722.1990.tb01004.x. [Backref page 19]
- [23] Papapanou PN. Periodontal diseases: epidemiology. *Annals of periodontology*. 1996;1(1):1-36. doi:10.1902/annals.1996.1.1.1. [Backref page 19]
- [24] Belting CM, Hiniker J, Dummett CO. Influence of diabetes mellitus on the severity of periodontal disease. *The Journal of Periodontology*. 1964;35(6):476-80. doi:10.1902/jop.1964.35.6.476. [Backref page 19]
- [25] Saeb AT, Al-Rubeaan KA, Aldosary K, Raja GU, Mani B, Abouelhoda M, et al. Relative reduction of biological and phylogenetic diversity of the

- oral microbiota of diabetes and pre-diabetes patients. *Microbial pathogenesis*. 2019;128:215-29. doi:10.1016/j.micpath.2019.01.009. [[Backref page 19](#)]
- [26] Bl M. Diabetes mellitus and periodontal diseases. *J Periodontol*. 2006;77:1289-303. doi:10.1902/jop..050459. [[Backref page 19](#)]
- [27] Borrell LN, Crawford ND. Social disparities in periodontitis among United States adults 1999–2004. *Community dentistry and oral epidemiology*. 2008;36(5):383-91. doi:10.1111/j.1600-0528.2007.00406.x. [[Backref page 19](#)]
- [28] Salvi GE, Kandyaki M, Troendle A, Persson GR, Lang NP. Experimental gingivitis in type 1 diabetics: a controlled clinical and microbiological study. *Journal of clinical periodontology*. 2005;32(3):310-6. doi:10.1111/j.1600-051X.2005.00682.x. [[Backref page 20](#)]

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