

EFFECT OF OBESITY ON PERIODONTAL DISEASE

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ABSTRACT

The present study investigates the effect of obesity on periodontal diseases. For this purpose a sample of 80 subjects (20-50 years age) was collected at the Department of Periodontology, Khyber College of Dentistry (KCD) during July 2015 to September 2015. The periodontal examination consisted of Pocket probing depth (PPD), Clinical attachment level (CAL). Body mass index (BMI) and Waist Circumference (WC) were used as obesity indicators. The data indicated significant relation of BMI and WC with CAL in obese group as compared to non-obese. The results also suggested that the overall and abdominal obesity were associated with extent of periodontal disease in sample of patients studied.

Key Words: Obesity, Body mass index, Periodontitis.

INTRODUCTION

Obesity is a major public health concern in both developed and developing countries.¹ Obesity can be defined as a body mass index (BMI) also called Quetelet Index ≥ 30 kg/m². It is the ratio of body weight in kg to body height in m squared. Body fat distribution can also be evaluated by measuring waist circumference with 102 cm for male and 88 cm for female being cut off point for abdominal obesity.² It is one of the several risk factors for conditions e.g. diabetes, hypertension, cardiovascular diseases, stroke and osteoarthritis. Periodontal disease is one of the most common chronic diseases. Periodontal disease is assessed by various ways. Two of them are PPD (Probing pocket depth) and CAL (Clinical attachment level). Pocket probing depth is defined as the distance to which probe penetrates into the pocket. On the other hand CAL is the distance between the base of pocket and a fixed point on the crown such as cemento-enamel junction (CEJ).³ Changes in level of attachment can be the result of gain or loss of attachment and afford a better indication of the degree of periodontal destruction or gain than probing pocket depth alone. Several systemic factors contribute to its occurrence e.g. smoking, stress, diabetes, age and osteoporosis. Obesity is the second to smoking as strongest risk factor for periodontal tissue destruction.⁴ Obesity signifies a role in causing an overall systemic

inflammatory state by affecting metabolic and immune parameters enhancing periodontal disease susceptibility. The mechanism correlating include adipose tissue derived cytokines and hormones called adipokines that modulate periodontitis.^{5,6}

A recent study conducted in Japan found a significant association between obesity and periodontitis.⁷ The most compelling evidence to date, of association between severity and extent of periodontal disease and obesity came from a study done in Jordan.⁸ A clinical study done Udaipur, India also concludes a high prevalence of periodontal disease among obese patients.⁹ Another recent study by Siato et al concludes that obesity is associated with deep periodontal pockets. Genco et al. analyzed National Health and Nutrition Examination and Survey (NHANES III) data and showed a positive relation between BMI and periodontal attachment loss.⁵

The main objective of this study was to probe if any relation exists between periodontal disease and obesity as mediators of inflammation in above diseases share similar patho physiology.

METHODOLOGY

The research was conducted in the Department of Periodontology, Khyber College of Dentistry from July 2015 to September 2015. Approval from ethical review committee of college was obtained. Eighty subjects were selected on basis of "convenient random sampling technique." Patients aged 20-50 years of both gender irrespective of their educational level and of any socio-economic status were selected for the present study. Out of total patients fifty percent were obese and the rest were non obese. The purpose of study was explained to patients and after their verbal consent they were included in the study.

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EXCLUSION CRITERIA

- 1) Patients with underlying systemic disease e.g. hormonal disturbances (diabetes mellitus, hyperthyroidism etc.), cardiovascular diseases (hypertension, angina pectoris, myocardial infarction etc.), hemorrhagic disorders (coagulation disorders, platelet disorders etc.)
- 2) Patients taking medications e.g., antibiotics, immunosuppressant, antidepressants.
- 3) Patients having history of smoking, or alcohol abuse.

Ramford teeth were selected for convenience of periodontal examination. Teeth are numbered using Palmer's notation.

6	1	4
4	1	6

Six site periodontal examinations were performed, (mesial, mid facial and distal), (mesial, mid palatal / lingual, distal). University of Michigan 'O' probe with William's markings was used to find out the pocket depths and maximum depth was recorded in millimeters. Plaque scoring was done using O'Leary index, presence of plaque was scored as 1 an absence as 0.

Subjects were categorized as obese or non obese using obesity indicators i.e. BMI (body mass index), and WC (waist circumference) in centimeters. BMI was calculated by dividing weight of each individual in kilograms (kg) to the height in meter squared (m²). Waist circumference was calculated using measuring tape calibrated in centimeters. The results of the study were analyzed to find correlation between obesity and periodontal indicators by t-test using SPSS version 19.

RESULTS

Table 1 shows that significant correlation between BMI and CAL in obese group (p-value=0.02) than non obese group (p-value =0.16). Similarly, WC and CAL showed significant relation in obese group (p-value=0.04). No significant correlation was found between BMI-PPD and WC-PPD (p-value =0.34 and 0.821) in obese group.

DISCUSSION

The results of our study showed a significantly positive relation between obesity in terms of BMI and WC and periodontal measurement of CAL among sample size of 80 subjects aged 20-50 years. The data suggested that no such relation was found between obesity and PPD. Our results are similar to those reported by Sheiham et al.¹⁰ and the cross sectional study by Al-Zahrani et al.¹¹

TABLE 1: PERIODONTAL DISEASE AND OBESITY

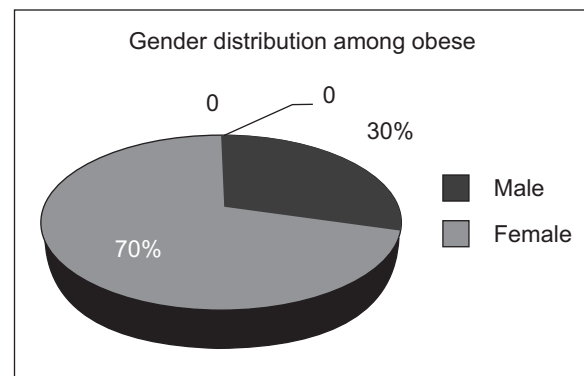
S. No.	Variable	Mean	St.D	Variable correlation	p-value
1	PPD	4	1.4	BMI-PPD	0.34*
2	CAL	7	3	WC-PPD	0.82*
3	BMI	31	6	BMI-CAL	0.02
4	WC	107	10	WC-CAL	0.04

indicators of obese subjects with p-values

*Non significant..

TABLE 2: PERIODONTAL DISEASE & OBESITY INDICATORS OF NON -OBESE SUBJECTS

Variable	Mean	St.D
Pocket probing depth	3	1.07
Clinical attachment loss	3	3.07
Body mass index	23	3.4
Waist circumference	65	30



Our results are comparable with the findings of a study conducted by Fatemeh Sarlati et al.¹² that showed a significant association between obesity and periodontal disease aged 18-34 years. In Saudi Arabia, Alabdulkarim et al.¹³ found alveolar bone loss to be strongly linked with obesity among adults, particularly among females.

H.EI-Sayed Amin¹⁴ carried out a study comprising a sample of 380 adults (170 males and 210 females), aged 20-26 years. A positive correlation of BMI and WC with CAL was found, which is in accordance with our results. Moreover, the data showed that higher percentage of the subjects with obese physique and periodontal disease was females. Similar gender differences were also found in a study conducted in India.⁹ Genco et al. postulated that obesity could affect periodontitis through inflammatory pathway.⁵ Another longitudinal study in India¹⁵ examining relation between periodontal pockets and obesity showed that individuals with increased BMI are at high risk of developing pockets in future. In this study BMI was strongly related to periodontitis

($p < 0.01$). Similar findings were also noted for WC ($p < 0.01$). Reeves et al.¹⁶ reported that adolescents with age 17-21 were at high risk of periodontal disease per 1 cm increase in waist circumference.

A systematic literature review between overweight/obesity and periodontitis meta analysis demonstrated a strong association between obesity and periodontal disease.¹⁷ The obese individual is 1.8 times greater chances of periodontitis than an individual having normal BMI. These results also support our finding regarding obesity and periodontitis.

The role of cytokines and hormones explain the mechanism of impact of obesity on periodontium.^{5,6} These adipokines, TNF- α (tumor necrosis factor), and IL-6 (Interlukin) produced from visceral fat enhance periodontal degradation. TNF- α in GCF (Gingival crevicular fluid) has been strongly correlated with subjects having BMI > 40.¹⁸ Obesity modulates the host immune response resulting in increased susceptibility to infection with exaggerated host response.¹⁹ Clinical evidence suggest that obese patients have high local inflammatory response and altered periodontal micro flora.²⁰

Although in the present study a significant correlation between obesity and periodontal disease was found, but further longitudinal /prospective studies are needed to address if obesity is true risk factor for periodontitis.

CONCLUSION

From the present study it can be concluded that obesity plays an important role and its impact on oral health cannot be neglected.

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CONTRIBUTION BY AUTHORS

- Muhammad Nasir Shah:** Project selection, study design drafting the article.
- Anam Rehan:** Data collection, patient examination.
- Sonia Zakir:** Analysis of Data.