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THE INCIDENCE OF PARTIAL EDENTULISM AND DENTURE STATUS AMONG MONGOLIANS

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Abstract

Introduction: Since 2013, the prevalence of tooth loss among adults in rural areas has not been studied in Mongolia. Therefore, our goal of the survey was to determine the level of tooth loss and denture needs among the population of Mongolia's. **Materials and Methods:** According to the geographical region of Mongolia, 1638 subjects over 18 years old were examined from target provinces and their partial edentulous status and denture status were determined. **Results:** The prevalence of partial edentulous level in total subjects was 1478 (90.2%), and partial edentulous level was high (93.5%) in over < 45 year-olds. The incidence of Kennedy's class in both arches was 880 (36.0%), Class III was 853 (34.8%), and Class II was 675 (27.6%), respectively. Class IV was lower at 40 (1.6%) in both dental arches (P< 0.01). Evaluating denture status in people: 435 (67.8%) have acrylic dentures and 171 (26.6%) have flexible dentures. The number of subjects who needed prosthetic treatment was 861 (57.3%). **Conclusion:** The level and pattern of partial edentulism among adults Mongolia were high, and the level and pattern of tooth loss were significantly associated with age groups. Prosthetic needs among rural people are high, and all these findings are also being considered in oral health promotion strategies designed to reduce tooth loss in Mongolia's adults.

Keywords: Tooth Mortality, Prosthodontic Treatment, Kennedys Classification, Tooth Loss Level, Partial Edentulism.

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INTRODUCTION

The World Health Organization has defined that oral health plays an important role in human health (1979) and in 1981, 2003, created recommendations to reduce oral diseases[1].

The absence of 1-13 teeth in the dental arch is referred to as a partial edentulism. Tooth loss causes temporomandibular disorders, loss of facial esthetics, reduces chewing, speaking, and intelligence quotient[2]. According to a study conducted in Mongolia (Selee.D, 1967), it was reported that the number of lost teeth increases with age[3]. According to studies conducted by Bataa.D, Purevjav.N, (1996), tooth loss in adults aged 30-39 were 28.5%, and in 40-49 year olds were 23%[4] . The Mongolian section of the IADR (MSIADR) conducted a national oral health survey in 2013, reported that the prevalence of tooth loss in 18 year olds were 24.8%, in 35-44 year olds were 93.5%, and in 65–74 years old people were 98% respectively[5].

The level of tooth loss in urban adults aged 35–44-year-old people (Bayasgalan.B, 2015) with 4-6 missing teeth were higher 36.8%, compared to those with a low or high level of lost teeth[6]. The prevalence of tooth loss status within patients visited at the University dental hospital were 89.7% (2019)[7]. In 2021, the prevalence of tooth loss among 18 to 65-year-old people in 8 rural provinces and 6 urban districts were 79.7%[8]. In other countries, tooth loss status in adults has been reported as follows: in the UK (2009), 94.4%; in China (2013), 80.72%; in India (2014), 76.12%; in USA (2016), 50.39%; and among elderly people in Brazil (2019) were 98.3%, among Indian adults (2021) had a tooth loss rate of 60.5%, 35-65 year olds had a rate of 51.6%, and over-65 year olds had a rate of 67.9% respectively[9-14]. The American Dental Association declares that the incidence of tooth loss increases with age[15]. Despite the rapid development of dental treatment services, tooth loss continues to be a major global health issue. Since 2013, the prevalence of tooth loss among adults in rural areas have not been studied in Mongolia. Therefore, our goal of the survey was to determine the tooth loss level and denture needs among the population of Mongolia's.

Purpose of the Study

To determine partial edentulous status and denture needs among population in of Mongolia.

Study Objectives

I. To determine the prevalence and tooth loss level by age group.

II. To determine pattern of partial edentulism by Kennedys classification by age group.

III. To determine denture wear status and denture needs among people.

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MATERIALS AND METHODS

According to the geographical region of Mongolia, the population over 18 year olds were examined from target rural and urban examined partial edentulous status in the maxillary and mandibular dental arches, and denture status was determined.

1. Study design

A descriptive cross-sectional study was carried out in 1638 dental charts which noted an examination of partial edentulous status of adults.

Objective Methods

1. Examination of partial edentulous status in the maxillary and mandibular dental arch

The tooth loss level was examined according to classification as follows:

0- No tooth loss

1- Low 1-3 lost teeth

2- Moderate 4-6 lost teeth

3- High 7-13 lost teeth

4- Edentulous

Pattern of Kennedys class was examined according to classification as follows:

5- Kennedy 1- Bilaterally located edentulous spaces

6- Kennedy 2- A unilateral edentulous area located posterior to the remaining natural teeth.

7- Kennedy 3- A unilateral edentulous area with natural teeth both anterior and posterior to the area.

8- Kennedy 4- A single but bilateral (crossing the midline) edentulous area located to the anterior of the remaining natural teeth.

Statistical Analysis

Data from dental charts was coded and database was created in Microsoft Office Excel program. Statistical analysis processed using SPSS 25.0 program. Descriptive quantitative analysis was applied for the statistical evaluation of the actual number, percentage, standard deviation, and mean values. Significant differences less than 0.05 level were considered statistically significant.

RESULTS

In the present study, a total of 1638 people were examined in the 951 (58.1%) were female, 687 (41.9%) were men (Table 1). Total category results showed no statistically significant difference ($P<0.65$).

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Table 1: Persons Participating In the Survey

			Gender		Total	P
			Male	Female		
Age groups	18-34	n	230	324	554	
		%	41.5	58.5	33.9	
	35-44	n	192	257	449	0.65
		%	42.8	57.2	27.4	
	45-74	n	265	370	635	
		%	41.8	58.2	38.7	
Total		n	687	951	1638	
		%	41.9	58.1	100	

The prevalence of partial edentulousness in total subjects was 1478 (90.2%), 1.6% were completely edentulous, and 135 (8.2%) had no tooth loss (Table 2). The partial edentulous level was high (93.5%) in 45-74 year-olds. Subjects with no teeth lost were 135 (8.2%) especially in adults aged 18-34. However, the complete edentulous level in subjects was indicated as higher in 45-74 ages (Table 2).

Table 2: Tooth Loss Status in Age Groups

			Tooth loss status			P
			No teeth lost	Partially edentulous	Completely edentulous	
Age groups	18-34	n	89	465	0	
		%	16.0	84.0	0	
	35-44	n	30	419	0	0.0001
		%	6.7	93.3	0	
	45-74	n	16	594	25	
		%	2.5	93.5	4.0	
Total		n	135	1478	25	
		%	8.2	90.2	4.0	

The low level of tooth loss in the maxillary arch was 54.3%, the moderate level was 26.0%, and the high level was 19.7% respectively. The low level of tooth loss in the mandibular arch was 55.4%, the moderate level was 30.0%, and the high level was 14.6% respectively (Table 3). Total category results showed no statistically significant difference (P<0.01).

Table 3: Level of Tooth Loss in Arches

Tooth loss level	Maxillary arch		Mandibular arch		Total		P
	n	%	n	%	n	%	
Low (1-3 lost teeth)	610	54.3	758	55.4	1368	55.0	
Moderate (4-6 lost teeth)	292	26.0	410	30.0	702	28.1	0.002
High (7-13 lost teeth)	220	19.7	201	14.6	421	16.9	
Total	1122	100	1369	100	2491	100	

Kennedy's classes in the maxillary arch: Class III was the highest (382), the Class III was 344, and Class I was 335 respectively. Class IV is lower (Table 4). The age group

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distribution of Kennedy's classes was different; in the 45-80 age group, it was higher (534), which Class I and II represented as higher, and in the 18-34 age group, it was lower (69). Total category results showed no statistically significant difference (P<0.01).

Table 4: The Age Group Distribution of Various Kennedys Classes in the Maxillary Arch

Kennedys class	Group 18-34 n (%)	Group 35-44 n (%)	Group 45-80 n (%)	Total n (%)	P
Class I	43(17.0)	56(18.4)	236(44.2)	335(30.7)	
Class II	68(26.9)	107(35.0)	169(31.6)	344(31.5)	
Class III	133(52.7)	131(43.0)	118(22.0)	382(35.0)	0.01
Class IV	9(3.4)	11(3.6)	11(2.2)	31(2.8)	
Total	253(100)	305(100)	534(100)	1092(100)	

Kennedy's classes in the mandibular arch Class I were the highest, at 545, and Class IV was lowest. The age group distribution in Kennedy's classes was different; in the 45-80 age group, Class I was highest (575) (Table 5). The total category results showed a statistically highly significant difference (P=0.0001).

Table 5: The Age Group Distribution of Various Kennedys Classes in the Mandibular Arch

Kennedys class	Group 18-34 n (%)	Group 35-44 n (%)	Group 45-80 n (%)	Total n (%)	P
Class I	87(21.6)	106(28.0)	352(61.2)	545(40.2)	
Class II	121(30.0)	106(28.0)	104(18.0)	331(24.4)	0.0001
Class III	192(47.7)	163(43.1)	116(20.2)	471(34.8)	
Class IV	3(0.7)	3(0.9)	3(0.6)	9(0.6)	
Total	403(100)	378(100)	575(100)	1356(100)	

The incidence of Kennedy's classification in both arches was 880 (36.0%), Class III was 853 (34.8%), and Class II was 675 (27.6%), respectively. Class IV was lower at 40 (1.6%) in both dental arches (Table 6). The total category results showed a statistically highly significant difference (P=0.0001).

Table 6: Incidence of Kennedys Classifications in the Maxillary and Mandibular Arches

Kennedys class	Maxillary arch		Mandibular arch		Total		P value
	n	%	n	%	n	%	
Class I	335	30.7	545	40.2	880	38.20	
Class II	344	31.5	331	24.4	675	28.61	0.0001
Class III	382	35.0	471	34.8	853	31.81	
Class IV	31	2.8	9	0.6	40	1.6	
Total	1092	100	1356	100	2448	100	

Evaluating denture status in people: 435 (67.8%) have acrylic dentures, and 171 (26.6%) have flexible dentures, and 18 have fixed dentures (Table 7). The number of subjects who needed prosthetic treatment was 861 (57.3%).

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Table 7: Denture Status and Needs among Study Population with Partial Edentulism

		Prosthodontic treatment needed	Wearing acrylic dentures	Wearing flexible dentures	Wearing cast metal dentures	Bridge	Implant	Total	P
PE	n	861	435	171	18	14	4	1503	
	%	57.3	67.8	26.6	2.8	2.2	0.6	100	0.01

DISCUSSION

In the present study, the prevalence of partial edentulous level in total subjects was 1478 (90.2%), 1.6% had completely edentulous, and 135 (8.2%) had no tooth loss, which is similar to previous other results. Present results may have related with other conditions: reasons for loss of teeth, lifestyle patterns of ethnic groups, lack of oral health education and lack of availability of dental services etc. The prevalence of tooth loss, which was conducted in the national survey of Mongolia (MSIADR, 2013), in 35-44 year olds were 93.5%, in 65-74 year olds were 98%, in urban people were 92.8% (2015), and in 2019 were 89.7%, in 18-65 year olds were 79.7% (2021) respectively[5-8]. These results may have related with other conditions: reasons for loss of teeth, lifestyle patterns of ethnic groups, lack of oral health education and lack of availability of dental services etc. In other countries, tooth loss in adults has been reported in the UK (2009), 94.4%[9]; 57.9% in Greece (2009)[16]; in China (2013), 80.72%[10]; in India (2014), 76.12%[19]; in USA (2016), 50.39%[12]; and among elderly people of Brazil (2019) were 98.3%[20]; 78.26% in Nepal (2018)[17] , 69% in Saudi Arabia (2019)[18], which were indicated as similar to our present study. Despite the rapid development of dental treatment services, tooth loss continues to be a major global health issue. A total of 1638 adults participated in the study, 58.1% were female, 41.9% were men. According to a study conducted in Hungary in 2008, the incidence of tooth loss is higher in woman than in men[21].

The level of tooth loss of people shows the low level was 55.0% (1-3 lost teeth), which is higher than the moderate level, which was 28.1% (4-6 lost teeth) and the higher level was 16.9% (7-13 lost teeth), respectively. Thus, the moderate level of tooth loss in urban people was 40.57% (Bataa.D, *et.al.* 1996), 36.8% (Bayasgalan.B, *et.al.* 2015), the lower level was 52.6% (Javkhlan.P, *et.al.* 2019), which was indicated as higher. Therefore, the low level of tooth loss was higher among rural and urban adult people than rural people in the present study. The levels of edentulous status may depend on the socio-economic status of the country, the availability of dental care services, insufficient dental care practices, lifestyle, lack of oral health knowledge, and the implementation of dental prevention programs, etc.

The findings of the present study showed that Kennedy class I was 36.0%, Class II was 27.6%, Class III was 34.8%, Class IV was 1.6% in both dental arches. Previous (2019) studies reported that Kennedy Class I was 38%, Class II was 26.8%, Class III was 18%, Class IV was 17.2% in urban adults, which was similar to Class I and II[7]. In the age group

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of 35-44, 31.65% were Class I, 31.11% were Class II, 34.92% were Class III, 4.59% were Class IV. In a similar study done in Mongolia, 25% of urban people had Class I, Class II was 33%, Class III was 28%, Class IV was 14% (P.Javkhlan *et.al.* 2019); B.Bayasgalan *et.al.* Reported that Class I was 19.6%, Class II was 8.2%, Class III was 65.2%, Class IV was 7%, respectively[6,7]. All results showed the most common class being Class III and the rarest class being Class IV. In another study conducted in India, 72% of 35-44 age group subjects had Class III, which was reported to be the most common pattern, whereas Class I, II, IV were 28%[22]. Similar results reported that in Saudi Arabia, 56.5% of 21-30 years old people had Class III, and the tendency of Class I increases with age. This study results were similar to the present study and showed Class I pattern was significantly associated with 45-80 years 61.2%, Class III was associated with people aged 18-34 years, which is similar to other studies above[23,24].

Prosthetic denture is one of the rehabilitation methods which is distributed in oral physiological function. The present study showed 57.3% of 1503 subjects needed prosthetic dentures, 42.7% of people wearing a removable denture (97.2%), and 2.8% of people wearing fixed dentures. The distribution of different types of prosthesis shows that acrylic denture (67.8%) flexible denture (26.6%), was in a higher percentage than removable cast dentures (2.8%), bridges (2.2%) and implants (0.6%). B.Bayasgalan et.al. (2015) reported that 40% of partial edentulous subjects needed prosthesis, whereas acrylic denture was 95%, removable cast denture was 2.2% and fixed was 4.4%6. In another study conducted in Mongolia (2019), it showed that an acrylic denture was worn 41.7%, flexible dentures were 13.2%, removable cast dentures were 19.5%, bridges were 5.2% and implants were 3.1%7. These similar results show that subjects with removable acrylic dentures had a higher percentage of any type of prosthesis and were not significantly associated with urban and rural people. Despite the rapid development of dental treatment services, tooth loss continues to be a major global health issue. Among Lebanon (1996) people aged 35-44 years old, 24% had worn a bridge, 16% had RPDs; in Russia (2009) 95% had acrylic dentures; in Serbia (2015) 60% of edentulous subjects were needed prosthesis and 90% had RPDs[25-27]. According to a study conducted in India, 17.6% of adults aged 35-44 years olds had dentures, and prosthesis needed subjects were 30%[19]. These results suggest that it might depend on family income related to the impact on OHRQoL of countries is similar. Therefore, a high incidence of dental status requires immediate preventive measures with a simple and inexpensive budget to provide preventive and dental services to promote oral health education and to educate about proper tooth brushing in rural areas.

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CONCLUSION

In conclusion, partial edentulism among adults of Mongolia was high, and the level and pattern of tooth loss were significantly associated with age groups. The lowest percentage was among 18-34-year-olds, continuously increasing by age group, whereas the highest percentage was among 45-80-year-olds. Prosthetic needs among rural people are high, and all these findings are also being considered in oral health promotion strategies designed to reduce tooth loss in Mongolia's.

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