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ORIGINAL RESEARCH

Common Reasons for Permanent Tooth Extraction and Its Correlation with Demographical Factors in Kabul, Afghanistan

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Objective: The aim of this survey was to investigate the main reasons for extraction of permanent teeth, and its correlation with age, gender, education level, smoking habits, and time of last dental visit, family income, and professions in Kabul, Afghanistan.

Subjects and Methods: The study proposal was approved by Research Ethics Committee of Khatam AL Nabieen and was conducted over a period of 5 months; its population consisted 594 patients, aged 10–70 years, who underwent extraction. The frequency distribution was calculated using X^2 test, ANOVA and *t*-test for differences in mean number of patients.

Results: A total of 594 patients underwent extraction. The highest rate (53.8%) of extraction occurred for those 21–40 years old. Females compromised 51.3% of patients. Two hundred (33.6%) patients were uneducated. Tooth loss due to caries was 30.1%; patient-request was 18.3%; impacted teeth was 14.4%. Other causes were periodontal reasons, failed root canal therapy (RCT), Tooth mobility, and Root fractures.

Conclusion: The result of this survey indicated that caries, patient request, and impaction were the leading reasons for tooth extraction. The majority of patients were uneducated, and had insufficient family income. Most of the patients were housewives and laborers.

Keywords: Tooth Extraction, Dental Caries, Periodontal Disease

Introduction

Tooth loss remains the foremost problematic dental issue universally.[1] Previous studies regarding teeth extraction have been conducted in various regions and concluded that caries, periodontal disease, trauma, orthodontic and prosthodontic treatments, endodontic treatment complications, root fracture and malposition are the main reasons for tooth loss.[2–7]

Numerous studies have shown that tooth decay and periodontal disease were the most common reasons for teeth extraction.[7–11] Generally, the majority of the studies revealed that dental caries was the primary reason for tooth loss among 20 to 60-year-old patients. Moreover, periodontal disease was the main reason for tooth loss among patients in their late 40s and older as there was a correlation between age and periodontal disease. On the other hand, root canal treatment complications and orthodontic treatment were observed as the major reasons for tooth extraction among adolescent patients.[12–14]

Some studies have concluded that there is an association between tooth loss and gender, where women lose more teeth due to tooth decay while men had more teeth loss due to periodontal disease.[12–14] Other reasons such as previous prosthetics and esthetic reasons, root fracture, and tooth malposition were found to have less effect on tooth loss.[2–6]

Only a few studies investigated the reasons for tooth extraction in Afghanistan. The study which is conducted by Safari S et al in the west of Kabul indicated that periodontal disease and caries were the principal reasons for tooth extraction.[15] Similarly the study of Da'ameh D which was conducted in the north of Afghanistan reflected the extent and severity of caries and periodontal disease as the most common reasons for tooth loss.[16] Therefore, this study aimed to explore the reasons for tooth extraction and investigate the correlation between tooth loss and several variables including age, gender, education level, family income, and smoking habit.

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Materials and Methods

The study protocol conforms to The Code of Ethics of World Medical Association (Declaration of Helsinki) for studies involving humans. The study proposal was approved by Research Ethics Committee of Khatam AL Nabieen. Participants in the research study signed an informed consent form prior to their participation. For patients under the age of 18, the parent or legal guardian of the patients provided their informed consent.

The present study was conducted in the National Curative and Specialized Stomatology Hospital in Kabul, Afghanistan. The selection of this hospital was based on its location, and the number of patients who could be recruited into the study. Moreover, the patients of this hospital come from different provinces of Afghanistan seeking free dental treatment services.

Dentists who were in-charge in Out Patient Department in the hospital cooperated in data collection. Patients aged between 10–70 years with tooth problems, after physical examination in the OPD and with final decision of tooth extraction as their treatment plan, were included in this study. Then, data were collected from each patient including age, gender, education level, tooth extracted, reason of extraction, level of family income, profession, smoking habit, time of last dental visit, and previous extraction. The diagnosis by the in-charge dentist in the OPD was considered as the reason for tooth extraction. Data were collected over a 5-month period (July – December 2022).

The inclusion criteria was those patient who were above 10 years old and can provide informed consent to participate in the study, with final management of tooth extraction.

The collected data were entered into SPSS (version 25) software. The relationships of the categorical background variables, such as age range, gender and education level, family income, profession, smoking habit, and time of last dental visit with reasons for tooth extraction were analyzed by the X2 test, while differences in the mean number of patients were analyzed with ANOVA and *t*-test methods. A p-value of less than 0.05 was considered to be statistically significant.

Findings

A total of 594 patients were included in the study. Females had more teeth extracted (51.3%) than men ($p > 0.05$). According to Table 1, the average number of patients who had teeth extracted during the survey was 5.54 ± 1.87 (5.41 males and 5.68 females). In total, patients from 21 to 30 of age lost 8.08 teeth, more than all other groups, as measured by the mean number of patients ($p < 0.05$). The highest rate of extraction during the survey were among patients from 21–30 (6.41 teeth). Moreover, under-graduated patients had lost 8.18 teeth in total, which is significantly higher than in other groups ($p < 0.05$). Besides, patients with an insufficient family-income had more teeth extracted (74.2%) than those who had adequate earnings ($p > 0.05$). Although non-smoker patients had more extracted teeth (67%) than smokers, it was not significant statistically ($p > 0.05$). Overall, patients who had never or not more than a year visited dentists had tooth loss more (7.27 ± 2.46 and 7.14 ± 2.35 teeth, respectively) than the other group, as measured by mean number ($p > 0.05$). Altogether, teachers lost 7.88 teeth more than all other professional groups ($p < 0.05$).

Dental caries was responsible for 30.1% of all extractions, while patient-request accounted for 18.3%. Nevertheless, Dental caries was responsible for most extractions in both genders, impacted teeth were more prevalent among males than females. Moreover, patient request and tooth mobility were the main causes of tooth extraction among females. While caries was the leading cause of tooth extraction among patients from 10 to 20 years and 31 to 50 of age, impacted tooth and tooth mobility were the common reasons for tooth loss in patients from 21 to 30 and above 60 years of age, respectively (Table 2). The common reason for tooth extraction among uneducated patients was patient request. On the other hand, Patients having high school diplomas and school students had lost more teeth due to caries compared with patients having a higher level of education but this was not significant statistically ($p > 0.05$). However, dental caries was the main cause for most tooth loss in both groups who thought to have sufficient family income and insufficient income, impacted tooth and tooth mobility were common among those who had insufficient family income ($p < 0.05$). Even so, dental caries was the principal reason for tooth loss among smokers and non-smokers, periodontal reasons were more prevalent among smokers than non-smokers ($p < 0.05$). Also, dental caries was the most prevalent cause of tooth loss among patients based on last time dental visit, but impacted tooth, periodontal reasons, failed RCT and tooth mobility

Table 1 Mean Number of Patients

	Extraction on the During the Survey	Previous Extracted	Total
Gender[a]			
Male (289)	5.41 ± 1.95	1.53 ± 0.50	6.94 ± 2.45
Female (305)	5.68 ± 1.80	1.48 ± 0.50	7.16 ± 2.30
Age in group[b]			
10–20 (n = 97)	4.78 ± 1.88	1.98 ± 0.43	6.76 ± 2.31
21–30 (n = 165)	6.41 ± 1.95	1.67 ± 0.47	8.08 ± 2.42
31–40 (n = 155)	5.68 ± 1.60	1.30 ± 0.46	6.98 ± 2.06
41–50 (n = 73)	5.55 ± 1.53	1.30 ± 0.46	6.85 ± 1.99
51–60 (n = 51)	4.84 ± 1.85	1.33 ± 0.47	6.17 ± 2.32
61–70 (n = 53)	4.58 ± 1.85	1.11 ± 0.32	5.69 ± 2.17
Education[b]			
Uneducated (n = 200)	5.36 ± 1.73	1.29 ± 0.45	6.65 ± 2.16
School student (n = 69)	4.17 ± 1.23	1.99 ± 0.12	6.16 ± 1.35
High school diploma (n = 136)	5.69 ± 1.61	1.35 ± 0.47	7.04 ± 2.09
Undergraduate (n = 80)	6.27 ± 2.22	1.91 ± 0.28	8.19 ± 2.50
Graduated (n = 109)	6.06 ± 2.04	1.48 ± 0.50	7.54 ± 2.54
Family income[a]			
Sufficient (n = 67)	5.66 ± 1.99	1.56 ± 0.50	7.22 ± 2.48
Insufficient (n = 229)	5.51 ± 1.84	1.48 ± 0.50	6.99 ± 2.34
Smoking[a]			
Yes (n = 220)	5.60 ± 1.91	1.56 ± 0.50	7.16 ± 2.41
No (n = 374)	5.52 ± 1.86	1.48 ± 0.50	7.04 ± 2.36
Time of last dental visit[b*]			
6 month - 1 year (n = 351)	5.46 ± 1.89	1.51 ± 0.50	6.97 ± 2.39
More than one year (n = 206)	5.65 ± 1.84	1.49 ± 0.50	7.14 ± 2.35
Never before (n = 37)	5.81 ± 1.95	1.46 ± 0.50	7.27 ± 2.46
Profession[b]			
Housewife (n = 167)	5.63 ± 1.67	1.28 ± 0.44	6.91 ± 2.18
Labor (n = 129)	5.50 ± 1.87	1.46 ± 0.50	6.96 ± 2.37
Student (n = 113)	5.11 ± 1.94	1.89 ± 0.30	7.0 ± 2.25
Teacher (n = 76)	6.22 ± 2.11	1.66 ± 0.47	7.88 ± 2.59
Other (n = 109)	5.47 ± 1.88	1.39 ± 0.48	6.86 ± 2.34
Total (594)	**5.5 ± 1.8**	**1.5 ± 0.5**	**7.0 ± 2.3**

Notes: [a]*t* test: $p > 0.05$ [b]ANOVA: $p < 0.05$ [b*]ANOVA: $p > 0.05$.

were more frequent among patients whose last time dental visit was more than a year ago than others ($p > 0.05$). After all, the major reason for tooth loss among teachers was impacted teeth, but caries caused patient tooth extraction in all professions ($p < 0.05$).

The most frequently extracted teeth were first and second molars (109, 18.3%), followed by upper first and second molars (106, 17.8%), while lower incisors and canine were least frequently extracted (16, 2.6%). Impaction was the main cause of the loss of upper and lower third molars (Table 3). Premolars of both jaws were the most frequently extracted teeth due to dental caries. Additionally, periodontal disease was the main cause of the loss of all incisors and canines ($p < 0.05$).

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Table 2 Reasons for Tooth Extraction by Age, Gender, Education Level, Family Income, Smoke, Time of Last Dental Visit and Profession

	Caries	Patient Request[c]	IMPACTED TOOTH	Periodontal Reasons	Failed RCT	Tooth Mobility	Root Fracture	Other[b]	total
Gender									
Male	88 (30.4)	50 (17.3)	44 (15.2)	24 (8.3)	19 (6.6)	16 (5.5)	18 (6.2)	30 (10.4)	289 (100)
Female	91 (29.8)	29 (19.3)	42 (13.8)	25 (8.2)	19 (6.6)	21 (6.9)	19 (6.2)	29 (9.5)	305 (100)
Age group[a*]									
10–20	54 (55.7)	4 (4.1)	14 (14.4)	21 (21.6)	2 (2.1)	0	0	2 (2.1)	97 (100)
21–30	25 (15.2)	26 (15.8)	59 (35.8)	18 (10.9)	14 (8.5)	1 (0.6)	13 (7.9)	9 (5.5)	165 (100)
31–40	49 (31.6)	43 (27.7)	13 (8.4)	5 (3.2)	14 (9.0)	1 (0.6)	15 (9.7)	15 (9.7)	155 (100)
41–50	26 (35.6)	21 (28.8)	0	3 (4.1)	8 (11.0)	4 (5.5)	5 (6.8)	6 (8.2)	73 (100)
51–60	12 (23.5)	10 (19.6)	0	0	0	13 (25.5)	1 (2.0)	15 (29.4)	51 (100)
61–70	13 (24.5)	5 (9.4)	0	2 (3.8)	0	18 (34.0)	3 (5.7)	12 (22.6)	53 (100)
Education level[a*]									
Uneducated	47 (23.5)	53 (26.5)	11 (5.5)	9 (4.5)	15 (7.5)	28 (14.0)	9 (4.5)	28 (14.0)	200 (100)
School student	52 (75.4)	3 (4.3)	1 (1.4)	11 (15.9)	1 (1.4)	0	0	1 (1.4)	69 (100)
High school diploma	44 (32.4)	27 (19.9)	8 (5.9)	6 (4.4)	9 (6.6)	7 (5.1)	15 (11.0)	20 (14.7)	136 (100)
Undergraduate	9 (11.3)	5 (6.3)	34 (42.5)	21 (26.3)	6 (7.5)	1 (1.3)	3 (3.8)	1 (1.3)	80 (100)
Graduated	27 (24.8)	21 (19.3)	32 (29.4)	2 (1.8)	7 (6.4)	1 (0.9)	10 (9.2)	9 (8.3)	109 (100)
Family income[a]									
Sufficient	48 (31.4)	22 (14.4)	29 (19)	15 (9.8)	12 (7.8)	4 (2.6)	8 (5.2)	15 (9.8)	153 (100)
Insufficient	131 (29.7)	87 (19.7)	57 (12.9)	34 (7.7)	26 (5.9)	33 (7.5)	29 (6.6)	44 (10)	441 (100)
Smoke[a]									
Yes	56 (25.5)	43 (19.5)	35(15.9)	13 (5.9)	16 (7.3)	13 (5.9)	17(7.7)	27 (12.3)	220 (100)
No	123 (32.9)	66 (17.6)	51 (13.6)	36 (9.6)	22 (5.9)	24 (6.4)	20 (5.3)	32 (8.6)	374 (100)
Time of last dental visit[a*]									
< 6 months	105 (29.9)	66 (18.8)	51 (14.5)	34 (9.7)	17 (4.8)	25 (7.1)	16 (4.6)	37 (10.5)	351 (100)
6–12 months	67 (32.5)	36 (17.5)	28 (13.6)	13 (6.3)	17 (8.3)	9 (4.4)	20 (9.7)	16 (7.8)	206 (100)
More than a year	7 (18.9)	7 (18.9)	7 (18.9)	2 (5.4)	4 (10.8)	3 (8.1)	1 (2.7)	6 (16.2)	37 (100)
Profession[a]									
Housewife	43 (25.7)	42 (25.1)	8 (4.8)	7 (4.2)	10 (6.0)	21 (12.6)	14 (8.4)	22 (13.2)	167 (100)
Labor	33 (25.6)	26 (20.2)	16 (12.4)	15 (11.6)	9 (7.0)	8 (6.2)	7 (5.4)	15 (11.6)	129 (100)
Student	59 (52.2)	8 (7.1)	18 (15.9)	14 (12.4)	7 (6.2)	0 (0)	5 (4.4)	2 (1.8)	113 (100)
Teacher	12 (15.8)	15 (19.7)	31 (40.8)	9 (11.8)	2 (2.6)	0 (0)	2 (2.6)	5 (6.6)	76 (100)
Other[d]	32 (29.4)	18 (16.5)	13 (11.9)	4 (3.7)	10 (9.2)	8 (7.3)	9 (8.3)	15 (13.8)	109 (100)
Total	**179 (30.1)**	**109 (18.3)**	**86 (14.4)**	**49 (8.2)**	**38 (6.3)**	**37 (6.2)**	**37 (6.2)**	**59 (9.9)**	**594 (100)**

Notes: Figures are numbers with percentages in parentheses. [a]X^2 test: $p < 0.05$. [a*]X^2 test: $p > 0.05$. [b]other reasons include: periapical abscess, failed RCT, preprosthetic surgery. [c]patient request includes treatable teeth which were diagnosed as chronic hyperplastic pulpitis, irreversible pulpitis, and pulp necrosis. [d]other professions include: unemployed, driver, police, mechanic, employee, cook, engineer.

Table 3 Reasons for Extraction by Tooth Type, Number (%)

Tooth Type	Caries	Patient Request	Impacted Teeth	Periodontal Reasons	Failed RCT	Tooth Mobility	Root Fracture	Other
Upper jaw								
Incisors (n = 26)	9[5]	3 (2.8)	0	6 (12.2)	0	7 (18.9)	0	1 (1.7)
Canines (n = 35)	11 (6.10)	2 (1.8)	6[7]	6 (12.2)	0	3 (8.1)	1 (2.7)	6 (10.2)
Premolars (n = 97)	45 (25.2)	21 (19.2)	0	7 (14.2)	8 (21.1)	4 (10.8)	5 (13.5)	7 (11.9)
First and second molars (n = 106)	23 (12.8)	32 (29.3)	1 (1.2)	5 (10.2)	15 (39.5)	7 (18.9)	5 (13.5)	18 (30.5)
Third molar (n = 44)	7 (3.9)	3 (2.8)	25 (29.1)	9 (18.4)	0	0	0	0
Lower jaw								
Incisors (n = 16)	8 (4.5)	0	0	4 (8.1)	0	3 (8.1)	0	1 (1.7)
Canines (n = 16)	7 (3.9)	0	0	3 (6.1)	2 (5.3)	1 (2.7)	0	3 (5.1)
Premolars (n = 74)	35 (19.9)	11 (10.1)	1 (1.2)	3 (6.1)	7 (18.5)	5 (13.5)	8 (21.6)	4 (6.8)
First and second molar (n = 109)	23 (12.9)	35 (32.1)	1 (1.2)	4 (8.1)	6 (15.8)	7 (18.9)	14 (37.8)	19 (32.2)
Third molar (n = 71)	11 (6.1)	2 (1.8)	52 (60.5)	2 (4.1)	0	0	4 (10.8)	0
Total (n = 594)	179 (100)	109 (100)	86 (100)	49 (100)	38 (100)	37 (100)	37 (100)	59 (100)

Note: Figures are numbers with percentages in parentheses.

Discussion

The results of this survey indicated that in Kabul, Afghanistan, dental caries were the leading reason for extraction. Patient-request was the next most common reason. The finding that caries was the most common cause is consistent with the majority of similar studies.[6,7,16–20] Surveys in Japan,[21] Italy,[22] and Singapore[23] indicated that both caries and periodontal disease were almost equally important reasons for tooth loss. Studies in Canada,[13,24] Jordan,[25] and west of Kabul[15] showed that the main cause of tooth loss was periodontal disease. West Kabul[15] had a lower percentage of dental caries compared to our study and the earlier study.[16] This difference may be attributed to diet, and socio-economic factors because the study in the west of Kabul was conducted in private clinics and the present study and the study in north Afghanistan were conducted in a governmental sector where people seek free dental treatment services.

In the present study, most patients whose teeth were extracted were 21–40 years old, while extraction in elderly patients (over 60) accounted for 8.9% of all tooth loss. While 83.7% of teeth extracted for tooth mobility were in patients over 50 years of age, caries was the main reason for extraction in patients from 10–20 and 31–40 years of age and impacted teeth in patients aged 21 to 30 years old. This result was also reported by Chrysanthakopoulos NA.[10] However, our study, as previously mentioned, is not in agreement with studies where caries was the principle cause of extraction in patients over 50 years old.[9,26]

Periodontal disease was the main cause of tooth loss in incisors in our study which is similar to the findings of Cobet E,[20] Angelillo IF,[22] and Morita M[27] and teeth extracted for orthodontic reasons were mainly first and second molars[17,22] which was patient request in our study. A likely reason for the high periodontal extraction in anterior teeth is that they are less susceptible to dental caries, retained longer in the mouth, and then may be subjected to periodontal disease risks.[7,10,23,28]

Overall, the highest number of extractions were in uneducated patients and the reason was patient-request in the present study, but in the study of Dena A the majority of extractions were in middle and high school groups where the reason was caries.[26] The overriding reasons for extraction was caries in different levels of education[26] which was caries in school student, high school diplomas, and uneducated patients, and impaction in graduated and under-graduated students in this study. According to our findings, the number of extractions was higher in smoker patients than in non-smokers which was in accordance with the result of Dena A's study.[26]

Not all patients have regular dental visits, which are essential to diagnose dental caries at its early stage in order to prevent and decrease tooth extraction. Moreover, many patients had their teeth extracted at their request, which is uncommon. Hence, it is an urgent need to have some programs to increase oral health/hygiene awareness among people. Further studies are recommended to be carried out in other provinces to use their results in planning for developing oral health in Afghanistan.

Despite, this study offers valuable insights into common reasons for tooth extraction among Afghans, the potential limitations include sample size and being single-center may not support broad generalizations.

Conclusion

The result of this survey indicated that caries, patient request, and impaction were the leading reasons for tooth extraction. The majority of patients were uneducated, and had insufficient family income. Most of the patients were housewives and laborers.

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Disclosure

The authors declare that they have no conflicts of interest related to this research.

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