

Severity of Periodontal Status in Type I and Type II Diabetes Mellitus

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ABSTRACT

Objective: To compare the severity of periodontal status in patients with type 1 and type 2 diabetes mellitus. The study was conducted in diabetic clinic Liaquat University hospital, Hyderabad.

Study design: It was a descriptive cross sectional study.

Setting: This study was conducted at diabetic clinic Liaquat University hospital, Hyderabad.

Data Collection Procedure: After meeting the inclusion criteria, 178 patients of diabetes mellitus type 1 and type 2, from diabetic clinic Liaquat University Hospital, (Hyderabad) were assessed to record their oral findings, to check for the presence of periodontal disease and record severity associated, with the help of CPITN index (Community Periodontal Index of Treatment Need). A (WHO-probe), also known as special dental CPI-probe, used for the relevant examination. Patients after relevant examination were advised treatment that they required. For that purpose they were referred.

Results: The sample of 178 patients which were divided in two groups equally. Among 89 patients of type 1 DM, 60 patients scored 1 according to CPITN scoring (bleeding on probing, which showed presence of periodontal disease). In comparison, among 89 patients of type 2 DM, 51 patients scored 3 according to CPITN scoring (which means pathological pocket depth (4-5) which showed more severity of periodontal disease.). The relationship of CPITN scoring was significant with both types of DM (p value=0.001).

Conclusion: This study concluded that patients of type 2 DM showed more severity of periodontal status than patients of type 1 DM.

Keywords: Periodontal Status, Type 1 and Type 2 Diabetes Mellitus

INTRODUCTION

Periodontitis and Diabetes mellitus (DM) are the most common chronic diseases by which patient's health and quality of life is affected. Periodontitis is a chronic bacterial inflammatory process which usually occurred with symptoms like bleeding gums, gingival detachment, pathological periodontal pockets, and gingival recession to resultant alveolar bone destruction.¹ Diabetes mellitus is a clinically as well as hereditary mixed set of disorders by which metabolism of carbohydrate, protein and lipid is affected. Patients who suffer from DM (diabetes mellitus) have increased vulnerability to certain infections and it can lead to diabetic complications because of hyperglycemia and poor metabolic control.² Diabetes and periodontitis are interrelated providing an example that oral infections are predisposed by systemic diseases. Periodontitis is the "sixth most common complication of DM (diabetes mellitus)"³

There are two type of diabetes mellitus juvenile diabetes (type 1 DM) which is an autoimmune pathology caused by destruction of pancreatic β cells resultant to complete loss of insulin secretion. On the other hand T2DM (type 2 diabetes mellitus) is associated to insulin resistance. Chronic form of DM either type 1 or type 2 characterized by hyperglycemia leading to long lasting micro and macro vascular complications for example cardiovascular disorders neuropathy, nephropathy and retinopathy ensuring to increased rate of early mortality and morbidity.⁴ T2DM (type 2 DM) is the most common type of diabetes mellitus recorded in adults whilst type 1 (T2DM) is mostly addressed in children and teenager.⁵

The severity of both DM and periodontitis was considered to be dependent on various factors for example duration and metabolic control of diabetes mellitus and certain aggregating factors like smoking and diabetes mellitus (DM) were considered as an important risk factor for oral infections like periodontitis.⁶ Studies reported that in comparison to other systemic diseases like hypertension diabetes mellitus is the most strongest element of danger for periodontitis.⁷ According to a study lipid profile of an individual with DM were linked with high level of IL-6 and systemic complications were also collaborated⁸ and those systemic complications associated with diabetes mellitus increases a risk for

the development of severe periodontal infection⁹ Maintaining good glycemic control and keeping healthy oral cavity is the effective preventive measure for oral complications associated with diabetic patients¹⁰

A study has shown that limited awareness in patients with type 1 and type 2 diabetes mellitus is the cause of poor oral health¹¹ Progression and prevalence of periodontitis are considerably increased in patients with both types of diabetes mellitus have been demonstrated in several studies¹²

Most of the studies have shown the relationship between periodontal status and Diabetes mellitus of one type (either type 1 or type 2). However there is less number of studies which have shown difference in periodontal status of patients with both type of diabetes mellitus patients.

This study will assess the comparison of the severity of periodontal status of patients with Type 1 and Type 2 Diabetes mellitus. This study will be beneficial for awareness of the patients with both types of diabetes mellitus about oral complications such as periodontitis associated with DM and will decrease further progression of periodontitis and prevention of tooth loss.

METHODOLOGY

This Descriptive cross-sectional study with non probability convenient sampling was conducted in diabetic clinic Liaquat University hospital, Hyderabad From 9 July 2018 to 9 December 2018 after the approval of synopsis

Sample Size: Sample size calculation: Sample size was calculated by WHO sample size calculator. The sample size of 178 subjects was needed to achieve the 5% of margin of error, at confidence interval of 95%, to assess the severity of periodontitis in patients with DM.

Inclusion Criteria:

- Type 1 and type 2 DM patients aged 15- 60 years
- Signed Informed consent by patient
- Patient diagnosed with DM (diabetes mellitus) for at least one year

Exclusion Criteria:

- Edentulous patient
- Pregnant woman

- Denture wearing patient
- Patient who will not sign the informed consent
- Medically compromised patients
- Patient diagnosed with systemic diseases except diabetes mellitus
- Patient with poor oral hygiene and with habit of smoking, betel nuts, etc

Data Collection Procedure: After approval of synopsis from the institutional ethical review committee, the data was collected. Patient presenting to diabetic clinic Liaquat University Hospital Hyderabad, diagnosed with either type 1 or 2 DM for at least one year, meeting the inclusion criteria, after taking informed consent, were recruited in the study and data was collected by the principle investigator. The study participants underwent a clinical examination which included periodontal examination with CPI-probe (WHO-probe) and a mouth mirror. They were advised for the treatment they require and, for that purpose, they were referred.

According to WHO recommendation 14, CPI (Community Periodontal Index) was used to assess the severity and degree of periodontal diseases (gingivitis, periodontitis) in a person or in a segment of population. Three basic features are dental calculus, gingival sulcus and bleeding. A (WHO-probe) is also known as special dental CPI-probe which is used for the relevant examination. According to the severity ranging from 0 (healthy, inflammation-free gingiva and periodontium) to 4 (most severe form of periodontitis with loss of function of the teeth), Periodontal diseases are further classified into five degrees.

In 1982, World Health Organization (WHO)/ FDI introduced Community Periodontal Index of Treatment Needs (CPITN).

Mouth is divided into 6 parts known as sextants
Examination will be done by World health organization probe
Examination of specified teeth or all teeth identify the scoring
6 1 6
6 1 6

Cpi Score Criteria

- 0 no periodontal disease
- 1 Bleeding on probing
- 2 Calculus with plaque seen or felt by probing
- 3 Pathological pocket 4-5 mm
- 4 Pathological pocket 6 mm or more
- X when only 1 tooth or no teeth are present

Treatment Need Scoring Criteria

- 0 No need of treatment
 - 1 Personal plaque control (OHI).1-4
 - 2 Professional plaque control (scaling, polishing) 2-4
 - 3 deep scaling, root planning, surgical procedure. 3-4
- No identifiable information will be disclosed in order to maintain the confidentiality.

Data Analysis: Data was analyzed by using SPSS version 16.0. Qualitative variables will be expressed in frequencies and percentages. Chi-square test will be applied for checking the association between qualitative variables.

Most of the patients were aged 46–60 years in both groups. The age group of 46 to 60 had a valid percentage of 39.9%. Out of 178 patients, 55 with valid percentage were aged between 15 and 30 years, and with the age of 35 to 45, only 52 were valid with a valid percentage of 29.20%. As shown in Table 1,

Table 2 represents a comparison of gender and its treatment needs according to the scoring of CPITN.

Males were 70 in number in both groups but only 33 had the highest treatment need score of 1, which means personal plaque control according to CPITN scoring criteria. Females were 108 in number out of 178 total, which was their total number in both groups. Only 57 got the highest treatment need score (1) according to CPITN scoring criteria. Score 1 means personal plaque control.

Of the patients, a total of 178 including both groups of type 1 and type 2 diabetes mellitus, the group with the highest duration of diagnosis was less than 10 to 40 years, which was 73 in number with a valid percentage of 41%. who were less than 5–30 years old, 51 in numbers with a percentage of 28.7%, and more than 10–60 years old, 54 in numbers, whose percentage was 30.0%. As described in Table 3,

Only 18 numbers were in for a score of 0 with 10%. For score 1, there were 74 in numbers with 41.6%, and for score 2, there were 35 in numbers with 19.7%. And there were 51 in numbers for 3 with a 28.7 percent. The highest value was for score 1, with a percentage of 41.0% shown in (Table 4).

Comparison between groups (type 1 and type 2 diabetes mellitus) of CPITN. The highest CPITN score is 3. In this result, score 3 is recorded in patients of type 2 with a percentage of 57.30%. In comparison of type 1, the highest score was 1, which means bleeding on probing. The higher the CPITN score, the more severe periodontal conditions are as shown in (Table 6)

Comparison between treatment needs according to cpitn index between 2 groups (type 1 and type 2 diabetes mellitus) is represented in table 6.

It shows that with the higher percentage of treatment needs for score 0 that is 60%, which in patients of type 1 means they have no need for periodontal treatment. In patients of type 2, with the treatment needs score of 1, it means they have a need for personal plaque control. It shows the presence and severity of periodontal diseases between two groups (type 1 and type 2 DM). When compared, cpitn scoring and treatment need according to the relation between both groups, that is, type 1 DM and type 2 DM, was significant (p value = 0.001).

Table 1: Age Distribution Among Total Number Patients of Both Groups According To Age Groups (N= 178)

		Frequency	Percent	Valid Percent
Valid	15-30 Years	55	30.9	30.9
	31-45 Years	52	29.2	29.2
	46-60 Years	71	39.9	39.9
	Total	178	100.0	100.0

RESULTS

Table 2: Comparison Between Treatment Needs According To Cpitn Index And Gender Of Toal Count (N=178)

			Treatment needs criteria				Total	Asymp. Sig. (2-sided)
			No need of treatment	Personal plaque control and OHI	Professional plaque control, scaling, polishing and OHI	Deep scaling, Root planning and Surgical procedure		
Gender	Male	Count	23	33	13	1	70	.438
		% within Gender	32.9%	47.1%	18.6%	1.4%		
	Female	Count	37	57	14	0		
		% within Gender	34.3%	52.8%	13.0%	.0%		
Total	Count	60	90	27	1	178		
	% within Gender	33.7%	50.6%	15.2%	.6%	100.0%		

Table 3: Duration Of Diagnosis Of Dm Of Total Count (N=178)

		Frequency	Percent	Valid Percent
Valid	Less than 5 years	51	28.7	28.7
	Less than 10 years	73	41.0	41.0
	More than ten years	54	30.3	30.3
	Total	178	100.0	100.0

Table 4: Comparison Of Cpitn Scoring Between Two Groups Total (N=178)

		CPITN score criteria					Asymp. Sig. (2-sided)
		No bleeding	Bleeding on probing	Calculus	Pocket depth 4-5 mm	Total	
Type I DM	Count	18	66	5	0	89	.000
	% within Type of DM	20.2%	74.2%	5.6%	.0%	100.0%	
Type II DM	Count	0	8	30	51	89	
	% within Type of DM	.0%	9.0%	33.7%	57.3%	100.0%	
Total	Count	18	74	35	51	178	
	% within Type of DM	10.1%	41.6%	19.7%	28.7%	100.0%	

Table 5: Treatment Needs According To Cpitn Index Scoring Criteria Of Total Patients (N=178)

	Frequency	Percent	Valid percent
No need of treatment	60	33.7	33.7
Personal plaque control and OHI	90	50.6	50.6
Professional plaque control, scaling, polishing and OHI	27	15.2	15.2
Deep scaling, Root planning and Surgical procedure	1	6	6
Total	178	100.0	100.0

Table 6: Comparison Of Treatment Needs Between Two Groups

			Treatment needs criteria				Total	Asymp. Sig. (2-sided)
			No need of treatment	Personal plaque control and OHI	Professional plaque control, scaling, polishing and OHI	Deep scaling, Root planning and Surgical procedure		
Type I	Count	60	29	0	0	89	.000	
	% within Type of DM	67.4%	32.6%	.0%	.0%	100.0%		
Type II	Count	0	61	27	1	89		
	% within Type of DM	.0%	68.5%	30.3%	1.1%	100.0%		
Total	Count	60	90	27	1	178		
	% within Type of DM	33.7%	50.6%	15.2%	.6%	100.0%		

DISCUSSION

In recent years most of the studies were done on only type 1 diabetes mellitus and its relation with periodontal disease but my study has compared the relation of periodontal disease and its progression in both types (type 1 DM, type 2 DM).

The findings of this study show that most of the patients with both types of diabetes mellitus were aged between 46 and 60. It was reported in my study that patients with type 2 diabetes mellitus were older in age in comparison to those with type 1 diabetes mellitus. In our study, patients over 40 were showing more periodontal severity; they were almost of type 2. Similar to previous studies, which show that age has a negative impact on periodontal status, the age of diabetic patients of either type 1 or type 2 DM is believed to be a risk factor for the progression and severity of periodontal disease. The result of those studies found that there was greater bone loss.^{13,14} In comparison, a study reported that age is not related with oral periodontal status.¹⁵

Gender is one of the important factors that have a role in the management of diabetes type 1 or 2. The results of this study found that females were greater in number than males of both types (type 1 DM type DM) similar to a cross sectional study. In that study, it was found that there was lower level of vitamin D in female than in men.¹⁶ According to some studies it was reported that vitamin D is related to diabetes and was confirmed in both genders.¹⁷

The findings of the present study reported that duration of diabetes mellitus is a factor which may not be that important but it affects the CPITN score (periodontal status) not that much but a little bit. Similar to my study, results of different studies have found that when you are bearing in mind the duration of DM, when a patient comes to know that they are diagnosed with diabetes, It is

still not well proved that the duration of DM is the most important factor. 13. Results of another study reported extended time duration of DM along with severe periodontal status causing tooth loss.¹⁸

In contrast, other studies found no association between duration of diagnosis and periodontal status in both type 1 and type 2 of diabetes mellitus.¹⁹

Results considering periodontal status through CPITN scoring criteria, the findings of my result showed that out of 178 patient including both types 1 and type 2 diabetes mellitus, 74 in number score 1(bleeding on probing). It means there that is a proved evidence of periodontal condition in diabetic patients depending which type they belong to. The second highest CPITN score among 178, of both types, 51 patients in number with 28.7 % were 3 means pathological pocket 4-5 mm. similar to a study done in indonesia.²⁰ It was a case control study, comparing two groups one was non diabetic and the other was diabetic.

The foremost objective of this study was comparison of severity of periodontal status in patients of both type 1 and type 2 diabetes mellitus through community periodontal index of treatment need scoring (scoring of CPITN).

When it comes to comparison between two groups (type 1 and type 2 DM) in comparison to type 1 which were showing highest score 1 means (bleeding on probing) they were 66 in number out of 89 patients which were equally divided in groups type 1 and type 2 mentioned in table 1. In comparison to type 1 patients of type 2 which were equally divided and 89 in numbers among them 51 in number with 57.3 % were scoring according to CPITN index 3 means with the pathological pocket depth of 4 to 5 mm. the findings compared both groups it was evident that periodontal status severity is more in type 2 than type 1. The data

of my study is supported by another study carried out by Pranckeviciene A.²¹

The data in my study represents that, out of total diabetic patients which were 178 including both groups among them 90 in number with 50.9 % were scoring according to treatment need 1 (TN 1 means personal plaque control).

According to findings of my result when treatment need according to CPITN score meeting the inclusion criteria were compared between two the groups that are type 1 diabetes mellitus and type 2 diabetes mellitus. out of 89 patients 60 in numbers with 67.4% were scoring again 0 (TN = no need of treatment) in type 1 diabetes mellitus patients. In comparison patients of type 2 diabetes mellitus which were 89 in numbers 61 in numbers were scoring 1 (TN= personal plaque control). Again it was proved that patients of type 2 diabetes mellitus need more treatment according to cpitn scoring than type 1 diabetes mellitus patients. The data regarding treatments was supported by the data of an author who believed that treatment need were necessary in patients of diabetes in comparison to healthy patients.²²

In contrast, many studies^{23,24} were in comparison of my result according to those diseases treatment need was scoring more in diabetic patients than the findings of my result.

By examining patients of type 1 and type 2 diabetes mellitus, the result of current study showed that there is a relationship between periodontal status and both types of diabetes. The findings of my overall result revealed that severity of periodontal status were more in type 2 patients of diabetes than in type 1 diabetic patients. The data of my results was supported by previous studies through meta analyses.²⁵

Recommendations: A diabetic patient, type 1 DM or type 2 DM, should know and have awareness about the complications of their diabetes mellitus through their physician. One of the complications of diabetes related to dentistry is periodontitis, an oral infection of periodontal tissue.

A physician who is treating a diabetic patient should have knowledge about all its complications, including periodontal disease, which, according to literature, is one of the six most common complications of diabetes.

Moreover, if a diabetic patient comes to a dentist, It is the dentist's duty to know the full history of the disease and inform them about its oral and other complications to prevent further loss and reduce the severity of periodontal disease.

There should be awareness programmes about complications of diabetes mellitus for physicians as well as patients, and students from medical universities should attend these kinds of programs. These programmes are known as oral health awareness programs. Target sites for these kinds of programmes should be schools, colleges, and universities.

Not only on the urban side, but these awareness programmes should also be held on the rural side by their health care centres and basic units. Also, students from medical universities and dental colleges should reach out to them and arrange for these kinds of programmes for prevention and awareness.

CONCLUSION

According to the findings of this study, it was observed that periodontal disease is mostly found to be severe in type 2 diabetes mellitus patients in comparison to type 1 diabetes mellitus patients. Furthermore, promoting factors that cause periodontal infection are smoking, betel nuts, and other systemic diseases.

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