Assessment of relationship between body mass index and periodontal status

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ABSTRACT

Background: The primary reason for adult tooth extractions is periodontal disease. The present study was conducted to assess relationship between body mass index and periodontal status.

Materials & Methods: 120 subjects of both genders were selected. BMI was calculated by the Quetelet index as the ratio of the subject's body weight (in kg) to the square of the height (in meters. Periodontal status was recorded using the Community Periodontal Index (CPI).

Results: Out of 120 patients, males were 65 and females were 55. CPI score 0 was seen in 8, score 1 in 26, score 2 in 38, score 3 in 33 and score 4 in 15 patients. The difference was significant (P< 0.05). 17 were underweight, 65 were normal, 28 were overweight and 10 were obese. The difference was significant (P< 0.05). The mean age of subjects with CPI score 3-4 was 36.4 years and in subjects with CPI score 0-2 was 32.5 years. The mean BMI of subjects with CPI score 0-2 was 18.2 kg/m^2 and in subjects with CPI score 3-4 was 25.7 kg/m^2. The difference was significant (P< 0.05). Logistic regression analysis revealed that subjects had an increased risk of periodontitis by 5% for8 each 1 kg/m^2 increase in BMI (adjusted odds ratio: 1.58;). The risk of periodontitis increased with increase in age, its influence was not significant (P> 0.05).

Conclusion: A greater BMI may be a risk factor for periodontitis in adults. Therefore, the examination of BMI could be utilized to determine periodontal risk.

Key words: Body mass index, Obesity, periodontal status

Introduction

Obesity is a chronic illness and a growing epidemic in terms of public health issues. Body mass index [BMI] 25 kg/m2 was associated with 35% of adults being overweight, and BMI 30 kg/m2 was associated with an estimated 502 million adults being obese. Obesity alters the host immune system's reactions, which makes people more susceptible to infections. A systemic pro-inflammatory condition can be brought on by adipocytes, which can release a number of inflammatory mediators. Although the mechanisms are not fully understood, it has been demonstrated that this negatively affects the wound-healing procedures associated with other chronic illnesses.[1]

The primary reason for adult tooth extractions is periodontal disease. It has been found that adults have a high prevalence of periodontal disease with notable population inequalities. A number of mediators, including infection, persistent inflammation, and genetic susceptibility, have been proposed for this association.[2] In addition to these mediators, nutrition has been proposed as a substitute. Periodontal diseases, also known as gum diseases, are a group of inflammatory conditions that affect the tissues surrounding and supporting the teeth. These diseases range from mild gum inflammation (gingivitis) to more severe forms, such as periodontitis.[3]

The main cause of periodontal diseases is the build-up of plaque, a sticky film of bacteria that forms on the teeth. Plaque can harden over time and become tartar (calculus), which is more difficult to remove and provides a surface for further plaque build-up.[4] The bacteria in plaque and tartar release toxins that irritate the gums, leading to inflammation. The body mass index

(BMI) has long been regarded as a convenient approach to assess dietary health. This index typically has a value between 20 and 25 kg/m2, which is related to body fat.[5] The present study was conducted to assess relationship between body mass index and periodontal status.

Materials & Methods

The present study consisted of 120 subjects of both genders. All gave their written consent to participate in the study.

Data such as name, age, gender etc. was recorded. BMI was calculated by the Quetelet index as the ratio of the subject's body weight (in kg) to the square of the height (in meters). BMI was calculated as underweight (BMI < 18.5 kg/m^2), normal weight (BMI from 18.5 to 24.9 kg/m^2), overweight (BMI from 25 to 29.9 kg/m^2), and obese (BMI > 30 kg/m^2). Oral examination was performed by a single examiner using a WHO CPI periodontal probe. Periodontal status was recorded under five scores: score 0 (healthy), score 1 (bleeding), score 2 (calculus), score 3 (shallow periodontal pockets), and score 4 (deep periodontal pockets). Periodontal status was recorded using the Community Periodontal Index (CPI). Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

Results

Table I: Distribution of patients

Total- 120		
Gender	**Male**	**Female**
Number	65	55

Table I shows that out of 120 patients, males were 65 and females were 55.

Table II: Assessment of periodontal status

CPI score	**Number**	**P value**
0	8	0.05
1	26	
2	38	
3	33	
4	15	

Table II shows that CPI score 0 was seen in 8, score 1 in 26, score 2 in 38, score 3 in 33 and score 4 in 15 patients. The difference was significant (P< 0.05).

Table III Assessment of BMI

BMI	**Number**	**P value**
Underweight	17	0.04
Normal	65	
Overweight	28	
Obese	10	

Table III, graph I shows that 17 were underweight, 65 were normal, 28 were overweight and 10 were obese. The difference was significant (P< 0.05).

Graph I: Assessment of BMI

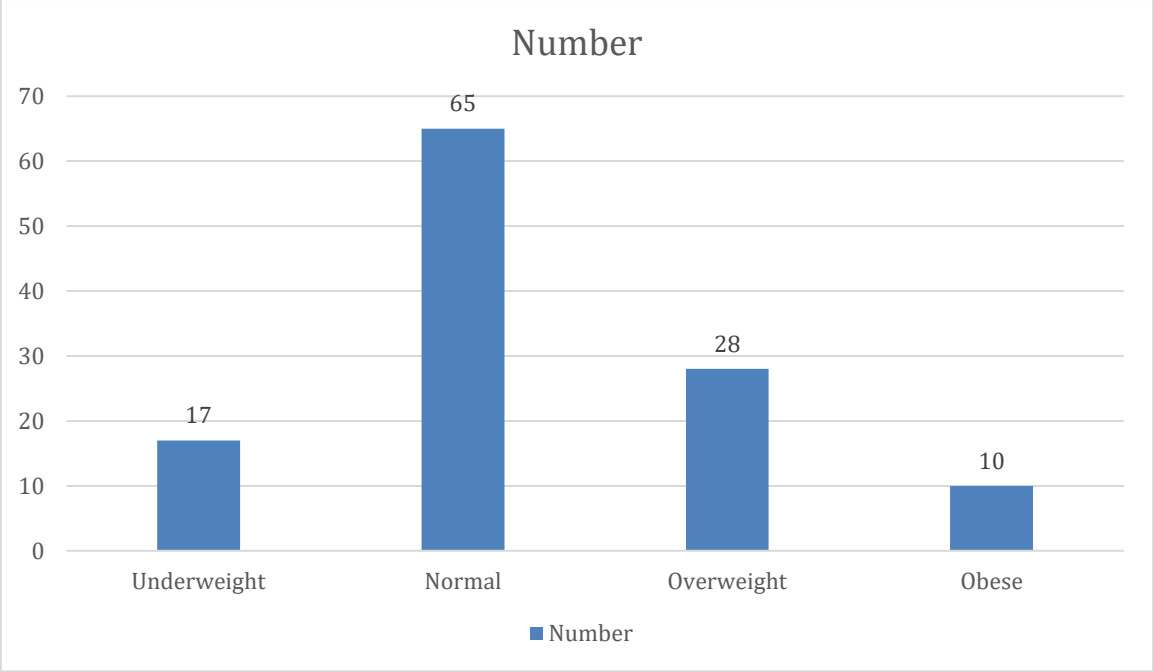

Table IV: Periodontal status of subjects by age and periodontal status

Parameters	CPI score 0-2 (72)	CPI score 3-4 (48)	P value
Age (years)	32.5	36.4	0.05
BMI (kg/m^2)	18.2	25.7	0.03

Table IV shows that mean age of subjects with CPI score 3-4 was 36.4 years and in subjects with CPI score 0-2 was 32.5 years. The mean BMI of subjects with CPI score 0-2 was 18.2 kg/m^2 and in subjects with CPI score 3-4 was 25.7 kg/m^2. The difference was significant (P< 0.05).

Table V Crude and adjusted odd ratio and 95% confidence interval of body mass index and age

Parameters	Crude odd ratio	P value	Adjusted odd ratio	P value
Age (years)	1.91	0.25	1.92	0.14
BMI (kg/m^2)	1.57	0.04	1.58	0.02

Table V shows that logistic regression analysis revealed that subjects had an increased risk of periodontitis by 5% for8 each 1 kg/m^2 increase in BMI (adjusted odds ratio: 1.58;). The risk of periodontitis increased with increase in age, its influence was not significant (P> 0.05).

Discussion

Research has explored the potential correlation between periodontal diseases and body mass index (BMI), a measure of body fat based on height and weight.[6] While the relationship is not fully understood, several studies have indicated a potential association between the two. Several studies have suggested that individuals with higher BMI or who are overweight or obese may have an increased risk of developing periodontal diseases.[7,8] Excess body weight is associated with systemic inflammation, insulin resistance, and changes in hormone levels, which may contribute to gum inflammation and disease. Adipose tissue, commonly known as body fat, produces various pro-inflammatory substances. These substances can promote inflammation in the body, including the gums. Inflammation is a key factor in the progression

of periodontal diseases.[9] The present study was conducted to assess relationship between body mass index and periodontal status.

We found that out of 120 patients, males were 65 and females were 55. Bhardwaj VK et al[10] found that 98.9% of people had periodontal disease overall. Calculus and bleeding received score 2, which was the best overall score. For every 1 kg/m2 rise in BMI, their incidence of periodontitis increased by 56%, indicating that a higher BMI may be a risk factor for periodontitis in individuals between the ages of 18 and 58.

CPI score 0 was seen in 8, score 1 in 26, score 2 in 38, score 3 in 33 and score 4 in 15 patients. We found that 17 were underweight, 65 were normal, 28 were overweight and 10 were obese. Suvan et al[11] in their study non-surgical periodontal care was given to 260 people. Based on measurements made by two calibrated examiners of probing pocket depths (PPD), clinical attachment levels (CAL), and whole-mouth gingival bleeding (FMBS) at baseline and two months, periodontal health was determined. In order to quantify the effect of baseline status, age, smoking status (smoker or non-smoker), and full-mouth dental plaque score on periodontal therapy response, generalized estimating equations (GEE) were utilized. Independent of age, smoking status, or dental plaque levels, BMI (continuous variable) and obesity (vs. normal weight) were linked with worse mean PPD ($p < .005$), percentage of PPD > 4 mm ($p = .01$), but not FMBS ($p > .05$) or CAL ($p > .05$) at 2 months. The extent to which this relationship.

We observed that mean age of subjects with CPI score 3-4 was 36.4 years and in subjects with CPI score 0-2 was 32.5 years. The mean BMI of subjects with CPI score 0-2 was 18.2 kg/m^2 and in subjects with CPI score 3-4 was 25.7 kg/m^2. The logistic regression analysis revealed that subjects had an increased risk of periodontitis by 5% for8 each 1 kg/m^2 increase in BMI (adjusted odds ratio: 1.58;). The risk of periodontitis increased with increase in age, its influence was not significant ($P > 0.05$). Miyazaki et al[12] used the CPI to assess the periodontal profiles of adults and found that periodontal disease increased with increase in age. The present study population had an increased risk of periodontitis by 57% for each 1 kg/m^2 increase in BMI, whereas the risk of periodontitis increased by 16% among young Japanese adults aged 18-24 years.

The limitation the study is small sample size.

Conclusion

Authors found that a greater BMI may be a risk factor for periodontitis in adults. Therefore, the examination of BMI could be utilized to determine periodontal risk.

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