VOLUME-8, ISSUE-11, NOVEMBER-2019 • PRINT ISSN No. 2277 - 8160 • DOI : 10.36106/gjra

Original Research Paper

Dental Science

A STUDY OF ASSOCIATION BETWEEN DIABETES MELLITUS AND TOOTH LOSS AMONG DIABETIC PATIENTS

Dr. Manisha Malviya	Dept of Dentistry, Raipur Institute of Medical Sciences, Raipur , CG , India
Dr. Mehul Trivedi*	Professor , Dentistry *Corresponding Author
Dr Pradip K Chourasia	Statistician / Biostatistician , School of Studies in Statistics , Pt. Ravi Shankar Shukla University , Raipur , CG
Dr Jyoti V Tote	Dept of Dentistry, Raipur Institute of Medical Sciences, Raipur , CG , India

ABSTRACT

Introduction: There are evidences on literature correlating Diabetes Mellitus type 2 with tooth loss. Considering the necessity of understanding the role dentition plays on welfare and daily life of diabetic people, this study was done around a tertiary medical Institute's adjoined territory, Urban & Rural health centres aiming to assess the number of missing teeth and to examine the relationship between age and tooth-loss in diabetic patients.

Method: This study was to assess the number of missing teeth and to examine the relationship between age and tooth-loss in diabetic patients. The study consisted of 201 diabetic patients and an equal number of non-diabetic patients as control. Self-administered questionnaires were distributed and this was followed by an oral examination of each patient; number of missing teeth were recorded in a data collecting sheet. Study was designed as a cross sectional analytical study . Information was analysed by using the Microsoft Excel and SPSS 20. Study was conducted around a tertiary medical Institute's (having a dental unit) adjoined territory, Urban & Rural health centres.

Results: Study subjects were within age-group 35 -75 years for diabetics and 30 – 68 years for non-diabetics. The mean number of missing teeth in diabetics was 5.18 ± 0.70 while non-diabetics had 3.17 ± 0.53 which was statistically significant when p-value was ≤ 0.005. Diabetic patients, within the age-group of 35-44 had 3.21 mean missing teeth and those within the age-group of 64-75 years had 7.31 mean missing teeth.

Conclusion: The Average mean number of missing teeth in the diabetic patients and the control subjects increased gradually as patients grew older but tooth loss was more significant in the diabetics. Within the limitations of this study, tooth loss is more in diabetic patients than nondiabetics and increases more in diabetics as both groups grow older.

KEYWORDS : Tooth Loss , Diabetic Patients , Age , Periodontal Disease

INTRODUCTION

Diabetes mellitus type 2 (DM) is a chronic, non-communicable, systemic Metabolic disease and it is known as one of the major international public health issues. The World Health Organization declared diabetes mellitus as an epidemic.[1]

Poorly Controlled Diabetes and periodontal diseases shares an significant association[2]. Previous studies have suggested that periodontal infection and DM have a two-way relationship . According to the International Diabetes Federation, maximum people having diabetes lives in low- and middle-income group countries.[2] Periodontal disease is characterized by loss of connective tissue and bone support, which eventually might lead to tooth loss.

Löe, [3]stated that periodontal disease is the sixth most common complication of DM, whereas Lalla et al.,[4]reported that DM is the strongest risk factor for periodontal infection compared to the other systemic conditions such as hypertension. Moreover, it has been demonstrated that individuals with periodontal pocket ≥6mm are 3.5 times more likely to develop T2DM than those having periodontal pocket <6mm [5]. By now there is strong evidence suggesting that the prevalence and severity of periodontal disease are higher among T2DM patients when compared with non-diabetic individuals[6,7]. Few studies have reported on no difference in periodontal disease between individuals with and without T2DM[8]. Whereas some studies have reported worse periodontal condition among poorly controlled T2DM patients[6,7] , others have disconfirmed an association between periodontal disease and metabolic control[9,10]

It has been demonstrated that the number of decayed, missed and filled teeth (DMFT) is higher among individuals with than without T2DM [11]. Moreover, Leung et al., [12] have found the risk of dental caries to be twice as high in T2DM patients compared to healthy controls.

A number of factors have been investigated to explain the reasons for the influence of DM on the periodontium and they include: the altered host immune response [13] the role of cytokines;[14] as well as the implication of advanced glycation end-products[15].

A huge number of both diagnosed and undiagnosed patients with DM are not aware of the possibility of developing periodontal diseases which would ultimately result in tooth loss [16]. It is believed that a study of tooth loss in diabetic patients would create greater awareness amongst patients and health providers on the role of periodontal health in the care of diabetic patients this study was conducted around a tertiary medical Institute's adjoined territory (Having a Dental / Dentistry Department) , Its Urban & Rural health centres aiming to assess the number of missing teeth and to examine the relationship between age and tooth-loss in diabetic patients.

METHEDOLOGY

After local ethical committee approval study was done over a period of 4 months .A cross sectional Analytical study was conducted around a tertiary medical Institute's adjoined territory, Urban & Rural health centres in Raipur District (RIMS Medical College Hospital)

The total amount of people to be part of the sample was 201 diabetic patients and an equal number of non-diabetic patients as control were chosen by random sampling

Subjects who were more than 18 years and above at the time of the examination, voluntary participation with consent , confirmed diabetic and controlled of other systemic diseases like hypertension , hypothyroidism , Chronic Kidney diseases etc were chosen for the study . Patients excluded are subjects who would not participate voluntarily, have systemic conditions that could have any similar / simulating conditions like diabetes mellitus (e.g. lupus, Blood diseases, HIV/AIDS), known smokers, subjects who have used antibiotics in the last one month and pregnant study subjects

A detailed Interview sheet was filled by respondents Consent , A Predesigned questionnaire was used for that purpose containing information such as age, sex, occupation, marital and educational status. In both the diabetic and non-diabetic group, blood sugar level was confirmed from patient's results using random blood sugar levels and HBA1c % .

Questions were asked to determine the previous health status of periodontal tissues and respondents were required to answer in simple terms in local languages (Hindi & Chhattisgarhi) Questions such as "have you ever had Swelling in the gums ?", "have you ever extracted a tooth because of swlling and pain ". Questions were asked to determine the previous health status of periodontal tissues and subjects were required to answer "Yes" or "No".

For each participant, clinical examination of all teeth (except 3rd molars) and soft tissues of the oral cavity was performed immediately after completion of the interview. Subjects were examined sitting in an upright position under over-head electric light and the number of teeth present and missing were counted and recorded to assess tooth loss. Tools used for the examination were (N22) Color Coded Probe 2-4-6-8-10-12 mm markings, (NAB2) Color Coded Nabors Furcation Probe 3-6-9-12 mm markings, curette, mirror, probe, tweezers and cotton rolls. *Plaque index , mobility index, Probing depth & Root surface caries were recorded Coronal caries was measured using DMFT index*[17]

Data was filled in Microsoft Excel sheet , and analysis was done using SPSS 20 (version 20 ; SPSS Inc., Chicago, IL, USA), comparisons were made by Chi-square test. All statistical tests were two-sided and performed at a significance level of = 0.05.

RESULTS

Total of 201 people took part in this study, most of the individuals in this research (59.42%) presented only with Hypertension, , with an average age of 54.83 (± 11.99), varying between 35 and 83 years.

The number of subjects in this study was 402 (four hundred and two) which was made up of an equal number diabetics and nondiabetics. Diabetic patients consisted of 99 males (49.3%) and 102 (50.7%) females while the non-diabetics were 96 males (47.8%) and 105 (52.2%) females. The age-group of the diabetics was 30-75years old with a mean age of 40.6 ± 10.3 and the non-diabetic had age from 30-68years old with a mean age of 38.4 ± 10.5 years old.

The mean Fasting blood glucose recorded for non-diabetics was 69.86 ± 13.71 and 112.39 ± 23.51 at 2 hours post-prandial. The diabetic group had a mean of 122 ± 15.37 recorded as fasting and 206.94 ± 18.60 at 2 hrs post-prandial.

The mean number of missing teeth in diabetics was 5.18 ± 0.70 while non-diabetics had 3.17 ± 0.53 which was statistically significant when p-value was ≤ 0.005. Diabetic patients, within the age-group of 35-44 had 3.21 mean missing teeth and those within the age-group of 64-75 years had 7.31 mean missing teeth.

DISCUSSION

The normal fasting blood glucose is below 100 mg/dl , 100 mg/dl-125 mg/dl is indicative of pre-diabetes and above 126 mg/dl is diabetes mellitus. Below 140 mg/dl 2hours post-prandial is normal, The blood sugar level recorded in this study at 2 hrs post-prandial implied that the patients may have type 2 diabetes mellitus.

The mean number of missing teeth reported in this study was statistically Significant with a steady increase as patient grew older. This is in agreement with the World Health Organization (WHO) statement that up to age thirty four (34), teeth are usually extracted as a result of caries but later as a result of periodontal disease as the individual grows older.[18]

The reason for these higher number of tooth loss in diabetic patients has been attributed to a lack of knowledge of the undesirable bi-directional relationship between diabetes mellitus and periodontal disease such that hyperglycemic environment will result in periodontal disease and periodontal disease on the other hand, will increase insulin resistance which could lead to tooth loss if left unchecked [19]. Mechanisms such as the production of advance glycation end-product, cytokines and the alter host microflora may contribute independently or synergistically and eventually lead to periodontitis as a complication of diabetes mellitus[13,14,15].

The present study confirmed the hypothesis that clinical indicators of periodontal disease, furcation involvement, mobility of teeth and number of teeth present as well as the OIDP discriminated between T2DM patients and their non-diabetic controls. The hypothesis that poorly controlled and long duration-T2DM patients presented with more oral disease and OIDP compared with their well-controlled and short duration counterparts was partly confirmed in this study. Thus, mobility index and dental caries were the only clinical indicators that discriminated significantly between the sub-groups of T2DM cases.

Diabetic patients with poor metabolic control should be seen more often in the dental clinic, especially if periodontal disease is already present because periodontal treatment comprising motivation and debridement of periodontal pockets would resulted in improved metabolic control of the diabetes mellitus and decrease in tooth loss [24]. Thus, patients with well-controlled diabetes mellitus who have good oral hygiene and who are on regular periodontal preventive appointments have the same risk of severe periodontitis and tooth loss as non-diabetic patients.

CONCLUSION:

The mean number of missing teeth reported in this study was statistically Significant it is in agreement with the World Health Organization's statement that up to age thirty four (34), teeth are usually extracted as a result of caries but later as a result of periodontal disease as the individual grows older. The dental surgeon has an important role in the early detection of clinical features of diabetes mellitus in patients reporting to the dental clinic for oral health care. Early treatment of oral infections like periodontal diseases is an effective way of preventing tooth loss. Further studies should be carried out to find more results.

ACKNOWLEDGEMENTS

Would like to thank Dr. Rahul Kewal Kumar , Asst Professor , Community Medicine for his always available guidance .

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved.

REFERENCES

1. Smyth S, Heron A. Diabetes and obesity: The twin epidemics. Nat Med 2006;12:75-80.
2. Taylor GW. Bidirectional interrelationships between diabetes and periodontal diseases: An epidemiologic perspective. Ann Periodontol 2001;6:99-112.
3. Löe H (1993 Jan) Periodontal disease. The sixth complication of diabetes mellitus. Diabetes Care 16: 329–334.
4. Lalla E, Lamster IB (2012) Assessment and management of patients with diabetes mellitus in the dental office. Dent Clin North Am 56: 819–829.
5. Morita I, Inagaki K, Nakamura F, Noguchi T, Matsubara T, et al. (2012 Feb) Relationship between periodontal status and levels of glycated hemoglobin. J Dent Res 91(2):161–6 91: 161.
6. Campus G, Salem A, Uzzau S, Baldoni E, Tonolo G (2005 Mar) Diabetes and periodontal disease: a case-control study. J Periodontol 76: 418–425.
7. Tsai C, Hayes C, Taylor GW (2002 Jun) Glycemic control of type 2 diabetes and severe periodontal disease in the US adult population. Community Dent Oral Epidemiol 30: 182–192.
8. Ribeiro FV, de Mendonça AC, Santos VR, Bastos MF, Figueiredo LC, et al. (2011 Aug) Cytokines and bone-related factors in systemically healthy patients with chronic periodontitis and patients with type 2 diabetes and chronic periodontitis. J Periodontol 82: 1187–1196.
9. Santos VR, Lima JA, Miranda TS, Feres M, Zimmermann GS, et al. (2012 Mar) Relationship between glycemic subsets and generalized chronic periodontitis in type 2 diabetic Brazilian subjects. Arch Oral Biol 57: 293–299.
10. Alpagot T, Silverman S, Lundergan W, Bell C, Chambers DW (2001 Jun) Crevicular fluid elastase levels in relation to periodontitis and metabolic control of diabetes. J Periodontal Res ;36(3):169–74 36: 169–174.
11. Tanwir F, Altamash M, Gustafsson A (2009) Effect of diabetes on periodontal status of a population with poor oral health. Acta Odontol Scand 67: 129–133.
12. Leung WK, Siu SC, Chu FC, Wong KW, Jin L, et al. (2008) Oral health status of low-income, middle-aged to elderly Hong Kong Chinese with type 2 diabetes mellitus. Oral Health Prev Dent 6: 105–118.
13. Lamster IB, Lalla E, Borqnakke WS, Taylor GW (2008) e relationship between oral Health and Diabetes mellitus. J Am Dent Assoc 139: 19S-24S.
14. Lalla E, Lamster IB, Feit M, Huang L, Spessot A (2000) Blockage of RAGE suppresses periodontitis-associated bone loss in diabetic mice. J Clin Invest 105: 1117-1124.
15. Hughes FJ (1995) Cytokines and cell signaling in the periodontium. Oral Dis 1: 259-265
16. Ochoa SP, Ospina CA, Colorado KJ, Montoya YP, Saldarriaga AF (2012) Periodontal status and tooth loss in diabetic patients at the University Hospital San Vicente de Paul. Biomedica 32: 52-59.
17. World Health Organization: Oral Health Surveys, Basic Methods, ed 4. Geneva, World Health Organization, 1997.
18. WHO 6cLentLfic Group on Epidemiology, Etiology and Prevention of Periodontal Diseases (1978) Epidemiology, etiology and prevention of periodontal disease: a report of WHO scLentLfic group [meeting held in Moscow from 23 Nov-2 Dec.1977]. World Health Organ Tech Rep Ser No.621 Geneva.
19. Azodo CC (2009) Current trends in the management of diabetes mellitus: e Dentist's Perspective. Journal of Postgraduate Medicine 11: 113-129.