

# Comparison Of Dental Caries Status Among Healthy And Diabetes Mellitus Patients - A Cross Sectional Study

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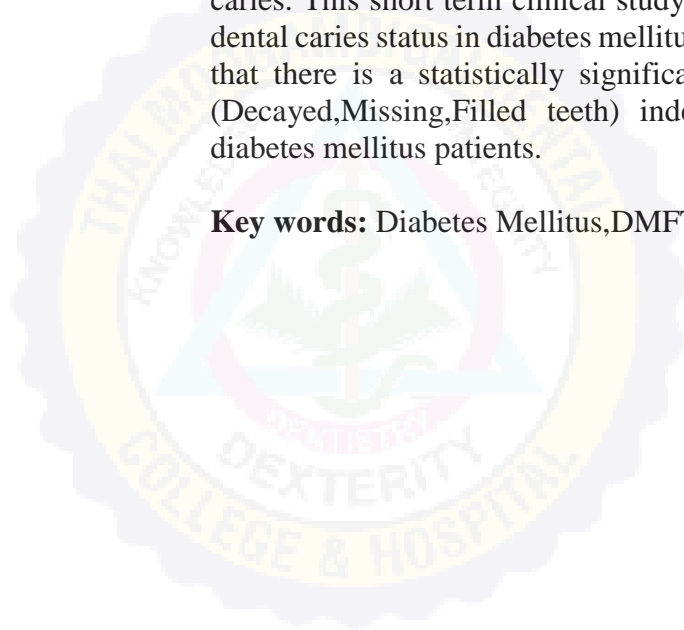
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## ABSTRACT

Diabetes mellitus is a disease characterized by increased blood glucose level. Diabetes patients have a higher risk of getting dental caries. This short term clinical study was performed to assess the dental caries status in diabetes mellitus patients. Our results showed that there is a statistically significant difference of the DMFT (Decayed, Missing, Filled teeth) index among the healthy and diabetes mellitus patients.

**Key words:** Diabetes Mellitus, DMFT index, Dental Caries, Saliva.



## INTRODUCTION

Diabetes mellitus (DM) is characterized by elevated blood glucose levels. The two main forms of DM are type 1 diabetes mellitus (T1DM) and type 2 diabetes mellitus (T2DM), both of which are primarily brought on by improper insulin secretion (T1DM) and/or action (T2DM). 90% of patients globally with DM have T2DM.[1] Insufficient insulin production or elevated cellular insulin resistance are the causes for the increase in the blood glucose levels. Retinopathy, nephropathy, neuropathy, macrovascular disease, and poor wound healing are some frequent and well known effects of diabetes mellitus.[2] Dry mouth, dental caries, periodontal disease, gingivitis, oral candidiasis or thrush, burning mouth syndrome, taste disturbances, rhinocerebral zygomycosis (mucormycosis), aspergillosis, oral lichen planus, geographic tongue, and others have all been linked to diabetes mellitus[3].

Dental caries is a multifaceted disease. According to reports, people with diabetes suffer it more frequently and severely than people without the disease.[4] Dental caries is brought on by demineralization, which is brought on by the buildup of microbial plaque flora, an increase in salivary glucose levels, a decrease in salivary calcium levels, and a reduction in salivary flow rate. Saliva's ability to remineralize internally is known to be maintained by remineralization-favoring substances such as calcium, phosphates, and fluorides.[5]

Therefore, this short-term clinical investigation was conducted to evaluate the prevalence of dental caries in both healthy individuals and people with diabetes mellitus.

## MATERIALS AND METHODS

A total of 60 study subjects were recruited from the patients reporting to the Outpatient department. Subjects were grouped under two categories of 30 subjects each, as healthy and diabetic patients.

## INCLUSION CRITERIA

Inclusion criteria for the control group included healthy patients without systemic disease of 30 – 70 Years of age, Any gender, and HbA1c values : < 6.5%. The Diabetic group included subjects of 30 – 70 Years of age, Any gender, with history of diabetes, and HbA1c values :  $\geq 6.5\%$

## EXCLUSION CRITERIA

Exclusion criteria for the control group included participants with a history of diabetes including gestational diabetes and other metabolic diseases. And for the diabetic group Participants without history of diabetes, and are under medication for any other disease are excluded. Participants who are under medications for diseases other than diabetics, and on-going dental treatments are excluded from both the groups.

## CLINICAL EXAMINATION

The dental caries status of the individual was recorded by employing Decayed – Missing- Filled tooth (DMFT) index. Since its introduction in the 1930s, the Decayed, Missing, and Filled Teeth (DMFT) index has become the most widely used population-based indicator of caries prevalence in the globe. This index displays the total amount of a person's permanent teeth or surfaces that are decaying, missing, and filled (DMFS).

## STATISTICAL ANALYSIS

Descriptive statistics was done to assess the mean and standard deviation among the study variables. Inferential statistics was done by using unpaired t test to compare the mean values between the diabetic and healthy patients. To analyze the data SPSS software was used. Significance level is fixed as 5% ( $\alpha = 0.05$ ). P-value < 0.05 is considered to be statistically significant.

## RESULTS

The mean and the standard deviation of the DMFT index of healthy and diabetes patients was found to be  $4.5000 \pm 2.75118, 7.6000 \pm 2.81131$  respectively. The DMFT values among healthy and diabetes mellitus patients were statistically significant with a p value of 0.0011 and 0.0016 respectively [Table.1].

## DISCUSSION

A group of chronic diseases known as diabetes mellitus (DM) are characterized by a lack of insulin, cellular resistance to insulin action, or both. This results in hyperglycemia and other related metabolic abnormalities. [6] 2.8% of persons globally had diabetes in 2000, and 4.4% may have it by 2030. [7] DM has also been associated with oral mucosal infections such lichen planus, recurrent aphthous stomatitis, and candidiasis, as well as dental caries, gingivitis, periodontitis, impairment of the salivary glands, altered taste, and other conditions.

According to some authors, diabetic people have a three times higher chance of developing dental caries than non-diabetics. Even though both diseases are linked to the consumption of dietary carbohydrates, there has been far less focus on the connection between diabetes and dental caries, especially among adults. [8] Our study showed significantly higher incidence of caries in diabetic patients with a mean value of  $7.600 \pm 2.81131$  to that of  $4.500 \pm 2.75118$  in healthy patients. This may be because diabetes mellitus has been shown to affect salivary composition and function, which ultimately affects the health of the oral cavity and teeth.[8]

Diabetes patients may be at an increased risk of developing caries because of hyposalivation and increasing salivary glucose levels caused by insulin insufficiency.[9]

There is evidence that saliva from people with low caries has higher levels of the following: pH and buffering, higher levels of calcium and phosphorus, higher concentrations of ammonia, high ATP and fructose diphosphate concentrations, increased bacterial O<sub>2</sub> absorption and aldolase activity increased antibacterial activity overall, increased opsonin activity, increased antimicrobial activity against lactobacilli and streptococci, Higher proportion of intact leukocytes and a different ratio of epithelial to leukocyte cells.[6]

The activity of bacteria is affected by increasing the level of glucose in the saliva. Because of their capacity to foster an environment with a low pH that promotes the progression of caries, *Streptococcus mutans* and *Lactobacillus* are thought to be associated to caries and to be the most cariogenic bacteria [10].

Moreover, calcium in saliva serves as a key mineral that prevents tooth dissolution by supplying a constant and continuous supply to the affected areas of teeth. Failure to regulate blood glucose in patients with diabetes has a significant negative impact on salivary calcium levels.[8] Hence, the future course of research must be made to find the salivary calcium levels in the diabetic patients and find its correlation with dental caries status of the individual.

For this reason, a potent way of monitoring oral illnesses in diabetes mellitus patients is the combined examination of dental caries, salivary components, and bacterial pathogens in saliva.

Therefore, as diabetes is an adult disease, when uncontrolled it becomes an important risk factor for caries .

## LIMITATION

The primary drawback of the study was the small sample size, which requires a more thorough study with a larger sample size to support these values.

Correlation between Salivary glucose and salivary calcium with the dental caries status of diabetes mellitus patients is necessary in order to know about the true nature of the disease.

## CONCLUSION

Diabetes being one of the most common systemic disease affecting an individual, monitoring salivary biomarkers could become an important complement to clinical examinations in diabetes patients. Our findings have proved that there is increase in dental caries prevalence in diabetic patients.

## CONFLICT OF INTEREST

All authors declare that they have no conflict of interest.

## STATEMENT OF INFORMED CONSENT

Informed consent was obtained from all individual participants included in the study.

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TABLE 1. Unpaired t test for DMFT values among Control and Diabetes mellitus patients.

	DMFT
CONTROL	4.5000±2.75118
DIABETES MELLITUS	7.6000±2.81131
t VALUE	4.019
P VALUE	0.0016*

Figure 1: COMPARATIVE ANALYSIS OF DMFT AMONG HEALTHY AND DIABETIC PATIENTS

