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RESEARCH ARTICLE
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CAUSES OF TOOTH EXTRACTION AMONG INDIVIDUALS VISITING EXODONTIA DEPARTMENT OF PUNJAB DENTAL HOSPITAL, LAHORE TO INVESTIGATE DEMOGRAPHIC CHARACTERISTICS IN CONTEXT OF LOW-INCOME COUNTRY.

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Abstract

Objective: to determine demographic characteristics of patients visiting Punjab dental hospital for extraction and associate these with cause of extraction.
Study design: Cross sectional, Descriptive.
Place and duration: Exodontia of Punjab Dental Hospital, one year after approval of Institutional Review Board, in October 2022.
Materials and methods: A self-structured questionnaire was completed for 7182 patients visiting PDH. The questionnaire had demographic characteristics and causes of extraction. Patients with age less than 18 years and those came for removal of third molar impactions were excluded. Data was entered into SPSS version 22 and quantitative variables were analyzed. Mean age, gender and causes of tooth extraction were calculated. Biological causes were computed into SPSS to categorize them into three variables, caries, periodontal and others. Chi square test of association was made between demographics and causes of extraction. P value was taken significant as <0.05.
Results: Results demonstrated that out of 7182 patients, 3654 were male and 3528 were females. 49.1% of the people were from age bracket of 18 to 40 years, the mean age being 42.24. 57.9% teeth extracted were from mandible and 42.1% from maxilla. Most common cause was dental caries (40.4%), followed by failed root canal treatment (15.8%).

Conclusion: Dental caries was most common cause in young age and preventable measures need to be taken in low income population to prevent early tooth loss.

Keywords: Exodontia, dental caries, tooth extraction, low income population, early tooth loss.

Introduction:

The Global Burden of Disease Study in 2017 has published that about 3.5 billion people are affected with oral diseases around the world with the most common cause being dental caries [1]. Tooth loss due to dental caries or periodontal problems is almost entirely preventable. With the increase in life expectancy, the need to maintain a healthy dentition for as long as possible is imperative. World Health Organization has recommended the oral health goals for 2020 to include a reduction in number of teeth extracted at ages 18, 35-44 and 65-74 years [2]. Tooth loss affects the quality of life as well as the self -esteem of an individual. Dental caries has been reported as the most common cause of tooth loss especially in developing countries while the incidence of tooth loss due to caries is now decreasing in many developed countries, showing the significance of preventive health programs [3]. The second most common cause of tooth extraction that has been widely reported in literature is due to compromised periodontal health. Periodontal health is affected not only due to neglected oral hygiene but also due to uncontrolled comorbidities [4]. Tooth extraction due to trauma has been reported as the least common causes of tooth extraction [5]. Many factors have been given as the predictors of multiple extractions including advanced age, lower socioeconomic status, low education status. The most common teeth to get periodontally compromised are mandibular incisors while first molars are the more commonly involved teeth with dental caries. In areas of low socioeconomic status, one of the causes of tooth extraction is patients' request. There are various factors affecting this decision including financial burden, multiple visits for a root canal treatment or a previous bad experience with root canal treatment of a family member or a friend. Other causes due to which patients present for extraction include orthodontic treatment, pre-prosthetic reasons, or in patient who require dental clearance for cardiac surgery or radiotherapy [5,6,8].

Punjab dental hospital is a major dental hospital in Lahore where patients are referred from all over the province of Punjab. In this study, we have gathered data from all the patients presented in the Department of Exodontia in one year. We present this data showing demographics and causes and pattern of tooth extraction along with some suggestions to improve the overall health care in a public sector hospital.

Materials and Methods:

This is a cross sectional descriptive study. A questionnaire was designed in which demographic characteristics such as age and gender were asked. Then the quadrant of the tooth to be extracted and the reason for extraction was mentioned. The questionnaire was then submitted for the Institutional Review Board and approval was taken from the Board of Punjab Dental Hospital.

The inclusion criteria included patients aged 18 to 60 years patients presenting in Department of Exodontia at Punjab Dental Hospital. the patients who require extractions of teeth present within a pathological lesion, supernumerary teeth or full bony or partial third molar or canine impactions were excluded from the study.

Informed consent was taken from all patients in the study and all the questionnaires were filled by the authors themselves.

The data was entered in the SPSS software version 22 and quantitative variables were analyzed. Biological causes were computed into SPSS to categorize them into three variables, caries, periodontal and others. Chi square test of association was made between demographics and causes of extraction. P value was taken significant as <0.05.

Results:

The results demonstrated that the total number of patients presented during this period in the Punjab Dental Hospital were 7182 out of which 3654 were male and 3528 were females. 49.1% of the people were young from the age bracket of 18 to 40 years, 45.6% were between 41 to 65 years while 5.3% were above 65, the mean age being 42.24.

57.9% teeth extracted were from the mandibular arch and 42.1% were from maxilla.

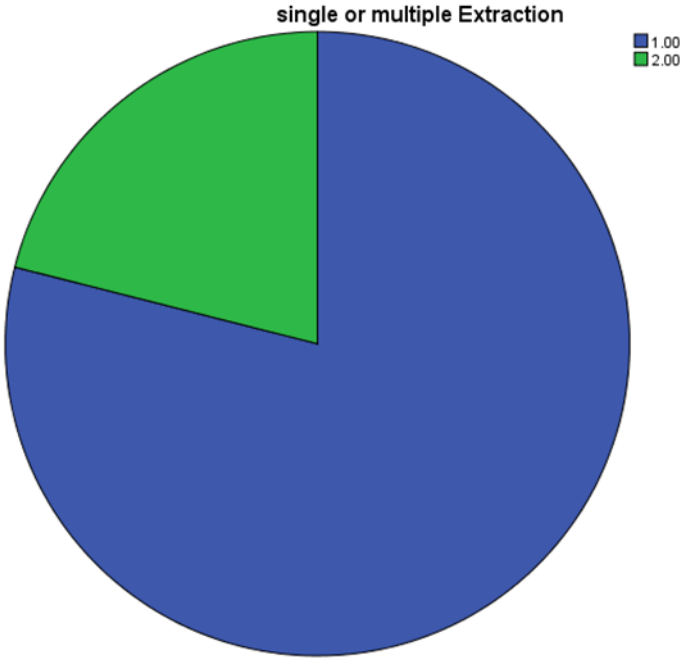
Table 2 shows the frequency of each tooth extracted with right maxillary first molar as the most frequently extracted tooth followed by mandibular left first molar.

40.4% were extracted due to dental caries when a tooth is beyond restoration, followed by 15.8% extracted due to failed root canal treatment. The third most common cause of extraction is periodontal cause which is 12.3%.

Table 01 Demographic Characteristics of Patient visiting Exodontia Department for tooth extraction.

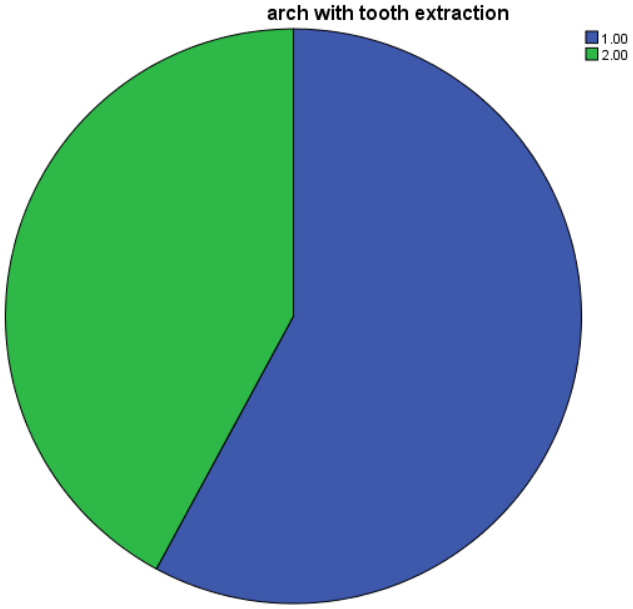
Sr. No.	Variable	Frequency	%
1	*Age Group*		
	• 18 to 40 years old	3528	49.1
	• 41-65 years old	3276	45.6
	• 66 years old or above age of 66 years	378	5.3
	• Total	7182	100.0
2	*Gender*		
	• Male	3654	50.9
	• Female	3528	49.1
	• Total	7182	100.0

Mean Age 42.24



1: Single tooth; 2: Multiple teeth

Pie Chart Showing patient desire to extract single tooth or multiple teeth



1: Mandible 57.9 % while in Maxilla 42.1% n (7182)
Pie Chart Showing patient arch distribution of teeth in Upper and Lower Jaw

Table 02 Frequency and Percentages of teeth being extracted among Patient visiting Exodontia Department for tooth extraction

Tooth Number	Extracted teeth	Frequency	%
1.	• Right Maxillary third Molar	252	3.5
2.	• Right Maxillary second Molar	126	1.8
3.	• Right Maxillary First Molar	1008	14.0
4.	• Right Maxillary second premolar	0	0
5.	• Right Maxillary first premolar	126	1.8
6.	• Right Maxillary Canine	0	0
7.	• Right Maxillary Lateral Incisor	0	0
8.	• Right Maxillary central Incisor	504	7.0
9.	• Left Maxillary central Incisor	126	1.8
10.	• Left Maxillary Lateral Incisor	0	0
11.	• Left Maxillary Canine	126	1.8
12.	• Left Maxillary first premolar	504	7.0
13.	• Left Maxillary second premolar	252	3.5
14.	• Left Maxillary First Molar	630	8.8
15.	• Left Maxillary second Molar	126	1.8
16.	• Left Maxillary third Molar	126	1.8
17.	• Left Mandibular third Molar	0	0
18.	• Left Mandibular second Molar	252	3.5
19.	• Left Mandibular First Molar	882	12.3
20.	• Left Mandibular second premolar	252	3.5
21.	• Left Mandibular first premolar	0	0
22.	• Left Mandibular Canine	0	0
23.	• Left Mandibular Lateral Incisor	0	0
24.	• Left Mandibular central Incisor	126	1.8
25.	• Right Mandibular central Incisor	0	0

26.	• Right Mandibular Lateral Incisor	0	0
27.	• Right Mandibular Canine	0	0
28.	• Right Mandibular first premolar	126	1.8
29.	• Right Mandibular second premolar	126	1.8
30.	• Right Mandibular First Molar	252	3.5
31.	• Right Mandibular second Molar	0	0
32.	• Right Mandibular Third Molar	0	0
	Total	7182	100.0

Table 03 Frequency and Percentages of causes of tooth extraction among Patient visiting Exodontia Department for tooth extraction

Sr. No	Causes of Tooth extraction	Frequency	%
1.	Dental caries	2898	40.4
2.	Periodontal Diseases	882	12.3
3.	Financial Burden	378	5.3
4.	Failed RCT	1134	15.8
5.	Pre- prosthetic	378	5.3
6.	Orthodontics	252	3.5
7.	Trauma	252	3.5
8.	Patient Request	252	3.5
9.	Patient clearance for cardiac or cancer patient	756	10.5
Total		7182	100.0

Table 04 Cross tabulation between demographic characteristics and affected Arch among Patient visiting Exodontia Department for tooth extraction

Sr no.	**Variable**	**Arch**			**P value**
1.	Age	Jaw Distribution			
		Mandible	Maxillae	Total	0.00
	• 18 to 40 years old	2142	1386	2142	
	• 41-65 years old	1638	1638	1638	
	• 66 years old or above age of 66 years	378	0	378	
	• Total	4158	3024	4158	
2	Gender				
	Male	2268	1386	2268	0.00
	Female	1890	1638	1890	
	Total	4158	3024	4158	

Table 05 Cross tabulation between age, gender, arch and cause of tooth extraction among patients visiting Exodontia Department for tooth extraction

Sr no.	**Variable**	**Cause of extraction**				**P value**
1	Age					
		Caries	Periodontal diseases	Others	Total	0.00
	• 18 to 40 years old	1890	126	1512	3528	
	• 41-65 years old	882	756	1638	3276	
	• 66 years old or above age of 66 years	126	0	252	378	
	• Total	2898	882	3402	7182	
2	Gender					
	Male	1638	126	1890	3654	0.00

	Female	1260	756	1512	3528	
	Total	2898	882	3402	7182	
3	Upper and Lower arch distribution					
	Mandible	1764	252	2142	4158	0.00
	Maxillae	1134	630	1260	3024	
	Total	2898	882	3402	7182	

Discussion:

Identifying the pattern of tooth extraction helps understand the major causes that can then be addressed for better service to the community. As reported by literature, the most common cause of tooth extraction is caries and the most common tooth to be extracted permanent first molar as it the first tooth to erupt [9].

Our results show that the mean age of our population presenting for tooth extraction to be 42 which differs from the mean age reported by Passarelli et al. i.e., 63.3 while in a similar study conducted in Karachi, Pakistan showed the mean age to be 50 years [5,7]. This shows that our population is at risk of tooth loss at an early age as compared to high income countries.

Danielsen reported periodontal cause to be the most common cause of tooth extraction followed by dental caries [6]. However, the study conducted by Kashif et al. showed similar results to our study with dental caries being the most common cause of tooth extraction [8]. Another study conducted in Lahore, Pakistan which showed similar results as ours with dental caries being the most common cause of tooth extraction, but the mean age reported was much younger as compared to our results [7].

Maxillary first molar has been found to be the most common tooth to be affected followed by mandibular first molar, which is consistent with many studies showing first molar to be the tooth extracted first. However, there are different reports with some reporting maxillary first molar to be the first to go while other report mandibular first molar to be the first extracted one [6,8,9,12].

According to World Bank, a lower middle-income country is one with GNI per capita between 1,046 to 4,095 in current US$ with Pakistan being one of them [10]. Most of the people working in Pakistan are daily wagers who must leave their work to get evaluated at a public sector hospital, it was reported in 2018 that only 5% of the population have access to complete dental facilities [11]. With the ever-melting economic conditions and such low per capita income, most of the people do not go for regular dental checkups and only seek treatment when they cannot tolerate pain.

The authors suggest that appropriate action must be taken by the relevant authorities to prioritize preventive measures and early treatment. Making these facilities available round the clock and at rural level will not only help reduce the disease burden but will also help tertiary care hospitals to provide better care to their patients.

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