FREQUENCY OF DENTAL CARIES IN TYPE 2 DIABETICS VERSUS NON-DIABETICS
A CROSS-SECTIONAL STUDY IN PRIVATE HOSPITALS OF KARACHI

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ABSTRACT

Objective: The current study was conducted to assess the frequency of dental caries in type 2 diabetics versus non-diabetics.

Materials and Methods: A cross-sectional study was conducted from August 2018-October 2018 amongst Type II Diabetics and non-diabetics attending the Diabetic Outpatient Department (OPD) in Baqai Institute of Diabetology, Nazimabad and out-patient Department of Oral Diagnosis, Baqai Dental College. The sample size was estimated using Open Epi version 3.03a by taking 27% prevalence rate with 95% confidence interval and α = 5%. The sample size calculated is 300. A consecutive sampling method was done and 150 patients with type II diabetes and 150 non-diabetic patients were examined. Data was analyzed using SPSS (Statistical Package for Social Sciences) version 22.

Results: The frequency of dental caries in type II diabetic patients was found to be 42.7% and 42% in non-diabetic patients. The results were statistically significant.

Conclusion: There is an association between dental caries and type II diabetes mellitus but there was less difference reported in prevalence of dental caries amongst diabetics and non-diabetics.

Keywords: Caries Index, Dental caries, Diabetes Mellitus, Oral health, Risk assessment

INTRODUCTION

Diabetes mellitus is a type of metabolic condition characterized by high blood glucose levels caused by a lack of insulin secretion or an insulin action or both.¹ Diabetes mellitus has been classified into two basic types: insulin-dependent DM (IDDM; type 1) and non-IDDM type 2.² Obesity is most commonly seen after 30 years of age and increased blood glucose levels are a sign of Type 2 DM.³ Dental caries is a microbial disease of the calcified tissues of the teeth which is characterized by alternate phase of demineralization and remineralization of the organic substances resulting in cavitation.⁴ There is an intricate association between the diabetes mellitus and dental caries,⁵ particularly amongst adults which has received not much attention so far despite of the fact that both diabetes mellitus and dental caries are related to carbohydrate ingestion.⁶⁻⁷ Various studies reported that dental caries is associated with systemic diseases like cardiovascular disease,⁸ cerebrovascular disease,⁹ metabolic syndrome.¹⁰

Some researchers reported association between dental caries and type 2 diabetes mellitus¹¹⁻¹³ whereas others reported no association¹⁴ or even inverse association¹⁵ between dental caries and type 2 diabetes mellitus.

According to the World Health Organization (WHO), diabetes mellitus is now growing abruptly worldwide, and spread is epidemic.¹⁶ Diabetes mellitus affected approximately 2.8% of people worldwide...
in 2000 in all age groups and it is projected to grow to 4.4% by 2030. Roglic et al in a study reported that Diabetes is responsible for almost nearly 3 million deaths per year which is equal to 5.2% of all deaths. Moosa et al in a study found that non-diabetics had a higher prevalence of dental caries than diabetics. The Rationale of the study was to highlight caries experience in diabetics and non-diabetics.

The current study was conducted to assess the prevalence of dental caries amongst type 2 diabetic and non-diabetic adults visiting Hospitals of Karachi.

MATERIALS AND METHODS

A cross sectional study was conducted from August 2018–October 2018 amongst Type 2 Diabetics and non-diabetics attending the Diabetic Outpatient Department (OPD) in Baqai Institute of Diabetology, Nazimabad and Outpatient Department of Oral Diagnosis, Baqai Dental College. The study was approved by ethical committee, Baqai Dental College and permission for patient examination was obtained from respective authorities. Patients aged 30–70 years with a history of 3 years of type 2 Diabetes and healthy patients with no history of Diabetes were included in the study. Open Epi version 3.03a was used to calculate the sample size by taking 27% prevalence rate at 95% confidence interval and α = 5%. The sample size calculated was 300. A consecutive sampling method was done and 150 patients with type 2 diabetes and 150 non diabetic patients were examined. An informed consent was taken, and data was collected with a closed ended questionnaire which included questions about demographic profile, type of Diabetes Mellitus and history of duration of Diabetes Mellitus. The participants completed the questionnaire to ensure data collection accuracy. The WHO 2013 proforma was used to record dental caries. Clinical examination was performed by a single examiner and was trained for a week in the Department of Operative Dentistry. Patients were seated comfortably on dental chair to examine all teeth present sextant wise using mouth mirror and sickle probe with disposable gloves and mask.

Data was analyzed by using SPSS (Statistical Package for Social Sciences) version 22. The chi-square test was used to compare the prevalence of dental caries between the sample groups and mean and SD were determined by using Student’s t-test. Level of significance was kept at 0.05.

RESULTS

A total of 300 patients aged 17–70 years were examined, out of which 187 were male patients and 113 female patients. (Table 1)

The frequency of dental caries in type II diabetic patients was found to be 42.7% and 42% in non-diabetic patients. The results were statistically significant. (Table 2)

Dental caries was recorded as DT (decayed teeth), MT (missing teeth), FT (filled teeth). Mean value of DT and MT was found to be higher in type II Diabetic group. Mean value of DT and MT was again found to be higher than FT in non-diabetic group. Mean DMFT was found to be higher in Type II diabetic group than non-diabetic group. The results were statistically significant. (Table 3)

DISCUSSION

The present study reported that there is an association between dental caries and type 2 Diabetes Mellitus. Dental caries was found to be 42.7% more common in diabetics than non-diabetics (42%). Dissimilar results were reported by Malvania E et al in a study that prevalence of dental caries amongst diabetics was 73.33% and 30.83% amongst the non-diabetics. Reddy C et al also reported dissimilar results that prevalence of dental caries amongst diabetics was 69.7% and non-diabetics 65.3%. Moin M et al, Malicka et al, Shoaib A et al and Sadia I et al reported high prevalence of dental caries amongst type 2 diabetics and non-dietics. Mohammed N et al in a study reported a low prevalence of dental caries amongst type 2 diabetics. Bacic M et al in a study reported no difference in the prevalence of dental caries amongst diabetics and non-diabetics. Hawraa K in a study reported no significant differences of dental caries amongst diabetics and non-diabetics. High caries in diabetic patients can be attributed to more regular meals than normal patients and even small amount of carbohydrates may be cariogenic when combined with high blood glucose level and hyposalivation. Another explanation may be that diabetic patients are less likely have access to oral health services as compared to non-diabetics. The reasons for differences were not investigated but it’s likely that this is due to lack of knowledge on the part of diabetic patients about oral diseases, and apparently lack of time management for this oral care
Regarding dental caries risk indicators, the present study reported that DT and MT amongst type II diabetics were higher than FT in non-diabetics. In type II diabetics, the mean score of DMFT was found to be higher in type II diabetics than non-diabetics. Reddy C et al.\(^6\) in a study reported that mean DMFT score amongst diabetics was high than non-diabetics. Kampoo K et al.\(^32\) in a study reported that mean DMFT score was higher in diabetics as compared to non-diabetics. Latti B et al.\(^33\) in a study reported that mean DMFT score was higher in diabetics than non-diabetics. Singh A et al.\(^34\) in a study reported high DMFT score in diabetics as than non-diabetics. Seetha Lakshmi et al.\(^35\) reported that the mean DMFT was higher in diabetics when than non-diabetics. Iqbal S et al.\(^24\) in a study reported that DFT score was higher in diabetics than non-diabetics. Jawed M et al.\(^36\) in a study reported a higher DMFT score in diabetics as compared to non-diabetics. Dissimilar results were reported by Bacic M et al,\(^27\) Collin H et al.\(^37\) Kanjirath P et al.\(^38\) in a study reported slight difference in DMFT amongst diabetics as compared to non-diabetics. The lack of defensive mechanism on the part of the saliva causes oral diseases in diabetics because it cleans and buffers the mouth and action of saliva are also compromised.

### Table 1: Demographic profile of study groups

<table>
<thead>
<tr>
<th>Variables</th>
<th>Options</th>
<th>Frequency (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Male</td>
<td>187(62.3%)</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>113(37.7%)</td>
</tr>
<tr>
<td>Marital status</td>
<td>Married</td>
<td>288(96%)</td>
</tr>
<tr>
<td></td>
<td>Unmarried</td>
<td>12(4%)</td>
</tr>
<tr>
<td>Type II Diabetic</td>
<td>Decayed</td>
<td>128(42.7%)</td>
</tr>
<tr>
<td></td>
<td>No decay</td>
<td>22(7.3%)</td>
</tr>
<tr>
<td>Non-Diabetic</td>
<td>Decayed</td>
<td>126(42%)</td>
</tr>
<tr>
<td></td>
<td>No decay</td>
<td>24(8%)</td>
</tr>
<tr>
<td>Age</td>
<td>Mean ±SD.</td>
<td>44.82±13.83</td>
</tr>
<tr>
<td></td>
<td>Min ± Max</td>
<td>17±70</td>
</tr>
</tbody>
</table>

### Table 2: Prevalence of Dental caries among the study

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>n</th>
<th>Prevalence</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type II Diabetic</td>
<td>150</td>
<td>128</td>
<td>42.7%</td>
<td>0.000</td>
</tr>
<tr>
<td>Non-Diabetic</td>
<td>150</td>
<td>126</td>
<td>42%</td>
<td>0.000</td>
</tr>
</tbody>
</table>

### Table 3: Descriptive statistics of dental caries among diabetics and non-diabetics

<table>
<thead>
<tr>
<th>Variable</th>
<th>DT (mean±SD)</th>
<th>MT (mean±SD)</th>
<th>FT (mean±SD)</th>
<th>DMFT (mean±SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type II Diabetic</td>
<td>4.79±4.123</td>
<td>4.19±5.353</td>
<td>0.23±0.689</td>
<td>9.21±6.461</td>
</tr>
<tr>
<td>Non-Diabetic</td>
<td>3.89±3.783</td>
<td>2.50±3.689</td>
<td>0.15±0.454</td>
<td>6.54±5.673</td>
</tr>
<tr>
<td>Independent t-test values</td>
<td>0.51</td>
<td>0.002</td>
<td>0.2</td>
<td>0.000</td>
</tr>
</tbody>
</table>
LIMITATIONS

The present study was limited to the sample size, selection criteria of diabetic and non-diabetic patients, qualitative and quantitative rate of saliva flow, blood glucose level, dental visits, and oral hygiene variables were missing.

CONCLUSIONS

The present study findings concluded that there is an association between dental caries and type II diabetes mellitus, but there was less difference reported in prevalence of dental caries amongst diabetics and non-diabetics. Diabetic patients should always seek care to maintain their oral hygiene by following proper tooth brushing, regular visits to dentists, physicians for blood glucose level and dietician for proper intake of diet.

REFERENCES

24. Shoaib A, Ul Hassan M, Hussain RI, Firdous K. Fre-


