Clinical Study of oral health in diabetes mellitus

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Abstract

Background: Diabetic population is at higher risk of developing oral health problems and the relationship between glycaemic levels and periodontal disease appears to be bidirectional. Quality of life (QOL) is seriously impaired because of oral problems in a large number of individuals. Oral problems affect various aspects of life, including oral function, appearance, and interpersonal relationships.

Objectives: This research was aimed at studying various manifestations of oral diseases in diabetic patients and to find out the correlation between control of diabetes and control of oral lesions. We hypothesised that controlling the hyperglycaemia over long term should result in better control of oral lesions.

Methodology: 120 diabetic patients with one or more oral problems were included and followed up for 6 months. Assessment for both diabetes as well as oral lesions was repeated after six months. Glycosylated haemoglobin and random glucose levels were used as parameters to diagnose diabetes whereas oral problems were diagnosed based on signs and symptoms at medicine and dental outpatient department.

Results: Most prevalent oral disease among the diabetic patients was found to be periodontitis (30.8%) followed by recurrent stomatitis (25 %) and gingivitis (21.67%) and glycaemic control showed significant improvement in these diseases. High prevalence of oral diseases was found in diabetics with low socioeconomic group and those who are addicted to tobacco, smoking or alcohol.

Conclusion: Relationship of diabetes and oral diseases is bidirectional and control of both is required for better outcome.

Key words: Oral Health, Diabetes Mellitus

Introduction

Oral signs and symptoms of diabetes include gingivitis, periodontitis, recurrent oral fungal infections and impaired wound healing. Diabetic population is at higher risk of developing oral health problems [1-2] and the relationship

between glycaemic levels and periodontal disease appears to be bidirectional. [3]

This research was aimed at studying various manifestations of oral diseases in diabetic patients and to find out the correlation between control of diabetes and control of oral lesions. We hypothesised that controlling the hyperglycaemia over long term should result in better control of oral lesions. Quality of life (QOL) is seriously impaired because of oral problems in a large number of individuals. Oral problems affect various aspects of life, including oral function, appearance, and interpersonal relationships. [4]

A patient with poorly controlled diabetes has a major risk of developing periodontal disease [5-6] which will start as gingivitis and gradually, if the glycaemic control is deficient, this may progress to an advanced periodontitis.

The research was designed with the aim of comprehensive study of diabetes mellitus with oral lesions. The major objectives were

a) To study various Manifestations of oral lesions in Diabetics.

b) To study correlation between control of diabetes and oral lesions.

Materials and Methods

This prospective, observational study included diabetic patients with one or more oral problems and followed them up for 6 months. Assessment for both diabetes as well as oral lesions was repeated after six months. Glycosylated haemoglobin and random glucose levels were used as parameters to diagnose diabetes whereas oral problems were diagnosed based on signs and symptoms at medicine and dental outpatient department. 120 patients having history of diabetes mellitus and having any of the oral lesion were screened for the study participation. The patients having any of the oral lesions with symptoms of

diabetes were also screened for presence of diabetes and included in the study if they could qualify.

The baseline assessment was done including physical examination, fasting blood sugar (FBS) levels, Glycosylated haemoglobin (HBA1C) levels and dental (oral cavity) examination.

For each individual, we administered a detailed questionnaire to collect information about demographic and socioeconomic parameters and behavioural factors. We established socioeconomic status for urban areas using the 2011 revised Kuppuswamy's scale [7] which uses occupation, education, and family income per month as parameters. Depending on the baseline assessment of their glycaemic control, treatment for diabetes was given.

Diagnosis and treatment of oral lesion was conducted in collaboration with department of dental science. Regular follow ups were done for the improvement of oral lesions. Final assessment for control of diabetes and control of oral lesions was performed after six months.

Oral carcinoma or oral metastatic lesion, any immunocompromised disease or patients on any immunosuppressive agent were excluded from the study.

Results and discussion

Both type 1 and type 2 diabetic patients were included in the study with age more than 13 years and below 80 years and having at least one oral problem.

Out of 120 selected patients of diabetes, 52.5% were females and 47.5 % were males. Maximum percentage of patients (34.17%) was found in the age group 51-60 years. More than half (53.33 %) of the patients of diabetes with oral disease belonged to lower income group. Only 9.17 % of the patients belonged to upper income group.37.5 % patient population was in mid-income group.

In this study, 38.33% were overweight (BMI>25 and <30) and 10.83% were obese (BMI>30). The study also found

that 29.17 % of the diabetic patients with at least one oral disease were not taking any medication for diabetes.

Most prevalent oral disease among the diabetic patients was found to be periodontitis (30.8%) followed by recurrent stomatitis (25 %) and gingivitis (21.67%). Salivary gland dysfunctions and oral candida infections were each found in 10% of diabetic population. Oral lichen planus was present in 10.83% of the diabetic patients. (Table 1)

More than one fourth (29.17%) of the cases were not taking any medication for diabetes.70.83% cases were taking at least one medicine for the control of DM. Patients with previous medication for diabetes had significantly better glycaemic control (Mean HBA1C =9.93) than patients who were not on any previous medication (Mean HBA1C =11.16)

Periodontitis improved in 85% of the cases with improved glycaemic control and this improvement was also highly significant. (P=0.0001) Gingivitis and Recurrent Stomatitis improved in65% and 64.71 % of the cases respectively with improved glycaemic control. The difference between improvement in two groups with and without glycaemic control was found significant. (P= 0.041 and P=0.036 respectively)

With improved glycaemic control, Salivary Gland Dysfunction improved in half of the cases, Lichen Planus improved in only 25 % of the cases, Oral Candidal Infections improved in 85.71 % of the cases. However, the difference between improvement in two groups with and without glycaemic control was found nonsignificant in all these conditions. (Table 2)

The proportion of tobacco chewers, smokers and patients with history of alcohol consumption was 42.5%,27.5 % and17.5 % respectively in overall study population.

73.1% patients with gingivitis had history of tobacco chewing and 53.8% cases had history of smoking. Every second patient with complaint of recurrent stomatitis had history of tobacco chewing while every third patient of oral candida infection was found to be addicted to tobacco chewing. Every third patient of salivary gland dysfunction had history of either alcohol consumption or smoking and every fourth patient had history of tobacco chewing. (Table 3)

The economic status directly impacts the quality of life and hygiene of an individual. Some oral diseases show prevalence in the lower economic class of society. In our study the prevalence of DM and oral conditions is inversely proportional to the level of income of the subjects. An ICMR sponsored multistate study [8] for finding prevalence of diabetes in urban areas of some of the more affluent states (Chandigarh, Maharashtra, and Tamil Nadu), diabetes prevalence was higher in people with lower socioeconomic status. In our study urban population with low socioeconomic status had higher prevalence of DM and oral disease.

In order to determine the link between socioeconomic and other factors related to DM and oral conditions, Yokohama et al did a multiple linear regression analysis. Albuminuria, education, smoking, and dental attendance showed relation with periodontal parameters, independent of the effect of age, sex, BMI and diabetes therapy. [9]

In present study, the most prevalent oral disease among the diabetic patients was seen to be periodontitis (37%) followed by recurrent stomatitis (25 %) and gingivitis (21.67%). These findings are consistent with the literature. Many studies have shown that amongst the oral conditions related to diabetes, periodontitis is the commonest. [10-12] Salivary gland dysfunctions, oral candida infections and oral lichen planus were also found in considerable amount in the selected population.

Diabetes and oral diseases can affect each other. So, untreated diabetes may invite unwanted oral diseases as

well. Toda K et al. demonstrated that adapting oral hygiene control habits improve glycaemic control and oral malodour in patients with T2DM. [13] This confirms the bidirectional relationship between DM and oral health. Javed F et al. in their study stated that glycemic control reduced the severity of self-perceived oral health and periodontal parameters in patients. [14] In our research, improvement of periodontitis with improved glycemic control was highly significant. The difference between improvements in two groups was also statistically significant in both gingivitis and recurrent stomatitis. But the difference between improvement in two groups with and without glycemic control was found non–significant for salivary gland dysfunction, oral candidial infection and oral lichen planus.

Our study also showed that the occurrence of oral conditions was more frequent in patients with the history of alcohol consumption, tobacco chewing or smoking. Percentage of smokers with diabetes ranged between 20 % to 41 % in various states of India. [8].

The percentage of diabetic smokers in our study was found to be 27.5 % which is well within the range of other the said study finding. There are evidences indicating that the addictions like smoking, alcohol etc. can worsen the oral diseases as well as diabetes. [15-17] The present study confirms the idea as the addictions in patients was found to be directly related to oral conditions in diabetic patients.

Conclusions

This study has established a direct relationship between DM and oral conditions. We found very high proportion patients with addiction of tobacco, smoking and alcohol in overall study population. There is growing prevalence of diabetes and oral diseases among lower socioeconomic groups. There is a need of creating awareness among Indians regarding diabetes and its oral complications and requirement of early intervention. This study is expected to help in better management of oral conditions in diabetes patients and simultaneous control of both these interrelated issues. The study also underlines the importance of dental professionals in diagnosis of diabetes especially among the ones who are unaware about their blood glucose levels.

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Legend Tables

Table 1: Distribution of Oral Diseases among Diabetic Population

Oral Disease	Number	Proportion
Gingivitis	26	21.67
Periodontitis	37	30.83
Salivary gland Dysfunction	12	10
Oral Lichen Planus	13	10.83
Recurrent Stomatitis	30	25
Oral candidial infections	12	10

Table 2: Comparison for Control of DM and Oral Disease Improvement after 6 Months, Follow-up.

Oral Disease	Total Number of Cases	Number of cases Improved	Number of cases Improved with Improvement in Glycemic Control after six months	Number of cases improved without Improvement in Glycemic Control after six months	Significance (p)
Gingivitis	26	14	13(65%)	1(16.67%)	0.041*
Periodontitis	37	20	17(85%)	3(17.65%)	0.0001**
Salivary Gland Dysfunction	12	3	2(50%)	1(14.23%)	0.203
Lichen Planus	13	4	2(25%)	2(40%)	0.58
Recurrent Stomatitis	30	14	11(64.71 %)	3(25%)	0.036*
Oral Candidial Infections	12		6(85.71%)	2(40%)	0.11

Table 3: Analysis of addictions in patients with diabetes mellitus and oral lesions

Group	Number	Tobacco		Smoking		Alcoholic	
		Number	%	Number	%	Number	%
Complete Study Population	120	51	42.5	33	27.5	21	17.5
Gingivitis	26	19	73.1	14	53.8	8	30.8
Periodontitis	37	16	43.2	9	24.3	9	24.3
Salivary Gland Dysfunction	12	3	25.0	4	33.3	4	33.3
Oral Lichen Planus	13	5	38.5	1	7.7	4	30.8
Recurrent Stomatitis	30	15	50.0	11	36.7	3	10.0
Oral Candidial Infections	12	4	33.3	2	16.7	0	0.0