Prevalence of periodontitis in diabetic patients in Jharkhand

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INTRODUCTION

Periodontal disease is an inflammatory condition affecting tooth-supporting tissues such as the gums, cementum, periodontal ligament, and alveolar bone.¹⁻³ It is associated with the presence of microorganisms causing inflammatory lesions that result in the damage and destruction of tooth supporting tissues.⁴⁻⁶

Mealey and Ocampo⁷ and Pérez et al.⁸ stated that in a healthy periodontal tissue, the gums are firm, healthy, non-bleeding, and pale pink and cover the entire root of the tooth whereas in diseases like gingivitis, the dental plaque and tartar cause gingival irritation resulting in mucosal redness and edema. In its more severe form, periodontitis, there is marked destruction of periodontal fibers.¹⁻³

There are many criteria that a dentist should evaluate to determine the presence, course, and severity of periodontal disease, one of them being diabetes mellitus (DM). Wild et al.¹⁰ stated that diabetes affects millions of people worldwide. The main complication of DM is angiopathy which is observed in oral tissues¹¹ making researchers to believe that periodontal disease is a complication of DM.¹²⁻¹⁶ Periodontal disease can occur in most age groups but is more common in diabetic adults.
and elders. Tissue destruction in periodontitis results in the breakdown of the collagen fibers of the periodontal ligament, resulting in the formation of a periodontal pocket between the gingiva and the tooth.

There is emerging evidence to support the existence of a two-way relationship between diabetes and periodontitis, with diabetes increasing the risk of periodontitis. The aim of the present study was to investigate the prevalence of periodontal disease among diabetic individuals in Jharkhand, a state in eastern part of India.

MATERIALS AND METHODS

The present study was carried out across a period of 6 months in Ranchi. The sample consisted of a total of 500 dentulous patients (250 males and 250 females), over 30 years of age having a history of diabetes. The self-administered questionnaire was provided to the patients.

The mode of dental examination in the current study was done as was performed by Pathak et al. in their study. Clinical examinations were performed in the dental office. Under proper asepsis, periodontal probes (Hu-Friedy, Chicago, USA), mouth mirrors, and gauze were used to examine all faces of the teeth.

The CPI index was used for the periodontal assessment in accordance with Namariyama, in which the dentition was divided into sextants. The highest CPI code was recorded in each segment as under:

- Code 0: No signs of periodontal disease
- Code 1: Gingival bleeding after gentle probing
- Code 2: Supragingival or subgingival calculus
- Code 3: 4–5 mm deep pathologic pockets
- Code 4: 6 mm or deeper pathologic pockets
- Code X: Missing index teeth

The other parameters considered in the diagnosis were gingivitis and periodontitis. The oral hygiene condition was visually evaluated by examined as good (plaque covering less than one-third of tooth surfaces), fair (plaque covering more than one-third but less than two-thirds of tooth surfaces), and poor (plaque covering more than two-thirds of tooth surfaces).

Statistical Analysis

The data were assimilated and entered into Statistical Package for the Social Sciences SPSS version 20 (SPSS Inc., Chicago, IL, USA) database and analyzed. Chi-square test was used to assess the significance in the difference in the proportion of responses with \( P \leq 0.05 \) was considered statistically significant.

RESULTS

Within the limitations of the present study, it was observed that diabetic females are more at risk of developing apical periodontitis. It was also observed that periodontal destruction was more common in older individuals. Almost 74\% of the female participants (\( n = 185 \)) were have periodontal destruction in comparison to 150 male samples (60\%) [Table 3] and 89\% of the diabetic individuals between 51 and 60 years of age exhibited periodontitis whereas only the number was lesser in younger individuals [Table 4].

From the results, it could be concluded that periodontitis is more common in diabetic females than in diabetic males where \( P \)-value observed was 0.000872 which is highly significant as \( P < 0.05 \).

The periodontal destruction was significantly higher in 51–60 years followed by 41–50 years and was less than 40\% in patients aged between 30 and 40 years of age. This shows increasing trends of periodontitis in older individuals, which is statistically highly significant.

### Table 1: Basic information of participants

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Age (years)</th>
<th>Male ( n = 250 )</th>
<th>Female ( n = 250 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>30–40</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>2</td>
<td>41–50</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>3</td>
<td>51–60</td>
<td>50</td>
<td>50</td>
</tr>
</tbody>
</table>

### Table 2: CPI index

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Code</th>
<th>Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Code 0</td>
<td>No signs of periodontal disease</td>
</tr>
<tr>
<td>2</td>
<td>Code 1</td>
<td>Gingival bleeding after gentle probing</td>
</tr>
<tr>
<td>3</td>
<td>Code 2</td>
<td>Supragingival or subgingival calculus</td>
</tr>
<tr>
<td>4</td>
<td>Code 3</td>
<td>4–5 mm deep pathologic pockets</td>
</tr>
<tr>
<td>5</td>
<td>Code 4</td>
<td>6 mm or deeper pathologic pockets</td>
</tr>
<tr>
<td>6</td>
<td>Code X</td>
<td>Missing index teeth</td>
</tr>
</tbody>
</table>

### Table 3: Analysis of gender and risk of periodontitis in samples

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Gender</th>
<th>( n )</th>
<th>Presence of periodontitis</th>
<th>%</th>
<th>Absence of periodontitis</th>
<th>%</th>
<th>( P )-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Male (( n = 250 ))</td>
<td>250</td>
<td>150</td>
<td>60.0</td>
<td>100</td>
<td>40.0</td>
<td>0.000872 (HS)</td>
</tr>
<tr>
<td>2</td>
<td>Female (( n = 250 ))</td>
<td>250</td>
<td>185</td>
<td>74.0</td>
<td>65</td>
<td>35.0</td>
<td></td>
</tr>
</tbody>
</table>

### Table 4: Analysis of age and risk of periodontitis in samples

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Age</th>
<th>( n )</th>
<th>Presence of periodontitis</th>
<th>%</th>
<th>Absence of periodontitis</th>
<th>%</th>
<th>( P )-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>30–40</td>
<td>200</td>
<td>68</td>
<td>34.0</td>
<td>132</td>
<td>66.0</td>
<td>0.001 (HS)</td>
</tr>
<tr>
<td>2</td>
<td>41–50</td>
<td>200</td>
<td>152</td>
<td>76.0</td>
<td>48</td>
<td>24.0</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>51–60</td>
<td>100</td>
<td>89</td>
<td>89.0</td>
<td>11</td>
<td>11.0</td>
<td></td>
</tr>
</tbody>
</table>

\( \chi^2 = 11.081; \, P \leq 0.05 \)
DISCUSSION

The present survey was conducted to assess the incidence of periodontal destruction in diabetic subjects in eastern part of India. In the present study, 500 diabetic patients (250 males and 250 females) between the age groups of 30 and 60 years were evaluated for signs of periodontitis. Under the limitations of the present study, it was observed that diabetic females were more prone to periodontal destruction with almost 75% of the subjects having periodontitis whereas only 60% of the male subjects presented with periodontal destruction. Older subjects were more susceptible to periodontitis in comparison to young diabetics where only 34% of the subjects were having periodontal destruction.

Several studies have concluded that periodontal disease is common in diabetic patients. Vascular abnormalities, dysfunctional factors, abnormalities synthesis, and genetic predisposition result in periodontal destruction in diabetic patients.

There are two hypotheses for determining the relationship between periodontitis and diabetes. Kiran et al. stated that the basement membrane protein undergoes non-enzymatic glycation and as the inflamed periodontium is highly vascular, this inflamed tissue serves as an endocrine-like source for tumor necrosis factor alpha and other inflammatory mediators. Nishimura et al. stated that genetic factors resulted in the development of either periodontitis or diabetes whereas Thorstensson et al. in their study inferred that periodontal disease can increase the risk of difficult metabolisation of carbohydrates, which causes the occurrence of diabetes.

In our study, we studied the association of periodontal destruction in diabetic patients. We included 250 patients each of both the genders with similar age correlation to ensure an uniformity in testing subjects and to eliminate any bias. Although detailed history was taken, yet habits such as tobacco consumption, smoking, and oral hygiene maintaining practices were not taken into account.

Drumond-Santana et al. observed 49.1% prevalence of periodontitis in diabetic patients. Pathak et al. in their study concluded that periodontitis was statistically more prevalent among men and stated that multiple determinants are associated with the prevalence of periodontitis among patients with diabetes. Lindhe concluded that individuals with diabetes have higher percentages of deep pockets and severe attachment loss than non-diabetic individuals.

CONCLUSION

The results of the present study indicate a high prevalence of periodontitis among females and old adults with diabetes in the East India. The treatment of periodontitis is essential in diabetic patients because an effective treatment of periodontal destruction improves blood glucose levels. Various consistent measures are required at larger level to broaden access to oral health-care services in India to curb the periodontal destruction in diabetic patients.

REFERENCES


