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Research Article

**ANALYSIS OF RELATIONSHIP AMONG OBESITY, DIABETES
MELLITUS AND PERIODONTITIS IN LOCAL POPULATION
OF PAKISTAN****¹Dr. Sidra Riaz, ¹Dr .Kainat Habib, ¹Dr. Maria Sajid**
¹Punjab Dental Hospital, Lahore**Abstract:**

Introduction: Diabetes mellitus is a metabolic disorder characterized by hyperglycemia due to defective secretion or activity of insulin. Chronic hyperglycemia results in production of advanced glycation end substances (AGEs) in the tissues, which have protean effects on the periodontal microenvironment. **Aims and objectives:** The basic aim of the study was to find the relationship among obesity, diabetes mellitus and periodontitis in local population of Pakistan. **Methodology of the study:** This population-based study was conducted at Punjab dental hospital, Lahore during 2018 with the permission of ethical committee of hospital. The data was collected from 100 patients of both genders. Those who was suffering from diabetes and obesity was included in this study. The data was collected through questionnaire. **Results:** The data was collected from 100 patients of both genders. Obese subjects, determined by BMI, WHR, and BF, showed a prevalence of periodontitis at 37.0%, 36.4%, and 42.6%, respectively; prevalence in the nonobese group was, respectively, 22.1%, 23.1%, and 21.6%. Regardless of the definitions of obesity used, the prevalence of periodontitis in the obese group was significantly higher than that in the nonobese group ($p < .05$).

Conclusion: It is concluded that periodontal conditions may significantly be associated with the level of education, frequency of tooth brushing, regular dental checkups, and mouth rinse use. Periodontal status as estimated by probing depth and degree of attachment loss deteriorates significantly with poor glycemic control in diabetes.

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INTRODUCTION:

Diabetes mellitus is a metabolic disorder characterized by hyperglycemia due to defective secretion or activity of insulin. Chronic hyperglycemia results in production of advanced glycation end substances (AGEs) in the tissues, which have protean effects on the periodontal microenvironment. The primary reparative cells in the periodontium, the fibroblasts, are not able to repair the damaged collagen because of binding with AGEs in high glucose environment, thus leading to delayed wound healing. In the periodontium, AGEs cause bone resorption and break down of collagen fibers which leads to weakening of periodontal support and tooth mobility [1].

Obesity is a multifactorial disease and is becoming a worldwide epidemic with an increasing prevalence in recent years, in both adults and children. According to the Global Burden of Disease Study 2015, 603.7 million adults and 107.7 million children were obese worldwide. In 2015, high body mass index (BMI) led to 4.0 million deaths, more than two thirds of them due to cardiovascular disease. This abnormal accumulation of fat is a leading cause of morbidity from cardiovascular disease and diabetes and becomes a socioeconomic burden in all countries [2].

Type 2 diabetes is recognized as a common non-communicable disease whose complications reduce life expectancy. Similar to obesity, diabetes prevalence has risen rapidly. In Vietnam, according a national survey in 2012, the prevalence of diabetes and prediabetes was 5.4% and 13.7%, respectively. In a further survey conducted on a sample of 16,282 Vietnamese subjects aged 30–69 years (5,602 men and 10,680 women), the prevalence of diabetes was 6.0%. There is a triangular relation between periodontitis, obesity, and diabetes [3]. Fat tissue is not merely a passive triglyceride reservoir of the body, but also produces a vast amount of cytokines and hormones, called adipokines or adipocytokines, especially IL-6 and TNF- α , appear to have the ability to modulate inflammatory activity [4].

Aims and objectives

The basic aim of the study was to find the relationship among obesity, diabetes mellitus and periodontitis in local population of Pakistan.

Methodology of the study

This population-based study was conducted at Punjab dental hospital, Lahore during 2018 with the permission of ethical committee of hospital. The data

was collected from 100 patients of both genders. Those who was suffering from diabetes and obesity was included in this study. The data was collected through questionnaire.

DATA COLLECTION:

A structured questionnaire collected sociodemographic information such as age, gender, and educational background. Dental habits such as daily tooth brushing (categorized as 2 times or more a day or less than 2 times a day), daily dental flossing use (categorized as yes or no), daily mouth rinse use (categorized as yes or no), and dental checkup behavior (categorized as those who regularly have dental checkups and those who never have or just visit a dentist when having problems) were also obtained.

Biochemical analysis

A full-mouth periodontal examination was performed on all participants to assess the periodontal index, including plaque index (PI), pocket depth (PD), clinical attachment level (CAL), bleeding on probing (BOP), and gingival index (GI). PD, CAL, and BOP were recorded for all teeth in the mouth (except for the third molars) at six sites per tooth, using a UNC periodontal probe.

Statistical analysis

Chi-square tests were used to examine distributional differences in age, educational background, dental habits (daily tooth brushing, daily dental flossing use, daily mouth rinse use, and dental checkup behavior), obesity (based on BMI, WHR, and BF), and Type 2 diabetes by gender and to determine the relationship between periodontitis and obesity (based on BMI, WHR, and BF) or Type 2 diabetes.

RESULTS:

The data was collected from 100 patients of both genders. Obese subjects, determined by BMI, WHR, and BF, showed a prevalence of periodontitis at 37.0%, 36.4%, and 42.6%, respectively; prevalence in the nonobese group was, respectively, 22.1%, 23.1%, and 21.6%. Regardless of the definitions of obesity used, the prevalence of periodontitis in the obese group was significantly higher than that in the nonobese group ($p < .05$). The means of PD and CAL in obese subjects were significantly higher than those in nonobese subjects when obesity was defined by BMI, WHR, and BF ($p < .001$).

Table 01: Analysis of periodontitis and periodontal parameters

Periodontal status	BMI			WHR			BF		
	Nonobese (n = 217)	Obese (n = 462)	p	Nonobese (n = 212)	Obese (n = 467)	p	Nonobese (n = 334)	Obese (n = 345)	p
Periodontitis, n (%)	48 (22.1%)	171 (37.0%)	<.001*	49 (23.1%)	170 (36.4%)	<.001*	72 (21.6%)	147 (42.6%)	<.001*
PI, Mean ± SD	1.22 ± 0.25	1.25 ± 0.29	.15**	1.22 ± 0.26	1.25 ± 0.29	.13**	1.23 ± 0.27	1.25 ± 0.29	.56**
GI, Mean ± SD	1.076 ± 0.09	1.081 ± 0.09	.60**	1.07 ± 0.09	1.08 ± 0.10	.36**	1.08 ± 0.09	1.07 ± 0.09	.78**
BOP, Mean ± SD	6.75 ± 6.35	7.82 ± 6.78	.05**	7.18 ± 6.45	7.61 ± 6.75	.43**	6.92 ± 5.77	8.02 ± 7.38	.03**
PD (mm), Mean ± SD	2.32 ± 0.82	2.61 ± 0.53	<.001**	2.39 ± 0.82	2.58 ± 0.55	.001*	2.36 ± 0.64	2.67 ± 0.63	<.001**
CAL (mm), Mean ± SD	2.34 ± 0.78	2.60 ± 0.54	<.001**	2.41 ± 0.78	2.57 ± 0.55	.002*	2.41 ± 0.64	2.63 ± 0.61	

DISCUSSION:

Differences in cultural, socioeconomic, dietary and oral hygiene practices in a given population affect the burden of oral diseases including periodontal disease which makes one set of population different from the other [5]. In a study conducted in Pakistan, diabetic patients with poor oral health were shown to have an increased severity of periodontal disease. Assessment of periodontitis in type 2 diabetic patients with good oral hygiene in a Pakistani population is not yet unequivocally documented; this lacuna in knowledge prompted the present research [6].

Currently, BMI is still the most popular indicator for obesity diagnosis because of its simple, practical, and noninvasive method. BMI is widely used in many studies due to the association with the risk of morbidity and mortality in obese people. However, BMI does not accurately assess the condition of excess body fat as well as lean mass or fat mass, two main components of weight that may differ between individuals. In this study, in addition to using BMI, we assessed obesity by other anthropometric indicators such as the WHR. WHR has been shown to be good indicator of abdominal adiposity and helps predict disease risk better than BMI [7]. We also used the Omron HBF-375 Karada Scan Body Fat Analyzer (BF) that is a body-composition-measuring device. Body fat percentage measured through body composition is theoretically better for evaluating excess adiposity than BMI [8]. However, many techniques for measuring body composition in vivo and are not feasible or inaccurate in epidemiological research settings. Obese subjects, determined by BMI, WHR, and BF had higher odd ratios for the

occurrence of periodontitis than did the non-obese [9]. These results were similar to the findings of many reports on obesity and periodontal disease, suggesting that obesity has an association with periodontitis [10].

CONCLUSION:

It is concluded that periodontal conditions may significantly be associated with the level of education, frequency of tooth brushing, regular dental checkups, and mouth rinse use. Periodontal status as estimated by probing depth and degree of attachment loss deteriorates significantly with poor glycemic control in diabetes.

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