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PREVALENCE OF PARTIAL EDENTULISM BASED ON KENNEDY'S CLASSIFICATION IN MAXILLARY ARCH - A RETROSPECTIVE STUDY

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Abstract

Purpose of classification of partial edentulous arches provides communication between dental colleges,students,techians about the case, for planning effective treatment and to design the partial denture. Prevalence of partial edentulism based on kennedy's classification was studied to an extent in various populations but fews studies are carried out in our population background. Aim of the study is to evaluate prevalence of partial edentulism based on Kennedy's classification in maxillary arch. A retrospective study was conducted by reviewing 46,000 patient records of University hospital for a period of nine months from June 2019 to March 2020.About 145 Consecutive case records containing information on patient's age, gender, partial edentulism based on kennedy's classification with signed informed consent were sorted.. Age of the patients were categorized as 21-30 years, 31-40years, 41-50 years, 51-60 years and above 60 years for statistical convenience. Descriptive statistics and chi square association test was employed to find the association between Age, Gender and Kennedy's classification with a level of significance set at $p<0.05$. Final data set consisted of 145 patients out of which 96 (66.2 %) were males and 49 (33.8%) were females. Most of the participants (29.6%) were in the age group above 60 years.Significant association between age groups and kennedy's classes was observed ($p= 0.000$). No significant association between gender and Kennedy's classes was observed ($p= 0.198$). It can be concluded that in maxillary arch Kennedy's class 1 was found to be most prevalent in the age group between 51-60 years. Kennedy's class 2 was found to be prevalent in the age group above 60 years. Kennedy's class 3 was found to be most prevalent in the age group between 41-60 years. Kennedy's class 4 was found to be most prevalent in the age group between 21- 30 years.Gender has no effect on prevalence of Kennedy's classes. However, age has significant association.

KEYWORDS: *Dental care, Dentition, Esthetics, Health, Tooth loss.*

Introduction

Tooth loss has a major influence on biological,social and psychological levels of oral health related quality of life [1]. In countries like India diversified cultures,different levels of socioeconomic status combined with non

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availability of resources for dental treatment,paved way for increased concerns about partial edentulousness [2,3].There are more than 6500 potential combinations of partial edentulism pattern in maxillary and mandibular arches [4,5]. Several classification have been suggested to classify partially edentulous arches to recognize possible combinations of teeth to ridges[6,7].The common classification are Cummer, Kennedy, Applegates, Neurohn, Bailyn,Wild, Skinner and Avant,.Kennedy's classification is most widely accepted classification because it provides immediate visualization,allows differentiation between tooth born and tooth tissue borne partial denture[8]. Kennedy's classification classI -Bilateral Edentulous area presents posterior to remaining natural teeth. ClassII -Unilateral Edentulous area present posterior to remaining natural teeth.Class III-Unilateral Edentulous area with natural teeth anterior and posterior to it.Class IV-single but bilateral edentulous area present anterior to remaining natural teeth [9,10].

Kennedy classified all the partially edentulous conditions into four categories in order of descending frequency of occurrence at time of proposal [11-13]. Patterns of tooth loss have been assessed in different populations in various countries [14-16].Epidemiological information on health care and its related concerns are essential for planning future health care. Many studies observed that Acrylic partial dentures are the most frequently prescribed prosthesis followed by fixed partial dentures while cast partial dentures are rarely opted treatment modality regarding partial edentulism [17,18]. Distal-extension RPD (Kennedy I and II) has the advantage of being less expensive, less complicated and reversible. However, they may be associated with several problems related to poor stability, poor retention, esthetics, masticatory efficiency, low patient satisfaction and low oral comfort [19-21].The main problems of RPDs are caries, resorption of the residual alveolar ridge and inflammation of the underlying mucosa, probably because of its dual-support system with different resilience [22]. Dental implants may be an alternative treatment to RPDs [23]. As epidemiological studies on edentulism and tooth loss vary considerably in prevalence between countries and between geographic regions within countries,this study aims to evaluate prevalence of partial edentulism based on kennedy's classification in our population background.

MATERIALS AND METHODS:

Study design and setting

A retrospective study was conducted by reviewing 46,000 patient records of the authors University hospital for a period of nine months from June 2019 to March 2020.

Ethical Approval:

The study was commenced after approval from the scientific review board, and the ethical clearance was obtained from the ethical committee of the University with the following ethical approval number-SDC/SIHEC/2020/DIASDATA/0619-0320."

Data collection

About 145 Consecutive case records containing information on patient's age, gender, partial The edentulism only in maxillary arch based on Kennedy's classification with signed informed consent were sorted. Patients

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with partial edentulism in the mandibular arch were excluded from the study. Age of the patients were categorized as 21-30 years, 31-40years, 41-50 years, 51-60 years and above 60 years for statistical convenience.

Statistical Analysis

Data was recorded in Microsoft Excel /2016 (Microsoft office 10) and later exported to the statistical package for social science for windows (version 20.0 , SPSS Inc). Descriptive statistics was done to present the socio demographic details and chi square association test was employed to find the association between Age, Gender and Kennedy's classification with a level of significance set at $p<0.05$.

RESULTS:

Figure 1 Shows distribution of age groups among the study participants.Mean age group of patients in the study is between 30-40 yrs. Most of the patients (29.6%) were in the age group above 60 years, followed by (24.1%) in the age group between 51-60 years, (22%) in the age group between 41-50years, (12.4%) in the age group between 21-30 years and (11.7%) in the age group between 31-40 years. Figure 2 shows gender distribution among patients. Out of 145 patients out of which 96 (66.2 %) were males and 49 (33.8%) were females. Figure 3 shows the distribution of Kennedy's classification among patients with missing teeth. (47.58%) have Kennedy's class 3, followed by (18.62%) has Kennedy's class 4 (17.24%) has Kennedy's class 1 and (16.55%) has Kennedy's class 2. Figure 4 shows the distribution of Kennedy's classes among different age groups. Among patients in the age group between 21-30 years (8.6%) has kennedy's class 3 and (44.4%) has kennedy's class 4. In the age group between 31-40 years (4%) has kennedy's class 1, (8.3%) has kennedy's class 2, (17.3%) has kennedy's class 3 and (7.4%) has kennedy's class 4. In the age group between 41-50 years (4%) has kennedy's class 1, (16.6%) has kennedy's class 2, (30.4%) has kennedy's class 3 and (22.2%) has kennedy's class 4. In the age group between 51-60 years (48%) has kennedy's class 1, (4.1%) has kennedy's class 2, (26%) has kennedy's class 3 and (14.8%) has kennedy's class 4. In the age group above 60 years (44%) has kennedy's class 1, (70%) has kennedy's class 2, (17.3%) has kennedy's class 3 and (11.1%) has kennedy's class 4. Significant association between age groups and kennedy's classes was observed ($p= 0.000$)

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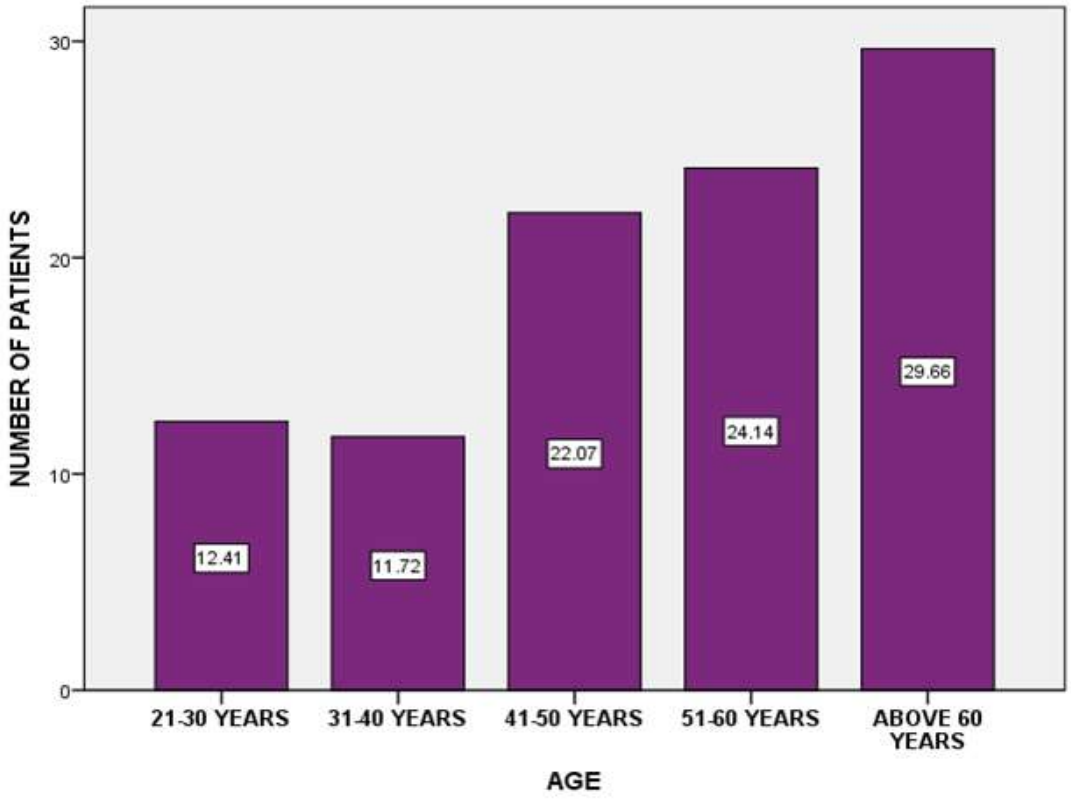

Figure 1: Bar chart showing distribution of age groups among patients with missing teeth in maxillary arch. X axis - Age groups, Y axis - Number of patients. Most of the patients were in the age group above 60 years (29.6%), followed by age group between 51-60 years (24.1%), age group between 41-50years (22%), age group between 21-30 years(12.4%) and least in the age group between 31-40 years (11.7%)

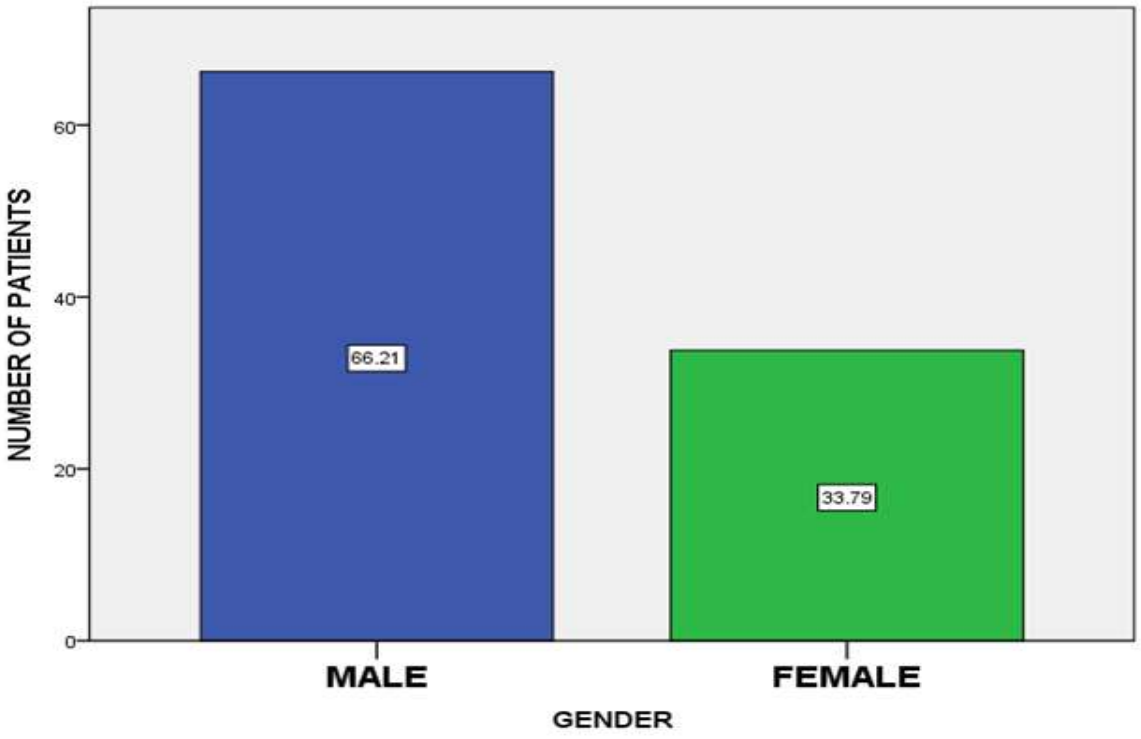

Figure 2: Bar chart showing distribution of Gender among the patients with missing teeth in maxillary arch. X axis shows Gender. Y axis shows the number of patients with missing teeth in each gender. Among the patients male predominance (66.21%) over female groups (33.79%) was observed.

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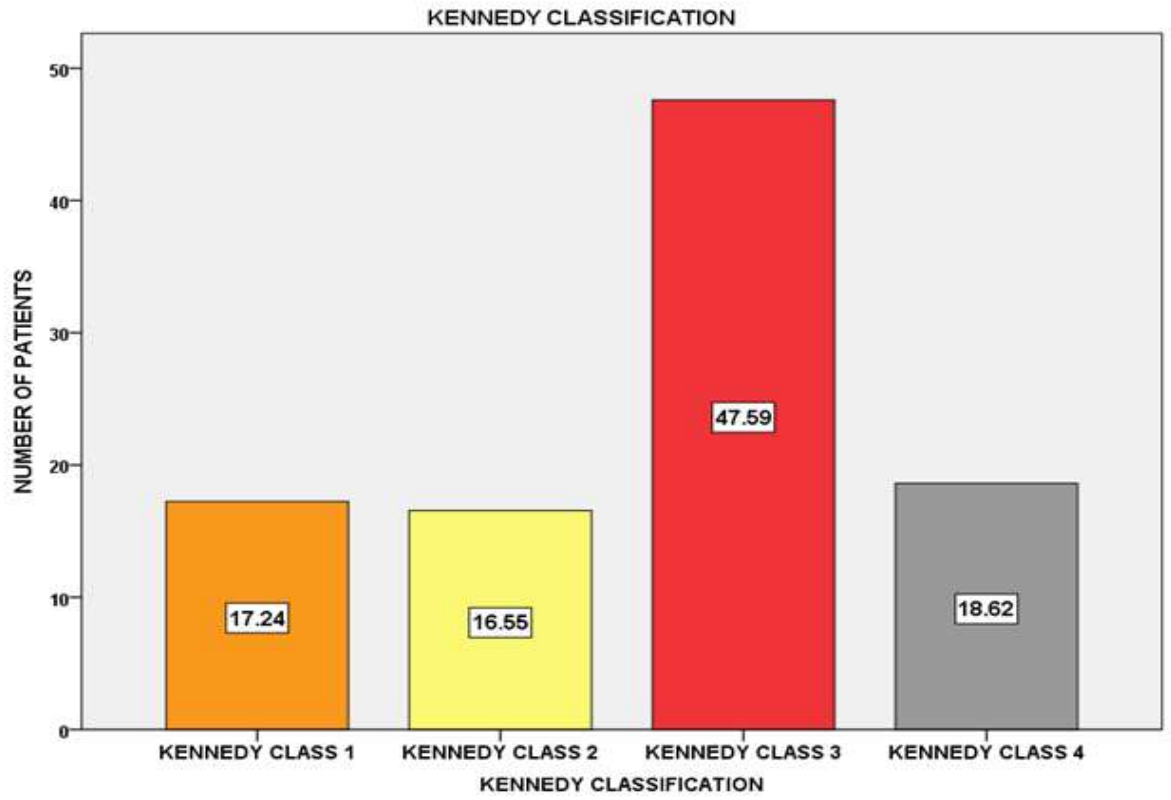

Figure 3: Bar chart showing distribution of Kennedy's classification in maxillary arch among patients with missing teeth. X axis shows missing teeth based on various Kennedy's classes. Y axis shows the number of patients. Most of the Patients have Kennedy's class 3 (47.58%), followed by Kennedy's class 4(18.62%), Kennedy's class 1(17.24%) and least was Kennedy's class 2 (16.55%).

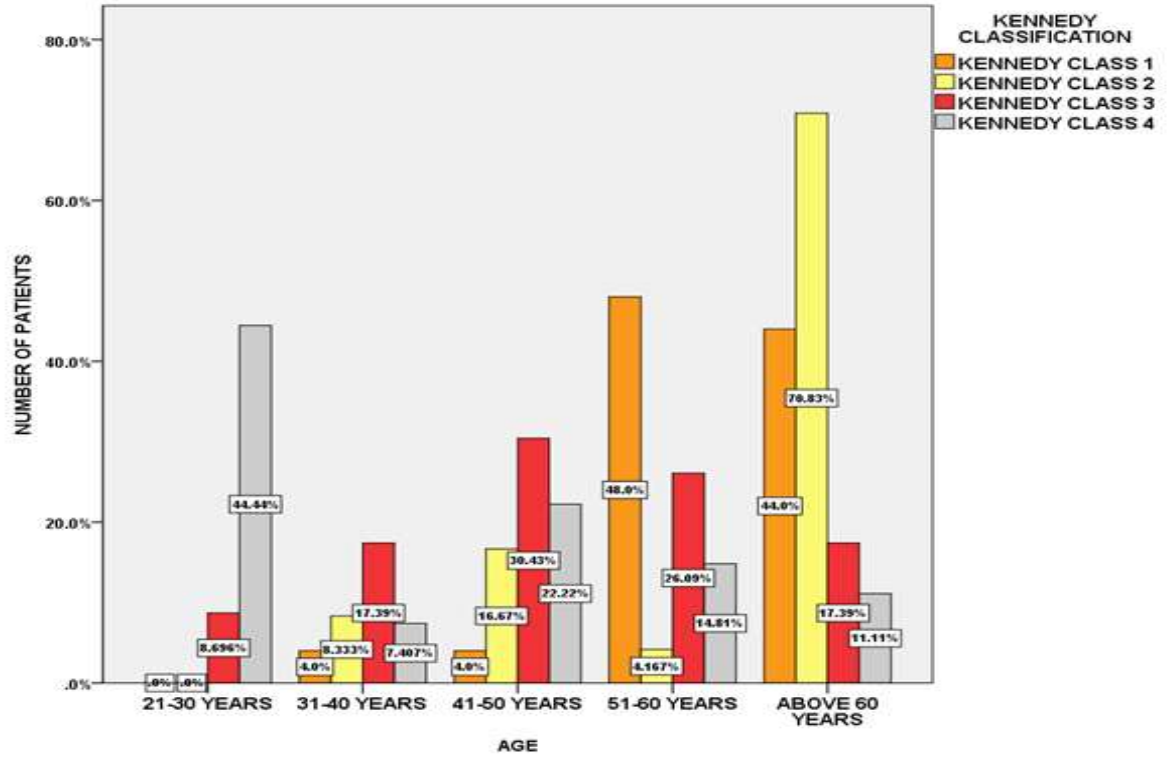

Figure 4: Clustered bar chart showing association between age groups and missing teeth based on various Kennedy's classes in maxillary arch. X-axis represents age groups in years. Y -axis represents the number of patients with missing teeth having various Kennedy's classes. Kennedy's class 1 was found to be most prevalent

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in the age group between 51-60 years than the other age groups and the difference is also significant statistically. (Pearson Chi-Square value =72.22;p=0.000; p<0.05

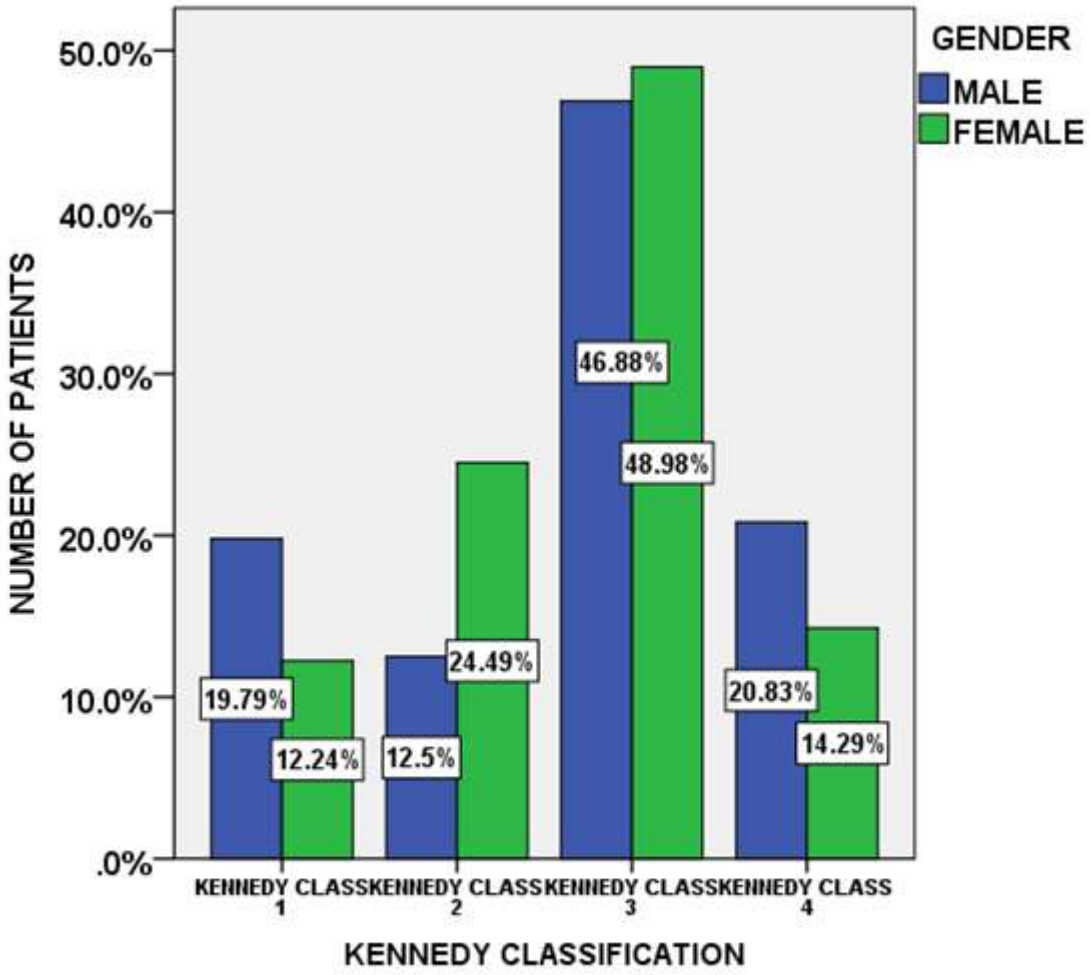

Figure 5: Clustered bar chart showing association between Gender and missing teeth based on various Kennedy's classes in maxillary arch. (X-axis represents distribution of various Kennedy,s classes among gender. Y -axis represents the number of patients with missing teeth. Kennedy's class 3 was more prevalent among Males and Females. However, the association between gender and missing teeth based on various Kennedy's classes in maxillary arch was found to be statistically not significant on chi-square analysis.(Pearson Chi-Square value = 4.666;p=0.198; p>0.05).

Figure 5 shows Kennedy's classes among different Gender. Among the male patients (19.7%) has kennedy's class 1, (12.5%) has kennedy's class 2, (46.8%) has kennedy's class 3 and (20.8%) has kennedy's class 4. Among the Female patients (12.2%) has kennedy's class 1, (24.4%) has kennedy's class 2, (48.9%) has kennedy's class 3 and (14.2%) has kennedy's class 4. No significant association between Gender and kennedy's classes was observed (p= 0.198)

DISCUSSION:

Mean age group of participants in the study is between 30-40 yrs.This is in accordance to the WHO guidelines as this category exhibited maximum partial edentulism.[24,25] It was seen that number of partially edentulous males (66.2%) outnumbered Female group (33.8%).This is contradictory with earlier studies which reported

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more females (76.4%) than males (72.1%) [26]. It was reported that higher incidence in females is due to lower level of education,employment status, dependence on male members of the family to take them for treatment [28-30]. However, some studies show more male edentulous patients than females, authors attributed that males are more active than females and do pay less attention to oral care . In the present study participants in the age group between 21-30 years (8.6%) have Kennedy's class 3 and (44.4%) have Kennedy's class 4. In the age group between 31-40 years (4%) has kennedy's class 1, (8.3%) has kennedy's class 2, (17.3%) has kennedy's class 3 and (7.4%) has kennedy's class 4. In the age group between 41-50 years (4%) has kennedy's class 1, (16.6%) has kennedy's class 2, (30.4%) has kennedy's class 3 and (22.2%) has kennedy's class 4. In the age group between 51-60 years (48%) has kennedy's class 1, (4.1%) has kennedy's class 2, (26%) has kennedy's class 3 and (14.8%) has kennedy's class 4. In the age group above 60 years (44%) has kennedy's class 1, (70%) has kennedy's class 2, (17.3%) has kennedy's class 3 and (11.1%) has kennedy's class 4.

With an increase in age, there was an increase in Class I & Class II dental arch tendency and a decrease in Class III & Class IV. This is supported in study by Zaigham AM et al., who supported that with an increase in age, there was an increase in Class I & Class II dental arch tendency and a decrease in Class III & Class IV. In younger age groups, Incidence of Kennedy's Class III was found to be 49% in age group 20–29 years and above 55% in age group 30–39 years, which was relatively higher than that of any other Classes. This is due to the trauma to maxillary central incisors at early childhood stage Early loss of first molar due to caries may be the reason for higher occurrence of Class III in younger age groups. When age increases, due to further loss of teeth, extension of existing saddle leads to Class I and Class II. Kennedy's Class IV was also found to be the most common incidence in age group 20-29 years. The author has explained that at early childhood stage, maxillary central incisors are more prone to trauma, which leads to Class IV in younger age groups.

Studies explained that since molar is the first tooth to erupt in the oral cavity,having higher caries percentage and higher chance of tooth being extracted. Another study reported that patients with class III had least percentage of replacement this could be because these patients had a higher option of getting their teeth replaced with a fixed partial denture or an implant which might have beyond their affordability.Contradictory to these findings, Pun et al reported that Kennedy class I was most frequent (38.4%) [27]. According to the present study, there were no significant gender differences in partially edentulous patients. This is contradictory to study by Saptoka et al which explained that females take more care of their oral health than males and in rural areas, females are not concerned about their oral hygiene[28]. 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. Also, subjects in this group are more aware to replace the missing teeth. The lower income group people could not afford the treatment procedures that would have saved their questionable tooth, so might have opted for extraction. Less educated people aren't much aware about oral health care. People with better employment status are more concerned about their aesthetics and opt for dental treatment. Socio economic parameters have direct influence on the replacement of missing teeth.Mohammed Arif et al reported prevalence of Class III predominant in age group between 21-30 yrs and 31-40 yrs in Kashmiri population [29].

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Limitations of the present study include small,non-probability samples of convenience.Size and homogeneity of the sample also a limiting factor hence additional studies are recommended.

Future Scope of the study is that evaluation analysis of tooth loss pattern is required to clarify more information about partially edentulous patients.

CONCLUSION:

From this study we conclude that in maxillary arch, Kennedy's class 1 was found to be most prevalent in the age group between 51-60 years, Kennedy's class 2 was found to be prevalent in the age group above 60 years, Kennedy's class 3 was found to be most prevalent in the age group between 41-60 years and Kennedy's class 4 was found to be prevalent in the age group between 21- 30 years. Gender has no effect on the prevalence of Kennedy's classes. However age has significant association. Incidence of various classes of partial edentulism may not be a reflection of pattern of tooth loss but also patient's demands and affordability of alternative prosthodontic treatments.

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AUTHORS CONTRIBUTIONS:

First author Keerthika S performed the analysis, and interpretation and wrote the manuscript.

Second author Revathi.D contributed to conception, study design, analysis and critically revised the manuscript. Third author Santhosh Kumar participated in the study and revised the manuscript.

Conflicts of Interest:

None declared

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