



## Assessment of tooth loss in chronic periodontitis patients with and without diabetes mellitus: A cross-sectional study

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### ABSTRACT

Periodontitis refers to infectious disease affecting both hard and soft tissues of the oral cavity. The disease is modified by a variety of risk factors such as tobacco smoking, poor oral hygiene, systemic diseases, hereditary, malnutrition. The relation between diabetes and periodontitis is bidirectional. Diabetes increases the risk of periodontal disease progression resulting in early tooth loss. The aim of this study was to assess tooth loss in chronic periodontitis patients with and without diabetes. This cross-sectional study was conducted among 400 chronic periodontitis patients (200 in each group; Group 1: Diabetes; Group 2: Non-diabetes) reported to Saveetha Dental College and Hospitals, Chennai. Based on the clinical examination data, all missing teeth except third molars were recorded in both groups. In group 1; among 200 diabetic patients, 1002 missing teeth were observed and in group 2; among 200 non-diabetic individuals, 638 missing teeth were observed. Also, the correlation between the systemic health status of the patients and the number of missing teeth was assessed. It was found to be statistically significant with the p-value of 0.00. The present study suggests that the prevalence of tooth loss was high among chronic periodontitis patients with diabetes (1002 missing teeth) compared to chronic periodontitis patients without diabetes (638 missing teeth).



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### INTRODUCTION

Periodontitis is an infectious disease affecting both hard and soft tissues of the oral cavity (Listgarten, 1987). It is characterized by the destruction of connective tissues and alveolar bone support following an inflammatory host response (Flemmig, 1999; Varghese *et al.*, 2015; Khalid *et al.*, 2016, 2017; Mootha *et al.*, 2016). The primary etiology of this disease is bacteria present in plaque. However, periodontitis is modified by a variety of risk factors including smoking, stress, malnutrition, genetic factors, systemic diseases (Ramesh *et al.*, 2016a; Ramamurthy and Visha, 2018). These risk factors if present aggravates the periodontal destruction

resulting in early tooth loss (Priyanka *et al.*, 2017; Ramesh *et al.*, 2017, 2016b).

Diabetes mellitus (DM) is characterized by hyperglycemia which results from defects in insulin secretion, insulin action or both (Preshaw *et al.*, 2012). Periodontitis is stated to be the sixth complication of diabetes. A literature search reveals higher prevalence of periodontal disease was observed among diabetics than non-diabetics (Ramesh *et al.*, 2019).

The influence of diabetes on the development of periodontitis has been studied by numerous researchers (Taylor *et al.*, 1996; Iacopino, 2001; Ramesh *et al.*, 2016b). The periodontium of diabetic individuals show areas of tissue degeneration and calcified bodies around blood vessels of the gingiva. Also, uncontrolled diabetic individuals are highly susceptible to infection as the defense mechanism is reduced. According to the literature, periodontal disease follows no consistent pattern in diabetic individuals. Severe gingival inflammation, deep periodontal pockets, rapid bone loss and multiple periodontal abscesses often occur in diabetic patients (Thamaraiselvan *et al.*, 2015; Kavarthapu and Thamaraiselvan, 2018; Ramesh *et al.*, 2016b). Diabetes has reduced defense mechanisms involving both micro-and macro-vasculatures (Panda *et al.*, 2014; Avinash *et al.*, 2017; Ramesh *et al.*, 2016b). Also, there exists a two way relationship between diabetes and periodontitis. It is well proven that hyperglycemia negatively impacts oral health and severe periodontitis can negatively impact glycemia control (Ravi *et al.*, 2017). Therefore, individuals with diabetes have greater risk of developing periodontitis than those without diabetes (Chapple and Genco, 1999; Ramesh *et al.*, 2016b).

A literature search reveals numerous studies assessing the periodontal status in diabetic patients. But only minimal studies have assessed the amount of tooth loss in diabetic patients with chronic periodontitis. Therefore, this study was undertaken to assess the prevalence of tooth loss in chronic periodontitis patients with and without diabetes.

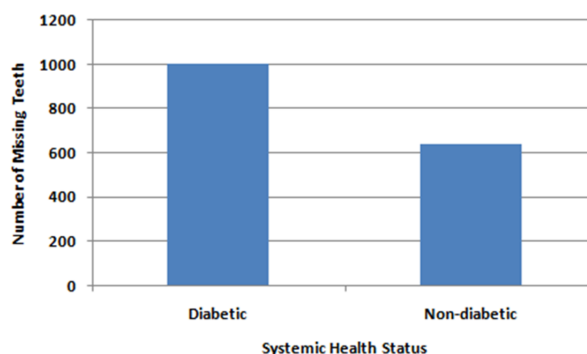
## MATERIALS AND METHODS

The present cross-sectional study was conducted among outpatients reported to Saveetha Dental College and Hospitals, Chennai. A total of 400 patients diagnosed with chronic periodontitis were recruited. Based on medical history, patients were divided into two groups. Group 1 (chronic periodontitis with diabetes); Group 2 (chronic periodontitis without diabetes). Periodontally healthy individuals, patients with other systemic diseases, patients

under long term medications and smokers were excluded from the study. In both the groups, all missing teeth except third molars were recorded. The collected data was then entered in Microsoft Excel spreadsheet and analysed using SPSS software (IBM SPSS Statistics, Version 23). Descriptive (Frequency distribution) and inferential statistics (Chi-square test) were done for data summarization and presentation.

## RESULTS AND DISCUSSION

The study sample consisted of 200 patients in each group. In each group 100 patients were males and 100 patients were females. The age groups of study subjects ranged from 18 to 70 years. In group 1 (chronic periodontitis with diabetes); the mean number of missing teeth was  $5.01 \pm 1.09$ . In group 2 (chronic periodontitis without diabetes); the mean number of missing teeth was  $3.19 \pm 0.54$ . The number of teeth missing in group 1 was 1002 and in group 2 it was 638 Figure 1.

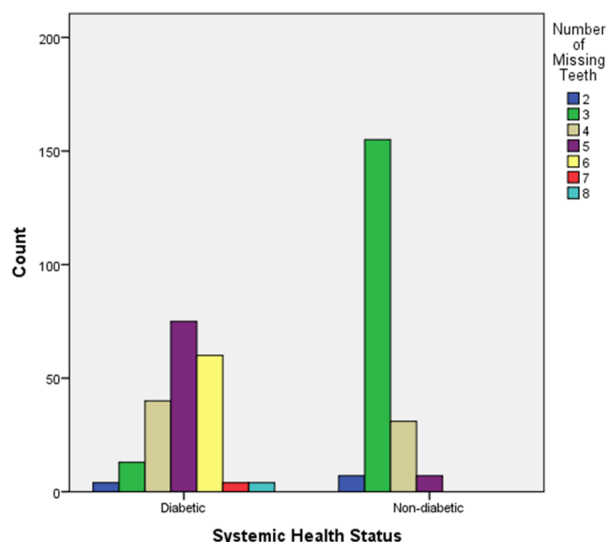


**Figure 1: Bar chart showing comparison of number of missing teeth between group 1 (chronic periodontitis with diabetes) and group 2 (chronic periodontitis without diabetes).**

Also, the correlation between the systemic health status of the patients and the number of missing teeth was assessed. It was found to be statistically significant with the p-value of 0.00 Figure 2.

The study assessed the prevalence of tooth loss in chronic periodontitis patients with and without diabetes.

The periodontal complication of diabetes was assessed by numerous studies (Kiran *et al.*, 2005). suggested that severe periodontitis was associated with poor glycemic control and periodontal health was found to be improved upon metabolic control. Similar results were observed by Aldridge *et al.* (1995); Ramesh *et al.* (2016b); Kesavan *et al.* (2015) compared the periodontal status among type II diabetics and nondiabetics and observed a



**Figure 2: Bar chart showing correlation between the systemic health status of the patients and the number of missing teeth.**

significant association between the diabetic status and periodontal disease and the prevalence of periodontal disease was high among diabetics when compared to nondiabetics. Also, [Popławska-Kita et al. \(2014\)](#) claimed that the poor metabolic control of diabetes increases the risk of severe periodontal destruction in patients with type 1 diabetes.

In the present study the number of missing teeth was more prevalent in chronic periodontitis patients with diabetes when compared with chronic periodontitis patients without diabetes. Similarly in a study by [Moore et al. \(1998\)](#) the amount of missing teeth and edentulism was more prevalent among subjects with type 1 diabetes mellitus. In this study, out of 406 subjects evaluated, 204 had missing teeth, 186 had partial tooth loss and 16 were edentulous. Our findings are in accordance with previous study, as the number of missing teeth was more among diabetic patients.

[Oliver and Tervonen \(1993\)](#); [Ramesh et al. \(2016b\)](#) evaluated the tooth loss in diabetic patients and compared it with the general population and found out that the prevalence of tooth loss was more among diabetic patients. The results obtained in the present study are in agreement with the previous study. Also, the present study results coincide with the studies conducted by [Alkhateeb et al. \(1991\)](#); [Reddy and Maurya \(2008\)](#); [Ramesh et al. \(2016b\)](#)

In the present study, the mean number of missing teeth among diabetic patients was  $5.01 \pm 1.09$  and  $3.19 \pm 0.54$  among non-diabetic patients. Also, the correlation between the systemic health status of the patients and the number of missing teeth

was found to be statistically significant. This is in agreement with previous study by [Ikimi et al. \(2017\)](#), where statistically significant correlation was observed between the systemic health status of the patients and the number of missing teeth.

In summary, in addition to medical complication of diabetes, the metabolic condition is also associated with periodontal complications resulting in early tooth loss. Therefore, better management with oral hygiene in diabetic patients improves the periodontal status and also blood glucose level.

Figure 1 shows, X-axis represents the systemic health status of the patients and Y-axis represents the number of missing teeth. The number of teeth missing in group 1 was 1002 and in group 2 it was 638.

Figure 2 shows, X-axis represents the systemic health status of the patients and Y-axis represents the number of missing teeth. The number of missing teeth were more in group 1 (chronic periodontitis with diabetes) when compared to group 2 (chronic periodontitis without diabetes). The correlation between the systemic health status of the patients and the number of missing teeth was statistically significant. (Chi-square test;  $p=0.00$ )

## CONCLUSION

The present study suggests that the prevalence of tooth loss was high among chronic periodontitis patients with diabetes (1002 missing teeth) compared to chronic periodontitis patients without diabetes (638 missing teeth).

## Conflict of interest

The authors declare that they have no conflict of interest for this study.

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