PREVALENCE OF DENTULISM, PARTIAL EDENTULISM AND COMPLETE EDENTULISM IN PRIVATE DENTAL HOSPITAL - A RETROSPECTIVE STUDY

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ABSTRACT:

Edentulism will occur among elderly people worldwide. It affects the health and the quality of life. Complete and partial edentulism is correlated with depletion in physical, psychological and function. Therefore, the aim of this study was to determine the prevalence of dentulism, partial edentulism and complete edentulism in Private Dental Hospital. A University set up retrospective study was conducted among subjects of complete edentulism, partial edentulism. A total of 2065 subjects participated in this study, of which 1008 were dentulous, 392 were completely edentulous and 665 were partially edentulous. The data were reviewed of 86,000 patient records between 01st June 2019 and 31st March 2020 based on data availability from Dental Information Archiving Software (DIAS). Oral examinations were done and verified intraoral photographs by another examiner. The data collection was tabulated in Microsoft Excel sheet which was imported to SPSS software Version 20. About 56.12% of males were completely edentulous in the age above 70 years and 43.88% of females were completely edentulous in the age above 50 years. Nearly, 22.11% of males were partially edentulous in the age above 60 years and 14.11% of females were partially edentulous in the age above 50 years. About 35.71% and 25.99% of the females and males were dentulous in the age above 18 years and above 50 years. A significant difference was seen between the gender and the different age groups of patients with complete edentulism (p<0.05). Hence, statistically significant. Association between the age and gender in dentulism patients shows positive significance (p<0.05). The association was found to be statistically significant between age of the patient and various classes of Kennedy's classification in patients with Partial edentulism (p<0.05).
INTRODUCTION:

Complete tooth loss or edentulism is the loss of permanent natural teeth and the treatment outcome is a multifactorial process [1]. A small number of remaining teeth and edentulism are associated with low education levels and family income [2]. Edentulism results in physical, physiological, and psychological trauma for the individual [3]. It is a risk factor for significant weight loss which is associated with systemic and chronic diseases among elderly people and important community health issues as a bigger proportion of elderly people are edentulous [4].

There is a significant effect on residual ridge resorption and [5] it occurs due to a depletion in alveolar bone height and the size of the denture bearing area. It can influence facial height and facial appearance [6]. Complete tooth loss is a community health burden and affects the quality of life in elderly population worldwide [7]. Edentulism (Complete or partial) limits dietary food, which leads to lack of confidence and confined social activities, psychological dissatisfaction [8] and affects the quality of life, socioeconomic, sociodemographic, habits and lifestyle factors influence edentulousness. According to the World Health Organization (WHO), nearly 30% elderly people over 65 year’s age, across the world have no natural teeth [9].

Partial edentulism in a dental arch occurs when one or more but not all natural teeth are missing [10]. It can cause caries decay, periodontal problems, traumatic injuries, impaction, supernumerary teeth, neoplastic and cystic lesion [11]. In addition, it leads to drifting and tilting of adjacent teeth, supra eruption of opposing teeth, altered speech, changes in facial appearance and temporomandibular disorders [11],[12].

There are various classifications for partially edentulous arches and many possible combinations of partial edentulism are more than 65,000 depending on their incidence in maxillary and mandibular arches [8]. The goal of the classification is to better communicate the combination of missing teeth to edentulous ridges among students, dental practitioners and laboratory technicians [12],[13]. Among the various classifications like Kennedy, Applegates, Avant, Neurohar, Eichner, ACP (American College of Prosthodontics). Kennedy’s classification is widely and clinically accepted by the dental professionals[14]. Oral health treatment in elderly people is not at a satisfactory level compared with developed countries. Tooth loss pattern has been assessed in many selected populations in several countries [8].

KEYWORDS: Complete edentulism; Dentulism ; Missing teeth; Partial edentulism; Prevalence

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Several studies were conducted on prevalence of edentulousness is associated with age, gender and living areas in most countries [1],[2],[15]. Previously our department has published extensive research on various aspects of prosthetic dentistry [16]-[31], this vast research is to research about the awareness of bone marrow depressors among dental students. Hence, the aim of this study was to assess the prevalence of dentulism, partial edentulism and complete edentulism in private dental hospital.

MATERIALS AND METHODS:

Study Setting

A University set up retrospective study was conducted to assess the prevalence of dentulism, complete edentulism and partial edentulism in relation to age, gender, arch who reported to Private Dental Hospital, Chennai. Before starting the study, ethical approval was obtained from the Institutional Ethical Committee, IEC approval number: SDC/SIHEC/2020/DIASDATA/0619-0320).

Study Subjects

A total of 2065 subjects participated in this study, of which 1008 were dentulous, 392 were completely edentulous and 665 were partially edentulous.

Methodology

The data were reviewed of 86,000 patient records between 01 June 2019 and 31 March 2020 based on data availability from Dental Information Archiving Software (DIAS). Oral examinations were done and verified intraoral photographs by another examiner. Informed consent was obtained from the participants.

Inclusion Criteria

Patient age between 18 and 85 years were included in this study; cases with permanent dentition, complete edentulism and partial edentulism. Subjects were randomly divided into five groups based on age for dentulism and partial edentulism, Group 1 - 18 to 29 years; Group 2 - 30 to 39 years; Group 3 - 40 to 49 years; Group 4 - 50 to 59; Group 5 - Above 60 years. For complete edentulism, Group 1 - 30 to 39 years; Group 2 - 40 to 49 years; Group 3 - 50 to 59 years; Group 4 - 60 to 69 years; Group 5 - Above 70 years.

Exclusion Criteria

Third molar and incomplete data were excluded from the study.
Statistical Analysis

The collected data were obtained and tabulated using computerized spreadsheet (Microsoft Excel sheet 2010) which was imported to SPSS Statistics software for Windows, Version 20.0. Chicago (IBM Corporation) for statistical analysis. Descriptive statistics and Chi-square test was used to determine the association between the subgroups, where p value < 0.05 is considered statistically significant with a confidence interval of 95%.

RESULTS AND DISCUSSION:

In the present study, a total of 2065 subjects, out of which 1008 were dentulous, 392 were completely edentulous and 665 were partially edentulous. Among 392 completely edentulous patients, 220 (56.12%) were males and 172 (43.88%) were females (Figure 1). We found that the prevalence of complete edentulism was high among the above 70 years of age (37.76%) and least prevalent among 30-39 years (2.81%) of age groups (Figure 2). Males were most commonly involved among the above 70 years as compared to females. The association was done using a Chi-square test which showed a significant difference between age and gender in patients with complete edentulism among all age groups and the p-value is < 0.05, thus this study is statistically significant (Figure 3). Out of 665 partially edentulous patients, 366 (55.04%) were males and 299 (44.96%) were females (Figure 4). Among the partial edentulism were more in the age group of 40 to 49 years and least among 18 to 29 years of age (Figure 5). There was an equal prevalence rate in partial edentulism both maxillary arch 332 (49.92%) and mandibular arch 333 (50.08%) (Figure 6). Class III type 334 (50.23%) was more in partial edentulism followed by Class II 124 (18.65%), class I 104 (15.64%) and class IV 103 (15.49%) (Figure 7). In this current study, out of 1008 subjects, in which 477 (47.32%) were males and 531 (52.68%) were females.

For partial edentulism and dentulism, the parameters were assessed included age groups (18-29, 30-39, 40-49, 50-59 and more than 60 years), number of patients, gender (male and female) with Kennedy’s classification, site (maxillary and mandibular arch) with Kennedy’s classification, Dentulism. Using these parameters, six comparisons were done using Chi-square tests and confessed that all the six comparisons were statistically significant (p < 0.05) (Figure 10,11,12,13 and 14).

In this present study, out of 392 subjects of completely edentulous patients were examined. Based on gender 220 (56.12%) were males and 172 (43.88%) were females. Similar findings were seen in previous studies of Kaira et al.[32], Sonkesariya et al. [15] Basnyat et al.[33], Nagaraj et al. [34], Vadavadagi et al. [35] and Saha et al.[36] where males were more common than females. In contrast, a study was done by Peltzer et al.[37][1][2][38] where females were more likely to be involved than males and their reason imputed the reality that females are always dependent upon the males to take them for treatment [39]. Complete edentulism was more in the age groups above 70 years (37.76%) and least prevalent among 30-39 years (2.81%) of age. The results of the study were similar with other
studies conducted by Al-Rafee[40] and Federal at al. [41] and different findings with the previous studies done by Douglass et al. [42], Sonkesariya et al. [15] and Peltzer et al. [37] where the prevalence of complete edentulism was more than 50 years of age. In this present study, completely edentulous male subjects were more in the age group above 70 years. Since the females were more distressed, regarding the oral hygiene and prefer conservative treatment rather than extraction [15]. The results were contradictory with the previous studies of Agarwal et al., [15],[43] Association was done using Chi square test, which showed that there is a significant difference between age and gender (p<0.05). Hence, the result was statistically significant.

Figure 1: Bar chart depicts gender wise distribution in patients with complete edentulism. X-axis denotes gender and Y-axis denotes number of patients. Among 392 subjects, 220 male patients (Brown colour) and 172 Male patients (Grey colour) were observed. Male predominance was found among partially edentulous patients.

Figure 2: Bar chart depicts age wise distribution in patients with complete edentulism. X-axis denotes age and Y-axis denotes the number of patients. The highest prevalence of complete edentulism was seen in the age group above 70 years old (purple colour, 37.78%), and least prevalence was seen in the age group among 30-39 years (Neon green, 2.81%).

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Figure 3: Bar chart depicts the association between age and gender in patients with complete edentulism. X-axis denotes the different genders of patients with different age groups and Y-axis denotes the number of patients affected by complete edentulism. In this graph, we infer that the male patients with age above 70 years old were most affected with complete edentulism with a percentage of 31.38%, meanwhile in female patients, age 50 to 59 years old were more affected. There is a significant association between the gender and the different age groups of patients with complete edentulism. Pearson’s Chi-Square test showing p-value=0.000 (p <0.05) which indicates statistically significant.

Figure 4: Bar chart depicts the distribution of gender in patients with partial edentulism. X-axis shows gender of the patients and Y-axis shows number of patients. Partial edentulism was higher in males (55.04%, Brown color) compared to females (44.96%, Grey color).
Figure 5: Bar chart depicts the age wise distribution in patients with partial edentulism. X-axis denotes the age of the patient and Y-axis denotes the number of patients affected. Prevalence of partial edentulism was highest in the age groups of 40-49 years (26.32%) (Pink colour), followed by 50-59 years (24.96%) (Red colour), above 60 years (22.11%) (Purple colour), 30-39 years (14.29%) (Sea blue colour) and 18-29 years (12.33%) (Neon green colour).

Figure 6: Bar chart depicts distribution of site (Maxillary arch and Mandibular arch) in patients with partial edentulism. X-axis denotes the site, and the Y-axis denotes the number of patients affected. From the graph it’s evident that the equivalent prevalence rate in partial edentulism is seen in both maxillary arch 332 (49.92%) (Lemon Yellow colour) and mandibular arch 333 (50.08%) (Mustard yellow colour).
Figure 7: Bar chart depicts various classes of Kennedy’s classification among partial edentulism. X-axis denotes various classes of Kennedy’s classification (Class I, Class II, Class III and Class IV), and Y-axis denotes the number of patients affected. The incidence of various patterns of partial edentulism was highest in Class III type (50.23%) (Orange colour) followed by Class II (18.65%) (Red colour), Class I (15.64%) (Blue colour) and Class IV (15.49%) (Green colour).

Figure 8: Bar chart depicts gender wise distribution in patients with Dentulism. X-axis denotes the gender of the patient; Y-axis denotes the number of patients present. From the graph it’s evident that dentulism was higher in females (52.6%, Grey) compared to males (47.3%, Brown).
Figure 9: Bar chart depicts the age wise distribution in patients with Dentulism. X-axis denotes the age of the patient, and Y-axis denotes the number of patients. From the graph it’s evident that the age group 18-29 years (Neon Green) (35.7%) was most commonly involved, followed by 50-59 years (Dark Pink) (25.9%), 30-39 years (Sea Blue) (20.5%), 40-49 years (Baby Pink) (15.1%) and least prevalent above 60 years age group (Purple) (2.58%).

Figure 10: Bar chart depicts the association between age and gender in patients with partial edentulism. X-axis denotes gender of the patient and Y-axis denotes number of patients. In this graph, we infer that the males in the age group above 60 years (Purple) are most commonly affected than females. However, there is a significant difference between age and gender. Pearson’s Chi-square test Chi-square value $p=0.000$ ($p<0.05$) which indicates statistically significant.
Figure 11: Bar chart depicts the association between age of the patient and various classes of Kennedy's classification in patients with Partial edentulism. X-axis denotes the age of the patients, and Y-axis denotes Kennedy's classification. In this graph, we infer that Kennedy's Class III was most commonly in the age group among 40-49 years (23.16%) (Orange). However, there is a significant difference between the age and various classes of Kennedy’s classification. Pearson’s Chi-square test showing p value - 0.000 (p<0.05) Hence, statistically significant.

Figure 12: Bar chart depicts the association between gender and various classes of Kennedy's classification in patients with Partial edentulism. X-axis denotes gender and the Y-axis denotes Kennedy's classification. In this graph, we infer that Kennedy's Class III was most commonly involved in males (26.32%) (Orange colour). However, there is a significant difference between the gender and various classes of Kennedy’ classification. Pearson’s Chi-square test showing p value =0.000 (p<0.005).Hence, statistically significant.
Figure 13: Bar chart depicts the association between site and Various classes of Kennedy's classification in patients with Partial edentulism. X-axis denotes the site (Maxillary arch and Mandibular arch) of the patients and Y-axis denotes Kennedy's classification was performed and the association was found to be statistically significant. In this graph, infer that Kennedy's Class III was most commonly present in the lower arch (30.08%) (Orange). However, there is a significant difference between the site and various classes of Kennedy’s classification. Pearson’s Chi-square test showing p=0.000, (p<0.05) which indicates that statistically significant.

Figure 14: Bar chart depicts the association between age and gender in patients with Dentulism. X-axis denotes age and Y-axis denotes gender of the patients. In this graph we infer that the females in the age group 18-29 years (35.71%) (Neon Green) are more commonly involved than males. However, there is a significant difference between the age and gender. Pearson’s Chi square test showing p=0.000, (p<0.05) which indicates that statistically significant.

In this study, a total of 665 subjects, of which 366 (55.04%) were males and 299 (44.96%) were females which shows that male prediction. Partial edentulism was more in the age groups among 40-49 years of age and the results of the present study is agreement with the studies of Agarwal et al., [15]
and Hama et al.,[44] The disparity of the results with the previous studies were conducted by Madhakumar et al., [45], Araby et al, [46], Akinboboye et al, [47], with the mean age of 36.5 years. The prevalence of partial edentulism was more common in both arches. Class III pattern is the most common of partial edentulism in this present study and similar study was done by Araby et al, [48]. According to the arch, the prevalence of Class III was observed more in males than females. Class III pattern of partial edentulism was more common in mandibular arch when compared to maxillary arch. The result of the present study is in agreement with the studies of Shah et al.[43] Arivan Mahmood Hama et al.,[49]. According to the age, Class III pattern was more in the age groups among 41–50 years and the results were disparity with the previous study by Prabhu et al. [39,49] Based on the genders, class III was observed more in male than females and the similar findings was seen by Prabhu et al.,[39] wherein Kennedy’s Class III type was more prevalent in males. In contrast, study was done by Rana B et al., [50]. Nearly, 22.11% of males were partially edentulous in the age above 60 years and 14.11% of females were partially edentulous in the age above 50 years which shows a significant difference both age and genders with partial edentulism (p<0.05). In contrast, study was done by Agarwal et al., [15] However, few studies were conducted by Shah et al. [51],[35] which show that there is also significant association between gender and partial edentulism of Kennedy's classification.

In this current study, among 1008 subjects of dentulism, 531(52.68%) were females and 477 (47.32%) were males. More females were dentulism when compared to males. Dentulism were more in the age groups among 18-29 years and least among above 60 years of age. Association was done for dentulism which shows that there is a significant difference between age and gender (p<0.05). Hence, indicates statistically significant. In contrast, study was conducted by Agarwal et al.,[15] where there is no significant difference between the age and gender (p>0.05).

Limitations of this study, it is an institution based set-up, single centered study and not indicative of state population. Therefore, further studies need to be conducted about the etiology of edentulism, socioeconomic status, nutritional status and sociodemographic factors which explore in multicentre aspects in larger populations.

CONCLUSION:
This study can be concluded that complete edentulism was more common among the age group above 70 years with male prediction. For partial edentulism, males and females were partially edentulous in the age above 60 years and above 50 years respectively. Similarly, Class III was the most common type of Kennedy’s classification and more common in the age above 40 years which indicates with male predilection. Kennedy’s Class III pattern of partial edentulism was more common in mandibular arch than maxillary arch. Dentulism was highly prevalent in the age group above 18 years with female predilection. Furthermore, necessary steps have to be taken to provide dental health education, rehabilitation and preventive treatment in all urban and rural areas. Dental health care services pay more attention to those who suffer from socio economic and geographical restrictions. For elderly people,dental health services need to improve access to oral health care in developing countries and
awareness regarding proper dental hygiene and timely replacement of the missing teeth needs to be emphasized among the community.

AUTHOR CONTRIBUTION:

Author 1 (Meera Theenathayalan) carried out the study by collecting data and drafted the manuscript after performing the necessary statistical analysis. Author 2 (Dr. Kiran Kumar Pandurangan) aided in conception of the topic, has participated in the study design, statistical analysis and has supervised in preparation of the manuscript. Author 3 (Dr. Deepak) has coordinated in reviewing the manuscript. All the authors have discussed the results among themselves and contributed to the final manuscript.

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Figure 1: Bar chart depicts gender-wise distribution in patients with complete edentulism.
Figure 2: Bar chart depicts age-wise distribution in patients with complete edentulism.
Figure 3: Bar chart depicts the association between age and gender in patients with complete edentulism.
Figure 4: Bar chart depicts gender-wise distribution in patients with partial edentulism.
Figure 5: Bar chart depicts age distribution in patients with partial edentulism.
Figure 6: Bar chart depicts site distribution in patients with partial edentulism.
Figure 7: Bar chart depicts various classes of Kennedy’s classification among partial edentulism.
Figure 8: Bar chart depicts gender-wise distribution in patients with Dentulism.
Figure 9: Bar chart depicts age-wise distribution in patients with Dentulism.
Figure 10: Bar chart depicts the association between age and gender in patients with Partial edentulism.
Figure 11: Bar chart depicts the association between age of the patient and various classes of Kennedy's classification in patients with Partial edentulism.
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