ORIGINAL ARTICLE

Frequency of Kennedy Classification of Partially Dentate Arches and their Association with different Sociodemographic Factors

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OBJECTIVE: This study aims to find frequencies of different Kennedy's classes in partially dentate arches and determine association of tooth loss with Sociodemographic variables.
METHODOLOGY: A cross sectional study was done with a sample size of 335 individuals. All individuals were examined using diagnostic kit and data recorded on proforma according to Kuppuswamy's socio-economic scale.
RESULTS: Mean age was 46 years with SD ± 1.22 with 189 female and 146 males. Kennedy's class III was most common pattern in both arches. Tooth loss is more in illiterate people showing significant correlation with education in both arches. Low income or unemployment shows significant correlation with tooth loss in maxillary arch.
CONCLUSION: Socioeconomic status like education, income and occupation has an impact on frequency of tooth loss.
KEYWORDS: Partially dentate arch, Sociodemographic factors, Education and tooth loss, Income, occupation and tooth loss
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INTRODUCTION

Teeth are the most fundamental component of stomatognathic system.[1] Preserving maximum number of teeth during life is one of the prime objective of oral health.[2] Tooth loss can be considered as a measure of the severity of oral diseases experienced by an individual or a population.[2,3] Loss of teeth disturbs the functional harmony of the remaining dentition and might cause teeth to drift, tilt or widen the contact areas, wedging of food, occlusal instability, bone resorption, reduction in vertical dimension or temporomandibular dysfunction.[1,3]

This will further deteriorate the condition and affect quality of life by affecting of choice of food and masticatory efficiency.[1,2]

Partially dentate arch is the one in which at least one or more teeth are missing.[4] Literature shows multiple factors involved in etiology of tooth loss like attitudinal factors, individual's approach towards dental health, cost of treatment, access to and use of dental services, limitation of dental services, variation among available treatment options, systemic conditions, senility and socio-demographic factors.[2,5] Various other reasons of tooth loss include caries, periodontal problems, traumatic injuries, impactions, supernumerary teeth, orthodontic extractions, neoplastic and cystic lesions.[1,3,5,6]

As per literature, there is a decline in trend of complete denture wearers and an increase in number of partial denture wearers which reflects improving clinical trends and successful preventive measures.[5,7] It also depicts an increase in awareness among population regarding significance of maintaining oral hygiene and retention of natural dentition.[5] A simple estimation of the proportion of Partially dentate persons is a rough estimate of the prevalence of dental

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diseases and the success or failure of dental care.[8] This forms a background for the assessment of treatment needs.[9]

Conservative treatment options used to treat partially dentate arches, such as dental implants also happen to be the most expensive.[7] This continues to limit their availability to lower socioeconomic groups in whom the highest rates of tooth loss occur.[7] It should not be a surprise then that conventional removable prosthodontic treatment modalities continue to outnumber implant tooth replacements in general practice and remain a versatile, cost effective, and reversible treatment method for partially dentate patients at any age.[7]

Several studies have analyzed the correlation between partially dentate arches and its influencing factors like age and gender but very limited studies are available locally to give information about correlation of education, occupation and income with frequency of partially dentate arches.[1,3,5,10]

This study will provide an insight into role of socio demographic factors in tooth loss that would help the practitioners in addressing the relative management needs of patients. This will create awareness amongst population for maintenance and retention of natural teeth by identifying the factors of significant influence. The rationale of this study is to find frequencies of differential Kennedy's classes in partially dentate subjects and to see its relationship with education, occupation and income.

Objective

The objectives of this study are to:

- Find frequencies of different Kennedy's classes in partially edentulous subjects.
- Determine its association with sociodemographic variables like education, occupation and income.

METHODOLOGY

Across sectional study was conducted at outpatient department (OPD), Institute of Dentistry (IOD), CMH Lahore Medical College over a period of six months. Approval was taken from ethical committee of the Institute of Dentistry, CMH Lahore Medical College Reference no.7/ERC/CMHLMC. A sample size of 335 subjects was selected by non-probability, consecutive sampling technique. Sample was estimated using least frequency of mandible Kennedy's class- IV i.e. 2%.[11] 95% confidence level and 3% margin of error was used while calculating the sample. Subjects having wisdom tooth as only missing tooth or missing 2nd molar that will not be replaced, congenitally missing teeth, edentulous patients or patients who are physically and mentally challenged or house wives were excluded from the study. Partially dentate patients or the patients having at least one missing tooth within the age range of 20 to 70 years were included.

After taking an informed consent, all required data was taken from participants and recorded. All subjects meeting the inclusion criteria requirements were examined intra orally according to European Global Oral Health Indicators Development[12] using diagnostic kit and information was recorded on patient proforma formulated according to Kuppuswamy's socio-economic status scale.[13] Kennedy's classification system was used for classifying arches. Modification areas were not included in the study to simplify the analysis.

The recorded data for education, income and occupation was further categorized into 3 sub-groups for each category. The sub groups for education level were; A (illiterate), B (Primary education till intermediate) and C (Graduate or above). The sub categorization for occupation level included; A (unemployed or unskilled worker), B (semi skilled, skilled, clerk) and C (semiprofessional or professional). For categorization of income, the scale comprised of 7 scores (1,2,3,4,6,10 and 12), the data was recorded according to Kuppuswamy's scale[13] after converting Indian rupee into Pakistani rupee and then data was divided in to 3 categories; Group A included income under scores 1 to 3 i.e. <Rs.2688 to 13456, Group B included income falling under scores 4,6,and 10 i.e. Rs 13457 to 53843 and Group C included income under score 12 that is Rs.53844 and above.

All collected data was entered and analyzed using SPSS version 23. Frequency and percentages are used for categorical data like occupation, social class and Kennedy's class I, II, III, IV. Chi-square test was applied to see association of Kennedy's class with social class and occupation post stratification. Data was stratified for socioeconomic status and occupation. P-value ≤ 0.05 was considered as statistically significant.

RESULTS

The study included a total of 335 patients who were inquired and examined to determine frequencies of differential Kennedy's classes in partially dentate subjects and their association with different socio-demographic profiles. Mean age was 46 years with SD ± 1.22. Kennedy class III was most common pattern (Figure 1). 146(43.6%) patients were male while 189(56.4%) patients were females.

Stratification of common patterns of acquired partially dentate arches with reference to education in both maxilla and mandible are given in table no 1.

Class I pattern is seen more in illiterate population in both maxilla and mandible and Class III is most common pattern seen in both arches as the education level is increased (as shown in table 1). P value was less than

Figure 1: Frequency of common Patterns of Kennedy Classification

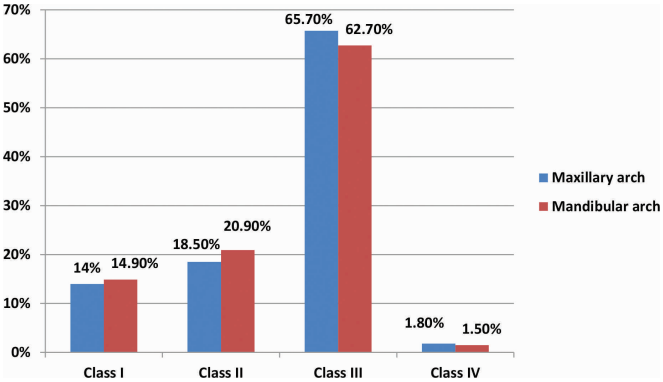

Table 1: Association of Kennedy classification with literacy level

Common Patterns		A- Illiterate	B- Primary to intermediate	C- Graduate or above	Total	P-Value
Maxilla	Class I	21	18	8	47	<0.001
	Class II	12	38	12	62	
	Class III	36	117	67	220	
	Class IV	0	6	0	6	
Total		69	179	87	335	
Common Patterns		A- Illiterate	B- Primary to intermediate	C- Graduate or above	Total	
Mandible	Class I	17	25	8	50	<0.027
	Class II	16	36	18	79	
	Class III	36	114	60	210	
	Class IV	0	4	1	5	
Total		69	179	87	335	

Table 2: Association of Kennedy classification with Occupation

Common Patterns		A- Unemployed/ Unskilled	B- Semi skilled/ clerk	C-Semi Professional/ Professional	Total	P-Value
Maxilla	Class I	32	13	2	47	0.006
	Class II	39	11	12	62	
	Class III	118	62	40	220	
	Class IV	0	5	1	6	
Total		189	91	55	335	
Common Patterns		A- Unemployed/ Unskilled	B- Semi skilled/ clerk	C-Semi Professional/ Professional	Total	
Mandible	Class I	35	13	2	50	0.109
	Class II	40	18	12	70	
	Class III	113	57	40	210	
	Class IV	1	3	1	5	
Total		189	91	55	335	

Table 3: Association of Kennedy classification financial status

Common Patterns		A-Low income	B-Average income	C-Good income	Total	P-Value
Maxilla	Class I	35	9	3	47	0.039
	Class II	41	18	3	62	
	Class III	120	72	28	220	
	Class IV	2	4	0	6	
Total		198	103	34	335	
Common Patterns		A-Low income	B-Average income	C-Good income	Total	
Mandible	Class I	39	10	1	50	0.097
	Class II	43	21	6	70	
	Class III	114	69	27	210	
	Class IV	2	3	0	5	
Total		198	103	34	335	

0.05 showing significant results.

Stratification of common patterns of acquired partially dentate arches with reference to occupation in both maxilla and mandible are given in table no 2.

Unemployed individuals were found to have more trend of missing teeth as compared to working/earning people. Class I, II and III patterns were higher in unemployed or unskilled workers when compared to professionals in both maxillary and Mandibular arch as shown in table 2. P value for maxilla was less than 0.05 and for Mandibular arch p=1.09.

Stratification of common patterns of acquired partially dentate arches with reference to income in both maxilla and mandible are given in table no 3.

There was increase in incidence of tooth loss in people with low income. Class I, II and III were common patterns in individuals with low income as compared to people earning more in both maxillary and mandibular arch as shown in table 3. p value for maxilla was less than 0.05 and for mandible it was 0.097.

DISCUSSION

Irrespective of the reason for tooth loss, the replacement of missing teeth by patient is sought to restore and maintain a perfect balance of form and function.[5] There are multiple factors influencing the prevalence of tooth loss that include education, occupation, financial status, oral hygiene maintenance and life style.[3] The study included individuals from semi-rural population.

Education is one of the significant factors associated with knowledge about dental problem and its management.[4,14] The patients are normally unknowledgeable about the oral health care measures and have a poor attitude towards management of dental problems.[14]

On observing the correlation of partially dentate arches

with education, results were significant for both arches. Class I pattern is seen more in illiterate or minimally educated population in both maxilla and mandible and Class III is most common pattern seen in both arches as the education level is increased. Similar trends have been reported in other studies as well.[1,4,15] The reason for this may be that esthetic consciousness is increased and focus is more on hygiene as education level and awareness about oral hygiene increases.[1,4] More understanding of oral hygiene practice and utilization of facilities to maintain or improve oral health condition also comes as part of learning.[1,4,5]

A study reported that 57.5% people reported with partially dentate arch were having medium level of education whereas 42.5% of the individuals with missing teeth were well educated.[10] Results of the same study show 64.5% of employed population reporting to clinic for replacement whereas only 10.3% of unemployed population demanded replacement of missing teeth.[10] Kennedy's class I was the most common type of partially dentate arches in upper and lower jaws (52.4%), preceding by class-III (33%), class-II in 12.8% and class IV being least common (1.6%).10 A local study reported that 49.5% cases were from primary to intermediate educational level, 40.8% were uneducated, while only 9.6% were graduate.[5] According to income level, 72.0% were presented with income level below half million Pakistani Rupees per year, 26.1% were presented with income level between fifty thousand to one lac rupees per year and only 1.8% cases were presented with income of more than one lac Pakistani Rupees per year.[5]

The lack of awareness due to low educational level and unmotivated people result in poor oral hygiene and higher prevalence of tooth loss thus, multiple saddle areas.[5,14,15] Less educated people lack awareness about dental health care and importance of teeth.[1,5,16] Such individuals do not visit the dentist for sake of regular checkups and present to the clinic only when in state of severe pain.[16] This can be better described as a curative rather than a prophylactic approach involving emergency dental health care, with removal of teeth being the treatment rendered for the decayed teeth.[15,16]

The study showed increase tooth loss in people with low income or unemployed individuals. This finding is in conformance with many other studies which state that complete or partially dentate arches were less in people with better family income and employment status.[1,2,4,5,16]

According to results of this study, professional or employed people as well as people with income greater than Rupees 20,000 were found to have less prevalence of tooth loss which was in accordance with other studies also.[5,16,17] People with better employment status are more concerned about their esthetics and seek dental care for preservation or restoration of teeth.[17] The trend seen from the results of this study show that the socio economic status directly influences the restoration or extraction of teeth and replacement of missing teeth as seen in this as well as other studies.[17] The results for income and occupation factors were significant for maxillary arch which might be due to the fact that esthetic concerns are more for maxillary teeth as compared to the teeth in mandibular arch.[18]

People of lower social classes i.e. unemployed or people with income lower than Rupees 10,000 tend to show inconsiderable value for health in general and dental health in particular.[17] They give little or no importance for preservation of their teeth for the entire life and consider tooth removal over restoration.[19] Also, the individuals with lower income could not afford the treatment procedures that would have saved their ailing tooth, so might opt for removal instead of preservation.[5] Thus, most of the patients attending belong to the low socioeconomic background therefore prefer extraction over restorative treatment as they are unable to take frequent leaves from work, afford transportation fares, and treatment cost to save the ailing teeth.[1,5]

This study was conducted in an institute based setting and included patients reporting to that institute only. In future, it can be conducted on greater sample size to better correlate and analyze the effect of sociodemographic variables. Further studies can be conducted by limiting the age range of the study population to young adults. Also, the strategies should be devised to enhance education level of the population apart from creating awareness about maintenance of oral hygiene. Also, the access to the basic dental treatment should be made easier or covered up in health insurance.

CONCLUSION

Our study concludes that there is a significant association between the Kennedy's class and sociodemographic factors. Class I pattern was more common in illiterate people and class III was seen to be common in educated people. Therefore, prevalence of tooth loss was more in uneducated individuals. Unemployed or unskilled workers were found to have high prevalence of missing teeth. There was increase frequency of tooth loss in people with low income. Thus socio economic status is associated with of tooth loss.

RECOMMENDATION

Strategies should be devised to enhance education level of the population apart from creating awareness about maintenance of oral hygiene. Also, the access to the basic dental treatment should be made easier or covered up in health insurance.

CONFLICT OF INTEREST

All researchers have no conflict of interest related to this study.

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