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Prevalence of Tooth Loss due to Periodontitis in Patients Visiting Tertiary Care Hospital

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ABSTRACT

Introduction: Epidemiological studies have been showing that caries is the main reason for tooth loss. But nowadays, it seems to show an increasing trend of tooth loss due to periodontal reasons rather than caries. The retention of natural teeth can improve the quality of life by maintaining the ability to chew and digest food. Thus, directly or indirectly periodontitis leading to tooth loss affects quality of life.

Objective: To determine the prevalence of tooth loss in periodontitis patients.

Methods: A cross-sectional study was done in Department of Periodontology and Oral Implantology from June 2023 to September 2023 after obtaining ethical clearance from institutional review committee. Study participants were patients diagnosed as periodontitis according to world workshop in periodontics 2017 classification and prevalence of tooth loss was recorded according to the history of mobile tooth. Poor prognosis and hopeless prognosis were counted as to be extracted tooth in the study. Collected data were entered into the excel sheet and further statistical analysis was done using SPSS v.20.

Results: Mean of tooth loss due to periodontitis was found to be 3.74±3.285 and tooth to be extracted is 1.94±1.884.

Conclusion: As the age increases number of tooth loss increases, likewise current smokers have more amount of tooth loss than that of former and nonsmokers. Likewise, mandibular anterior region was most common for prevalence for tooth loss.

Keywords: Chronic periodontitis; prevalence; smokers; tooth loss.

INTRODUCTION

Periodontal disease is an infectious disease characterized by inflammation and subsequent destruction of the supporting structures of the teeth.[1] In a recent study done by Global burden of disease states that seventh most common prevalent disease worldwide is severe periodontitis with prevalence of 11.2% and affected people were around 743 million and there was increase in global burden of periodontal disease from 1990 to 2010 by 57.3%.[2] It is already recognised that severe periodontal disease affects certain group of individuals that appear to exhibit increased susceptibility to periodontal destruction.[3]

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Retention of the teeth is a main aim of dental treatment.[4] A combination of surgical and nonsurgical therapies is the management of periodontal disease.[1] The success of periodontal therapy is usually measured in terms of maintenance or improvement in clinical attachment levels.[1]Tooth loss directly or indirectly affects quality of life.[5]

To our knowledge there has been very few data on the prevalence of tooth loss among periodontitis patients at the time of dental visit in Nepalese population. Therefore, the present study was aimed to evaluate the prevalence of tooth loss among periodontitis patients and its association with gender and smoking habit.

METHODS

A descriptive cross-sectional study was done to find out the prevalence of tooth loss in periodontitis patients visiting the Department of Periodontology and Oral Implantology in Kathmandu University school of medical sciences (KUSMS), Dhulikhel,

kavrepalanchok, Nepal from June 2023 to September 2023. Conventional sampling technique was used to determine the sample population. Ethical clearance was obtained from Institutional Review Committee of KUSMS (IRC-KUSMS, Ref. 77/23). Written Informed consent form was obtained from patients. Sample size was calculated using the prevalence of tooth loss from the study done by Karthikayan et al.[4] using following formula:

$$n = deff^* \frac{Npq}{\frac{d^2}{1.96^2}(N-1)+pq}$$

Where,

Deff=Design effect = 1, N= population size = for finite population (100000)

d= desired absolute precision = 5%, p= estimated proportion = 83%[4]

Sample size =216

Patients above 30 years of age, who are systematically healthy and patients who are systematically healthy and smokers was also included in this study while patients who are lactating or pregnant women, whose teeth were extracted due to orthodontic reasons or dental caries were excluded from the study.

Then, diagnosis of periodontitis patients (According to AAP + EFP classification 2017) was done.[6]

If loss of attachment seen was >30% and diagnosed as generalized periodontitis of any stage and grade, then patient was determined as a sample. If missing tooth was present, then history of patient was the ultimate source for the reason behind the loss of tooth. If patient gave history of mobile tooth as a reason, then only it was counted liable for the study. Tooth with questionable and hopeless prognosis was also counted as extracted tooth. Here questionable and hopeless prognosis was defined as:[7]

Questionable prognosis: >50% attachment loss, poor crown-to-root ratio, poor root form, grade II furcation invasion (location and depth make access difficult) or grade III furcation invasion; mobility no. 2 or no. 3. Hopeless prognosis: Inadequate attachment to maintain health, comfort, and function.

Patients who are current/former smoker and non-smoker were differentiated on basis of: current smokers are those who smokes every day, or some days, former smoker are those who have smoked at least 100 cigarettes in entire life, nonsmoker are those who have smoked ever 100 cigarettes in entire life.[8]

Data were entered and coded in Microsoft excel sheet 2016. Data were then transported to IBM SPSS statistics for window 20.0 (IBM Corp., Armonk, N.Y, USA) for further analysis. Descriptive data were presented as frequency, mean and standard deviation. Association between age, gender and prevalence of periodontitis was calculated using Chi-square test. Statistical level was set at P <0.05 for significance at 95% confidence interval.

RESULTS

The present study showed that among 216 patients of periodontitis where 101 (46.8%) participants were male while 115 (53.2%) participants were female. Age was categorized into five groups in interval of 10 starting with 30 and maximum age being 80 years. Current smokers, former smokers and nonsmoker's participants were 96 (44.4%), 29 (13.4%) and 91(42.1%) in number respectively who were included in the study. (Table 1)

Based on arch involvement on tooth loss on mandibular anterior were most commonly involved 55 (25.5%), followed by mandibular posteriors 14 (6.5%). On overall basis, most cases involved missing tooth in all sextants 79 (36.6%) while others were mixed amongst anteriors and posteriors. (Table 1)

Based on age group maximum mean was found to be in age group of 70-80 being 7.36±4.15 while least in age group of 25-35 years with mean 1.56±1.52. Likewise tooth to be extracted i.e. poor or hopeless prognosis was found to be maximum at age group of 70-80 being 3.40±2.828 and minimum in age group of 25-35 being 1.19±1.001. Both were statistically significant (P value <0.005, Table 3).

Based on categories of smoker's maximum number of tooth loss was seen in current smokers (4.70±3.549) while nonsmokers show a smaller number of tooth loss (2.79±2.953) which was found to be statistically

Table 1: prevalence of all parameters, n (%)

Parameters or variables	Frequency n (%)
Gender	
Male	101 (46.8)
Female	115 (53.2)
Age group (in years)	
30-40	27 (12.5%)
41-50	48 (22.5%)
51-60	82 (38.6%)
61-70	34 (15.7%)
71-80	25 (11.6%)
Smoking status	
Current smoker	96 (44.4%)
Former smoker	29 (13.4%)
Non smoker	91 (42.1%)
Sites involved	
Maxillary anterior	6 (2.8%)
Maxillary posterior	7 (3.2%)
Mandibular anterior	55 (25.5%)
Mandibular posterior	14 (6.5%)
All of the above sites	79 (36.6%)
Combination of sites	55 (25.4%)

Table 2: Mean differences of tooth loss and to be extracted tooth.

	Group (Mean±SD)
Tooth loss	3.74±3.285
Tooth to be extracted	1.94±1.884

Table 3: Mean differences of tooth loss and to be extracted compared with age.

Tooth loss	Age (in years)	Mean±SD	P value
Tooth Loss	30-40	1.56±1.528	0.000
	41-50	2.17±2.056	
	51-60	3.68±2.931	
	61-70	5.18±3.040	
	71-80	7.36±4.152	
To be extracted	30-40	1.19±1.001	0.000
	41-50	1.65±1.120	
	51-60	1.79±1.769	
	61-70	2.21±2.171	
	71-80	3.40±2.828	

Table 4: mean differences of tooth loss and to be extracted compared with smoking criteria

	Smoking criteria	Mean±SD	P value
Tooth loss	Current smoker	4.70±3.549	0.000
	Former smoker	3.55±2.443	
	Non smoker	2.79±2.953	
To be extracted	Current smoker	2.19±2.212	0.209
	Former smoker	1.79±1.780	
	Non smoker	1.71±1.485	

Table 5: mean differences of loss of tooth with gender

	Tooth loss due to periodontitis (Mean±SD)	P value
Male	3.90±3.236	0.000
female	3.60±3.335	

significant (P value<0.005). Likewise, in case of tooth to be extracted in smoking categorisation maximum mean value was seen in current smokers (2.19±2.212) than that of former smokers (1.79±1.780) and non-smokers (1.71±1.485) (Table 4).

Prevalence of tooth loss in male (mean 3.90±3.238) was found to be more than that of females (mean 3.60±3.335). Mean of tooth loss due to periodontitis out of 216 patients was found to be 3.74±3.285 and tooth to be extracted is 1.94±1.884. (Table 5)

DISCUSSION

This study was accomplished in order to find the prevalence of tooth loss amongst periodontitis patients. Furthermore, also compares with age, gender, sites involved and smoking status. In 2010, about 2.3% of the global population representing 158 million people worldwide was edentate, the standardised global age prevalence had a decrease from 4.4% to 2.4% of severe tooth loss in the entire population was seen between 1990 and 2010.[9] As in this study, age has been proven in evidences as an influencing factor for causation of periodontitis since 1986's Srilankan longitudinal study till today.[10,11] In recent study prevalence of periodontitis in middle-aged and elderly individuals was seen to be high.[11] Moreover bidirectional relationship between the age and periodontal disease by basic cellular and molecular research has been proven.[12] In a study resulted that the prevalence of tooth loss in age above 40 years is due to chronic periodontitis where lower anterior tooth loss is the most common which is similar to our study.[13] While some study contradicts our study where maxillary posterior tooth has seen with more bony defects in cone beam computed tomography, thereby resulting in maxillary posterior tooth being most common site for periodontitis.[14] Most common reason for loss of tooth is mobility due to periodontitis where as high as 67.2% of lower anterior was lost due to mobility amongst other causes like furcation, pocket involvement or combination of these.[15] Smoking directly and indirectly plays a role in periodontitis where prevalence of periodontitis changes with change in smoking rate which was showed by a 40 years longitudinal study of Sweden.[16] Among Nigerian population tooth loss was found to be more frequent in diabetic patients than in systematically healthy patients[17], likewise tooth loss due to caries is more common than periodontitis in younger age[18] has been shown in some literature.[19]

From the literature it has shown that prevalence of tooth might affect by Diabetes, dental caries other than periodontitis. Whereas this study is amongst few one where retrospective study is done to relate tooth loss and periodontitis who are systematically healthy. This study resulted in mandibular anterior to be most frequent region to lose tooth because of single root and traumatic occlusion might be the region to lead more amount of destruction.[4]

This finding of current study has limitations as well where this study was conducted in the single center/ hospital setup with limited sample size, so the results

of this study cannot be generalized into the general population. Also, patient might not recall the actual cause of tooth loss which has occurred long time ago. Study was based on history of patient which depends on memory, honesty as well as understanding of the patients.

However, this study has strength as well to date there have been very few publications specially in context of Nepal which finds the prevalence of tooth loss amongst age, gender sites involved and smoking criteria as well.

CONCLUSION

This study demonstrated that mean of tooth loss due to periodontitis was found to be 3.74±3.285 and tooth to be extracted is 1.94±1.884 where increase in age was statistically significant with prevalence of tooth loss. Similarly, current smokers had seen with more amount of tooth loss than that of non-smokers which was statistically significant and mandibular anteriors were the prone areas for tooth loss compared to any other areas.

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Conflict of interest: None

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