

Comparison of oral health status of diabetic and hypertensive patients in a known population

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Abstract

Aim: The aim of the study is the comparison of oral health status of diabetic and hypertensive patients in a known population.

Methods: The study population comprised of multiethnic groups of patients. The sample consists of 50 patients with type 2 diabetes mellitus and 50 hypertensive patients of age range of 35 to 70 years of both sexes.

Results: The results show the comparison of various parameters of diabetic and hypertensive groups. In diabetic group mean age, smoking habit score, BMI, waist circumference, DMFT, PI, GI score, OHI-S score and bone loss were higher than hypertensive patient group. But statistically body mass index, waist circumference, periodontal disease score, gingival index score and bone loss were higher in diabetic group and significant.

Conclusion: Oral medicine specialists can play a key role in educating diabetic and hypertensive patients regarding maintaining their oral hygiene and the potential risk of periodontal disease. This objective is achieved by adequate plaque control (brushing and flossing) and professional prophylaxis including coronal scaling, root planning and polishing.

Keywords: oral health, periodontal diseases, Type 2 diabetes mellitus, periodontal disease, Bone loss, Smoking

Introduction

Periodontal disease is a chronic inflammatory disorder stemming from the tissues surrounding the teeth¹ but with evidence of systemic effects on inflammatory markers.²⁻⁴

Oral conditions are known to affect almost half of the world's population. Dental decay alone affects nearly 2.5 billion people, making it the most prevalent condition worldwide. More than 7% of the world population suffers from severe chronic periodontitis.⁵ More Indians suffer from caries and periodontitis than their South Asian counterparts.⁶ A recent survey reports prevalence of caries and periodontitis among rural Indian adults was nearly 65% for both conditions.⁷ It has been estimated that the total health loss associated with oral conditions is comparable to that for hypertensive heart disease, schizophrenia, and all maternal conditions combined.⁵ Besides, India has the maximum number of adults with diabetes in the South-East Asian Region (72.9 million) with the numbers expected to rise to 134 million in 2045.⁸

Diabetes Mellitus (DM) is a metabolic disorder characterized by chronic hyperglycaemia and disturbances of carbohydrate, fat and protein metabolism.⁹ Type 1 DM is most common in children and adolescents, whereas type 2 DM (T2DM) affects adults. T2DM constitutes about 90–95% of all patients having the disease.¹⁰ Poorly controlled DM has been associated with increased susceptibility to oral infections including periodontal disease.¹¹⁻¹⁴ Periodontal disease is characterized by loss of connective tissue and bone support, which eventually might lead to tooth loss. Previous studies have suggested that periodontal infection and DM have a two-way relationship.^{14,15} Lo'e,¹⁶ stated that periodontal disease is the sixth most common complication of DM, whereas Lalla et al.,¹⁴ reported that DM is the strongest risk factor for periodontal infection compared to the other systemic conditions such as hypertension.

Although some studies have reported on the benefit of periodontal treatment on blood pressure (BP) profile^{17,18} data on the impact of periodontitis on BP control in treated hypertensive patients are lacking.

The aim of the study is the comparison of oral health status of diabetic and hypertensive patients in a known population.

Methods

The observational study, originally approved by the ethical committee and it was undertaken in time period of 12 months.

Study Population

The study population comprised of multiethnic groups of patients. The sample consists of 50 patients with type 2 diabetes mellitus and 50 hypertensive patients of age range of 35 to 70 years of both sexes. The patients were taken from the outpatient department of Oral Medicine and Radiology, community dental camps and government hospital.

Socioeconomic and Demographic Factors

Socioeconomic and demographic factors used in the present study were age, sex, level of education, family income categories and urbanization. Age was classified into four categories: 35 to 44 years, 45 to 54 years, 55 to 64 years and 65+ years old. Levels of literacy were divided into four categories as illiterate, elementary, secondary and university. The family income was divided as poor class, middle class and upper class. Area is categorized as rural and urban.

Interview

The interview was conducted by a single person using structured questionnaire to gather information on oral health practices and diabetic status. Each patient in diabetic group was asked about the history of diabetes and laboratory analysis reports of blood sugar and their detailed health questionnaire was completed in our predecided format. Subject's habit history including the chewing of betel nut/lime/pan/tobacco/pan masala, smoking or any other were furnished in terms of type, frequency and duration, their habit index was also calculated.

Clinical examination

In the general examination subject's blood pressure, temperature, height, weight and body mass index were recorded.

A comprehensive dental evaluation including a head and neck soft tissue examination was carried out. Intraorally gingiva, buccal mucosa, vestibular and alveolar mucosa, tongue, floor of the mouth, hard and soft palate and frenum attachment were examined carefully. The flow and consistency of saliva was checked. In the hard tissue examination, dentition was assessed keeping following points in mind: Dental caries, attrition, abrasion, erosion, root stumps, fracture, mobility, furcation involvement, discoloration, pulp exposure, tender on percussion, restored teeth and any crown or bridge.

The oral indicators used in the study were orthopantomogram (OPG), fasting blood glucose (FBS) and postprandial (PP) glucose, random blood sugar (RBS), decayedmissing- filled teeth (DMFT) index, periodontal index (PI), oral hygiene index-simplified (OHI-S), gingival index (GI), body mass index (BMI) and waist circumference (WC).¹⁹⁻²¹

Armamentarium Required for Clinical Examination

Armamentarium used in the study were kidney tray, mouth mirror, straight probe, explorer, tweezers, disposable mask, gloves and head caps, cotton swab, BP instrument, measuring tape weighing machine, X-ray view box, patient drape, kit for blood glucose estimation, etc.

Statistical Considerations

The statistical tests used in the study for analysis of the result were Z-test, Student's t-test, Pearson's correlation and Chi-square test.

Results

Table 1: Mean + SD various parameters of diabetic and hypertensive subjects

Parameters	Mean + SD		p-value	Inference
	Diabetic	Hypertensive		
Age	52.50 + 9.50	51.65 + 9.60	> 0.05	NS
Duration	11.82 + 7.17	-	-	-
Habit	70.30 + 160.40	50.75 + 150.00	> 0.05	NS
BMI	24.61 + 2.87	22.73 + 3.75	< 0.01	S
WC	35.10 + 3.75	34.16 + 3.50	< 0.003	S
DMFT score	3.60 + 2.59	2.74 + 2.22	> 0.05	NS
PI Score	5.40 + 1.76	4.50 + 2.16	< 0.02	S
GI Score	2.47 + 0.37	2.24 + 0.51	< 0.03	S
OHI-S Score	4.45 + 0.83	4.08 + 1.13	> 0.05	NS
Bone loss	2.58 + 0.89	1.88 + 0.89	< 0.004	HS

Table 2: Mean + SD various parameters of diabetic and hypertensive population according to middle class socioeconomic status

Parameters	Mean + SD		p-value	Inference
	Diabetic	Hypertensive		
DMFT score	4.00 + 3.53	2.44 + 1.64	> 0.05	NS
PI Score	5.50 + 1.75	5.20 + 2.30	> 0.06	NS
GI Score	2.60 + 0.29	1.77 + 0.55	< 0.02	S
OHI-S Score	4.39 + 0.86	3.57 + 1.14	< 0.05	S
Bone loss	2.82 + 0.98	1.67 + 0.94	> 0.05	NS

Table 3: Mean + SD various parameters of diabetic and hypertensive population according to upper class socioeconomic status

Parameters	Mean + SD		p-value	Inference
	Diabetic	Hypertensive		
DMFT score	3.30 + 1.59	3.16 + 2.15	> 0.05	NS
PI Score	5.60 + 1.70	3.80 + 1.96	< 0.05	S
GI Score	2.40 + 0.42	2.04 + 0.54	> 0.05	NS
OHI-S Score	4.52 + 0.91	3.85 + 1.20	> 0.05	NS
Bone loss	2.41 + 0.77	1.45 + 0.50	> 0.05	NS

The results show the comparison of various parameters of diabetic and hypertensive groups. In diabetic group mean age, smoking habit score, BMI, waist circumference, DMFT, PI, GI score, OHI-S score and bone loss were higher than hypertensive patient group. But statistically body mass index, waist circumference, periodontal disease score, gingival index score and bone loss were higher in diabetic group and significant (Table 1).

When comparing various parameters of diabetic and hypertensive groups according to their socioeconomic status, there is no statistical significant difference is seen in patients of poor socioeconomic status, but there is statistical significance is observed in scores of OHI-S and GI of patients with middle socioeconomic status and PI score significant in patients with upper class. (Table 2 and 3)

Discussion

The role of oral medicine specialist in recognition of oral manifestation of diabetes mellitus is established firmly in first world countries. Diabetic and hypertensive patients suffer many oral manifestations among which gingival and periodontal diseases are main. These problems aggravate with poor oral hygiene and lack of dental awareness, these problems are now reducing in big cities because of increased levels of education and proper management of diabetes, but in rural areas the problem is increased.

In the present study, when we look on severity of scores of periodontal index, gingival index, oral hygiene index simplified and bone loss score in OPG and there in no significant difference in their severity, but overall they are significant. There is significant difference in their body mass index and waist circumference in diabetic compared to hypertensive.

The results of the present investigation revealed that the diabetic patients exhibited significantly higher levels of gingivitis, periodontitis and bone loss than the hypertensive patients. The above findings are in agreement with the following studies.²²⁻²⁵ Some studies say that there is no significant difference in periodontal disease among diabetic and hypertensive patients.^{26,27}

The result of our study shows that diabetic smokers have increased periodontitis than diabetic nonsmoker, the following studies²⁸⁻³⁰ agree with our results and reported that smoking increases the severity of periodontal diseases in diabetic patients. Our study indicates that there is statistical significance is observed in scores of OHI-S and GI scores of middle class and PI score of upper class when socioeconomic status is compared in diabetics and hypertensive population, with no statistical significance in patients with poor socioeconomic. This may be due to difference in geographical area and selection of patients in our study from other studies and also people with lower middle and upper class have diet of high fat containing, junk food and also decreased physical activity compared with people of poor class.³¹

Our study indicates that statistical significance is observed in scores of OHI-S and DMFT and highly significant GI, PI and bone loss in population those educational status are secondary and above. The reason for statistical difference in our study from other studies is same as mentioned for socioeconomic status.

Conclusion

Oral medicine specialists can play a key role in educating diabetic and hypertensive patients regarding maintaining their oral hygiene and the potential risk of periodontal disease. This objective is achieved by adequate plaque control (brushing and flossing) and professional prophylaxis including coronal scaling, root planning and polishing.

A good periodontal health is associated with a better SBP profile during antihypertensive therapy by about 2.3 to 3 mm Hg and with lower odds of treatment failure. Dedicated studies are needed to explore the impact of periodontal therapy on BP in treated hypertensive patients of different racial/ethnic descent and the long-term effects on cardiovascular outcomes of such a complementary approach to systemic health.

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