INTRODUCTION

Diabetes Mellitus refers to a group of common metabolic disorders that share the phenotype of hyperglycemia. Several distinct types of diabetes mellitus exist that are caused by a complex interaction of genetics and environmental factors. Diabetes mellitus is classified on the basis of the pathologic process that leads to hyperglycemia. The two broad categories are type 1 and type 2. Type 2 diabetes mellitus is characterized by variable degree of insulin resistance, impaired insulin secretion and increased glucose production. Based on the current trends, >360 million individuals will have diabetes by the year 2030. The prevalence of type 2 diabetes mellitus is rising much more rapidly because of increase in obesity and decrease in activity level in developed and industrialized countries.

A number of oral disorders have been associated with diabetes mellitus. The association of diabetes mellitus and periodontal diseases (such as gingivitis...
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and periodontitis) has received the greatest attention. In addition to gingivitis and periodontitis, root dental caries, salivary dysfunction, oral mucosal diseases, oral infections such as candidiasis, taste and other neurosensory disorders are seen in patients of diabetes mellitus.3 In Patients of type 2 diabetes mellitus which often is associated with obesity and intake of high-calorie and carbohydrate-rich food—can be expected to have a greater exposure to cariogenic foods.3,7-9 Furthermore, a reduction in salivary flow has been reported in people with diabetes who have neuropathy,4 and diminished salivary flow is a risk factor for dental caries. Diabetes is believed to promote periodontitis through an exaggerated inflammatory response to the periodontal microflora.6-9

Dry mouth, or xerostomia, has been reported in people with diabetes mellitus.4 Salivary dysfunction, however, can be difficult to diagnose. A number of types of oral mucosal lesions, including lichen planus and recurrent aphthous stomatitis, have been reported in people with diabetes mellitus. Not all study results have showed this association, and these are relatively common disorders that often are observed in patients who do not have diabetes.7,9 In contrast, oral candidiasis has been a more consistent finding in patients with diabetes.6 Candidiasis is a manifestation of an immunocompromised state, and a reduction in salivary flow is another risk factor for oral candidiasis.10

Taste disturbances is a complex symptom, and it may be related to salivary flow and changes in food intake associated with disease management. Other neurosensory disorders of the oral and perioral tissues, include burning mouth syndrome and dysphagia, have been reported in patients with diabetes.5,6-9 In contrast to other reported oral manifestations of diabetes mellitus, periodontal disease is a recognized and well-documented complication of diabetes mellitus. Data suggest that periodontal disease may increase the risk of experiencing poor metabolic control.2,3,7

METHODOLOGY

This study was conducted from January 2010 to January 2011, at the OPD of the Operative Department of AFID, Rawalpindi. 200 patients diagnosed as suffering from type 2 diabetes mellitus of ≥35 years of age were included. Physically and mentally handicapped patients, patients of Type 1 diabetes mellitus, patients of chronic renal failure as well as patients on immunosuppressive therapy or who had undergone any transplantation and those using alcohol/smoking were excluded from study. It was a cross sectional prospective/observational study.

Information like patient age, gender, address and any other significant medical information were record on a predesigned proforma by the author, followed by detailed dental history, intra-oral examination and radiographs. In doubtful cases consultation of the supervisor/advisor was sought. All the data were collected through the specially designed proforma. Data were analyzed in terms of frequency, percentages and ratios using SPSS 15. Mean and standard deviation was calculated for age, while only percentage was calculated for gender.

RESULTS

Out of two hundred patients 70(35%) were female and 130(65%) were male patients.

The mean age of the patients was 57.63 years (SD ± 8.09). Minimum age was 36 years and maximum age was 77.

The frequency of different oral manifestations and complications seen in these patients are shown in table 1:

<table>
<thead>
<tr>
<th>S.No</th>
<th>Complication</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Gingivitis</td>
<td>45</td>
</tr>
<tr>
<td>2</td>
<td>Periodontitis</td>
<td>36</td>
</tr>
<tr>
<td>3</td>
<td>Dental caries</td>
<td>22</td>
</tr>
<tr>
<td>4</td>
<td>Taste dysfunction</td>
<td>7</td>
</tr>
<tr>
<td>5</td>
<td>Neurosensory dysesthesia</td>
<td>5</td>
</tr>
<tr>
<td>6</td>
<td>Xerostomia</td>
<td>4</td>
</tr>
<tr>
<td>7</td>
<td>Oral candidiasis</td>
<td>2</td>
</tr>
</tbody>
</table>

DISCUSSION

The oral signs and symptoms of the diabetic patient can be important indicators of the risk of both periodontal disease and future diabetic complications. and symp-
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Symptoms related to dental structures may furnish clues about the presence of diabetes.1,3,6 The prevalence of severe periodontitis is 10–15% in most populations. In 1993, periodontal disease was identified as the sixth complication of diabetes, and in the 1997 report of the Expert Committee on the Diagnosis and Classification of Diabetes Mellitus, periodontal disease was referred to as one of the pathologic conditions often found in adults with diabetes.1,4

The association between diabetes and periodontal disease has been recognized in the dental literature for many decades. Indeed, multiple studies have demonstrated that the prevalence, severity, and progression of periodontal disease are significantly increased in patients with diabetes.3,6 Furthermore, longitudinal studies have shown that severe periodontal disease in diabetic patients at baseline is associated with poor metabolic control and other diabetes complications at follow-up. A number of reports on the relationship between diabetes and oral complications have included children and adolescents; however, these studies are limited with respect to the depth of data collected and analyses presented. Manouchehr-Pour and Bissada reviewed periodontal conditions in individuals with diabetes and reported that in patients with childhood-onset diabetes, periodontitis seems to ensue around puberty and to progress with age.4,6

Previous studies have also indicated that gingival inflammation is significantly increased compared with nondiabetic control subjects, even after adjusting for oral hygiene levels. Findings from the present study indicate that periodontal destruction is increased in adolescents with diabetes and, importantly, is in direct proportion to the level of hyperglycemia, raised HbA1c duration of diabetes.5,8,12

The etiopathogenesis of both diabetes and periodontitis is complex, and identifying the mechanisms underlying this association was beyond the scope of this study. However, evidence suggests that mechanisms that account for the development of other diabetes complications might be operating in the pathogenesis of accelerated periodontitis in diabetes as well.6,9

According to previous evidence suggesting that individuals with diabetes and poor metabolic control are at a higher risk for suffering from more severe periodontitis. However, not all studies have reported such an association, and there are conflicting data between prospective follow-up studies that have in their majority suggested the former and many cross-sectional studies like this study that have shown no correlation.6,8,12 Further studies including larger numbers of children and adolescents are under way. These will shed more light into these associations, other factors involved, as well as the natural history of the development of periodontal changes in diabetes.10

Dental caries, xerostomia, and mucosal lesions have been reported in patients with diabetes, but the data are conflicting. Most recent studies suggest that young people with diabetes exhibit similar levels of caries to systemically healthy individuals.7,9-11 In this study it was found that diabetes is a risk factor for the development of caries. Unfortunately not have been done in Pakistan to address this important aspect of oral complications of diabetes mellitus, and it will not be proper to apply the data available from different countries, as confounding factors like alcohol use, literacy, diet, health education, obesity economical status etc can play important role in the etiopathogenesis of these complications.9,12 Therefore a lot of work is to be done in order to decrease the frequency of these complications to reduce the morbidity.

Regular communication of dentist with diabetologist is a critical component of safely treating patients
with diabetes. Communication must be bidirectional, diabetologist must be apprised of oral manifestations of the disease and dentists must be updated on glycemic control to help them maintain a patient’s oral health. \(^7,^{10}\) Diabetologist should be well aware of the signs and symptoms of periodontitis and other oral manifestations, making a prompt diagnosis of the condition, as periodontitis can also lead to poor control of diabetes. \(^6\)

Treating patients with diabetes also represents an opportunity to expand a dentist’s referral base. Physicians who treat children and adults with diabetes could be a good referral source of patients whose oral health care needs may not be satisfied adequately. \(^1,^{3,9-11}\)

Most forms of dental therapy should not interfere with the medical control of diabetes. However, dentoalveolar surgery, orofacial infections and the stress of dental procedures can increase serum glucose levels and metabolic insulin requirements. Therefore, dentists must consider modifying medical therapy in consultation with the patient’s diabetologist.

**CONCLUSION**

On the basis of the available data, it can be concluded that practicing dentists and dental hygienists can have a significant positive effect on the oral and general health of patients with diabetes mellitus. Although many aspects of this new component of dental practice need to be developed, it is an opportunity, the profession should embrace.

Prevention and management of oral complications, especially periodontal disease, in patients with diabetes is important due to their possible adverse effect on glycaemic control. Promotion of a healthy oral cavity in patients with diabetes is paramount.

**REFERENCES**