

Relationship Between Body Mass Index and Periodontal Disease Status in Vegetarian and Mixed Diet Subjects of Udaipur, Rajasthan, India.

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Abstract:

This study was conducted to assess the relationship between the body mass index and periodontal disease status in vegetarian and mixed diet subjects of Udaipur, Rajasthan, India.

This study was conducted to know the periodontal disease status in the vegetarian and mixed diet subjects of Udaipur. Age group of the study population was 35 to 44 years. Two hundred subjects were assessed to know the periodontal disease status by trained and calibrated examiners. Obesity related to visceral fat accumulation, is known to increase the risk of various adult diseases, especially type II diabetes and cardiovascular disease. This study was conducted to clarify the relationship between obesity and periodontitis. Body-mass index (BMI) was significant risk indicator for periodontitis after adjustment for known risk factors ($p < 0.002$).

Higher categories of Body Mass Index significantly increased the adjusted risk of periodontitis compared with subjects with the lower categories of Body Mass Index. Body mass index has a direct co-relation with periodontal status of the population. Periodontal disease status highly depends on the dietary habits of the population.

Key Words: Body mass index, periodontal diseases, diet.

Introduction:

Obesity is increasing at an alarming rate throughout the world. Today it is estimated that there are more than 250 million obese people worldwide, equivalent to seven percent of the adult population. National Family Health Survey (NFHS- 2, 1998-99) shows 5.8 percent obese women with BMI (Body Mass Index) 30 or more and 17.7 percent overweight women with BMI between 25-30 in urban India.¹ Because of urbanization and modernization, our lives are becoming more sedentary and less physically active than it was before. Women (house-wives) are spending most of their leisure time in front of T.V. Household durable goods like washing machines, cooking gas and electric ovens etc again reduce the physical activity. Application of transportation even for shorter distance is increasing. All these prevent the people from physical activity

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and leads to overweight and obesity. At the same time, consumption of oily and junky food is responsible for overweight and obesity. Obesity has a significant association with the periodontitis in terms of BMI, Body fat and maximum oxygen consumption.²

Obesity is a risk factor for periodontitis, with a higher prevalence of periodontitis instituted among obese patients.³ A larger percentage of obese individuals at risk for periodontitis will develop this disease as a result of their obesity condition.⁴ Increased BMI is associated with gingival bleeding, a symptom of periodontal disease. Additionally, periodontal disease is associated with weight gain.⁵

The nutritional factors also have the definite influence on the periodontal status of the individuals. So that there are 2 main groups.

- 1) Vegetarian diet group
- 2) Mixed diet group.

These groups were divided on the basis of the daily intake of the food of the individuals. Age was the factor most strongly associated with the attachment loss, with odds ratios for subjects 35 to 44 years old ranging from 1.72 (95% CI:1.18 to 2.49) to 9.01 (5.86 to 13.89) for subjects 65 to 74 years old.² There is relationship between the periodontitis and obesity because both take long time for development. Human dentition is suitable for the vegetarian diet more over than the mixed diet. It is suitable for the vegetarian food more likely because of the broad surface of the molars which are more likely suitable to chew the

fibrous food.⁶ The salivary pH also changes fast in the mixed diet people and saliva is somewhat acidic by pH. But in the vegetarian people the saliva is almost neutral by pH. Diet has a strong association with the body weight of the persons. Periodontitis is most probably caused by the gram negative bacteria and as the inflammations of the gums are present many inflammatory mediators are also present. Periodontitis also affect's the systemic health of the patient and periodontitis is also associated with the diet which patient takes so that it seems responsible to investigate the relation between the body mass index and periodontal disease status among the vegetarian and mixed diet subject.

Material and Methods:

Study Population: A cross sectional analytical study was conducted in 200 among vegetable and mixed diet subject. Subjects were selected by Random sampling method. Udaipur is located in southeastern zone of Rajasthan. This study was done between the time periods from November 2008 to January 2009

Udaipur was divided into 4 zones those were North, East, West and South. The methodology used was based on the WHO Oral health survey Basic methods (1997)⁷. Taking socio demographic profile of Udaipur, into account 200 subjects were selected using simple random technique and those subjects were in the age groups between 35 to 44 years.

General Examination:

The indicators of the obesity were assessed using Body mass index. Body mass index is calculated by dividing the weight in kilograms of the subjects with height of the subjects in meter square.

- 1) Underweight (<18.5kg/m²)
- 2) Normal (18.5 to 24.9 kg/m²)
- 3) Overweight (25 to 29.9 kg/m²)
- 4) Obese (>30 kg/m²)

The cut of point for Body Mass Index were based on the Guidelines of the WHO⁸.

Risk Factors:

The risk factors were assessed from the socio demographic variables and their visit to the dentist.

Oral Examination:

This investigation was carried out using the following Indices.

- (a) Loss of attachment Index,

- (b) Community periodontal Index,
- (c) Oral Hygiene Index - Simplified
- (d) Body mass Index

All the volunteers were offered oral health evaluation and treatment at Department Of Community And Preventive Dentistry, of Darshan Dental College Udaipur. All the clinical data were recorded by the same trained examiner. Intra examiner variability was checked by kappa statistics.kappa value was 0.90. Community periodontal index, loss of attachment index and oral hygiene index - simplified were recorded, in addition to the prescribed Performa which included the dietary intake, height and weight of the subjects.

Subjects were examined for the following teeth 16, 11, 26, 36, 31, 46.on mesial, buccal, distal, lingual surfaces, in case of the missing teeth among the 16, 26 ,36, 46 the adjacent tooth were recorded that is 17, 27 ,37, 47. Tooth attachment loss level was measured as the distance between the cemento enamel junction and the most apical penetration of the probe, for the 16, 11, 26, 36, 31, 46 teeth. Ethical clearance was obtained from the ethical committee of Darshan Dental College and hospital. Informed consent was taken before starting the examinations.

Statistical Analysis:

Statistically significant difference between the two group means were tested with the help of t – test. Spearman’s correlation coefficient was used to analyze linear relationship of each two variables. This statistical analysis was done with the help of Statistical package for social science software (SPSS) version 11.

Results:

Table 1: Distribution of study subjects according to gender.

	Frequency	Percent
Male	139	69.5
Female	61	30.5
Total	200	100.0

Table 1 shows the Male Female ratio in the percentage. About 69.5 % of the subjects were males and 30.5 % of the subjects were females.

Table 2 shows that the mean and standard deviation values among the vegetarian and mixed diet subjects. Values are 23.5173 and 3.3713 respectively

Table 2: Mean and Standard deviation values among the vegetarian and mixed diet subjects.

	Vegetarian		Mixed diet	
	Mean	S.D	Mean	S.D
BMI	23.5173	3.3713	22.9455	3.2706
OHIS	1.00	0.71	1.17	0.67
CPI	2.44	1.24	2.80	1.13
LOA	0.83	0.79	1.02	0.79

of body mass index. 1.00 and 0.71 of oral hygiene index, 2.44 and 1.24 of community periodontal index and 0.83 and 0.79 of loss of attachment index among the vegetarian diet. In mixed diet mean and standard deviation values are 22.9455 and 3.2706 of body mass index, 1.17 and 0.67 of oral hygiene index, 2.80 and 1.13 of community periodontal index and 1.02 and 0.79 of loss of attachment index.

Table 3: Spearman’s correlation values between periodontal disease indicators, obesity indicators and gender

		OHIS	CPI	LOA	BMI	Gender
OHIS	R	1.000	.916**	.887**	.188**	.085
	P	0	.000	.000	.008	.231
CPI	R	.916**	1.000	.962**	.213**	.081
	P	.000	.	.000	.002	.255
LOA	R	.887**	.962**	1.000	.208**	.039
	P	.000	.000	.0	.003	.586
BMI	R	.188**	.213**	.208**	1.000	.029
	P	.008	.002	.003	0	.681
Gender	R	.085	.081	.039	.029	1.000
	P	.231	.255	.586	.681	0

**Correlation is significant at the .01 level (2-tailed). Table 3 shows the correlation values between BMI on one side and There was strong correlation between BMI and LOA, CPI, OHIS, SEX.

Discussion:

This study showed a strong association between body mass index and periodontal disease status among the subjects aged 35 to 44 years. This age group was chosen because there were previous studies that reported association between mass index and periodontal disease status in younger but not in 35-44 years of age group. Our results were also similar to those reported by Sheiham⁹ in 2002 and cross sectional study of al-zaharani¹⁰ in 2003. Al-zaharani showed a significant association between obesity and prevalence of periodontal disease only among the individuals aged 18 to 34 years and not in the middle or older age group. The explanation given for this were that since the aging is associated with the increase body fat mass, it is responsible to assume that most of the obesity in the younger population started earlier in life.

The other explanation is the dilution of the effect of obesity in the older age groups due to the fact of that stronger risk factors could mask the influence of the obesity on the periodontal status of the older participants and the non-obese subject would develop periodontal disease as the age grows, diluting the affect of the obesity toward no association. Nakamura¹¹ in 1994 reported that the visceral fat accumulation that is frequently observe in the upper body. Obesity increases the risk factor of cardiovascular diseases and type II diabetes.

As the previous results shows the nature of the relationship between the BMI and oral health is clear rather complex. In our study oral hygiene was assessed by OHI-S, LOA, and CPI among the vegetarian and mixed diet subjects. The results showed the relation between the diet of the people and periodontal status. The people who were vegetarian had the good health status in spite of consuming tobacco in the comparison to the mixed diet people. In our study there is a comparison between people having vegetarian diet and mixed diet which consisted of 139 males and 61 females. The people who were consuming tobacco with the alcohol and had mixed vegetarian diet were definite prone to show poor oral hygiene.

The result of all the indices showed that the vegetarian subjects have the good oral hygiene in comparison to the mixed diet subjects. The BMI and periodontal relation showed that the obesity of the subjects definitely effect the oral health. Although the study has some strong points we appreciate that there are other factors that needs to be taken in the consideration such as the availability of the information

on many of the potential cofounders and periodontal status by loss of attachment, by measuring oral hygiene index and community periodontal index.

Conclusion:

In conclusion, obesity has a negative effect on a person's overall health, which includes periodontal health. Promotion of healthy nutrition (vegetable diet) and adequate physical activity may help prevent or slow the progression of periodontal disease. Oral health care providers can have an impact on treatment outcomes by recognizing patients at risk and addressing these concerns. Body mass index has a direct co-relation with periodontal status of the population.

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