ijcrr
Vol 04 issue 03
Category: Research
Received on:11/12/11
Revised on:15/12/11
Accepted on:19/12/11

ARE LIFESTYLE DISORDERS A RISK FOR PERIODONTAL DISEASE?

Manoj Raja

Karpaga Vinayaga Institute of Dental Sciences, Maduranthakam TK, Chennai

E-mail of Corresponding Author: msabitha@hotmail.com

ABSTRACT

The main objective of this study was to identify certain lifestyle disorders like diabetes mellitus and other medical conditions like hypertension and hyperlipedemia in an older adult population and to verify their relationship with the periodontal health status in the same group of individuals.

A total number of 600 patients between 35-75 years were selected for this study. Their lifestyle habits were obtained through a questionnaire. It was followed by a periodontal examination, blood pressure recording and a biochemical analysis of the blood samples taken from them.

Results of MLRA showed that diabetes mellitus, was clearly associated with attachment loss. Hypertension was not associated with attachment loss, and elevated blood cholesterol levels (hyperlipedemia) were associated only in univariate models.

It could be concluded that in the selected group of subjects aged 35-75 years, only diabetes mellitus was associated with attachment loss in this cross-sectional study.

Keywords: Diabetes, Attachment loss, Hypertension, Hyperlipedemia

INTRODUCTION

Diabetes mellitus is a bonafied risk factor in periodontal disease. Type 2 is the form of diabetes present in 90-95% of patients with the disease and the risk of developing this form of diabetes, increases with age, obesity, previous history of gestational diabetes and lack of physical activity. (Brian L. Mealey and Gloria L.Ocampo) 1

The association between diabetes and periodontal disease has been reported for more than forty years. "Chronic Periodontitis" is now considered the sixth complication of diabetes mellitus.2

Other general disorders like hypertension and elevated blood cholesterol levels (hyper lipedemia) often go hand in hand with diabetes mellitus. They are proving to be health epidemic in middle age populations causing many reasons to panic.

This cross sectional survey aims to correlate elevated blood sugar levels, hypertension and elevated blood cholesterol levels with Gingival and Periodontal disease. It also helps to include patient education and motivation in the treatment plan, thus keeping a check on these life style disorders in the long run.

MATERIALS AND METHODS

The present study was using a stratified randomly selected sample of 600 persons, aged 35 to 75 years from the patients in a private Dental College and Hospital. A William's probe and a Shepherd's Crook explorer were used for the examination of the periodontal parameters in the study

namely Gingival Index (GI), Probing Pocket Depth (PPD) and Clinical Attachment Level (CAL).

The blood pressure reading (both systolic and diastolic blood pressure) was recorded for all the subjects, using a conventional sphygmomanometer with the help of a general physician. The blood pressure was recorded in the morning time.

Each subject was then taken to the bio-chemical laboratory of the hospital for the assessment of Fasting blood sugar and Total blood cholesterol levels. The biochemical analysis was done in the morning time. The subjects who were included in the study were instructed to come on an empty stomach (i.e) they should not have consumed food for the past 12 hours. 3 ml of venous blood was drawn, from the Median-cubital vein of each subject using a 20- gauge needle connected to a 10 ml syringe.

Statistical Methods

The association of the three periodontal parameters namely Gingival Index (GI), Probing Pocket Depth (PPD) and Clinical Attachment Level (CAL) with three variables namely hypertension, diabetes and total cholesterol levels was estimated using "Chi-square test" to calculate the p - value

RESULTS

348 subjects who did not have hypertension showed a gingival index score less than or equal to 2, where as 24 subjects who did not have hypertension showed a gingival index score greater than 2.216 subjects who had hypertension showed a gingival index score less than or equal to 2, where as 12 subjects who had hypertension showed a gingival index score greater than 2.

The difference was not statistically significant in both the subjects who did not have hypertension and the subjects who had hypertension ($p = 0.68$). 514 subjects who did not have diabetes showed a gingival index score less than or equal to 2, where as 26 subjects who did not have diabetes showed a gingival index score greater than 2. 50 subjects who diabetes had showed a gingival index score more than 2, where as 10 subjects who had diabetes showed a gingival index score greater than 2. The difference was found to be statistically significant in both diabetics and non diabetics ($p<0.0001$). 532 subjects with total cholesterol levels less than 200mg per dl showed a gingival index score less than or equal to 2, where as 26 subjects with total cholesterol levels less than 200mg per dl showed a gingival index score greater than 2. 32 subjects with total cholesterol levels greater than 200mg per dl showed a gingival index score less than or equal to 2, where as 10 subjects with total cholesterol levels greater than 200mg per dl showed a gingival index score greater than 2.The difference was found to be statistically significant in both the subjects with total cholesterol <200mg/dl and subjects with total cholesterol levels > 200mg/dl ($p<0.0001$).

366 subjects who did not have hypertension had a probing pocket depth less than or equal to 5mm, where as 6 subjects who did not have hypertension had a probing pocket depth greater than 5mm. 222 subjects who had hypertension had a probing pocket depth less than or equal to 5mm, where as 6 subjects who had hypertension had a probing pocket depth greater than 5mm. The difference was not statistically significant in both the subjects who did not have hypertension and the subjects who had hypertension. ($p< 0.39$).540 subjects who did not have diabetes had a probing pocket depth less than or equal to 5mm, where as no subject who did not have diabetes had a probing pocket depth greater than 5mm. 48 subjects who had diabetes had a probing pocket depth less than or equal to 5mm, where as12 subjects who

had diabetes had a probing pocket depth greater than 5mm. The difference was found to be statistically significant in both diabetics and non diabetics ($p<0.0001$).558 subjects with total cholesterol levels less than 200mg per dl had a probing pocket depth less than or equal to 5mm, where as no subject with total cholesterol levels less than 200mg per dl had a probing pocket depth greater than 5mm.30 subjects with total cholesterol levels greater than 200mg per dl had a probing pocket depth less than or equal to 5mm, where as 12 subjects with total cholesterol levels greater than 200mg per dl had a probing pocket depth greater than 5mm. The difference was found to be statistically significant in both the subjects with total cholesterol <200mg/dl and subjects with total cholesterol levels >200mg/dl ($p<0.0001$).

324 subjects who did not have hypertension showed clinical attachment levels less than or equal to 4mm, where as 48 subjects who did not have hypertension showed clinical attachment levels greater than 4mm.192 subjects who had hypertension showed clinical attachment levels less than or equal to 4mm, where as 36 subjects who had hypertension showed clinical attachment levels greater than 4mm.The difference was not statistically significant in both the subjects who did not have hypertension and the subjects who had hypertension. ($p = 0.39$).480 subjects who did not have diabetes showed clinical attachment levels less than or equal to 4mm, where as 60 subjects who did not have diabetes showed clinical attachment levels greater than 4mm.36 subjects who had diabetes showed clinical attachment levels less than or equal to 4mm, where as 24 subjects who had diabetes showed clinical attachment levels greater than 4mm.The difference was found to be statistically significant in both diabetics and non diabetics ($p<0.0001$).498 subjects with total cholesterol levels less than 200mg per dl showed clinical attachment levels less than or equal to 4mm, where as 60 subjects with total cholesterol levels less than 200mg per dl showed clinical attachment levels greater than 4mm.18 subjects with total cholesterol levels greater than 200mg per dl showed clinical attachment levels less than or equal to 4mm, where as 24 subjects with total cholesterol levels greater than 200mg per dl showed clinical attachment levels greater than 4mm. The difference was found to be statistically significant in both the subjects with total cholesterol <200mg/dl and subjects with total cholesterol levels >200mg/dl ($p<0.0001$).

Results of Univariate Logistic Regression analysis showed that the factors such as diabetes (OR= 5.33, $p<0.0001$) and total cholesterol >200mg /dl (OR = 3.1, $p<0.0001$) were significantly associated with CAL. Hypertension was not significantly associated with CAL ($p = 0.32$). (Table1)

Results of multiple logistic regression analysis showed that only diabetes (OR = 4.3, $p < 0.0001$) was significantly associated with Clinical Attachment Loss. However the other variables like hypertension and total cholesterol >200mg/dl, were not significantly associated with Clinical Attachment Loss.

DISCUSSION

Chronic periodontitis is "an infectious disease resulting in inflammation within the supporting tissues of the teeth; progressive attachment loss, and bone loss" (Flemmig TF 1999)3.

Risk assessment is defined by numerous components4. Risk is the probability that an individual will develop a specific disease in a given period. The risk of developing the disease will vary from individual to individual. Genetic factors, age, gender socioeconomic status and stress are categorized as risk determinants 5.

Diabetes mellitus is an extremely important disease from a periodontal standpoint. This complex metabolic disorder, characterized by chronic hyperglycemia, is an established risk factor for periodontitis 6 and periodontitis is now considered to be the sixth complication in diabetes mellitus 2.Of the systemic risk factors, it has been well established that patients with diabetes have atleast a two-fold increase in the severity of periodontal disease as compared to non-diabetics 7-9.

Overall, in the present study, there were 60 diabetics. Patients, who had a Fasting Blood Sugar level (FBS) ≥ 126mg/dl, were considered as diabetics. Their inclusion was further substantiated through a questionnaire, wherein 55 out of the 60 subjects confirmed their diabetic status. Only 5 out of the 60 subjects came to know their condition, after our present study. There was a significant association between the 3 periodontal parameters and the diabetic patients in the study. Results showed 24 diabetics, had CAL > 4mm as against 36 diabetics, with CAL < 4mm. Similarly 12 subjects with diabetics had PPD > 5mm and 10 diabetic subjects had a GI score ≥ 2. These values were highly significant. The results of ULRA for CAL showed an odds ratio of 5.33, in diabetic's subjects while the results of MLRA for CAL had the highest odds ratio of 4.33. Considering the above results, diabetes mellitus, was found to be most significantly association with periodontal disease progression, in our present study.

The mean FBS level, in subjects with PPD > 5mm was found to be greater than 213mg/dl. This was in accordance with a study by Richard C Oliver et al10, wherein an increased prevalence and extent of periodontal pockets was a consistent finding of diabetics versus non-diabetics.

The Oulu study, reported more gingival bleeding, as metabolic control worsened in diabetics, despite similar plaque and calculus scores in the diabetic subgroup. Other studies also reported extensive gingival inflammation in diabetics 8. These results were similar to the one in our present study.

Hyperlipidemia is essentially not a well acknowledged risk factor for periodontal disease11. It plays a larger role in cardiovascular disease and stroke12.The results in ULRA for CAL in our present study showed an odds ratio of 3.1 for subjects with a Total Blood Cholesterol level >200mg/dl (42 subjects). However, 38 subjects in the group had an FBS level > 126mg/dl. So, the independent role of high Total Blood Cholesterol level (>200mg/dl), in periodontal disease could not be established in our present study, as the results of MLRA for CAL did not include subjects with Total Blood Cholesterol levels >200mg/dl as significant variables.

The role of hypertension in periodontal disease progression was clearly negative, from our present study. The results clearly indicated that hypertension was a non significant parameter in our present study in periodontitis.These results in our study, was in accordance to a similar study done by Mattout C et al13, who included arterial hypertension as a parameter, on a population of 2144 adults, in France. The results from the study yielded similar non-significant values for hypertension.

Thus we can infer that certain risk elements like Diabetes Mellitus play a major role in increasing the probability for chronic periodontal disease among older adults. One possible bias which could have occurred in our study is the relatively small sample size of subjects, belonging to a highly similar geographic area, and all of them being subjects, seeking some form of dental therapy, as they were selected from a patient pool, at a dental hospital.

Table 1: RESULTS OF UNIVARIATE LOGISTIC REGRESSION ANALYSIS FOR CAL

VARIABLE	OR (95% CI)	p - value
HYPERTENSION No	1.00	0.32(NS)
Yes	1.27 (0.79 – 2.02)	
DIABETES No	1.00	<0.0001 (Sig)
Yes	5.33 (2.98 – 9.55)	
TOTAL CHOLESTEROL (>200mg/dl) No	1.00	<0.0001 (Sig)
Yes	3.1 (2.5 – 4.9)	

ACKNOWLEDGMENTS

Authors acknowledge the immense help received from the scholars whose articles are cited and included in references of this manuscript. The authors are also grateful to authors / editors / publishers of all those articles, journals and books from where the literature for this article has been reviewed and discussed. I also wish to thank my professors T.Ramakrishnan, N.Ambalavanan, Pamela Emmadi and D.Deepalakshmi for their able guidance provided for my study.

The study was conducted on a self financing basis by the author Dr. Manoj Raja.

REFERENCES

1. Brian L. Mealey and Gloria L.Ocampo: Diabetes mellitus and periodontal disease, Periodontology 2000: 127-153, 2007.
2. Loe H: Periodontal disease: the sixth complication of diabetes mellitus, Diabetes Care 16 (suppl 1):329, 1993.
3. Flemmig TF: Periodontitis, Ann Periodontal 4:32, 1999
4. Page RC, Beck JD; Risk assessment for periodontal diseases, Int Dent J 47:61, 1997.
5. Michalowicz BS, Diehl SR, Gunsolley JC. Evidence of a substantial genetic basis for risk of adult periodontitis. J Clin Periodontol. 2000;71:1699–1707
6. Robert J Genco: Current view of risk factors for periodontal diseases. J Periodontol 1996; 67:1041 -1049
7. Tervonen T, and Knuuttila M: Relation of diabetes control to periodontal pocketing and alveolar bone level Oral Surgery, Oral Medicine, Oral Pathology 1986:61,346 -349
8. Taylor GW. Bidirectional interrelationships. between diabetes, and periodontal diseases: an epidemiologic perspective. *Annals of Periodontology*2001;6:99–112.
9. Soskolne W A and Klinger A: The relationship between periodontal diseases and diabetes an overview. Annals of Periodontology 2001:6,91 - 98.
10. Richard C Oliver and Tellervo Tervonen: Diabetes – A risk factor for periodontitis in adults? J Periodontol 1994;65:530 -538.
11. Moeintaghavi A, Haerian-Ardakani A, Talebi-Ardakani M, Tabatabaie I. Hyperlipidemia in patients with periodontitis. J Contemp Dent Pract. 2005 Aug 15; 6(3):78-85

12. Moise Desvarueyx, Christial Schwahn and Thomas Kocher. Gender differences in relationship between periodontal disease, tooth loss, and atherosclerosis. Stroke, 2004; 35, 2029.

13. Mattout C, Bourgeois D, Bouchard P. Type 2 diabetes and periodontal indicators: epidemiology in France 2002-2003. J Periodontal Res. 2006 Aug;41(4):253-8.

GRAPH: 1 NUMBER OF SUBJECTS WITH ELEVATED FBS LEVELS (FBS > 126 mg/dl) AND NORMAL FBS LEVELS (FBS< 126 mg/dl)