

# Prevalence Of Periodontal Diseases In Diabetic And Non-Diabetic Patients- A Clinical Study.

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## Abstract

Background: The sixth long-term complication of diabetes is periodontitis. The link between periodontal and systemic health is a two-way street. Patients with diabetes are at a greater risk for developing infections, and these infections can impair these patients' metabolic control. Patients with both diabetes mellitus and periodontal disease present the challenge of managing two chronic diseases, each of which may impact the other. Aim: The aim of this study was to determine the prevalence of periodontal disease in patients with type 2 DM in a single center Mauras College Of Dentistry, Oral Research Institute and Hospital at Arsenal in Mauritian population. Methods: A clinical study was carried out. A total of 2000 patients were included (980 diabetic patients and 1020 nondiabetic patients as controls). Patients with type 2 diabetes mellitus who were dentate aged 40 years and above and with  $\geq 6$  remaining teeth were studied. The study period was 3 months. Results: Periodontal disease was seen in 49.9% of the subjects when both diabetics and controls were taken into consideration. Periodontal disease is prevalent in all diabetic patients. Conclusion: Mauritian subjects with Diabetes Mellitus had more prevalent periodontitis than healthy Mauritian subjects

## INTRODUCTION

The sixth long-term complication of diabetes is periodontitis. Periodontal diseases are infections of the gums and supporting structures of the teeth. These diseases are as old as mankind. Human skulls from ancient civilizations show evidence of periodontal bony destruction.[1]

Both diabetes mellitus and periodontal diseases are chronic inflammatory disorders that have a major impact on the health and well-being of millions of individuals worldwide.[2] Periodontal disease is the second main cause of oral cavity disorders affecting the population due to its high prevalence.[3] Therefore, if the presence of periodontal diseases plays any role in overall systemic health, the public health impact may be substantial.[2] Evidence consistently reveals that diabetes is a risk factor for increased prevalence of gingivitis and periodontitis.[4]

Diabetes results in changes in the function of immune cells including neutrophils, monocytes, and macrophages. Neutrophil adherence, chemotaxis, and phagocytosis often are impaired.[5,6] Defects in this first line of defense against periodontal pathogens can facilitate bacterial persistence in the periodontal pocket and significantly increase periodontal

destruction.

In a 2008 review of evidence published since year 2000, Taylor and Borgnakke[7] validated previously reported conclusions that diabetes is associated with increased occurrence and progression of periodontitis and, further, that periodontal infection is associated with poorer glycemic control in individuals with diabetes.

However, inspite of the alarming increase in the prevalence of diabetes mellitus in Mauritius, no information has been obtained on the relationship of diabetes mellitus and periodontal disease. There is definitely need for investigation as we feel oral health has been neglected especially when it comes to management of DM.

This study provides consistent evidence of greater prevalence of periodontal diseases in diabetic patients. As this study was conducted using a number of different measures of periodontal disease, we can state with confidence that diabetics have an increased susceptibility to periodontitis related to diabetes mellitus.

## METHODS

This was a clinical study starting from January 2011 to May

2011, a total of 2000 patients were included (980 diabetic patients and 1020 non diabetics as controls). The patients were attending the outpatient dental clinic of Mauras College of Dentistry & Oral Research Institute in Arsenal, Republic of Mauritius. Included patients were type 2 DM patients who were dentate persons aged 40 years and older with  $\geq 6$  remaining teeth. Patients who were edentulous were excluded. The controls were non diabetic patients who were visiting the outpatient dental clinic.

Diabetes Mellitus was diagnosed according to the American Diabetes Association recommendations in 2002. Patients who were on drug treatment for diabetes and with  $HbA1C \geq 7$  were considered diabetic. Patients who have  $HbA1C \geq 7$  were considered as diabetics. Dentists performed the dental examinations. The oral health examination included an examination of the oral cavity to assess tooth count and location, local factors assessment, the soft tissue examination and the periodontal examination. Periodontal examination consisted of measurement of gingival bleeding, calculus and clinical probing depth.

Demographic variables included gender and age at examination. The analyses were carried out on participants of both genders aged 40 and above, with and without clinical diagnosis of diabetes mellitus. Specifically, participants responding that they had previously been told by a physician that they had diabetes, or who had  $HbA1C \geq 7$  were considered to have previously diagnosed diabetes. Brushing habits were the same for all the patients. Oral care consisted of twice toothbrushing daily and flossing. However, none of the patient used flossing.

The William graduated periodontal probe was used to assess probing depth. The data were collected when slight resistance to probe penetration was felt. The periodontal examination was carried out in all the quadrants. All fully erupted teeth in these quadrants were assessed, excluding the third molars. All the teeth present in the oral cavity were examined for periodontal parameters. Periodontitis included persons who have 2 or more teeth (or  $\geq 30\%$  of the teeth) with  $\geq 5$  mm probing depth. Persons who had 6 or more teeth present and who were without the aforementioned criteria of periodontitis were classified with no periodontitis. The periodontal pocket was confirmed to be present with the help of IOPA of the diseased site having alveolar bone loss.

The total number of patients was 2000; of them, 980 were diabetic patients and 1020 were controls.

## STATISTICAL ANALYSIS

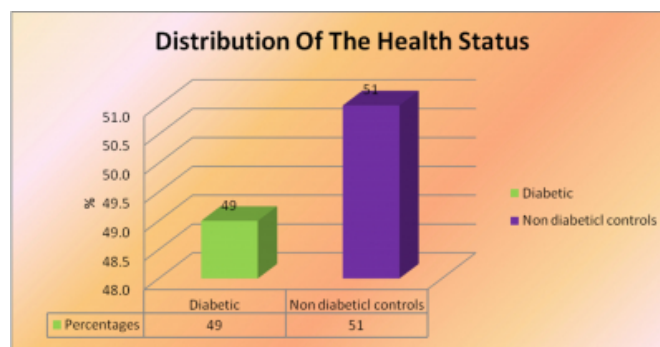
Categoric variables were summarized as percentages. MS Excel was used for the analysis.

## RESULTS

All the patients who were diabetics, they were suffering from periodontal diseases. In other words, the diabetics had 100% prevalence of periodontal disease. But while taking into account both diabetics and non-diabetics, the prevalence of periodontal diseases in both of them was 49.9%. 23.0% of the males were those who had Type 2 DM and periodontitis while 26.0% were diabetic females with periodontitis. It should be noted that there was no difference between the diabetics and controls (non-diabetics) in mean age, sex, tooth care (at least 2 times a day brushing), and smoking.

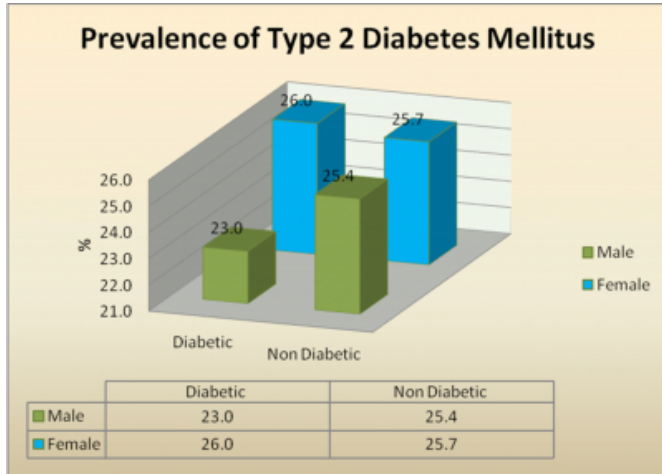
**Figure 1**

Figure 1: Bar chart representing the subjects' health status. 49% of the subjects were diabetic patients while 51% were non-diabetics. The 51% were the controls.



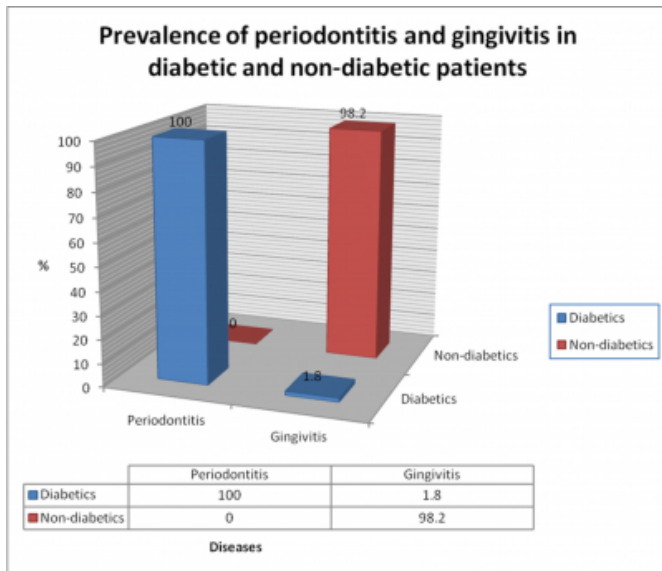
**Figure 2**

Figure 2: Bar chart representing the prevalence of Type 2 Diabetes Mellitus in the subjects. 26.0% of the subjects were female who were diabetic while 23.0% of them were male and diabetic. 25.7% were those who were female and non-diabetics and the remaining 25.4% subjects were non-diabetic males.



**Figure 3**

Figure 3: Bar chart representing the prevalence of periodontitis and gingivitis in the subjects of the clinical study. All the patients who were diabetics had periodontitis, that is 100% refers to diabetic patient with periodontitis. 98.2% were those who were non-diabetics and suffering from gingivitis. Remaining 1.8% were those who were non-diabetic but suffering from gingivitis.



**DISCUSSION**

This study indeed reveals that Mauritian subjects with Type 2 Diabetes Mellitus have significantly increased prevalence of periodontitis compared to healthy Mauritian subjects.

Furthermore, this increase seemed to be independent of confounding factors, i.e., age, sex, smoking, BMI, ethnicity and other medical conditions.

A sample of 980 Diabetes Mellitus Type 2 patients and 1020 controls would have been enough to detect this difference. The education level of our patients and controls was low. The oral hygiene was fair; 100% of the included patients were brushing at least 2 times a day. None our patients were smokers.

With pocket depth as a marker of periodontal disease in this study, periodontal disease was more common among the diabetics than the controls. This has been reported. However, diabetes has been found to be significantly correlated with the number of lost teeth, which is again one marker of disease.

Comparison cannot be made with other data because this is the first study that has been conducted in Mauritius on the relationship of diabetes mellitus and periodontitis. However studies in other countries give the same evidence. For instance, the Pima Indians of Arizona have very high prevalence of Type 2 diabetes. In this population, the severity and prevalence of loss of attachment and bone loss were greater among diabetic patients than non-diabetic control subjects in all age groups.[8,9]

Of our subjects, 49.9% had some periodontal disease. However all the diabetic patients were suffering from periodontal diseases. 100% reveals periodontitis and diabetic mellitus. In our survey among Mauritian adults 40 years and older, 49% had pathologic pockets Our study had its limitations. We used only pocket depth as a marker of disease, but attachment loss and number of missed teeth may correlate more with periodontal disease. Furthermore, it was a single-center experience and could not represent the whole population in Mauritius.

The presence of periodontal disease in the diabetic subjects provides strong evidence that Diabetes mellitus and periodontal diseases have definitely a strong link between them.

**CONCLUSION**

This study shows that periodontitis prevalence is significantly higher in a group of Mauritian patients with Diabetes Mellitus Type 2 compared to a group of healthy Mauritians. Diabetes affects approximately 120,000 Mauritians, more than of the adult population. A large body

of evidence suggests that diabetes is a major risk factor affecting the prevalence of periodontitis.

Given the already high and increasing prevalence of Diabetes Mellitus Type 2 in Mauritius, patients with should be screened for periodontitis and preventive oral health care should become part of the regular care provided to Mauritian patients with DM2. Given the proposed bilateral association between Diabetes Mellitus Type 2 and periodontitis, such care may contribute to better oral and overall health.

Of both the diabetics and the controls, periodontal disease was seen in 49.9%. However in cases of diabetics, 100% were suffering from Type 2 DM. Periodontal diseases were significantly more among diabetics. Larger studies with pocket depth, attachment loss with radiologic evaluation for bone loss, are needed to assess the periodontal disease among diabetics, other systemic disease, and the general population.

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