

Periodontal Health and Its Impact on Quality of Life among Type II Diabetes Mellitus Patients

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ABSTRACT

Introduction: Diabetes mellitus is one of the key public health issues worldwide. Diabetes mellitus and its related oral manifestations, particularly in the form of poor periodontal health, has impact on physical health along with emotional and psychosocial consequences. The current study was done to assess periodontal health and its impact of on the quality of life among type II diabetics.

Materials and methods: A total of 138 diabetic subjects (test group) and 128 nondiabetic subjects (control group) were included in the study. Periodontal parameters, such as plaque index, gingival index, and community periodontal index of treatment needs (CPITN) index were recorded. Oral health impact profile (OHIP-14) questionnaire was used to evaluate effect of periodontal health on quality of life.

Results: Plaque index and gingival index scores were greater among test group, but were not statistically significant. The CPITN score was statistically significant when compared with control and test groups. When the mean of OHIP-14 scores was compared among two groups, five of the seven subdimensions were statistically significant. A statistically significant difference was found when overall total OHIP score was compared among control and test groups.

Conclusion: Overall oral health and observed oral health-related quality of life were lower among diabetic subjects in comparison with nondiabetics. Periodontal health was poorer and needs more attention among diabetic patients.

Keywords: Community periodontal index of treatment needs, Periodontal disease, Quality of life, Type II diabetes mellitus.

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INTRODUCTION

The American Diabetes Association¹ defined diabetes mellitus (DM) as “a group of metabolic diseases

characterized by hyperglycemia as result of defects in insulin secretion, insulin action, or both.” Along with classical symptoms, it may be accompanied by increased susceptibility to certain infections.¹ In DM, altered wound healing is also observed.

India has been ranked first among the countries with the highest number of people with diabetes, with a diabetic population of 31.7 million and the projection for 2030 is 79.4 million.² Around 95% of individuals with diabetes are suffering from type II DM.³

Diabetic individuals exhibit a greater occurrence of oral disorders, such as dry mouth, taste alteration, candidiasis, and lichen planus.⁴ Poor periodontal health is commonly associated with diabetic individuals; hence, it is coined as the “sixth” complication of DM.⁵ The severity of the disease is related to long-term metabolic control, not the duration of the DM.^{6,7}

The presence of periodontal disease in diabetics may lead to poor diabetic control. Moreover, the management of periodontal disease has shown improvement in the metabolic control of disease.^{7,8}

Oral conditions can play a vital role in economic, social, and psychological status of an individual. Person’s eating practices, speaking, deglutition, and type of food can get influenced by the various oral conditions. Research has shown that oral health and systemic health cannot be separated from each other.³

The influence of disease status on overall life experience is an important concern in the management of patients with chronic diseases including diabetes.⁹ Oral health-related quality of life (OHRQoL) can be affected by the increased number of oral diseases as well. However, the impact of OHRQoL in diabetic patients is not clear.⁹ Although some studies^{3,9,10} on OHRQoL among diabetic patients have been reported, limited factors have been considered. The planning, assessment of oral care, and management should effectively address patients’ necessities and concerns. This can be assessed by a thorough understanding of the consequences of oral diseases and patients’ perception regarding the role of oral health in daily life. Thus, this study aimed at assessment of impact of periodontal health on the quality of life among diabetics using the short-form version of the oral health impact profile (OHIP-14).¹⁰

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MATERIALS AND METHODS

The patients were recruited from the monthly diabetic outpatient clinic of a private hospital, and type II diabetic patients who were visiting the outpatient department of the dental college during the study period (October 2013–March 2014) were included. A total of 150 known type II diabetic patients (test group) were screened during the study period. All were on required treatment and being supervised for their systemic condition regularly. Out of this, 138 patients gave consent to recruit them for the study as test group by signing the written informed consent sheet. A total of 128 subjects who reported during the same period without diabetes and with similar age group were recruited as control group. They were explained about the research and included as part of the study only after obtaining informed consent. All the subjects underwent a clinical examination. The study protocol was approved from the institutional ethical review board before the commencement of the study. All the data were statistically analyzed using Statistical Package for Social Sciences version 13 (Inc., Chicago, Illinois, USA).

Oral Health Impact Profile 14

The OHIP-14¹⁰ comprised a questionnaire as a measure of the social impact of problems that may compromise oral health. Participants were asked to grade any of the difficulties in the previous 12 months (using OHIP-14).

The OHIP-14 scale scores ranged from 0 to 56, with higher scores indicating poorer OHRQoL.

Besides OHIP-14 items, the data regarding age and educational level were recorded. This was followed by clinical oral examination.

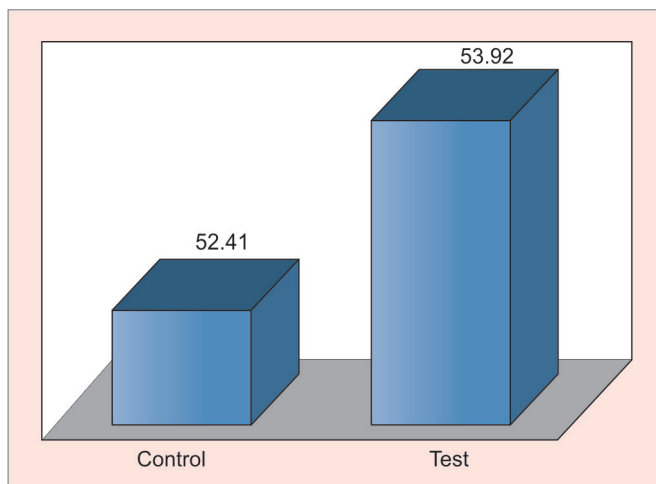
Clinical Examination

Experienced periodontists did all the clinical examination. For every patient, gingival index (GI),¹¹ plaque index (PI),¹² and community periodontal index of treatment needs (CPITN)¹³ index were recorded.

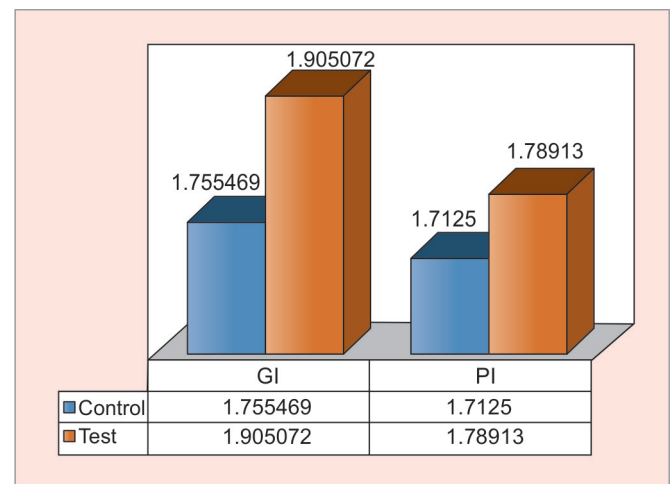
RESULTS

The mean age of the study and control groups was 53 ± 10.23 and 52 ± 10.59 respectively (Graph 1). The age of the diabetic subjects ranged from 32 to 75 years and that of the control group was from 32 to 73 years. The education level of the subjects ranged from primary schooling to professional qualification. Both the groups did not show much difference in the education levels as shown in Table 1.

Periodontal parameters, such as PI, GI, and CPITN index were recorded for both the test and control groups (Table 2 and Graph 2). Both group participants had gingivitis. The severity of gingivitis varied from mild to severe, but the difference was not statistically significant. Around 10.2, 50.7, and 39.1% population had mild, moderate, and severe gingivitis respectively.



Graph 1: Age comparison among control and test groups



Graph 2: The GI and PI among control and test groups

Table 1: Education level of the test and comparison groups

Education level	Control group	Test group
Primary education	11 (8.6)	19 (13.8)
High school	24 (18.7)	36 (26.08)
Degree qualification	74 (57.8)	67 (48.6)
Professional qualification	19 (14.9)	16 (11.5)

Table 2: Periodontal parameters among test and control groups

Parameter	Control group	Test group	p-value
Gingival index	1.75 ± 0.69	1.90 ± 0.69	0.08
Plaque index	1.71 ± 0.68	1.78 ± 0.67	0.359
Community periodontal index of treatment needs	1.97 ± 1.19	2.26 ± 1.08	0.03*

*Significance level, $p \leq 0.05$

Diabetic patients exhibited higher (64%) mean number of CPITN scores of 2 and 3. It was statistically significant. In the control group, around 69% of the population exhibited mean number of sextants with score of 0 and 1.

When mean OHIP-14 scores were compared among the two groups, out of seven dimensions, five showed statistically significant difference (Table 3 and Graph 3).

The OHIP-14 questions were analyzed individually among test and control groups using Pearson's

Chi-square test. Out of 14 questions, OHIP-4 ($p = 0.02$), OHIP-6 ($p = 0.03$), OHIP-8 ($p = 0.02$), OHIP-13 ($p = 0.006$), and OHIP-14 ($p = 0.006$) were statistically significant.

As shown in Graph 4, a statistically significant difference was found when overall total OHIP score was compared among control and test groups (Table 3).

DISCUSSION

Periodontal disease is one of the most common dental diseases that affect human populations worldwide. The prevalence of the disease shows greater numbers compared with other oral conditions. In several developed and developing countries, the prevalence and severity of the periodontal disease have been measured in population-based surveys. However, these studies were carried out with a wide range of criteria and methods.

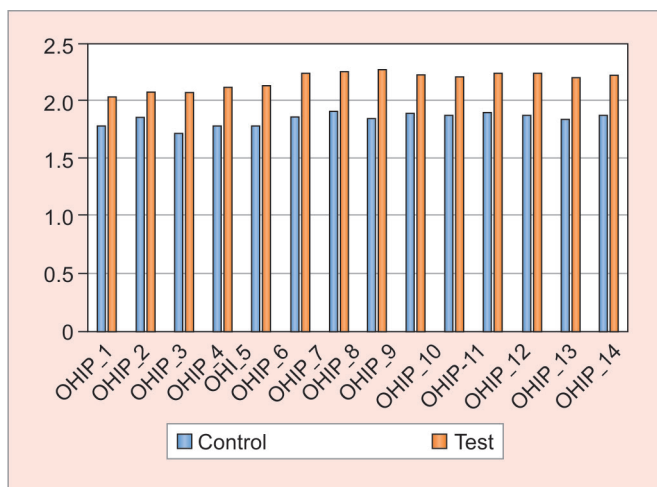
This study was conducted on 266 subjects [138 (test) + 128 (control)] with the purpose of assessing the impact of periodontal health on the quality of life among diabetics in comparison with nondiabetic patients using the short-form version of the OHIP.¹⁰ The periodontal health was found to be poorer among the diabetic patients in comparison with nondiabetic counterparts, which was in accordance with earlier research.^{3,8,14,15}

There was difference in the clinical parameters, such as GI,¹¹ PI,¹² and CPITN¹³ among the two groups. The entire study population (case and control group) was suffering from different degrees of gingivitis. The condition varied from mild to severe. The oral hygiene also ranged from good to poor. The CPITN was used to measure periodontal health because of its simplicity, quickness, international uniformity, and its validation by the World Health Organization for recording periodontal disease. The CPITN score was statistically significant among the

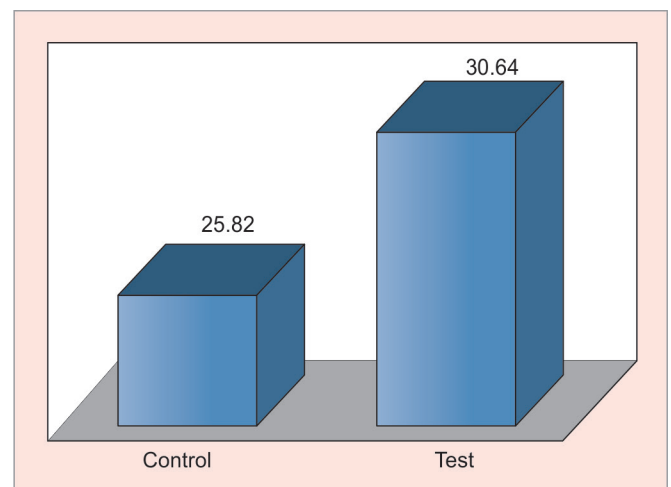
Table 3: Comparison of OHRQoL among diabetic and nondiabetic subjects

OHIP-14 items	Mean ± SD	p-value
<i>Functional limitation</i>		0.08
Control group	1.82 ± 1.16	
Test group	2.06 ± 1.13	
<i>Physical pain</i>		0.013*
Control group	1.75 ± 1.18	
Test group	2.12 ± 1.18	
<i>Psychological discomfort</i>		0.008*
Control group	1.82 ± 1.10	
Test group	2.19 ± 1.15	
<i>Physical disability</i>		0.005*
Control group	1.88 ± 1.07	
Test group	2.27 ± 1.10	
<i>Psychological disability</i>		0.0135*
Control group	1.88 ± 1.12	
Test group	2.22 ± 1.11	
<i>Social handicap</i>		0.012*
Control group	1.89 ± 1.16	
Test group	2.25 ± 1.13	
<i>Handicap</i>		0.0115*
Control group	1.86 ± 1.10	
Test group	2.21 ± 1.12	
<i>Overall OHIP-14 score</i>		0.008*
Control group	25.82 ± 14.48	
Test group	30.64 ± 14.93	

*Significance level, $p \leq 0.05$; SD: Standard deviation



Graph 3: Individual OHIP-14 comparisons among control and test groups



Graph 4: The OHIP-14 total score among control and test groups

test group. This is in accordance with the earlier research by Bacić et al.¹⁶ The increased periodontal disease occurrence in diabetics may be due to xerostomia, which is very common among diabetics and elderly individuals. Xerostomia may lead to some oral problems, such as dental caries, bad breath, burning sensation in oral tissue, and increase in the plaque formation. This, in turn, can favor gingival inflammation in patients with compromised oral hygiene; diabetic individuals are more prone to severe inflammation due to weaker host defense mechanisms. This may be due to disturbances in function of white blood cells and alteration in the gingival vasculature. There is alteration in the flow of nutrients to the oral tissues and removal of noxious agents from oral tissues also decreased.³

Several methods have been developed for the analysis of distribution of oral problems in a community. These methods are usually used to determine both the occurrence of diseases and the associated conditions in the community. In this study, OHIP-14 has been used as an instrument for evaluating the adverse impacts of oral conditions, such as periodontal condition on well-being. This is in agreement with other available literature.^{14,15}

CONCLUSION

The findings of this study revealed that periodontal health and perceived OHRQoL were poorer among diabetics than nondiabetics. Periodontal disease had a negative impact on quality of life, and this impact was greater among diabetics. The interaction between periodontal disease and DM makes it essential to ensure optimum oral health care for diabetic patients. These findings suggest that comprehensive management of the periodontal disease and its successive maintenance among diabetic patients who are already at higher risk to develop severe periodontal disease is very essential. Related quality of life assessment can be used for periodontal preventive community programs to reduce the prevalence of periodontal diseases or other oral health problems.

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