

INFLUENCE OF DIABETES MELLITUS ON ORAL HEALTH

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ABSTRACT

Diabetes Mellitus Type 2 has been illustrated as a new endemic disease. About 285 million people globally suffer from diabetes. Even though there is authentic evidence that supports the correlation between diabetes mellitus and oral health, oral health knowledge is deficient among patients with diabetes and other health physicians. There is a requirement for a general physician to be well-informed regarding a variety of oral manifestations of diabetes with the intention to diagnose before time and referrals to oral health professionals can be made.

This study was conducted to compare between oral health status of diabetic and non-diabetic patients and frequency of diabetes in patients who came for dental treatment to the Oral Diagnosis & Medicine Department of Sir Syed Dental Hospital, Qayummabad, Karachi, and to provide awareness of diabetes among them. The data were collected in two months duration (October and November 2017) from 35 diabetic patients (males = 11, females =24) and 74 non-diabetics patients (males =27, females = 47). Inclusion criteria for the study were patients over 30-years old, diagnosed with Diabetese Mellitus for more than 2 years.

Statistically significant difference was found between diabetic and non-diabetic patients in association with dental caries, periodontal disease, xerostomia, burning sensation, candidiasis, missing teeth, geographic tongue, taste abnormalities, impacted third molars and lichen planus.

Key Word: *Diabetes Mellitus, Diabetes, Oral Manifestation of Systemic Diseases, Medically Compromised Patients, Oral health.*

INTRODUCTION

Diabetes mellitus is an unremitting endocrine disease that symbolize a disorder in the metabolism of glucose, carbohydrates, proteins, and lipids, and it is categorized by the incapability of the organ to resist or

produce insulin.¹ Diabetic patient presents with typical symptoms: Polydipsia, polyuria, and polyphagia, which are frequently related with chronic fatigue and weight loss.²

The estimated numbers of people suffering from diabetes have increased from 108 million in 1980 to 422 million in 2014.³ There are two types of diabetes mellitus type 1 and type 2. Patient with type 1 are called insulin dependent and is a young onset diabetes afflicting 10 to 15% of all patients with diabetes mellitus. It is caused by immunologically controlled autoimmune destruction of beta cells of the pancreas. Type 1 diabetes mellitus appears in infancy or in youth age and is categorized with an absolute lack of insulin. A more recurrent diabetes mellitus is Type 2 now referred as adult onset diabetes and previously it was called as non insulin dependent diabetes mellitus.^{4,5} Diverse types of oral manifestations in diabetic patients are reported by different researchers which are listed in box no.1.^{3,4,5,6} Patients who have uncontrolled diabetes are more

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prone to have infections such as bacterial, fungal and viral due to defect immune response as a consequence of the hyperglycemia. Patients who have controlled diabetes without vascular disease are not prone to have increased rates of infection because successful control of the disease decreases the vulnerability to infection, and repair is the same which is observed in the non-diabetic patients.⁶

Oral manifestation of diabetes are burning sensations, candidiasis, dental caries, periodontal disease (gingivitis and periodontitis), lichen planus, neurosensory dysaesthesia, salivary dysfunction, xerostomia and halitosis. There is a standard lack in scientific proof that explores the oral health of diabetic patients in the city of Karachi. The population of Karachi is diverse, so permit us to study vast scale of relation between epidemiological aspects and health conditions in diabetes patients. Current study highlights on assessing the oral health status of diabetic patients

in comparison to control group and the frequency of diabetes in the patients of Sir Syed Dental Hospital, Karachi.

METHODOLOGY

This study was conducted at the Oral Diagnosis and Medicine Department, Sir Syed Dental Hospital, Karachi, who had dental checkups in October and November 2017. Ethical approval was obtained from ethics committee of Dental section of SSCMS. The sample consisted of 109 patients of both genders, over 30 years old, diagnosed with diabetes (35) and non-diabetics (74). Patients with known disease and on medication were excluded. The study of the participants was performed by evaluating detailed patient record forms. Details of patients including demographic data, past medical history, dental history, and oral hygiene practices were recorded. The examination was done using artificial light with a mouth mirror and CPITN (Community Periodontal Index Treatment Needs) probe. All anatomical sites were analyzed (lips, tongue, gingiva, and palate) and information was filled out on patient record forms. The data were recorded and analyzed by SPSS software 17 version using chi square test for comparison of proportions between the two groups and a value of $p < 0.05$ was regarded as statistically significant.

RESULTS

The present study comprised 38 male and 71 female patients (Fig 1). The ages of patients were ranging from 30 to 70 years old with the mean age of 46.06 years (Table 1). Distribution of oral manifestations among diabetic patients is shown in Table 2. Female diabetic patients had more frequencies of oral manifestations as compared to male diabetic patients. Comparison of oral diseases and oral manifestations among study population can be seen in Table 3. Statistically significant difference was found between diabetic and non-diabetic

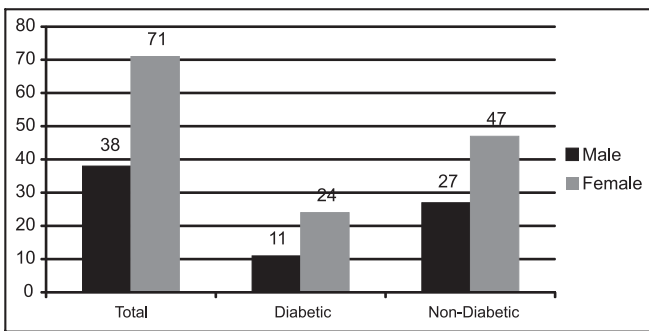


Fig 1: Diabetic and non-diabetic patients’ gender distribution

TABLE 1: MEAN AGE OF STUDY

Gender	N	Mean Age
Male	38	48.69
Female	71	44.57
Total	109	46.06

TABLE 2: DISTRIBUTION OF ORAL MANIFESTATIONS AMONG DIABETIC PATIENTS ACCORDING TO GENDER

Oral Manifestations	Male		Female		Total	
	N 11	%	N 24	%	N 35	%
Periodontal disease	4	11.4	13	37.1	17	48.5
Xerostomia	0	0	5	14.2	5	14.2
Burning sensation	2	5.7	1	2.8	3	8.5
Candidiasis	1	2.8	3	8.5	4	11.4
Geographic tongue	1	2.8	3	8.5	4	11.4
Taste abnormalities	1	2.8	1	2.8	2	5.7
Lichen planus	1	2.8	1	2.8	2	5.7

TABLE 3: OVERALL COMPARISON OF DENTAL DISEASES/ORAL MANIFESTATIONS AMONG DIABETIC AND NON-DIABETIC PATIENTS. STATISTICALLY SIGNIFICANT*

Dental disease/Oral manifestations	Non-Diabetics		Diabetics		Total		P-value
	N 74	%	N 35	%	N 109	%	
Dental caries	39	52.7	4	11.4	43	39.4	0.00*
Periodontal disease	9	12.1	20	57.1	29	26.6	0.00*
Xerostomia	1	1.3	5	14.2	6	5.5	0.00*
Burning sensation	0	0	3	8.5	3	2.7	0.01*
Candidiasis	0	0	4	11.4	4	3.6	0.00*
Missing teeth	16	21.6	0	0	16	14.6	0.00*
Geographic tongue	0	0	4	11.4	4	3.6	0.00*
Taste abnormalities	0	0	2	5.7	2	1.8	0.03*
Impacted 3 rd molars	9	12.1	0	0	9	8.2	0.03*
Lichen planus	0	0	2	5.7	2	1.8	0.03*

patients in association with dental caries, periodontal disease, xerostomia, burning sensation, candidiasis, missing teeth, geographic tongue, taste abnormalities, impacted third molars and lichen planus.

DISCUSSION

Diabetes can lead to changes in the oral cavity also such as gum diseases like gingival hyperplasia, gingivitis and periodontitis. Other diabetes-related oral manifestations include dental caries, candidiasis, xerostomia and glossodynia.⁸

In this study female patients reported with oral diseases more as compared to males in both among diabetic and non-diabetic. Periodontal disease was found common among diabetic patients in the current study while dental caries was common in non-diabetic patients. Diabetic patients may have less cavities due to the content of their diet which generally includes more protein and smaller quantity of fermentable carbohydrates.⁸ In another study high prevalence of dental caries was reported in both diabetic and non-diabetic patients.⁹

In the current study, incidence of periodontal diseases was more in diabetics than among non-diabetics. Comparable results were reported by JV Bharateesh et al in 2012.¹⁰ Other studies also reported that diabetes is a possible reason for gingivitis and periodontitis and the degree of glycemic control seems to be a significant determinant in this correlation.^{3,11} These results contradict the results of other study in which there was no major difference between diabetics and non-diabetics groups as regards periodontal disease and oral hygiene⁴ which was in agreement with the results reported by Velea et al.¹²

Xerostomia is regarded as decreased salivary flow, and this state is measured as one of the most essential signs of diabetes mellitus. Its incidence causes uneasiness and development of rampant caries.¹³ Numerous studies have reported the association between xerostomia and type 2 diabetes mellitus.^{14,15} Likewise in this study xerostomia was the third most common oral manifestation of type 2 diabetes mellitus. Candidiasis, geographic tongue, burning sensations, taste abnormalities and drug induced lichen planus were also reported in this study mostly among the diabetes patients while missing teeth and third molar impactions were accounted in non-diabetic patients.

CONCLUSION

Results of present study showed that patients with type 2 diabetes mellitus are at higher risk for developing oral lesions than non-diabetics, particularly periodontal disease, xerostomia, candidiasis, geographic tongue, burning sensations, candidiasis, taste abnormalities and lichen planus.

REFERENCES

- 1 Gopal D, Malathi N, Reddy BT. Efficacy of oral exfoliative cytology in diabetes mellitus patients: a light microscopic and confocal microscopic study. *J Contemp Dent Pract* 2015; 16(3):215-21.
- 2 Akram TK, Hisham MD. Diabetes mellitus: The epidemic of the century. *World J Diabetes* 2015; 6(6): 850-67.
- 3 Elisabet MO, Albert ED, Enric JS, Miguel V, José LL. Oral manifestations of Diabetes Mellitus. A systematic review., *Med Oral Patol Oral Cir Bucal* 2017; ;22(5):586-94.
- 4 Abdulaziz G, Muataz B, Mohammed R, Wahdan ME. Influence of Diabetes Mellitus on Dental Health Status. *Int J Health Sci Res* 2017; 7(1):124-29.
- 5 Straka M. Oral manifestation of diabetes mellitus and influences of periodontological treatment on diabetes. *Bratislav lek listy* 2011; 112(7): 416-20.

- 6 Hamadneh S, Dweiri A. Oral manifestations in controlled and uncontrolled diabetic patients – a study in Jordan. *Pak Oral Dent J* 2012 Dec; 32(3):456-59.
- 7 Opeodu OI, Adeyemi BF. Prevalence of Coexisting Diabetes Mellitus and Hypertension among Dental Patients In A Tertiary Care Hospital. *J West Afr coll Surg* 2015; 5(3): 16-35.
- 8 Renata SL, Nicole MM, Jyotika KF. Oral health and Type 2 Diabetes. *Am J Med Sci* 2013; 345(4): 271-73.
- 9 Hasaan GM, Shaza BI, Mutaz FA, Olav EB, Kamal M, Salah OI, Anne NA. Association between Oral Health Status and Type 2 Diabetes Mellitus among Sudanese Adults: A Matched Case-Control Study. *PLOS ONE* 2013 ; 8(12):821-58.
- 10 Bharateesh J, Ahmed M, Kokila G. Diabetes and Oral Health: A Case-control Study. *Int J Prev Med.* 2012; 3(11):806-09.
- 11 Maya SI, Arati SM, Sanjiv I. Oral manifestations of diabetes. *Clin Diabetes* 2016; 34(1):54-57.
- 12 Velea OA, Kralev C, Onisei D, Doina O, Luminita MN, Iulian PV. Diabetes mellitus and periodontal disease-a two-way road: current concepts and future considerations (literature review). *Eur Sci J.* 2013; 9(9): 61-79.
- 13 Nirmala SV, Saikrishna D. Dental care and treatment of children with diabetes mellitus: An overview. *J Pediatr Neonatal Care* 2016; 4(2):1-14.
- 14 Micheline ST, Georgia V, Michele DFerreira, João PC, Soluete OS, Igor FPL, Luiz RP. Most frequent oral lesions in patients with Type 2 diabetes mellitus. *J Contemp Dent Prac* 2017; 18(2):107-11.
- 15 Ivanovski K, Naumovski V, Kostadinova M, Pesevska S, Drijanska K, Filipce V. Xerostomia and salivary levels of glucose and urea in patients with diabetes. *Prilozi* 2012; 33(2):219-29.

CONTRIBUTIONS BY AUTHORS

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| 1 Yousuf Moosa: | Statistical and data analysis, drafting of article and abstract writing, results writing, formulations of tables. |
| 2 Mahreen Shahzad: | Conception and design of research, literature search, data collection, drafting of article and final review. |
| 3 Amir Akbar Shaikh: | Proof reading and review for intellectual content. |
| 4 Syed Azhar Matloob: | Data interpretation and manuscript editing. |
| 5 Anila: | Data collection, helped in article layout. |
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