

# Epidemiological Survey on Edentulousness in Elderly Nepalese Population

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## ABSTRACT

### Background

A lot of epidemiological surveys have been conducted in dental caries and periodontal problems, but prosthetic sector is lacking such study.

### Objective

The aim of this study was to assess the level of edentulousness, the cause of edentulousness, the denture wearing and denture needs of selected Nepalese population. It will also analyze how factors, such as habits, built, educational needs influence edentulousness.

### Method

Patients visiting the Dental Outpatient Department of Dhulikhel Hospital and various dental camps organized by the hospital were selected for study. The examination was conducted using basic diagnostic tools (Mouth mirror, straight probe and explorer). Statistical software SPSS 16.0 was used for data analysis, chi-square test was performed for each parameter.

### Result

The statistical analysis showed that age was statistically associated to edentulousness, but gender and built were not associated to edentulousness. Furthermore educational status and habit were statistically associated with edentulousness.

### Conclusion

Oral health awareness and education programs should be conducted at the community level for every individual. The role of oral hygiene practice, the negative effect of various oral habit, especially smoking and tobacco chewing habits, the need to replace missing teeth and care of artificial denture should be explained.

## KEY WORDS

*Built, dental caries, edentulousness, educational status, periodontal disease.*

## INTRODUCTION

Epidemiology is concerned with the cause and outcome of diseases in individuals and groups in human population. Although a lot of epidemiological surveys have been conducted in dental caries and periodontal problems and data have been obtained, prosthetic sector has not gained any interest in epidemiology. One of the major handicaps in the elderly is loss of teeth, affecting their mastication, dietary intake and nutritional status.<sup>1-4</sup>

Weintraub and Burt used the term edentulism to describe the complete absence of natural teeth, regardless of whether they had been replaced or not.<sup>5</sup> There are a number of factors known to be associated with oral health of the adult population, such as literacy level, smoking or chewing tobacco and alcohol consumption. Other factors such as oral hygiene practices, social and cultural beliefs and attitudes, perceptions regarding oral health, function of the dentists, can all influence oral health in the adult population. The percentage of edentulous people is expected to decrease in the coming decades as a result of improved oral health whereas the number of edentulous people will increase as a result of the strong increase in the aging population.<sup>6-9</sup>

The prosthetic sector has not gained the same epidemiological interest as caries and periodontitis and the data obtained are often difficult to interpret. Therefore, this study is planned to evaluate the level of edentulousness, denture wear habits and denture needs of adult population. It was planned to study the difference according to age and gender.

## METHODS

A table comprising of variables of edentulousness was developed to acquire required data from the subjects and the patients were questioned and the information were filled personally. Patients visiting the Dental Outpatient Department (DOPD) and dental camp organized by Dhulikhel Hospital, Kathmandu University were selected for the study. The total number of patients involved in the study was 100 and the duration of study was 6 months (June 2014 to December 2014). The examination was conducted using basic diagnostic tools like mouth mirror, periodontal probe, and explorer. The personal details like name, age, gender of the subject were recorded, educational status were listed, height and weight of each patient were recorded to calculate body mass index (BMI) as an indicator of nutritional status. The BMI was calculated using following formula:  $BMI = \text{Weight in Kg} / (\text{Height in m})^2$ . The effect of loss of tooth on esthetics, mastication and phonetics were recorded as per the patients response. Patients were instructed about the good oral hygiene practices during examination. Statistical software SPSS 16.0 (SPSS Inc., USA) was used for data analysis. The Chi-square test was carried out to find out whether there was

significant association between edentulousness and factors such as age, gender, educational status, built, and habits.

## RESULTS

Total 100 partially or fully edentulous patients were examined for the study. The sample of the table used for obtaining data is presented in Table 1. Statistical analysis showed that age was statistically associated to edentulousness ( $p= 0.000$ ) (Table 2). When the edentulousness and gender were compared there was no statistical association between them ( $p=0.464$ ) (Table 3). This study also revealed that educational status of the patients was associated with edentulousness ( $p= 0.008$ ) (Table 4), whereas, it was found that there was no role to be played by body mass index (BMI) in leading to edentulous state ( $p= 0.341$ ) (Table 5). Similarly, habit was statistically associated with edentulousness ( $p=0.000$ ) (Table 6).

This study showed large number of patients faced esthetic and mastication problem, whereas, dental caries and periodontal disease were the major causes of edentulousness.

**Table 1. Data collection sheet**

<b>S. No.</b>			
Name			
Age (years)	18-40		
	41-60		
	>60		
Gender	Male		
	Female		
Educational Status	Illiterate		
	Primary Education (upto class 5)		
	Secondary Education (class 6-SLC)		
	Educated (I.A. or above)		
Built	Weight (kg)	BMI < 20 (underweight) 20-30 (desirable) >30 (obese)	
	Height (m)		
Habits	Smoking	Yes	No
	Tobacco/Pan chewing	Yes	No
Type of problem of patient	Esthetics	Yes	No
	Mastication	Yes	No
	Phonetics	Yes	No
Cause of edentulousness	Dental caries	Yes	No
	Periodontal disease	Yes	No
	Trauma	Yes	No
About previous denture wearer	Yes		
	No		
Willing for prosthetic treatment	Yes		
	No		

**Table 2. Comparison of level of edentulousness and age**

Variable	No. of edentulous patient					Chi-square value	p-value
	1 tooth missing	2 teeth missing	>2 teeth missing	All teeth missing	Total patient (n)		
Age (years)							
18-40	7	16	11	1	35	45.458	0.000
41-60	7	7	28	4	46		
>60	3	0	5	11	19		
Total	17	23	44	16	100		

Chi-square test ( $\chi^2$ ),  $p < 0.05$  significant,  $p > 0.05$  not significant

**Table 3. Comparison of level of edentulousness and gender**

Variable	No. of edentulous patient					Chi-square value	P-value
	1 tooth missing	2 teeth missing	>2 teeth missing	All teeth missing	Total no of patient (n)		
Gender							
Male	5	11	20	9	45	2.565	0.464
Female	12	12	24	7	55		
Total	17	23	44	16	100		

Chi-square test ( $\chi^2$ ),  $p < 0.05$  significant,  $p > 0.05$  not significant

**Table 4. Comparison of level of edentulousness and educational status**

Variable	No. of edentulous patient					Chi-square value	P-value
	1 tooth missing	2 teeth missing	>2 teeth missing	All teeth missing	Total no of patient (n)		
Educational status							
Illiterate	10	6	22	15	53	22.435	0.008
Primary education	0	3	7	0	10		
Secondary education	4	9	7	1	21		
Educated	3	5	8	0	16		
Total	17	23	44	16	100		

Chi-square test ( $\chi^2$ ),  $p < 0.05$  significant,  $p > 0.05$  not significant

## DISCUSSION

The preservation of dentition can be justified on the following grounds that, teeth are useful for maintenance of arch length, esthetics, maintenance of healthy oral environment, mastication, phonetics etc. Tooth loss is the end product of oral disease. The importance of this study is to establish base line data on the prevalence of edentulism in adult population seeking care. Previous studies have divided the subjects into 18 to 40 years (young adult),<sup>10</sup> 41 to 60 years (middle adults), and >60 years (old adults), for the sake of convenience in classification. This study has also made use of the same classification to segregate the sample size of 100 subjects participating in this research. The younger age group (18 to 40 years) consisted of 35 subjects, middle age group (41 to 60 years) consisted of 46

**Table 5. Comparison of level of edentulousness and built**

Variable	No. of edentulous patient					Chi-square value	P-value
	1 tooth missing	2 teeth missing	>2 teeth missing	All teeth missing	Total no of patient (n)		
Built							
Underweight	0	2	2	5	9	0.905	0.341
Desirable	17	21	42	11	91		
Total	17	23	44	16	100		

Chi-square test ( $\chi^2$ ),  $p < 0.05$  significant,  $p > 0.05$  not significant

**Table 6. Comparison of level of edentulousness and habit**

Variable	No. of edentulous patient					Chi-square value	P-value
	1 tooth missing	2 teeth missing	>2 teeth missing	All teeth missing	Total no of patient (n)		
Habit							
Smoking	1	5	32	6	44	60.201	0.000
Tobacco/pan chewing	0	0	1	0	1		
Smoking tobacco pan chewing	0	0	2	6	8		
None	16	18	9	4	47		
Total	17	23	44	16	100		

Chi-square test ( $\chi^2$ ),  $p < 0.05$  significant,  $p > 0.05$  not significant

subjects, old age (>61 years) consisted of 19 subjects. Shah N et al. showed that tooth loss increased with advancing age and was higher among the elderly subjects.<sup>1</sup> Our study also verifies the finding showing that 2.9% of the patients with age group 18-40 years, 8.7% of patients with age group 41-60 years and 57.9% of patients with age group >60 years have all teeth missing. This study establishes the highly significant association between age of the patient and edentulousness ( $p=0.000$ ).

The number of male subjects was 45 and the number of female subjects was 55. It was seen from the similar study by Prabhu et al. that the number of partially edentulous females outnumbered the males.<sup>11</sup> This is in accordance with earlier studies, which have reported more females than males having partial edentulousness.<sup>12-15</sup> Females in this surveyed group had a lower level of education and employment status, because of which they had to depend on the male members of the family to take them for treatment. This could be a possible reason for more females being partially edentulous. A higher proportion of males were dentulous compared to females. This could be because most males were employed and had better access to treatment. This is in agreement with the study by Udani.<sup>16</sup> Some earlier studies have also shown significant gender difference in edentulism with more males becoming edentulous than females.<sup>17,18</sup> These authors attributed it to the fact that males are more active than females and do not pay much attention to oral care however many previous

studies shows higher proportion of edentulousness in male than female.<sup>18</sup> They have pointed out that these may be due to various socioeconomic factors, psychological factors, intake of more sugars and smoking. In contradiction to above finding, our research showed that there is no statistical association between gender and edentulousness ( $p=0.464$ ). This may be attributed to the fact that the scope of our study did not cover various socioeconomic factors, psychological factors etc.

Out of 100 edentulous patients who participated in our study, 53 were illiterate, 10 had completed primary education, 21 had completed secondary education and 16 were educated. The population who had basic primary education or less had a higher percentage of partially edentulous people than those who had secondary education or above. Similar observations were made by previous studies.<sup>1,19-22</sup> This could be due to lack of awareness about oral health among less educated people.

A total 91 patients had desirable BMI and 9 were underweight. The level of edentulousness and built of the patient (BMI) were compared and it was found that there was no role to be played by body mass index in leading to edentulous state. Thus, there is no statistical association between BMI and edentulousness ( $p=0.341$ ). Studies by Mack F et al. showed that the most significant risk factor for subjects with high BMI were hypertension and diabetes.<sup>9</sup> Dental factors were not influenced by BMI but influenced by socioeconomic factors. This is also in concurrence with previous study by Shah N et al. which showed that BMI does not correlate to level of edentulousness.<sup>1</sup>

In this study, out of hundred edentulous subjects, 44% were smokers 1% were tobacco chewer 8% were both tobacco chewers and smokers and 47% did not smoke or chew tobacco. Statistical analysis showed that there was significant association between edentulousness and habit ( $p= 0.000$ ). Findings from the studies by Jerome Haber et al. suggest that smokers are a high risk group for Periodontitis,<sup>23</sup> and that smoking may be the single most important environmental risk factor for Periodontitis. Hanoika T et al. found out that current smoking was associated with total tooth loss,<sup>24</sup> although smoking rate was low in females.

The survey showed that 26% of the patients have mastication problem followed by 6% patients having esthetic problem, which showed a similar findings by Annette Thomas-Weintraub,<sup>25</sup> who stated that masticatory difficulty was the most frequently voiced complaint. 46% had both mastication and esthetic problem while 22% of the people reported all problems (esthetics, mastication and phonetics).

Another important finding was that dental caries (46%) topped the cause for tooth loss, followed by dental caries and periodontal disease (40%), the cause of trauma or a tooth loss stands at (7%), with the combined cause of all three at (6%). The result is in conformity to the previous studies by Cahen PM.<sup>2</sup> This finding is also in agreement

with other studies. The fact that dental caries is the leading cause of tooth loss may be attributed to the changes in dietary patterns, a departure from coarse/tough and fibrous diet to more cariogenic refined carbohydrate-rich food, socioeconomic background and lifestyle of the people over the years.<sup>11</sup>

Out of the total denture wearers examined for this study, (39%) of them were previous denture wearers as opposed to (61%) without history of denture wear indicating a high level of unawareness about prosthodontic therapy in the edentulous subjects.

There was overwhelming response to the willingness to accept prosthodontic treatment (100%) by the patients involved in research. This may be due to increased awareness during dental examinations. This shows that majority of subjects were willing to accept prosthodontic treatment, if they are motivated which is in accordance to previous study by Henry A Collett.<sup>26</sup> The negative attitude among patients might be due to the influence of their lack of education, income and availability of dental treatment facilities.

Some people did not want replacement of missing teeth. This might be out of the feeling that dentures are made of natural teeth extracted from another person's mouth. Some people felt that tooth replacement was uneconomical and that they would rather invest that money for the education and better future of their children. Still others, being aware of their limited life expectancy, appeared to accept the limitation of a disabled mouth rather than embark upon a lengthy course of treatment for tooth replacement.<sup>27</sup>

## CONCLUSION

In this study, it was observed that the subjects who were illiterate exhibited more amount of tooth loss compared to subjects who were more educated. This survey revealed that as age is associated with edentulousness, the need for oral care for elderly is even more necessary. Dental caries plays an important role in edentulousness thus to avoid the tooth loss oral health awareness and education programs should be conducted at the community level for every individual. Since oral habit is statistically associated with edentulousness, the role and proper method of oral hygiene practice, the negative effect of various oral habit, especially smoking and tobacco chewing habits, the need to replace missing teeth, care of artificial denture should be explained. Due to time constraint, the number of patients included in the study was 100. Therefore future research should include more number of sample so that the statistical analysis gives more reliable result.

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