

Relationship between Body Mass Index and Periodontal Disease among Adults Attending the Out Patients Department of ITS Dental College

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ABSTRACT

Background: The aim of the study was to evaluate the relationship between obesity and periodontitis.

Introduction: It is evident from the scientific literature that general health has considerable impact on oral health and vice versa. Obesity is excessive body fat in proportion to lean body mass, to such an extent that health is impaired. Obesity, a serious public health problem, relates to a chronic low-grade systemic inflammation and is involved in the development of obesity-linked disorders including insulin resistance, type 2 diabetes and cardiovascular disease. The accurate process whereby obesity can affect periodontal health is so far unclear. The aim of the present study was to evaluate the relation between obesity (using body mass index [BMI] and various periodontal parameters.

Material and methods: A total of 60 subjects were equally divided into two groups (30 study and 30 control group). The study group comprised of individuals with BMI 25-29.99 (overweight), BMI >30 (obese) and the control group comprises of individuals with BMI 18.5-24.99 (normal). BMI was calculated as ratio of subject's body weight (in Kg) to the square of their height (in meters). Oral examination was performed on the subjects, which included Oral Hygiene Index (OHI) & gingival index (GI).

Statistical Analysis Used: Statistical analysis was performed by student (unpaired) t-test.

Results and Conclusion: There was a significant difference between the BMI and oral health of obese individuals when compared to the control group.

Key words: BMI, Obesity, Periodontitis, OHI

INTRODUCTION

Obesity is a part of the first wave of defined cluster of non-communicable diseases called New World Syndrome creating an enormous socioeconomic and public health burden. The World Health Organisation (WHO) has described obesity as one of today's most neglected public health problem affecting every region of the globe. [1]

It is a risk factor for several chronic health conditions as well as being associated with increased mortality. A few negative health effects of obesity includes hypertension, high cholesterol, heart disease, type 2 diabetes, stroke, certain cancers and periodontal disease. It is now considered the sixth biggest crucial dangerous factor contributing to diseases worldwide, and it has been suggested that decreased life expectancy in the future may be the result of increased levels of obesity. [2]

It leads to immuno-inflammatory modifications and the condition has also been linked to periodontitis which is a disease of the supporting structures of the teeth resulting from the interaction between pathogenic bacteria and a host immune response. Periodontitis is a disease of multifactorial origin. Numerous systemic or local risk factors play a major role in its clinical sequences. Periodontal diseases are

also influenced by various risk factors including aging, smoking, oral hygiene, socioeconomic status, genetics, race, gender, psychosocial stress, osteopenia, osteoporosis, and various other systemic diseases such as type 2 diabetes mellitus and cardiovascular disease which signifies that periodontitis does not occur merely as a consequence of plaque deposition but is also coupled with various host factors which could alter the consequence of the plaque on a particular individual. [3,4]

Several researches from around the world have repeatedly shown a positive affiliation among prevalent periodontal disease and obesity. Linden *et al.* did not observe an affiliation among obesity in early adulthood and severity of periodontitis at the age of 60–70 years, whereas 6 years earlier in a study done by Morita *et al.*, it was described that periodontal disease and BMI were positively associated. [2,5] Till date, most of the studies which have been carried out related to obesity were among adults and elderly people. [6] Many mediators have been postulated for this relationship, namely, infection, chronic inflammation, and genetic predisposition. Nutrition has been postulated as an alternative mediator apart from these mediators. The body mass index (BMI) has always been considered a simple method for analysis of the nutritional status. The normal value for this index ranges from 20 to 25 kg/m², which correlates with body fat. [7]

Although some studies have shown an association between obesity and periodontal disease in different populations, there have been only three studies documented in literatures so an attempt was made to explore the relationship between body mass index and periodontitis, among the patients attending outpatient department of dental college in Greater Noida.

MATERIALS AND METHODS

The study included 60 subjects divided into study and control groups of 30 each all above 20 years of age. The study was commenced after obtaining ethical

clearance from the Institutional Ethical review board. Individuals were selected based on their BMI as study and control groups from the out patients department of ITS Dental College.

BMI was computed by the formula:

$$\text{BMI} = \text{WEIGHT (kg)} / \text{HEIGHT}^2 (\text{m}^2)$$

Later individuals were categorized into normal, overweight and obese based on the WHO criteria. Study group comprised of individuals with BMI >30 (obese) and BMI of 25-29.99 (overweight), whereas control group included individuals with BMI from 18.5 to 24.99 (normal).

Oral examination was performed on the subjects which included OHI (Oral Hygiene Index) and Gingival Index (GI). Exclusion criteria for both study and control groups included subjects with any systemic diseases and deleterious habits. Written informed consent was obtained from the subjects prior to conducting the study. Mean and standard deviation for scores of individuals were determined and compared between study and control group.

STATISTICAL METHODS

Statistical analysis was performed by student (unpaired) t-test. The values were considered statistically significant when $P < 0.05$.

RESULTS

Out Of 60 subjects, 29 were males and 31 were females aged between 22 and 40 years. The gender distribution in study group (I) and control group (II) is shown in Table no.1. A significant difference was seen on a comparison of BMI and basal metabolic rate (BMR) between the study (I) and control group (II) which is shown Table no. 2. A significant difference was also seen on comparison of the dental indices between group I and control group II that is, oral hygiene and gingival indices. A significant correlation was observed between BMI of study group and control group. It was observed that index scores were higher in study group compared to control group.

These results were in accordance with the previous studies. [8-10]

Table 1: Showing gender distribution in study group & control group

GROUPS	FEMALES	MALES
I (n=30)	14	16
II(n=30)	17	13

Table 2: Showing the comparison of BMI and Dental indices between study group and control group (P<0.05)

GROUPS		BMI	OHI	GI
I	Mean	22.37	1.43	1.41
	± SD	± 10.37	± 0.74	± 0.60
II	Mean	20.98	0.49	0.29
	± SD	± 10.02	± 0.78	± 0.82

DISCUSSION

An increased prevalence of obesity is observed in recent years and is one of the fastest growing health related problems in the world. Obesity and overweight have been suggested to be associated with periodontitis, because obesity may have some effects on systemic health by affecting the host susceptibility to periodontitis due to inflammatory mediators. [11]

The aim of the present study was to assess the relationship between BMI and periodontal disease which was determined by Oral Hygiene Index (OHI) and Gingival Index (GI). Overweight and obesity as assessed by BMI using WHO criteria were evaluated as risk indicators for periodontal disease. [12] Excess gain of fat is often associated with increased stress levels, may also play a role in promoting periodontal disease. Diversification in oral surroundings or small grade of chronic inflammation may be due to excess of adipose tissue. As many as fifty bioactive molecules known as adipokines are secreted by adipose cells in obese participants. The adipokines comprise hormone-like proteins (adipocytokines, adiponectin, and leptin) and classical cytokines (TNF α and IL-6) As the release of inflammatory cytokines is linked closely to a higher vulnerability to bacterial infection, increased production of these pro-inflammatory cytokines increases the host susceptibility heading for the evolution and advancement of periodontal disease. [13]

Hence a positive correlation of TNF- α levels with periodontal disease together with high plasma level of TNF- α and its soluble receptors, which in turn may lead to hyperinflammatory state increasing the risk of periodontal disease, was found in obese patients thereby proving a significant relation between obesity and periodontitis. [14]

The limitations of our study are not including the patients with systemic disease, some of which may affect the BMI and periodontal status of an individual. Necessary steps should be taken by the oral health-care professionals, to arrange dental screening camps among the vulnerable groups for early detection of periodontal disease and recognize patients at risk to advocate promotion of healthy nutritional habits and physical activity to prevent the progression of obesity and periodontal disease.

CONCLUSION

The results of present study show that higher BMI could be a major risk factor for periodontitis.

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