Original Research Article

Partial edentulism and its correlation to age, gender, socioeconomic status and incidence of various Kennedy's classes - A cross-sectional study

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ABSTRACT

A simple estimation of the proportion of the partial edentulous persons is a rough indication of dental diseases and also the success or failure of dental care. The epidemiological features of partial edentulousness of one community or one village can be evaluated on the basis of a cross-sectional house-to-house survey. In this study a cross-sectional house-to-house survey was carried out at lower Garhwal region of Uttarakhand, India. The objective of this study was to determine the prevalence of the level of edentulism and its relevance to other co-factors such as age, gender and socioeconomic status.

1. Introduction

Oral health contributes significantly to the quality of life. Poor oral health and tooth loss affect not only the nutritional status and phonetics, but also the overall health of individuals. Tooth loss generally occurs by caries, periodontal problems, traumatic injuries, impactions, neoplastic and cystic lesions.[1] Partially edentulous arches have been classified by various methods. Among the various methods of classification like Kennedy, Applegates, Avant, Neurohar, Eichner, ACP (American College of Prosthodontics) etc., Kennedy's classification is widely studied and clinically accepted by Dental Community. Several studies have analyzed the correlation between partial edentulous and its influencing factors like socio-economic, age, gender, etc.[2]

Owing to the large Indian population, a nationwide survey cannot be done. However, the epidemiological features of partial edentulousness of one community or one village can be evaluated on the basis of a cross-sectional house-to-house survey. Thus, a survey was carried out among the patients of lower Garhwal region of Uttarakhand to study the prevalence of the level of edentulism and its relevance to other co-factors such as age, gender and socio-economic status.

2. Aims and Objective

To study the prevalence of the level of partially edentulism and its relevance to age, gender and socioeconomic status.

3. Materials and Methods

3.1. Study design

This cross-sectional house-to-house survey was carried out within selected areas of Uttarakhand (Pauri (101), Chamba(102), Dehradun(98), Haridwar(99) and Rishikesh(100). The survey was conducted on 500 individuals who were considered to be residents of the area. First the subjects were interviewed according to the questionnaire performa and then intra-oral examination of the subject was done in day light with the help of mouth mirror.

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3.2. Inclusion criteria

1. Subjects who were willing to participate and provided informed consent were included in the study.
2. Teeth that were not salvageable and indicated for extraction due to dental caries or periodontal diseases or any other factor were considered as missing teeth.
3. Individuals who had no impedance in opening mouth were included in the study.

3.3. Exclusion criteria

1. Subjects not willing to participate.
2. Subjects not able to open mouth or patients with neurological impairment.
3. Pregnant and lactating female.

3.4. Proforma details

The study involved completion of a pre-designed and structured questionnaire. The questionnaire was framed to collect information regarding the demographic profile, dentition, educational status and monthly income. Partially edentulous arches was classified according to well accepted Kennedy's classification as Class I, class II, Class III, Class IV.

The recorded data was compiled and entered in a spreadsheet computer program (Microsoft Excel 2007) and then exported to data editor page of SPSS version 11.5. Chi square test was used for comparison. P Value < 0.05 was considered statistically significant

Criteria used for recording the data in the study:

3.5. Age

Patients were grouped into three age groups:

18 - 35 years
36 - 59 years
> 59 years

3.6. Gender

Studied population includes both males and females.

3.7. Socioeconomic status

1. Income: For evaluation patients were grouped into different categories according to their monthly income, representing the lower, middle and higher income of social status in our country.
2. Education: It is divided into 7 categories.
   No formal schooling
   Less than primary school
   Primary school completed
   Secondary school completed
   High school completed
   College/university completed

Postgraduate degree

4. Result

The epidemiological survey was conducted in the lower Garhwal region of Uttarakhand to study the prevalence of the level of edentulism and its relevance to other co-factors such as age, gender and socio-economic status. Data was analyzed using statistical package SPSS. Chi-Square test was conducted and results were obtained and P value < 0.05 was considered statistically significant. The study focused on a total of 500 subjects to arrive at a significant statistical analysis. Given below are the results after the statistical analysis from Table 1 to 5 as well as plotted in graphic charts from 1-5.

Table 1: Showing distribution of partially edentulous patient according to Kennedy's classification

Kennedy's Class	Frequency	Percentage
1	172	34.4
2	148	29.6
3	98	19.6
4	82	16.4
Total	**500**	**100.0**

Majority of 172 participants (34.4%) belonged to Kennedy's class 1. Kennedy's Class 2 and 3 had 148 (29.6) and 98 (19.6) participants respectively. 82 participants (16.4%) belonged to Kennedy's class 4. These findings were illustrated in graphical format in Figure 1.

Increased number of partial edentulous cases were seen in middle age (36-59 years) and old age (more than 59 years) individuals with more incidence of kennedy's class 1 and class 2. Kennedy's Class 3 and class 4 was found be more in younger age group individuals. There was a statistically significant correlation between partial edentulism and age (P < 0.05). These findings were illustrated in graphical format in Figure 2.

Number of females (279) in the studied group were more as compared to males (221). Incidence of kennedy's class 1, class 2, class 3, and class 4 was more in females as compared to male group. There was a statistically significant correlation between partial edentulism and gender (P < 0.05). These findings were illustrated in graphical format in Figure 3.

No formal schooling was seen with majority of the participants (22.4%). This was closely followed by primary school completed (19.8%) and less than primary school (16%). Secondary school completed and High school completed were seen in 76 participants each (15.2% each). Forty six (9.2%) participants had completed college/university. Only 11 participants (2.2%) had obtained a post graduate degree. There was a statistically significant correlation between partial edentulism and education (P < 0.05). As level of education increases, the incidence of

Table 2: Showing distribution and association of Kennedy's classification with age group

Age	Kennedy's Class	Frequency	Percentage	Association
	1	16	12.8	
	2	26	20.8	
18 - 35 years	3	48	38.4	
	4	35	28.0	
	Total	125	100.0	
	1	63	36.4	
	2	51	29.5	
36 - 59 years	3	29	16.8	p value <0.05
	4	30	17.3	
	Total	173	100.0	
	1	93	46.0	
	2	71	35.1	
> 59 years	3	21	10.4	
	4	17	8.4	
	Total	202	100.0	

Table 3: Distribution and association of Kennedy's classification with Gender

Gender	Kennedy's Class	Frequency	Percentage	Association
	1	80	36.2	
	2	65	29.4	
Male	3	40	18.1	
	4	36	16.3	
	Total	221	100.0	p value <0.05
	1	92	33.0	
	2	83	29.7	
Female	3	58	20.8	
	4	46	16.5	
	Total	279	100.0	

Table 4: Distribution of study population according to education

	Frequency	Percentage
No formal schooling	112	22.4
Less than primary school	80	16.0
Primary school completed	99	19.8
Secondary school completed	76	15.2
High school completed	76	15.2
College/university completed	46	9.2
Postgraduate degree	11	2.2
Total	500	100.0

partial edentulism decreases. These findings were illustrated in graphical format in Figure 4.

As monthly income increases, the incidence of partial edentulism decreases. The association between Kennedy's classification with monthly income was found to be statistically significant with p value < 0.05. These findings were illustrated in graphical format in Figure 5.

5. Discussion

Table 1 represented the distribution of partial edentulous cases according to kennedy's classification. Majority of 172 participants (34.4%) belonged to Kennedy's class 1.
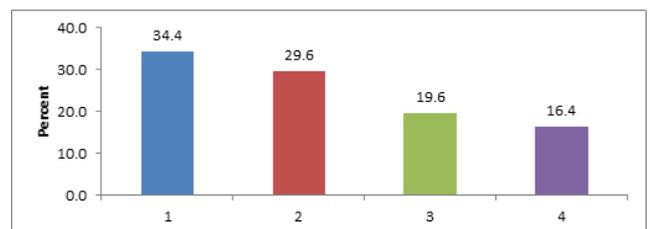
Fig. 1: Distribution according to Kenndy's class

Kennedy's Class 2 and 3 had 148 (29.6) and 98 (19.6) participants respectively. 82 participants (16.4%) belonged

Table 5: Association of Kennedy's classification with monthly income

SES	Kennedy's Class	Frequency	Percentage	Association
	1	42	33.6	
	2	27	21.6	
Less than Rs.5000	3	33	26.4	
	4	23	18.4	
	Total	125	100.0	
	1	36	32.1	
	2	41	36.6	
Rs. 5000 - Rs. 10000	3	14	12.5	
	4	21	18.8	
	Total	112	100.0	
	1	37	41.1	
	2	26	28.9	
Rs.10001 - Rs.30000	3	16	17.8	
	4	11	12.2	
	Total	90	100.0	
	1	20	30.8	p value < 0.05
	2	18	27.7	
Rs.30001 - Rs.50000	3	15	23.1	
	4	12	18.4	
	Total	65	100.0	
	1	21	38.2	
	2	22	40.0	
More than Rs.50000	3	7	12.7	
	4	5	9.1	
	Total	55	100.0	
	1	16	30.2	
	2	14	26.4	
Not disclosed	3	13	24.5	
	4	10	18.9	
	Total	53	100.0	
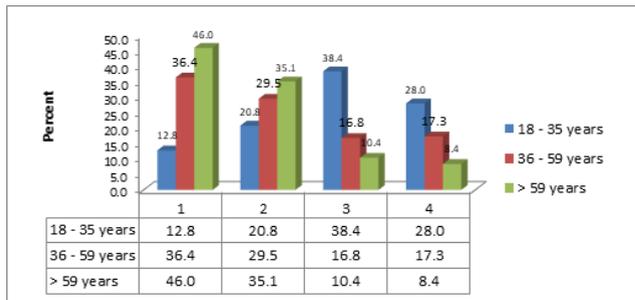
Fig. 2: Distribution of Kennedy's class according to age (in %)
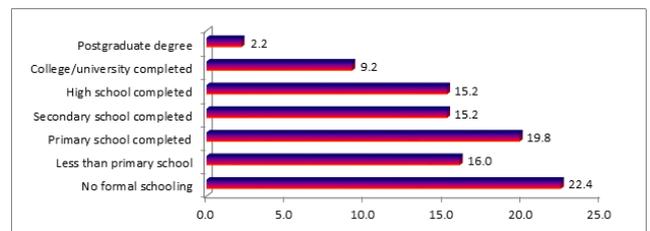
Fig. 4: Distribution according to education completed (in percent)
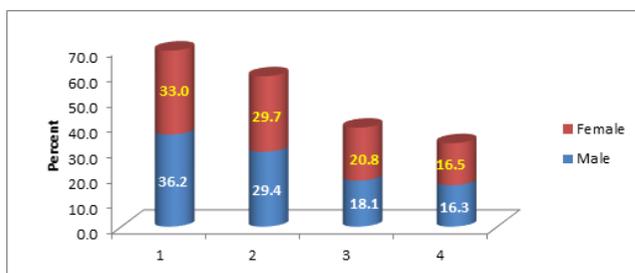
Fig. 3: Distribution of Kennedy's class according to gender (in %)
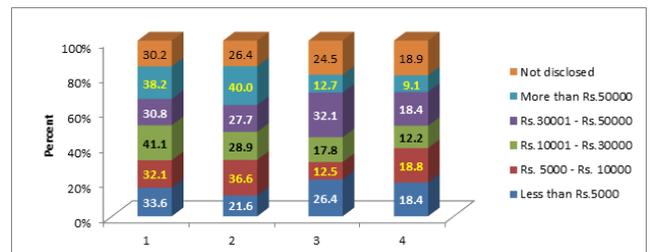
Fig. 5: Distribution of Kennedy's class according to monthly income (in %)

to Kennedy's class 4. This can be attributed to the fact that with aging event like tooth loss increases resulting in more class 1 and class 2. These findings were in correlation with Khalil A et al.,[1] who also observed more class 1 and class 2 in combination type of edentulousness. These findings were illustrated in graphical format in Figure 1.

Table 2 represented the age distribution of the sample of 500 cases. Majority of the cases 202 (40.4%) were more than 59 years, followed by participants of age Group 36 – 59 years 173 (34.6%). The remaining 25% (125 cases) belonged to age range 18 – 35 years. This is in accordance with the fact that the middle and senior age group is the most prone to loss of teeth due to ageing and subsequent partially edentulism. It was also found in the study that with increase in age, there was an increase in class 1 and class 2 dental arch tendency and a decrease in class 3 and class 4. This study was in accordance with the study done by Vidhya Jeyapalan.[1] These findings were illustrated in graphical format in Figure 2.

The Table 3 represented the gender distribution of the sample of 500 cases. Females were predominant with 55.8% (279 cases). 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 dental treatment. This could be a reason for more females being partially edentulous. Moreover it was seen that females cooperated better than males for the study. These findings were illustrated in graphical format in Figure 3. This study was in accordance with the study done by Prabhu[3] and Osterberg,[4] which also shows the correlation between the gender and various classes of partial edentulousness.

Table 4 represent education status among the 500 participants. No formal schooling was seen with highest frequency in 112 participants (22.4%). This was closely followed by primary school completed (99–19.8%) and less than primary school (80–16%). Secondary school completed and High school completed were seen in 76 participants each (15.2% each). Forty six (9.2%) participants had completed college/university. Only 11 participants (2.2%) had obtained a post graduate degree. Less educated people aren't much aware about oral health care. People with better employment status are more concerned about their aesthetics and opted for dental treatment. Less educated people aren't much aware about oral health care. People with better employment status are more concerned about their aesthetics and opted for dental treatment. Socio economic parameters have direct influence on the replacement of missing teeth. This is in correlation with the finding done by Palmer[5] and Moen[5] and Ronald.[6] More educated and financially sound people were more likely to be more aware regarding oral health issues. The fact that maximum number of subject had no education, depicts the real scenario of lack of education. Similar observations were made by Ronald.[6] These findings were illustrated in

graphical format in Figure 4.

The Table 5 explained the distribution of 500 participants according to the monthly income. Majority of the participants 125 (25.0%) had an earning less than 5000. It was followed by an earning of Rs. 5000 – Rs.10000 by 112 participants (22.4%). Followed by 90(18.0) participants who earned 10001-30000. 53 participants (15.2%) refused to disclose their income. 65 (13.0%) participants and 55 participants (11.0%) earned Rs. 30001 – Rs.50000 and more than Rs. 50000 respectively. It was found that Partial edentulism depends on socio-economic parameters like family income, education, occupation, etc. Partial edentulism decreases in the employed group and when family monthly income increases. The lower income group people could not afford to the treatment procedures that would have saved their questionable tooth, so might have opted for extraction. This is in correlation with the finding done by Moen[5] and Ronald.[6]

So the result of the foregoing study may serve as a baseline data that may assist in future planning and implementation for oral health services among the population in lower Garhwal region of Uttarakhand and may prove to be an important asset for oral health service.

6. Conclusion

Age, gender, socioeconomic status was found to be a significant co-factors associated with Partial edentulism. The prevalence of level of partial edentulism was found to be higher in females than males specially in older age and middle age participants respectively. Class 1 and class 2 dental arch tendency increases whereas class 3 and class 4 type decreases with increase in age. Partial edentulism is found to be lesser in younger participants. More educated and financially sound people were likely to be more aware regarding oral health issues.

7. Source of Funding

8. Conflict of Interest

The authors declare that there is no conflict of interest.

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