



**Assessment of Knowledge and Awareness about Oral Manifestations of Diabetes among Diabetic Patients**

<sup>1</sup>Dr Megha B, Mahe Institute of Dental Sciences and Hospital, Chalakara, Mahe

<sup>2</sup>Jincy Joseph, Mahe Institute of Dental Sciences and Hospital, Chalakara, Mahe

<sup>3</sup>K. Naganandhini, Mahe Institute of Dental Sciences and Hospital, Chalakara, Mahe

<sup>4</sup>Hiba Muhammad, Mahe Institute of Dental Sciences and Hospital, Chalakara, Mahe

<sup>5</sup>Hridhya Ramesh, Mahe Institute of Dental Sciences and Hospital, Chalakara, Mahe

**Corresponding Author:** Dr Megha B, Mahe Institute of Dental Sciences and Hospital, Chalakara, Mahe

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**Conflicts of Interest:** Nil

**Abstract**

**Background:** diabetes is a global epidemic which is associated with various complications. Association of oral health and diabetes is already proved. However, many patients are not aware of the oral diseases associated with diabetes.

**Aims and objectives:** To evaluate the awareness and attitude of patients regarding the same.

**Materials and method:** Study included 358 diabetic patients. Participants were asked fill the questionnaire which was evaluated. Participants were educated regarding the oral complications of diabetes.

**Result:** 67% patients in present study were male and rest were females. Most of the patients were unaware of the oral manifestations of diabetes mellitus. Conclusion: Though the knowledge regarding oral manifestation of diabetes was less, most of the patients had positive

attitude oral health and was keen to gain knowledge regarding the same

**Keywords:** Diabetes, Periodontitis, Periodontal Abscess, Xerostomia

**Introduction**

Diabetes mellitus is disease characterized by hyperglycemia. Diabetes effect various functions of the body. Diabetes associated with high mortality and morbidity.<sup>1</sup> Uncontrolled diabetes might be associated with various complications such as diabetic nephropathy, coronary artery diseases and stroke.<sup>2</sup> Effect of diabetes in oral cavity is well proved.<sup>3</sup> According to International Diabetes Federation, diabetes might rise to 69.9 million by the year 2025 in India. Studies done in various countries had shown lack of knowledge regarding diabetes in patients.<sup>4</sup> This study aims at assessing the awareness about oral manifestations of

diabetes among diabetic patients and educating the participants regarding the same.

### Materials and method

**Study design:** Cross Sectional Questionnaire Study

#### Inclusion criteria

Diabetes mellitus patients above 18 years of age who were willing to participate in the study.

#### Exclusion criteria

Patients with history of other systemic diseases and medications.

Pregnant patients

Sample size estimation

$$N = p(1-p) (Z\alpha/E)^2$$

$Z\alpha$  = constant set by convention according to accepted  $\alpha$  error (0.05)

$P$  = proportion of population from published data\*

$E$  = Desired margin of error

$$N = p(1-p) \times (Z\alpha/E)^2$$

$$= 0.37(1-0.37) \times (1.96/0.05)^2$$

$$= 358.04 \approx 358$$

The study requires a Total sample size of  $N=358$  study participants at 95% confidence level

#### Data collection

Study was conducted in Department of Oral Medicine and Radiology in a dental college after obtaining institutional ethical committee certificate. Written informed consent was obtained from each participant. 358 participants meeting the inclusion criteria were randomly selected. Each participant was asked to fill the questionnaire.

#### Result

358 patients participated in the study which included 239 males and 119 females. 268 patients were in the age group of 46 to 60, 87 were above 60 years of age and 9 were below 45 years age. Only 9 patients knew that

diabetes is associated with oral manifestations. Only 12 patients visited dentist regularly, 263 occasionally and 83 very rarely. Only 9 patients reported that their healthcare providers had discussed regarding oral manifestations of diabetes. Various oral manifestations noticed in diabetic patients were dry mouth, bleeding gums, gum infections, oral ulcers, bad breath, taste alteration, burning sensation. 39 participants noted deterioration in oral health following diagnosis of diabetes, 319 participants did not notice any changes. 339 participants were interested in knowing more about oral manifestations of diabetes.

#### Discussion

Diabetes mellitus is a global epidemic. Diabetes is associated with numerous complications and quality of life of patients.<sup>5</sup> Oral manifestations associated with diabetes include periodontitis, increased incidence of dental caries, peripical infections, xerostomia, candidiasis and burning mouth syndrome and many other oral diseases.<sup>6</sup> Various studies had shown insufficient oral health knowledge in diabetic patients.<sup>7</sup> 67% patients in present study were male. This is in contrast with study conducted by Mwendemeke M et al where female prediction was noted.<sup>8</sup> 97.4 % participants said they were not informed about oral complications associated with diabetes by health care providers before. Study by Davies K in 2023 in Australia reported low referral rate of diabetic patients to dentist by physicians.<sup>9</sup> Since periodontitis is one of the most common oral diseases seen in diabetic patients, participants were asked if they had noticed any gum infections or bleeding gum.<sup>10</sup>

37% participants had experiences bleeding gums. 5.5% participants reported gum infections. Periodontal abscess

are more common in diabetic patients compared to others.<sup>11</sup>

Timely management of periodontitis will help in lowering proinflammatory cytokines. Diabetes and periodontitis have a two-way relationship. Prevalence of periodontal disease is high in patients with poorly controlled diabetes. Also, periodontitis may worsen the glycemic control in diabetic patients.<sup>12</sup> 61% participants reported halitosis. 30% participants experienced dry mouth. This is in contrast to study conducted by Ivanovski et al 80% participants reported xerostomia.<sup>13</sup> Study by Carda *et al.* et al had reported incidence of xerostomia in 76% patients with diabetes.<sup>14</sup> However, there are various other studies where no association was found between decreased salivary flow rate and diabetes.<sup>15,16</sup> Change in composition of saliva and decrease in salivation is seen in diabetic patients. This might affect patients' quality of life due to difficulty in speaking and swallowing.<sup>17</sup> 3.3% participants reported burning sensation and 8.3% patients reported altered taste sensation. Burning sensation of oral mucosa and altered taste sensation in diabetic patients could be due to diabetic neuropathy.<sup>11</sup> Diabetic patients are also predisposed to various opportunistic infections such as candidiasis.<sup>18</sup>

59% participants brushed twice daily and 35% brushed once daily and 6% more than two times. In a study conducted by Kadambari et al were 67% patients brushed only once daily.<sup>2</sup> In present study only 2.5 % patients had knowledge regarding oral manifestation associated with diabetes mellitus. In a study conducted by Al Habashneh et al. 28% participants had knowledge regarding oral manifestations in diabetes.<sup>19</sup> Only 3% patients visited dentist regularly, 74 % visited occasionally and 23% rarely. Similar findings were

reported in various other studies where most of the patient's visited dentist for emergency purposes.<sup>20,21</sup> 59% participants depended on internet for seeking information regarding diabetes. Only 10% participants depended on health care providers for this. Though the knowledge regarding oral manifestation of diabetes was less, most of the patients had positive attitude oral health and was keen to gain knowledge regarding the same. Hence participants were educated regarding relationship between oral health and diabetes.

### Conclusion

Diabetes and oral health have a synergistic relationship. Though there are many studies revealing oral diseases related to diabetes, most of the patients are unaware of these. Hence it is important to educate patients regarding this. Patients should be encouraged to maintain good oral health and regular dental checkups.

### Questionnaire

1. Age
  - a. 18-30
  - b. 31-45
  - c. 46-60
  - d. Above 60
2. Gender
  - a. Male
  - b. Female
  - c. Others
3. How long have you been diagnosed with diabetes
  - a. Less than 1 year
  - b. 1-5 years
  - c. 5-10 years
  - d. Above 10 years
4. Do you know that diabetes has oral manifestations
  - a. Yes
  - b. No

5. How often do you visit your dentist
  - a. Regularly
  - b. Occasionally
  - c. Very rarely
6. How many times do you brush a day?
  - a. Once
  - b. Twice
  - c. More than two times
7. Have your healthcare providers discussed oral health concerns related to diabetes with you?
  - a. Yes
  - b. No
8. Do you experience any of the following symptoms
  - a. Dry mouth
  - b. Bleeding gums
  - c. Gum infections
  - d. Oral ulcers
  - e. Bad breath
  - f. Taste alteration
  - g. Burning sensation
9. Have you noticed any improvements or deteriorations in your oral health after being diagnosed with diabetes
  - a. Improvement
  - b. Deterioration
  - c. No changes
10. Where do you usually seek information about oral health in relation to diabetes?
  - a. Healthcare providers
  - b. Internet
  - c. Books and magazines
11. Would you be interested in learning more about how to manage your oral health as a diabetic patient?

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