RELATIONSHIP BETWEEN PERIODONTAL DISEASE, SMOKING AND DIABETES IN CORONARY HEART DISEASE PATIENTS VISITING UNIVERSITY COLLEGE OF DENTISTRY, LAHORE, PAKISTAN

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ABSTRACT

This cross sectional study was done to find out the association of periodontal disease, smoking and diabetes in Coronary Heart Disease (CHD) patients. Sixty eligible coronary heart disease male patients with periodontitis visiting the University College of Dentistry between October 2011 to April 2012 were divided into 4 groups i.e. A (smoker-diabetic), B (nonsmoker-diabetic), C (smoker-non diabetic) and D (non smoker-non diabetic). Bleeding on probing, periodontal pocket depth and clinical attachment loss were noted as measures of periodontal status. Differences of periodontal parameters between groups A, B, C and D were analyzed using K-test of proportions and one-way ANOVA. Levels of bleeding on probing, periodontal pocket depth and clinical attachment loss were comparatively higher in group A (smoker-diabetic). Mean levels of bleeding on probing, periodontal pocket depth and clinical attachment loss were significant (<0.05) between groups. Forty five percent subjects of group A (smoker-diabetic) had periodontal pocket depth >4mm and clinical attachment loss >3mm at more than 30% of sites (p=0.01). This study showed that periodontal disease is significantly associated with coronary heart disease and the levels of periodontal parameters were higher in smoker-diabetic coronary heart disease patients suggesting an association between periodontal disease, smoking, diabetes and coronary heart disease.

Key words: Periodontal disease, Coronary Heart Disease, Smoking, Diabetes

INTRODUCTION

Chronic non communicable diseases (NCDs) including cardiovascular diseases, cancer, chronic obstructive pulmonary disease and diabetes are the biggest cause of death around the world including the south-east Asia region (SEAR). The observed rapid rise in non communicable diseases threatens economic and social development as well as lives and health of millions of people in the region.1 Of the estimated 14.5 million total deaths in 2008 in SEAR, 7.9 million (55%) were due to non communicable diseases. NCD deaths are expected to increase by 21% over the next decade. Of the 7.9 million annual NCD deaths in SEAR, 34% occurred before the age of 60 years compared to 23% in the rest of the world.1

Amongst the non communicable diseases, cardiovascular diseases are number one cause of death globally. An estimated 17.3 million people died from...
cardiovascular diseases in 2008, representing 30% of all global deaths. Of these deaths, an estimated 7.3 million were due to coronary heart disease.\(^2\) Low-and middle-income countries are disproportionately affected: over 80% of cardiovascular diseases deaths take place in low- and middle-income countries and occur almost equally in men and women. By 2030, almost 23.6 million people will die from cardiovascular diseases, mainly from heart disease and stroke. These are projected to remain the single leading causes of death.\(^2\)

Infection has been recognized to contribute to atherogenesis, contributing to pathology of cardiac diseases.\(^3\) Oral infections have been identified as chronic infections and periodontal disease is one of the most common types of prevalent oral diseases.\(^4\) Heart diseases are one of the most commonly found systemic condition in patients with periodontal disease.\(^5\) Various studies have reported significant association of periodontal disease with coronary heart diseases.\(^6,7,8,9\)

Both Periodontal and coronary heart disease are commonly influenced by two most established risk factors i.e. diabetes and smoking.\(^10,11,12,13\) Little work has been done on this topic in developing countries and probably no such study has been conducted so far in Pakistan. This cross-sectional study has been designed to explore further the relationship between periodontal disease and chronic heart disease through periodontal markers of bleeding on probing, periodontal pocket depth and clinical attachment loss in cardiac patients with and/or without diabetes and smoking reporting at University College of Dentistry Lahore Pakistan.

**METHODOLOGY**

For this study the following inclusion criteria was used:

- Only patients with coronary heart disease who had undergone percutaneous coronary intervention or coronary artery bypass graft of principal coronary vessel/s and were angiographically confirmed through personal files were selected
- Males only
- Age: \(>35\) years; with or without diabetes mellitus
- Current smokers/former smokers or non-smokers
- Having at least 14 teeth in mouth
- At least \(\geq 1\) tooth with Periodontal pocket depth of \(\geq 4\)mm at 4 sites and \(3\)mm clinical attachment loss at the same site

Coronary heart disease patients with following characteristics were excluded from study: patients having any cardiac procedure/intervention within \(<3\) months; patients having any acute/chronic inflammatory condition other than diabetes or trauma; patients reporting use of any anti-inflammatory drugs or antibiotics \(<1\) month; patients reporting periodontal treatment within \(<6\) months or tooth extraction within \(<1\) month; acute oral infections; not fulfilling oral/periodontal criteria; unable /un-willing to give consent. All coronary heart disease patients who visited the University College of Dentistry, The University of Lahore during the study period (October 2011 to April 2012) and fulfilled the exclusion/inclusion criteria were requested to participate in the study. Demographic parameters of age and marital status were noted. Subjects were classified into groups: groups A (smoker-diabetic), B (nonsmoker-diabetic), C (smoker-non diabetic), and D (nonsmoker-non diabetic).

Number of present teeth was noted for each study subject. Periodontal parameters of bleeding on probing, periodontal pocket depth and clinical attachment loss were noted for all teeth present in mouth excluding third molars. Bleeding on probing, periodontal pocket depth and clinical attachment loss were measured at six sites of each tooth with a UNC-12 calibrated probe by a two calibrated examiners. Analysis was done to compare the groups A, B, C, and D. For categorical variables \(K\)-test of proportions (Marascuilo procedure for intergroup differences) used and for continuous variables ANOVA \(t\)-test was applied as tests of significance. Value of \(p \leq 0.050\) was considered as level of significance.

**RESULTS**

A total of sixty male coronary heart disease individuals completed the one stage examination and a response rate of 100% was obtained. The periodontal parameters of study are presented in table 1. A comparison of status of variables between the groups A, B, C and D are given with statistical significance values.
Periodontal parameters were observed at 8143 sites of 1437 teeth. The Mean ± SD of number of teeth was 25.07 ± 3.82. The difference of Mean number of teeth between the groups was found to be insignificant (p=0.648).

**DISCUSSION**

This study observed the association of periodontal disease, smoking and diabetes in coronary heart disease patients. The results of the study confirm a strong association between periodontal disease and the two common risk factors i.e. smoking, diabetes in coronary heart disease patients. This finding is similar to previous studies by Page RC\(^1^4\) who suggested that both periodontal and systemic diseases (such as cardiovascular disease) share common risk factors including tobacco smoking, male gender and aging. The results are also in coherence with the study conducted by Cairo F et al who reported a strong relationship between diabetes mellitus and periodontal disease.\(^1^5\)

Results of this study also reveal that study sample belonged to the middle age population which corresponds to coronary heart disease data of study by Jafar TH et al on the prevalence of cardiovascular diseases in Pakistan suggesting that one in 4 middle-aged adults in Pakistan have prevalent cardiovascular disease. Risks are uniformly high in the young.\(^1^6\) Majority of study subjects belonged to middle and lower social class that is in agreement with other studies reporting the socio-economic status of coronary heart disease population of Pakistan.\(^1^7\)

The subjects in the four groups (A, B, C, and D) were presented with similar baseline characteristics with respect to age and income. The insignificant difference in status of number of present teeth between the groups (A, B, C, and D) minimized the level of disagreement for recording of periodontal parameters for a comparison between groups.

The status of bleeding on probing, periodontal pocket depth and clinical attachment loss were notably and significantly higher in smoker-diabetic group (A), that shows a role of smoking and diabetes on periodontal disease status and this finding conforms to the literature.\(^1^8\) The difference of periodontal parameters between non-smoker diabetic (B) and smoker non-diabetic (C) was insignificant; suggesting that smoking and diabetes have contributed equally to periodontal disease status in this study sample. This finding is in line with other studies reporting role of diabetes and smoking as personal factors to diminish the efficiency of host defense and increase disease occurrence.\(^1^9\)

The possible limitations of this study, as we may report are non-inclusion of other confounding factors i.e. marital status and female gender. The reason for not noting the marital status was that the influence of marital status on diabetes, smoking and periodontal diseases in not well supported by literature. Since

<table>
<thead>
<tr>
<th>Parameters of Study</th>
<th>Angiographically confirmed CHD Patients n=60</th>
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<tbody>
<tr>
<td></td>
<td>Smoker-diabetic n=17</td>
</tr>
<tr>
<td>Present teeth Mean±SD</td>
<td>25.0±3.20</td>
</tr>
<tr>
<td>BOP (%) Mean±SD</td>
<td>44.5±15.56</td>
</tr>
<tr>
<td>% sites with BOP&gt;30%</td>
<td>48.3</td>
</tr>
<tr>
<td>PPD(mm) Mean±SD</td>
<td>3.7±0.72</td>
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<tr>
<td>% sites with PPD≥4mm</td>
<td>49.8±10.17</td>
</tr>
<tr>
<td>CAL(mm) Mean±SD</td>
<td>4.4±1.99</td>
</tr>
<tr>
<td>% sites with CAL≥3mm</td>
<td>68.2±20.5</td>
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</tbody>
</table>

*ANOVA t-test, **K-test of proportions (Marascuilo procedure), significance level <0.050

BOP=Bleeding on Probing PPD=Periodontal Pocket Depth CAL=Clinical Attachment Loss
there was a scarcity of female patients with established coronary heart disease visiting the study site therefore to avoid bias only males were included in the study. The recommendations for future research are that the association between coronary heart disease and periodontal disease should also be explored through systemic inflammatory markers of coronary heart disease just like we explored the association through periodontal disease markers of bleeding on probing, periodontal pocket depth and clinical attachment loss. Different age groups and female gender should also be explored. The results of the study endorse the relationship of periodontal disease with diabetes and smoking in coronary heart disease patients and emphasize the need to make the easier choice the healthier choice. Patients with coronary heart disease should be discouraged from smoking and health professionals should contribute in reduction and quitting of smoking not only in coronary heart disease patients but in general public too. Food and physical inactivity are known to contribute in coronary heart disease directly and through uncontrolled diabetes, therefore making healthier food accessible, affordable and acceptable may contribute significantly in reduction and control of diabetes, coronary heart disease and subsequently periodontal disease.

REFERENCES


7 Joshipura KJ. The relationship between oral conditions and ischemic stroke and peripheral vascular disease. JADA 2002;133:23-30


12 Muller HP. Smoking and Periodontal health. Gesundheitswesen 2000;62(7):400-08


14 Page RC. The etiology and pathogenesis of periodontitis. Compend Contin Educ Dent 2002;23(5):11-14


