

# Awareness on Oral Disorders in Diabetes Mellitus among General Population in Chennai

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## Abstract

**Objective:** To evaluate the awareness on oral manifestation of diabetes in general population in Chennai. **Background:** Diabetes mellitus (DM), according to the World Health Organization is a silent epidemic which affects large number of people around the world and is directly related to the oral health status of the patients. DM is a metabolic disorder of multiple etiologies due to disturbances of carbohydrate, fat, and protein metabolism. It is characterized by chronic hyperglycemia, and it is associated with oral disorders, cardiovascular, and renal complications. These complications result in diminished quality of life and reduced life expectancy. Although dental caries was comparatively low in diabetics, periodontal status was compromised. Awareness on diabetes and increase risk of oral disorders in diabetic patient is comparatively less than awareness on systemic diseases in general population. Hence, this study was conducted to evaluate awareness and educate them by reinforcing the importance of oral health care in diabetes. **Methodology:** A total of 159 self-completion questionnaires were distributed to assess the main objectives of the study. **Results:** The awareness of public toward increased risk for oral diseases in diabetes is low compared to their awareness of systemic diseases. On average, only 41.8% people is aware of an oral complication of DM, which is very low and 58.2% of population is unaware of a complication of DM. **Conclusion:** People were found to have little knowledge on oral manifestation of DM. To promote proper oral health and to reduce the risk of oral diseases, health professionals in both the dental and medical fields need to take the responsibility to develop programs to educate the public about the oral manifestations of diabetes and its complications on oral health.

**Keywords:** Awareness, diabetes mellitus, general population, oral manifestation

## INTRODUCTION

Diabetes mellitus (DM) is chronic metabolic disorders characterized by incompatible blood hyperglycemia, due to the failure of the pancreatic beta cells to produce insulin and/or inability of the body to use the insulin produced because of insulin resistance in the body cells. DM is a growing problem worldwide, it affects 5% of the world's population, and the number of cases is doubling every generation.<sup>[1]</sup> In fact, the prevalence of DM has been increasing worldwide at such a rate that recently the World Health Organization (WHO) declared the disease an epidemic. Worldwide, the number of estimated cases of DM has increased from 30 million in 1985 to 135 million in 1995.<sup>[2]</sup> Furthermore, the WHO reported that by the year 2030 the number of estimated cases of DM is jutting to increase to 366 million. In most part of the world, this increase is directly attributed to a genetic predisposition to the disease and also to lifestyle changes that modern development has brought on, such as a high-sugar

diet, physical inactivity, obesity, as well as other etiological factors.

Uncontrolled diabetic patients will be at high risk of systemic and oral complications. The most common chronic manifestations are vascular diseases that include coronary artery, peripheral vascular and cerebrovascular diseases. In addition, microvascular complications manifest as retinopathy, neuropathy, and nephropathy among others. Examples of acute complications are diabetic ketoacidosis, hyperosmolar hyperglycemia, as well as other acute infections.<sup>[3]</sup> In terms of its oral consequences, diabetes manifests itself in several ways. When DM is left uncontrolled for an extended period, for example, it negatively affects the salivary glands and

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results in xerostomia or sialosis.<sup>[4-8]</sup> When not enough saliva is produced to wash and cleanse the oral cavity, plaque, and debris accumulate at a much faster rate.<sup>[9,10]</sup>

In addition to periodontitis, persistent poor glycemic control has been associated with increased incidence and progression of gingivitis and alveolar bone loss,<sup>[11,12]</sup> salivary gland dysfunction,<sup>[13,14]</sup> taste disturbances,<sup>[15]</sup> and orofacial neurosensory disorders (e.g., burning mouth syndrome [BMS]).<sup>[16]</sup> People with diabetes have also been shown to be at greater risk of developing certain oral mucosal disorders such as lichen planus, recurrent aphthous stomatitis, and oral fungal infections.<sup>[17]</sup> There is also evidence that people with diabetes have an increased risk of oral cancer and oral premalignancies.<sup>[18]</sup> Awareness on diabetes and increase risk of oral disorders in a diabetic patient is comparatively less than awareness on systemic diseases in general population. Hence, this study was conducted to create awareness and educate them by reinforcing the importance of oral health care in diabetes.

## METHODOLOGY

A cross-sectional study was conducted among the general population of Chennai. A total of 200 people in the age group 16–75 years were selected using random sampling technique. Informed consent was obtained from each person. A self-completion questionnaire was utilized to assess the main aims of the study [Figure 1].

TO EVALUATE THE AWARENESS ON ORAL DISORDERS IN DIABETES MELLITUS AMONG GENERAL POPULATION IN CHENNAI.

Name : \_\_\_\_\_ Age/sex : \_\_\_\_\_ Education: \_\_\_\_\_  
 Address: \_\_\_\_\_ Occupation: \_\_\_\_\_

1. Are you aware that diabetes cause oral disorders ?  
a) Yes b) No
2. Are you aware that diabetes cause gingivitis(bleeding gums) ?  
a) Yes b) No
3. Do you know that periodontitis( mobility of teeth) is the manifestation of diabetes?  
a) Yes b) No
4. Are you aware that periodontal abscess occurs in diabetes ?  
a) Yes b) No
5. Are you aware that diabetes can cause xerostomia (dry mouth) ?  
a) Yes b) No
6. Do you know that diabetes cause halitosis (bad breath) ?  
a) Yes b) No
7. Do you know that fungal and bacterial infection are superadded in diabetes ?  
a) Yes b) No
8. Burning mouth syndrome ( burning sensation of mouth) is present in diabetes?  
a) Yes b) No
9. Dental caries/ tooth loss occurs in diabetes ?  
a) Yes b) No
10. Are you aware that wound healing will be delayed in diabetes?  
a) Yes b) No

Figure 1: Image of the questionnaire.

The questionnaire included information related to the patient’s name, age, gender, occupation, and residential area. It was further categorized to evaluate their awareness on oral complications associated with diabetes. The completed questionnaires were then analyzed statistically to obtain the results in terms of percentages.

## RESULTS

A total of 149 patients out of 200 fulfilling the inclusion and exclusion criteria were enrolled into the study. Sixty-nine (46.3%) were males and 80 (53.7%) were females. The median age of the included patients was 55.00. Regarding people’s knowledge and awareness of oral complications associated with diabetes; results were represented as bar diagram [Figures 2-4].

More than half of the included patients (55.7%) were not aware that diabetic patients are more prone to oral diseases. Only less than half of them (37.6%) and (44.9%) knew that diabetes cause gingivitis and affect periodontium consequently.

More than half of the included patients (56.4%) did not know that diabetes cause dry mouth. Only less than half of the people (38.2%) knew that diabetes cause halitosis. The study showed that most of the patients (85.2%) were not aware that diabetes cause BMS.

More than half of the included patients (65.8%) did not know that diabetes cause oral fungal infection. Only less than half of the people (38.2%) knew that diabetes cause dental caries. The study showed that most of the patients (96.6%) were aware that diabetes cause delayed wound healing. Results were represented in Table 1.

## DISCUSSION

Increasing amount of evidences indicate that patient education is one of the most effective ways to decrease the complications of diabetes.<sup>[19]</sup> The results of this study vividly highlight that patients’ lack knowledge about the relationship

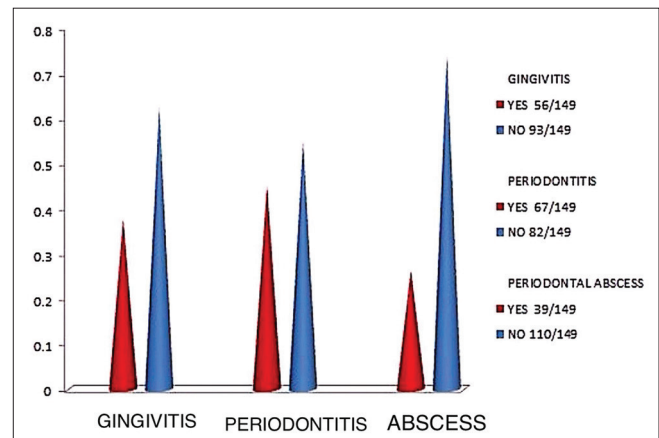
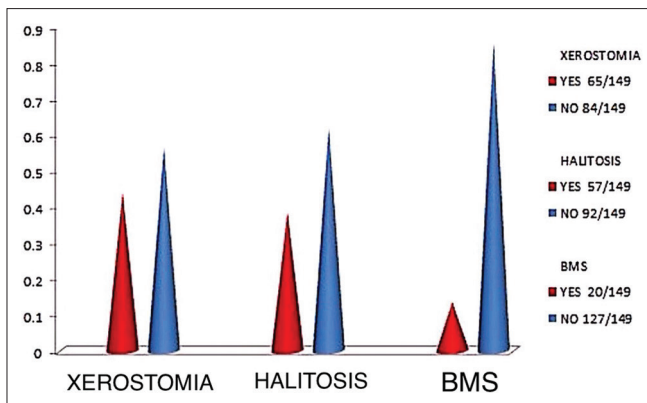
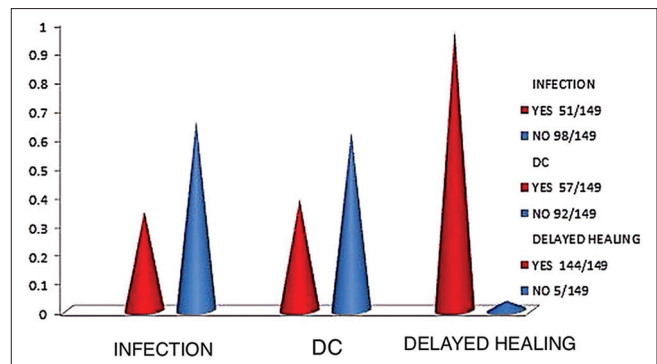


Figure 2: It represents bar diagram comparing known to unknown awareness toward gingivitis, periodontitis, abscess.



**Figure 3:** It represents bar diagram comparing known to unknown awareness toward xerostomia, halitosis, burning mouth syndrome.



**Figure 4:** It represents bar diagram comparing known to unknown awareness toward infection, dendritic cell, delayed wound healing in diabetes.

**Table 1: Result values were represented**

Questions	Answer	Percentage	Mean
Oral disorder	Yes (66)	44.29	1.5
Gingivitis	Yes (56)	37.58	1.6
Periodontitis	Yes (67)	44.96	1.5
Periodontal abscess	Yes (39)	26.17	1.7
Xerostomia	Yes (65)	43.62	1.6
Halitosis	Yes (57)	38.25	1.6
Infection	Yes (51)	34.22	1.6
BMS	Yes (20)	13.42	1.8
Dental caries	Yes (57)	38.25	1.6
Delayed healing	Yes (144)	96.64	1.0

BMS: Burning mouth syndrome

of diabetes and oral health. This statement is in agreement with Sandberg *et al.*, Kamel *et al.*, Masood Mirza *et al.*, and Awartani.<sup>[20-23]</sup>

According to this study, 44% of the members were aware that diabetes can lead to oral complications. This is in accordance with the study reported by Faten MR *et al.*, on the other hand, 47.7% showed positivity toward awareness of oral diseases caused by diabetes Jayanthi *et al.* reported about 58% awareness among the residents of Bengaluru which is comparatively higher than the study conducted by us.<sup>[24-29]</sup>

Thirty-eight percent of people are acquainted with the knowledge that gingivitis is a manifestation of DM, which is similar to the study by Faten *et al.* Fatin *et al.* stated that 30% of diabetic patients having bleeding on brushing. This study also proved that diabetic patients are at high risk of developing periodontal diseases. About 44.9% of participants have adequate knowledge that diabetes could cause periodontitis.

About 65% of attendants were familiar that xerostomia is caused by DM. Fifty-seven percent of the contributors were aware halitosis occurs in diabetes. Ninety-seven percent of the population is aware of delayed wound healing which is probably because they do know any ulcer in their body/feet will take the time to heal. Among the study group, more than

half 51% of participants were acquainted with knowledge that diabetics are prone to infection and 57% of people were familiar that dendritic cell occurs in diabetes. This was inconsistency with study conducted by Ismaei and Ali that only 39.2% of participants know that diabetes can cause oral fungal infection and 46.1% of participants aware of diabetes can cause dental caries.<sup>[30]</sup>

## CONCLUSION

People are less informed the risk for dental diseases in comparison with their knowledge of their increased risk for systemic diseases in DM. Thus, it is necessary for dental professionals and related government medical agencies to promote awareness of the relationship between DM and oral health to prevent harmful complications. Education programs to increase public awareness as a first step to prevent the disease and long-term complications. Health professionals in both the dental and medical fields and as well as the nutritionists need to take the responsibility to develop programs to educate the public about DM and the serious oral and systemic complications of the disease.

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## Conflicts of interest

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