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Research Article

Prevalence of Oral Manifestations in Patients with Type II Diabetes Mellitus – A Cross - Sectional Study

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Abstract: Diabetes mellitus (DM) is a group of metabolic diseases characterized by increased blood glucose level resulting from defects in insulin secretion, insulin action, or both. Diabetes mellitus is associated with a greater probability of developing various oral mucosal disorders. The aim of the study was to evaluate the prevalence of various mucosal lesions in the oral cavity of patients with type 2 diabetes mellitus. This cross – sectional study involved 1000 patients aged between 30 – 77 years who visited the Department of Oral Medicine and Radiology, Pushpagiri College of Dental Sciences, Thiruvalla. The most commonly occurring manifestations were Periodontitis, Fissured Tongue, Xerostomia, Candidiasis and Burning Mouth Syndrome.

Keywords: Diabetes, Manifestation, Cross-sectional, Periodontitis, Xerostomia, Candidiasis.

INTRODUCTION

Diabetes mellitus (DM) is a clinically and genetically heterogeneous group of metabolic disorders and an emerging public health concern worldwide (Awatif, Y.,*et al*.,2011). Diabetes is characterized by the presence of chronic hyperglycemia associated with alterations to carbohydrate, protein, and lipid metabolisms (Mauri-Obradors, E.,*et al*.,2017). DM is classified into type I diabetes or insulin dependent, type II or insulin resistant, gestational diabetes and other types (Nélio, V.,*et al*.,2018).

Diabetic patients often present with alterations in the oral mucosa since chronic hyperglycemia can induce structural changes in tissues. Hyperglycemia is also linked with impaired wound healing, greater susceptibility to infections as well as microvascular and macrovascular dysfunctions (Franklin, M.,*et al*.,2015; Sadeq, A.,*et al*.,2013).

Diabetes mellitus is associated with inflammatory diseases such as gingivitis, periodontitis, candidiasis, stomatitis, benign migratory glossitis or geographic tongue (GT), median rhomboid glossitis, and angular cheilitis. DM predisposes an individual to bacterial and fungal infections as well, including those caused by Candida species (Sadeq, A.,*et al*.,2013). Other manifestations include xerostomia due to xerogenic drugs and autonomic neuropathy as well as neurosensory disorders such as dysguesia and burning mouth syndrome (BMS) (Cicmil, A.,*et al*.,2017; Cairo, F.,*et al*.,2001).

Oral soft tissue abnormalities include irritation fibroma, fissured tongue, traumatic ulcers, and parotid gland enlargement (Sadeq, A.,*et al*.,2013).

The aim of this study was to evaluate the prevalence of various oral manifestations in the oral cavity of patients with type 2 diabetics.

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MATERIALS AND METHODOLOGY:

This study was designed as a cross-sectional study in the Department of Oral Medicine and Radiology over a period of 6 months. A total of 1000 adults, aged 30 – 77 years, participated in the study. The study group included type 2 diabetic patients (as per their history and existing records) and was divided into 5 groups as per their age.

Group I – 30 – 39
Group II – 40 – 49
Group III – 50 – 59
Group IV – 60 – 69
Group V – 70 – 79

Patients with the habit of smoking, chewing tobacco, consuming alcohol, under immunosuppressive drugs or patients with an immunosuppressant disease associated with diabetes were excluded from the study.

All patients were explained about the need of the study and patient consent was obtained. The ethical standards pertaining to the Helsinki Declaration were followed. Oral examination was carried out under electrical overhead lights using a mouth mirror, tweezer, gauze and a tongue depressor. Oral mucosa was carefully examined and all alterations were noted down. After the oral examination, patients who presented with diabetes-associated lesions were referred for appropriate treatment.

The recorded data was further subjected to statistical analysis. Age was presented as mean and standard deviation. Categorical variables were presented and tabulated as frequency and percentage. T test was used to compare the difference in the prevalence of Diabetes between the genders and ANOVA test to compare the prevalence of the commonly occurring manifestation between the age groups.

RESULTS:

Among 1000 diabetic patients, 523 (52.3%) patients were males and 477 (47.7) patients were females. The difference in prevalence between the genders was found to be statistically significant at P value 0.02.

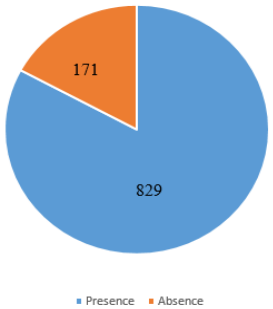
Table 1: Distribution of The Most Commonly Encountered Manifestations with Respect to Age Group.

ORAL MANIFESTATION	AGE GROUP					TOTAL	P VALUE
	30-39 N=18	40-49 N=243	50-59 N=297	60-69 N=361	70-79 N=81		
Periodontitis	4 (0.6%)	103(15.9%)	199(30.7%)	280(43.1%)	63(9.7%)	649 (64.9%)	0.0001
Fissured Tongue	5(2.4%)	34(16.1%)	54(25.6%)	96(45.5%)	22(10.4%)	211(21.1%)	0.0014
Xerostomia	0(0%)	63(31.8%)	72(36.4%)	54(27.3%)	9(4.5%)	198 (19.8%)	0.0001
Candidiasis	2(1.2%)	36(21.7)	63(38%)	51(30.7%)	14(8.4%)	166 (16.6%)	0.13
BMS	2(1.5%)	43(33.6%)	31(24.2%)	45(35.2%)	7(5.5%)	128(12.8%)	0.093

The diabetic patients had an age range from 30-77 years, with the mean age as 57.2 years, median of 58 years, coefficient of variation 17% and standard deviation of 9.5 years.

Out of 1000 diabetic patients, 18 patients were between 30 – 39 years, 243 patients between 40-49 years, 297 patients between 50-59 years, 361 patients between 60-69 years and 81 patients between 70-79 years.

From 1000 diabetic patients, 829 (82.9%) patients had oral manifestations. A total of 171 (17.1%) patients did not present with any manifestation (**Graph 1**).



Graph 1: No. Of Diabetic Patients with Oral Manifestations

The most commonly occurring manifestation was periodontitis (64.9%) followed by fissured tongue (21.1%), xerostomia (19.8%), candidiasis (16.6%), burning mouth syndrome (12.8%), taste alteration (11%), angular cheilitis (4.9%) oral ulcers (2.7%), sialadenosis (2.2%), oral lichen planus (1.9%), sialorrhea (1.8%), geographic tongue (1%) , mucocoele (0.7%) and hairy tongue (0.5%) in descending order (**Fig. 1-6**).

Fig. 1: Periodontitis

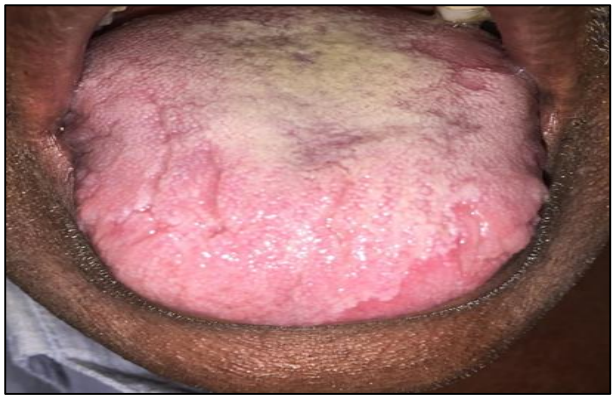


Fig. 2: Oral Candidiasis with Geographic and Fissured Tongue

Fig. 3: Oral Lichen Planus

Fig. 4: Sialadenosis

Fig. 5: Mucocoele

Fig. 6: Hairy Tongue

The Distribution Of The Five Manifestations Which Occurred Commonly In Our Study With Respect To Age Is As Follows:

Periodontitis was most prevalent in the age group of 60-69 years (43.1%) and this was found to be statistically significant at P value of 0.0001. Fissured tongue was more prevalent in the age group of 60-69 years at 45.5% and this was statistically significant (P value 0.0014). Xerostomia occurred more frequently in patients aged between 50-59 years (36.4%) which was significant with P value of 0.0001. Candidiasis was more common in the age group between 50-59 years (38%) at P value of 0.13. Burning mouth syndrome was more prevalent in patients between 60-69 years at 35.2% (P value 0.093)

All the manifestations observed in this study were least common in the age group between 30-39 years.

DISCUSSION:

In our study, among 1000 patients identified with Type 2 Diabetes mellitus, 523 (52.3%) patients were males and 477 (47.7%) patients were females. The difference in prevalence between the genders was found to be statistically significant at P value 0.02. Studies show that Type 2 diabetes mellitus is more prevalent in males than females and this may be attributed to differences in visceral fat mass (Nordstrom, A.,*et al*.,2016).

Our study revealed that 82.9% patients had oral manifestations whereas only (17.1%) patients did not present with any manifestation. This finding is similar to a study by Belmiro *et al*., which revealed that 80% of diabetic patients had at least one oral manifestation, and 20% of patients did not have any lesion or manifestation (Vasconcelos, B.C.D.E.,*et al*.,2008).

Periodontitis had a relatively high prevalence at 64.9% in our study. Similar results were obtained by Kathiresan *et al*., where periodontitis was seen in 58.41% of diabetic patients (Kathiresan, T.S.,*et al*.,2017). The high prevalence of periodontitis in

diabetes has been attributed to the presence of advanced glycation end-products, alteration in lipid metabolism, presence of oxidative stress and increased levels of cytokines (Rutger, G.,*et al*.,2011).

In our study, fissured tongue was present in 21.1% of the patients. Similar results were obtained by Mohsin *et al*., in which fissured tongue was present in 26.9% (Syed-Mohsin, S.F.,*et al*.,2014). However a study by Belmiro *et al*., had a very low prevalence of fissured tongue at 3.33% (Vasconcelos, B.C.D.E.,*et al*.,2008). These differences may be attributed to the different ethnic group used in their study.

Xerostomia was observed in 19.8% of patients in our study. Studies by Sadeq *et al*., and Kathiresan *et al*., demonstrated a prevalence of xerostomia at 30.4% and 12.05% respectively (Sadeq, A.,*et al*.,2013; Kathiresan, T.S.,*et al*.,2017). Xerostomia in diabetic patients is due to polyuria and autonomic dehydration and neuropathy along with the use of various drugs in diabetes mellitus (American Diabetes Association. 2010; Mortazavi, H.,*et al*.,2014; Subashree, R.S., & Suresh,V. 2013; Cicmil, A.,*et al*.,2017).

In our study, candidiasis was seen in 16.6% of the patients. Candidiasis was observed in 29.09% of the patients in a study by Belmiro *et al*., and in 6.14% of patients in a study conducted by Rashmi *et al*., respectively (Vasconcelos, B.C.D.E.,*et al*.,2008; Rashmi, B., *et al*.,). These differences may be due to differences in the sample size used. The presence of candidiasis among diabetic patients may be due to high levels of salivary glucose, hyposalivation, impairment in the candidacidal action of neutrophils, microvascular degeneration and adhesion of yeasts to the epithelial cells. (International Journal of Oral Care and Research (2018).

Burning mouth syndrome was observed in 12.8% of patients in our study. Similar results were obtained by Kathiresan *et al*., at 15% (Kathiresan, T.S.,*et al*.,2017). Burning mouth syndrome in diabetic patients is possibly a result of diabetic peripheral neuropathy (Célia, F.,*et al*.,2019).

Altered taste sensation was observed in 11% of the patients in our present study. Altered taste sensation may occur as a result of structural changes in the papilla of the tongue due to causes like anaemia, zinc deficiency, candidiasis, neuropathy or decreased salivary flow (Moore, P.A.,*et al*.,2007; Cicmil, A.,*et al*.,2017).

Angular cheilitis was observed in 4.9% of patients in our study. Similar results were obtained by Belmiro *et al*., at 5.40%. Oral ulcers were observed in 2.7% of the patients in the present study. Oral ulcers had a prevalence of 5.4%, 2.8% and 2.67% in the studies conducted by Belmiro *et al*., Sadeq *et al*., and Rashmi *et al*., respectively.(Vasconcelos, B.C.D.E.,*et al*.,2008; Sadeq, A.,*et al*.,2013; Rashmi, B.,*et al*.,).

Various studies suggest that there may be an association between oral lichen planus and diabetes mellitus. Immunological defects resulting in endocrine dysfunction in diabetes mellitus may also play a role in the development of Oral lichen planus. Moreover, the antidiabetic drugs used in the treatment of diabetes may produce oral lichenoid reactions resembling oral lichen planus (Matsunaga, K.,*et al*.,2019). In our study, oral lichen planus was observed in 2.1 % of the diabetic patients. Similar results were obtained by Rashmi *et al*., Mohsin *et al*., and Kathiresan *et al*., at 2.67%, 1.8%, 1.14% respectively (Rashmi, B.,*et al*., Syed-Mohsin, S.F.,*et al*.,2014; Matsunaga, K.,*et al*.,2019).

Autonomic neuropathy plays a role in both sialadenosis and diabetes. Disturbances in the autonomic sympathetic innervation and dysregulation of protein synthesis and secretion result in engorgement of the salivary glands due to accumulation of zymogen granules. This will result in hypertrophy of the salivary glands. In our study, 2.2% of patients had sialadenosis (Mozaffari, H. R.,*et al*.,2016).

The other manifestations observed in our study included, sialorrhea (1.8%), geographic tongue (1%), mucocoele (0.7%) and hairy tongue (0.5%).

Among the most commonly observed manifestations, periodontitis, fissured tongue, and burning mouth syndrome were more prevalent in the age group of 60-69 years. Xerostomia and candidiasis were more common in the age group 50-59 years. All of these manifestations were least prevalent in the age group between 30-39 years which suggests that the occurrence of these manifestations is influenced by age.

CONCLUSION:

In the present study, majority of the diabetic patients had at least one manifestation. At times, these manifestations may be helpful to diagnose diabetes in a patient who has not been diagnosed previously. A thorough understanding of these manifestations by the dentist and other oral health care workers along with motivation of the patient towards better glycaemic control is highly essential.

REFERENCES:

1. Awatif, Y., Al-Maskari., Masoud, Y., Al-Maskari., & Al-Sudairy,S. (2011). Oral Manifestations and Complications of Diabetes Mellitus A review. *SQU Med J, May, Vol. 11, Iss. 2, pp. 179-186.*
2. Mauri-Obradors, E., Estrugo-Devesa, A., Jané-Salas, E., Viñas, M., & López-López, J. (2017). Oral manifestations of Diabetes Mellitus. A systematic review. Med Oral Patol Oral Cir Bucal. *Sep 1;22 (5),e586-94.*

3. Nélio, V., Tiago, M., Ana-Sofia, M., João, C., *et al*., (2018). Oral Manifestations and Diabetes. *Biomed J Sci & Tech Res. 2018; 7(5), 6169 – 71.*
4. Franklin, M., Silva, A., *et al*., (2015). Prevalence of oral mucosal lesions among patients with diabetes mellitus types 1 and 2. *An Bras Dermatol. 90(1),49-53.*
5. Sadeq, A., Al-Maweri, A., Ismail, N.M., Ismail, A.R., & Al-Ghashm, A. (2013). Prevalence of Oral Mucosal Lesions in Patients with Type 2 Diabetes Attending Hospital Universiti Sains Malaysia. *Malays J Med Sci. Jul-Oct 20(4), 39-46.*
6. Cicmil, A., Govedarica,O., Jelena, L., Mališ, S., Smiljka, C.,& Saša, Č. (2017). Oral Symptoms and Mucosal Lesions in Patients with Diabetes Mellitus Type 2. *Balk J Dent Med, 21:50-54.*
7. Cairo, F., Rotundo, R., Frazzingaro, G., Muzzi, L., & Pini-Prato, G.P. (2001). Diabetes mellitus as a risk factor for periodontitis. *Minerva Stomatol . 50(9–10) ,321–330.*
8. Nordstrom, A., Jenny, H., Tommy, O., Franks, P.W., & Nordstorm, P. (2016). Higher Prevalence of Type 2 Diabetes in Men Than in Women Is Associated With Differences in Visceral Fat Mass. *J Clin Endocrinol Metab.101(10),3740–3746.*
9. Vasconcelos, B.C.D.E., Moacir,N., Sandrini, F.A.L., Almir, W.D.A.M.F.,& Coimbra, L.S. (2008). Prevalence of Oral Mucosa lesions in Diabetic Patients: A Preliminary Study. *Rev Bras Otorrinolaringol74(3),423-8.*
10. Kathiresan, T.S., Masthan, K., Sarangarajan, R., Babu, N.A., & Kumar, P.A. (2017). Study of Diabetes Associated Oral Manifestations. *J Pharm Bioall Sci 9:S211-6.*
11. Rutger, G., Persson, D., & Periodontal, D. (2011). An Update for Health Care Providers. *Diabetes Spectrum.24(4),195-198.*
12. Syed-Mohsin, S.F., Ahmed, S.A., Fawwad, A., & Basit, A. (2014). Prevalence of Oral Mucosal Alterations in Type 2 Diabetes Mellitus Patients attending a Diabetic Center. *Pak J Med Sci 30(4),716-719.*
13. American Diabetes Association. (2010). Diagnosis and Classification of Diabetes Mellitus. *Diabetes Care 33(Suppl 1),S62-S69.*
14. Mortazavi, H., Baharvand, M., Movahhedian, A., Mohammadi, M., & Khodadoustan, A. (2014). Xerostomia Due to Systemic Disease: A Review of 20 Conditions and Mechanisms. *Annals of Medical and Health Sciences Research 4(4),503-510.*
15. Subashree, R.S., & Suresh,V. (2013). Effect of Oral Hypoglycemic Drugs on Salivary Flow- *A Review, Int.J.PharmTech Res.5(4),1608-1610.*
16. Rashmi, B., Sudarshan, K.C., Charlotte, R.D., & Anjaly, P.K.B. Oral Mucosal Changes in Type II Diabetes Mellitus Patients*: A Case–control Study*.
17. International Journal of Oral Care and Research. (2018). April-June 6(2),32-35
18. Célia, F., Rodrigues., Maria, E.R., Mariana, H., & Candida, S.P. (2019). Infections in Patients with Diabetes Mellitus, *J. Clin. Med, 8, 76; doi:10.3390/jcm8010076.*
19. Moore, P.A., Guggenheimer J., & Orchard, T. (2007). Burning Mouth Syndrome and Peripheral Neuropathy in Patients with Type 1 Diabetes Mellitus. *J Diabetes Complications. Nov-Dec;21(6),397-402.*
20. Matsunaga, K., Yoshida, Y., Takemaru, M., Yamashiro, K., Monden, I., Inohara, K., Nakagawa, S., Maeda, E., Nakahama, K., Kohriyama, T., & Takashiba, S. (2019). Multidisciplinary clinical approach by sharing oral examination information to treat a diabetes patient with dysgeusia, *Clin Case Rep. 7:877–880.*
21. Mozaffari, H. R., Sharifi, R., & Sadeghi, M. (2016). Prevalence of oral lichen planus in diabetes mellitus: a meta-analysis study. *Acta Informatica Medica*, *24*(6), 390.
22. Mandel, L., & Patel, S. (2002). Sialadenosis associated with diabetes mellitus: a case report. *Journal of oral and maxillofacial surgery*, *60*(6), 696-698.