

THE PREVALENCE OF COMMON ORAL COMPLICATIONS OF DIABETES MELLITUS

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ABSTRACT

Objective: To determine the prevalence of common oral complications of diabetes mellitus.

Methodology: A total of 70 patients with diabetes mellitus of at least 1 year duration visiting the outpatient department were evaluated. History and oral cavity examination were used to determine xerostomia, taste disturbance, dental caries, fungal infection, bacterial infection and periodontal disease.

Results: Periodontal disease was the most prevalent oral complication, observed in 81.4% of participants. The prevalence of xerostomia, dental caries and fungal infection was 72.9%, 67.1% and 37.1%, respectively. Taste dysfunction and bacterial infection were observed in minority of patients. Periodontal disease showed a statistically significant association with the frequency of teeth brushing ($p=0.046$).

Conclusion: We conclude that complications affecting the oral cavity are very common in patients with diabetes mellitus.

Key words: Diabetes mellitus, complications, periodontal disease.

INTRODUCTION

Diabetes mellitus is one of the most common causes of morbidity and mortality, affecting 371 million people and it resulted in 4.8 million deaths worldwide in 2012.¹ The estimated number of diabetics worldwide for 2010 was 285 million which is projected to increase to 439 million by 2030.² The number of diabetics living in developing countries is steeply increasing and by the year 2025, more than 75% of people with diabetes will reside in developing countries.³ International Diabetes Federation ranks Pakistan 10th in the list of countries with highest population with diabetes.¹ World Health Organization projects that diabetes will be the 7th leading cause of death in 2030.⁴

Diabetes mellitus is associated with 10 to 30% decrease in life expectancy.⁵ The morbidity and mortality associated with diabetes are mainly due to its complications.⁶ Apart from the well-recognized complications, a number of inflammatory and non-inflammatory diseases of oral cavity are also associated with diabetes.⁷ These include periodontal diseases (periodontitis and gingivitis); salivary dysfunction resulting in xerostomia, taste disturbance and dental caries; findings that have been observed in international and local studies.^{8,9} Oral fungal and bacterial infections have also been found

to be prevalent in patients with diabetes, and are more frequently associated with local complications and longer hospital stay.^{10,11} Periodontal disease has been the most well studied oral complication of diabetes and has been referred to as 'the sixth complication of diabetes mellitus'.¹² Because of increasing awareness of the importance of oral health in diabetics, American Diabetic association recommends that every diabetic should be referred to a dentist for periodontal examination as part of comprehensive diabetes evaluation.¹³ But the level of knowledge regarding oral complications including periodontal disease is low in diabetic patients at the moment.¹⁴

The aim of this study is to determine the prevalence of common oral complications of diabetes. The findings of this study will help increase physicians' awareness about oral health in diabetics and will improve their efforts to target oral complications as rigorously as other complications of diabetes in the overall management of their patients. Moreover, these results will provide opportunities for further research on this issue.

METHODOLOGY

This was a cross-sectional descriptive study which was conducted at services hospital, Peshawar from November 2013 to April 2014. Patients having diabetes of at least 1 year duration were included in the study after obtaining informed verbal consent. Patients using anticholinergic and immunosuppressive medications, and those using dentures were excluded from the study.

Demographic information like age, gender, duration of diabetes and socioeconomic status was recorded on the pre-structured proforma. Information about frequency of teeth brushing, smoking status and

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any previous dental consultation was also recorded. The presence of xerostomia and taste disturbance was detected by history. This was followed by clinical examination of oral cavity for detecting the following oral complications: dental caries, fungal and bacterial infections, and periodontal disease. All the findings were recorded on the proforma. Data were analyzed using SPSS 21. Mean and standard deviation were calculated for age and duration of diabetes while frequency and percentages were calculated for socioeconomic status, frequency of teeth brushing, smoking status and previous dental consultation and oral complications of diabetes. Complications were stratified among gender, duration of diabetes, socioeconomic status, frequency of teeth brushing, smoking status and previous dental consultation to see effect modification.

RESULTS

A total of 70 patients were included in the study. The characteristic of study population are presented in table 1. The frequencies of different oral complications are presented in table 2.

DISCUSSION

Diabetes Mellitus is one of the most prevalent chronic diseases of present time. It leads to a variety of complications in majority of patients. Complications involving the oral cavity are also common among diabetics. But these are less well recognized and, therefore, not looked for by physicians in their routine practice.

This study presents an overview of the common oral complications in diabetic patients. We evaluated 70 outpatient diabetic patients for this purpose. History taking and dental examination were the main tools for detecting these complications.

Out of 70, only 2 patients did not have any of the complications, 07 patients had one while 61 patients had 2 or more complications.

Periodontal disease (PD) was the most prevalent oral complication, observed in 81.4% of participants. The very high prevalence of PD in our study is consistent with the findings of Rajhans NS, and Bharateesh J but differs from that reported by Preshaw PM.^{15,16,17} The difference may be due to a small sample size in our study and a possible difference between the long term glycemic control of the two study populations. PD was more common in those who brushed their teeth less than twice daily compared to those who brushed at least twice daily, and this difference was statistically significant ($p=0.046$). Gender, duration of diabetes, socioeconomic status, smoking and history of dental consultation had no effect on prevalence of PD.

Xerostomia was observed in 72.9% of study population. This finding is comparable to the prevalence reported by Khovidhunkit SO and Carda C.^{18,19}

Table I: Characteristic of study population n=70

Age (years)	49.34 ± 8.50
Gender	
Male	42 (60 %)
Female	28(40 %)
Duration of diabetes (years)	7.20 ± 4.80
≤ 10 years	56 (80 %)
> 10 years	14 (20 %)
Socioeconomic status	
Satisfactory	24 (34.3 %)
Unsatisfactory	46 (65.7 %)
Previous dental consultation	
Yes	22 (31.4 %)
No	48 (68.6 %)
Smoking status	
Never smoker	54 (77.1 %)
Former smoker	06 (8.6 %)
Current smoker	10 (14.3 %)
Frequency of teeth brushing	
At least twice daily	26 (37.1 %)
Less than twice daily	44 (62.9 %)

Table II: The frequencies of common oral complications of diabetes mellitus n=70

Periodontal disease	
Yes	57 (81.4 %)
No	13 (18.6 %)
Xerostomia	
Yes	51 (72.9 %)
No	19 (27.1 %)
Caries	
Yes	47 (67.1 %)
No	23 (32.9 %)
Fungal infection	
Yes	26 (37.1 %)
No	44 (62.9 %)
Taste disturbance	
Yes	08 (11.4 %)
No	62 (88.6 %)
Bacterial infection	
Yes	04 (5.7 %)
No	66 (94.3 %)

Dental caries was found in 67.1% of patients. This is similar to the prevalence reported by Baloch GH in a study carried out in Hyderabad, Pakistan, but higher than that reported in a study conducted by Moshaverinia M in Iran.^{20,21}

Fungal infection was observed in 37.1% of study population. This was consistent with the findings reported by Tekeli A in a study involving only type 1 diabetics.²² Other studies vary widely (15.1 – 77%) about the prevalence of fungal infection in diabetic patients.^{23,24} Fungal infection was more prevalent in those having xerostomia and dental caries, and these associations were statistically significant (p values 0.004 and 0.015 respectively). Taste dysfunction and bacterial infection were found only in 11.4% and 5.7% of participants, respectively.

Periodontal disease, xerostomia and dental caries were found to be much more prevalent in our study population than that reported for most other study populations in literature as mentioned above. This difference may be due to the fact that our sample size was smaller than other studies. Another explanation may be the fact that majority of our participants might have had poor long term glycemic control. And since only those patients in our community having more severe dental pathologies are likely to visit a dentist, it is possible that majority of our study participants comprised of such patients. But these hypotheses need objective testing as testing for association between degree of glycemic control and grades of severity of dental pathologies was not part of this study.

CONCLUSIONS

We conclude that complications affecting the oral cavity are very common in patients with diabetes mellitus. Periodontal disease is the most common complication. Physicians should be aware of this fact, and all diabetics should be referred to dentists to screen for dental pathologies along with other macro and micro vascular complications to improve their overall health. The findings of this study shall motivate further research on this aspect of diabetes Mellitus.

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REFERENCES

1. IDF DIABETES ATLAS 5th edition | 2012 update
2. Shaw JE, Sicree RA, Zimmet PZ. Global estimates of the prevalence of diabetes for 2010 and 2030. *Diabetes Res Clin Pract* 2010;87(1):4-14.
3. King H, Aubert RE, Herman WH. Global Burden of Diabetes, 1995–2025: Prevalence, numerical estimates, and projections. *Diabetes Care*. 1998;21(9):1414-1431.
4. Global status report on non-communicable diseases 2010. Geneva, World Health Organization, 2011
5. Frier BM, Fisher M. Diabetes Mellitus. In: Colledge NR, Walker BR, Ralston SH, editors. *Davidson's Principles and Practice of Medicine*. 21sted. New Delhi: Elsevier;2010.p.795-834.
6. Powers AC. Diabetes mellitus. In: Fauci AS, Kasper DL, Longo DL, Braunwald E, Hauser SL, Jameson JL, et al, editors. *Harrison's Principles of Internal Medicine*. 17thed. New York: The McGraw-Hill;2008.p.2276-92.
7. Bell G, Large D, Barclay S. Oral health care in diabetes mellitus. *Dent Update* 1999; 26:322-30.
8. Sandberg GE, Sundberg HE, Fjellstrom CA, Wikblad KF. Type 2 diabetes and oral health: a comparison between diabetic and non-diabetic subjects. *Diabetes Res Clin Pract*. 2000 Sep;50(1):27-34.
9. Bangash RY, Khan AU, Tariq KM, Yousaf A. Oral aspects and complications in type 2 diabetes mellitus – a study. *Pak Oral & Dental J*. 2012;32(2):296-9.
10. Soysa NS, Samaranayake LP, Ellepola NB. Diabetes mellitus as a contributory factor in oral candidosis. *Diabet Med*. 2006;23:455-9.
11. Rao DD, Desai A, Kulkarni RD, Gopalkrishnan K, Rao CB. Comparison of maxillofacial space infection in diabetic and nondiabetic patients. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod*. 2010;110:7-12.
12. Löe H. Periodontal Disease: The sixth complication of diabetes mellitus. *Diabetes Care*. 1993;16(1):329-34.
13. Standards of Medical Care in Diabetes 2014. *Diabetes Care*. 2014;37(1):14-80
14. Habashneh R, Khader Y, Hammad MM, Almuradi MJ. Knowledge and awareness about diabetes and periodontal health among Jordanians. *J Diabetes Complications*. 2010;24(6):409-14.
15. Rajhans NS, Kohad RM, Chaudhari VG, Mhaske NH. A clinical study of the relationship between diabetes mellitus and periodontal disease. *J Indian Soc Periodontol*. 2011;15(4):388-92.
16. Bharateesh J, Ahmed M, Kokila G. Diabetes and Oral Health: A Case-control Study. *Int J Prev Med*. 2012;3(11):806-9.
17. Preshaw PM, Silva N, McCracken GI, Fernando DJ, Dalton CF, Steen ND et al. Compromised periodontal

status in an urban Sri Lankan population with type 2 diabetes. *J Clin Periodontol.* 2010;37(2):165-71.

18. Khovidhunkit SO, Suwantuntula T, Thaweboon S, Mitrirattanakul S, Chomkhakhai U, Khovidhunkit W. Xerostomia, hyposalivation, and oral microbiota in type 2 diabetic patients: a preliminary study. *J Med Assoc Thai.* 2009;92(9):1220-8.
19. Carda C, Mosquera N, Salom L, Gomez ME, Peydró A. Structural and functional salivary disorders in type 2 diabetic patients. *Med Oral Patol Oral Cir Bucal.* 2006;11(4):309-14.
20. Baloch GH, Dal AQ, Hayat AS, Shah SZA, Devrajani BR. Dental caries in patients with type 2 diabetes mellitus. *Professional Med J.* 2013;20(2):237-43.
21. Moshaverinia M, Lavaee F, Moshaverinia S, Gholami F. The prevalence of dental caries in diabetic patients of SheshdehQarebolaq. *Sadra Med Sci J.* 2014;2(1):11-19
22. Tekeli A, Dolapci I, Emral R, Cesur S. Candida carriage and Candida dubliniensis in oropharyngeal samples of type-1 diabetes mellitus patients. *Mycoses.* 2004;47(7):315-8.
23. Guggenheimer J, Moore PA, Rossie K, Myers D, Mongelluzzo MB, Block HM et al. Insulin-dependent diabetes mellitus and oral soft tissue pathologies: II. Prevalence and characteristics of Candida and Candidal lesions. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod.* 2000;89(5):570-6.
24. Willis AM, Coulter WA, Fulton CR, Hayes JR, Bell PM, Lamey PJ. Oral candidal carriage and infection in insulin-treated diabetic patients. *Diabet Med.* 1999;16(8):675-9.

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