



ORIGINAL ARTICLE

Pattern of tooth extraction in a Tertiary Care Hospital-Karachi, Pakistan.

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ABSTRACT... Objective: To identify the pattern of tooth extraction and its relative risk factors in our local population, in terms of gender distribution and age groups. **Study Design:** Cross-sectional study. **Setting:** Department of Oral & Maxillofacial Surgery, Sir Syed College of Medical Sciences for Girls, Karachi-Pakistan. **Period:** May 2018 to April 2019. **Material & Methods:** Following the selection criteria, a number of 242 patients were selected with the age ranging from 15 years to 65 years. After history and examination, following information was recorded in a proforma; age, gender, type of tooth extracted, reason for extraction of tooth (caries, periodontal disease, trauma, pericoronitis, impactions, prosthesis, supernumerary teeth and failed root canal treatment), relative risk factors (uncontrolled diabetes mellitus, smokers) were also noted, data was analyzed using SPSS version 21. **Results:** 242 patients underwent a total of 1149 dental extractions in a period of 1 year. Mean age was 36 years with a male predilection. Most commonly extracted tooth was mandibular molar. Most common reason of tooth extraction were dental caries, followed by periodontal diseases. Relative risk factors like diabetes and smoking had a statistically strong association with tooth extraction. **Conclusion:** Dental extractions were more common in males. Most common reason of tooth extraction was dental caries. Diabetes and smoking are significant relative risk factor for extractions.

Key words: Dental Caries, Oral Manifestations in Diabetics, Periodontal Diseases, Relative Risk Factors, Tooth Extraction.

INTRODUCTION

Tooth loss is a major health issue throughout the world.¹ Loss of teeth results a difficulty in mastication, speech problems, esthetic issues and psychiatric problems.¹ Status of oral health and dentition indicates the severity and consequences of underlying chronic illnesses.¹

Rationale behind tooth extraction can vary from dental caries, periodontitis, trauma, orthodontic reasons, assault, pericoronitis, odontogenic infection, impactions, endodontic failures, prosthodontic requirements, supernumerary teeth and many more.¹⁻¹⁰

With recent advancements in preventive dentistry, awareness campaigns in schools, advertisement campaigns in media, new cost effective health insurance policies, trends of water fluoridation, and other preventive measures such as use of

fluoridated tooth pastes, development of local applications for fluoride gels, have reduced the incidence of tooth extractions.² Moreover, prevalence of metabolic diseases and chronic systemic illnesses have made periodontal diseases as one of the leading cause of tooth extraction as compared to dental caries.²⁻⁵

Certain risk factors have been associated with tooth loss.^{2,5} These include poor oral hygiene measures, uncontrolled diabetes mellitus, smoking and a low socio economic status.^{2,5} Masses with low socio economic status has higher prevalence and extent of teeth mortality.⁵⁻⁷ Smoking is directly related to periodontal diseases.¹⁰ Uncontrolled diabetes mellitus leads to gingivitis and periodontitis, which ends up in tooth loss.¹¹⁻¹⁶ Poor oral hygiene measures can lead to decaying of tooth and more compromised periodontal status of dentition.¹⁶⁻²⁵

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Passarelli et al² revealed the fact that tooth decay and periodontitis was the main culprit behind tooth loss with 52.2% and 35.7% respectively, they found a male predilection as high as 71.1% among tooth extraction patients, a mean age range of 23 to 91 years was found with a total of 27% as smokers and 22.5% were affected by uncontrolled metabolic disease (diabetes mellitus). Approximately 6% of patients were smokers and suffering with diabetes also. Most common teeth to be extracted were molars and the canines were least extracted. 7% of extractions were performed due to endodontic failure while other 2.9% due to prosthetic indication. In this above mentioned study, diabetic patients with compromised periodontal health had more frequency of dental extractions as compared with non-diabetic patients whereas no statistically significance was found among non-smokers and smokers in association with the pattern of tooth extraction.

Diabetes has now turned into a national epidemic, basit et al in their study reveals that 26.3 % of Pakistani population is diabetic. Oral and systemic manifestations along with associated morbid of diabetes are well known in literature. Most important oral manifestations of diabetes are periodontitis, gingivitis, tooth decay, burning mouth, periapical lesions, xerostomia, osteomyelitis and zygomycosis.

This study aims to recognize the rationale and pattern of tooth extraction and its relative risk factors in our local population.

By identifying the reasons and risk factors for tooth extraction we can endeavor to limit the future extractions of teeth by overcoming the causes of tooth loss. Moreover, we can successfully highlight the role of preventive measures in tooth loss. Effective media campaigns, addition of brushing instructions in school syllabus and developing good quality fluoridated tooth paste can be done by successfully identifying the causes of tooth extraction. A baseline data can be obtained for future studies, to be conducted on the same subject. Lastly, commonest causes of tooth extraction can be identified for our

local population, which may or may not be in accordance to the international studies, this can more effectively channel the health resources for prevention of identified causes of tooth extraction.

MATERIAL & METHODS

A total of 242 patients who randomly reported in the outpatient department (OPD) of Oral & Maxillofacial Surgery, Sir Syed College of Medical Sciences, Karachi-Pakistan were included. One year cross-sectional study was performed, from 1st may 2018 to 30th April 2019. The inclusion criteria followed in the study encompassed; patients belonging to age range 15 to 65 years of both genders, who were willing to participate in the study and underwent dental extraction under local anesthesia, patients having multiple extractions were also included but only those who had isolated rationale of multiple tooth extraction. Patients excluded from this study were those with chronic illnesses except diabetes, patients with chronic renal failure, organ transplant patients, alveolar cleft patients, extraction requiring general anesthesia, patients who had undergone radiation and chemotherapy, pregnant females, jaw pathologies (odontogenic cysts and tumors), orthodontic extraction cases and patients who underwent multiple extractions for multiple rationales of extraction were also not included in study.

This cross-sectional study was performed after obtaining Institutional Ethical Approval Letter issued on 6-04-2018 with letter No.F.8/2018/ESL/DC/SSH. Informed consent was taken from every participant. History was acquired from every patient regarding age, gender, systemic and drug history, history of smoking and diabetes was also acquired. Intraoral examination findings were also recorded in a specially designed proof.

Specially designed study proforma was used, which included dentition status (missing, carious and buried tooth roots) along with rationale of extraction (caries, periodontal disease, trauma, pericoronitis, impactions, prosthesis, supernumerary teeth and failed root canal treatment) and relative risk factors like diabetes

mellitus and smoking. These clinical findings were correlated with radiological investigations. Orthopantomogram (OPG) was done for every patient, It was also helpful to exclude any pre-existing bone pathology and for making a comprehensive treatment plan. Patients were divided into two age groups. Group I (15 – 35 years) and Group II (36 to 65 years).

Statistical Package for Social Sciences (SPSS) version 21 was used. Mean and standard deviation were calculated for quantitative variables like age of patients. Frequency and percentage were calculated for qualitative variables; type of tooth extracted, rationale of tooth extraction, relative risk factor (diabetes and smoking) and gender of patient. Age groups were compared for most common reasons of tooth extraction (dental caries or periodontal diseases) and for relative risk factors (diabetes and smoking). Chi square test was used for analysis of comparison of two age groups with causes of extraction (dental caries or periodontal diseases), and to analyze the comparison of reasons of tooth extraction with the relative risk factors (diabetes and smoking) with a value of $P < 0.05$ regarded as significant.

RESULTS

A total number of 242 patients underwent extraction of tooth in our study and 1149 dental extractions were performed in a period of 1 year. The mean age of patients was 36 years, with 36% of patients among age range of 15 years to 35 years and 64% with age range of 36 to 64 years (Table-I). A male predilection of 56.2% (136 patients) followed by 43.8% (106 patients) females (Figure-1). Most prevalent rationale of tooth extraction was dental caries among 39.7% of patients, followed by periodontal diseases in 34.3%, endodontic reasons in 10.7%, prosthetic reasons 8.3% and due to previous treatments 7% of patients underwent tooth extraction (Table-II, Figure-2). Most commonly extracted tooth was molar tooth as 54.6 % followed by 18.4% premolars, 25.3% anterior teeth and only 1.7% canines among all dental extractions (Table-III).

Dental caries was most prevalent reason in group I (15 years to 35 years) for dental extractions but

for group II age group (36 to 65 years) it was periodontal disease (Table-IV), $p=0.001$ shows statistical significance that younger age group patients have statistically higher rationale of dental caries than older age group patients who have periodontal disease as main culprit behind losing their teeth.

Table-V shows that 52 patients (21.4%) were smokers and 118 patients (48.7%) were known diabetic. Both relative risk factors were present in 14 patients (5.7%).

Rationale of extractions were compared with the relative risk factors for tooth extractions (diabetes and smoking). P value less than 0.001 is statistically significant to prove a higher tooth loose incidence in diabetic patients along with higher incidence of periodontal disease as main culprit behind extraction among diabetics (Table-V).

Smoking is also directly related with increase in tooth extraction incidence, p value less than 0.001 is statistically significant (Table-V).

		Frequency	Percent	Mean age
Valid	Group I (15-35)	87	36.0 %	28+ 8.9
	Group II (36-65)	155	64.0%	44+ 13.9
	Total	242	100.0	36 year

Table-I. Age distribution and mean age.

		Rationale	Percent
Valid	dental caries	96	39.7%
	periodontal disease	83	34.3%
	endodontic reasons	26	10.7%
	prosthetic reasons	20	8.3%
	failed previous treatments	17	7.0%
	Total	242	100%

Table-II. Rationale of extraction.

Type of Tooth Extracted	Number of Teeth	Percent
molar	627	54.6%
premolar	211	18.4%
anteriors	291	25.3%
canine	20	1.7%
Total	1149	100%

Table-III. Type of tooth extracted n=1149.

Gender Distribution

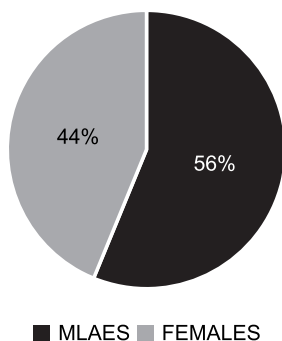


Figure-1. Gender distribution.

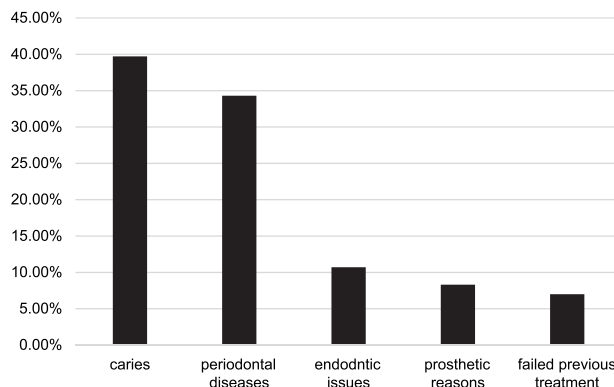


Figure-2. Rationale of tooth extraction causes among all patients.

		Rationale of Extraction					Total
		Dental Caries	Periodontal Disease	Endodontic Reasons	Prosthetic Reasons	Failed Previous Treatments	
Age Group	Group I (15-35)	50	10	7	4	16	87
	Group II (36-65)	46	73	19	16	1	155
Total		96	83	26	20	17	242
P value=0.001							

Table-IV. Age distribution and rationale of extraction.

	Rationale of Extraction					Total
	Dental Caries	Periodontal Disease	Endodontic Reasons	Prosthetic Reasons	Failed Previous Treatments	
non diabetic	66	17	18	12	11	124
diabetic	30	66	8	8	6	118
Total	96	83	26	20	17	242
P=0.001						
Non Smoker	66	62	25	20	17	190
Smoker	30	21	1	0	0	52
Total	96	83	26	20	17	242
P=0.001						

Table-V. Risk factor (diabetes mellitus, smoking) and rationale of extraction.

DISCUSSION

A comprehensive cohort study was performed by Passereli et al² in Italy. The study comprised of 120 patients with mean age range of 63.3 and a male predominance (55.8%). Molar was most common tooth to be extracted. Out of 120 patients, 33 patients (27.5%) were smokers and 27 patients (22.5%) were suffering from diabetes mellitus. Patients suffering from diabetes with habit of smoking, were 5 (5.8%). The top most rationale for extraction was tooth decay; 289 teeth (52.2%), followed by periodontal diseases; 198 patients (35.7%), endodontic failures; 38 teeth (6.9%),

prosthetic reasons; 16 (2.9%) and previous treatment; 13 patients (2.2%). Out of the 198 teeth extracted due to periodontal diseases, 146 teeth were extracted from diabetic patients and 52 teeth were extracted from non-diabetic patients, this indicates a significant association between periodontal diseases and diabetes mellitus, their study showed a statistically non-significant association between periodontal diseases and smoking habits. This study results are very close to which we concluded in our study, performed on Pakistani population.

Taiwo et al³ in Nigeria, performed on a total of 984 patients, reported an age range of 21 to 30 years to be the most common age group for tooth loss. Main culprit behind extraction was tooth decay (631 teeth, 54.1%) followed by periodontal diseases (192, 16.5%) there was a male predilection with a male to female ratio of 1.1:1. Most commonly extracted tooth was mandibular molar; 780 teeth; 66.8% and least extracted tooth was canines; 26 teeth; 2.2%. Over all, most commonly extracted tooth was mandibular left 3rd molar. These findings also correspond to our results, except that we identified mandibular 1st molar as the commonest tooth extracted, during our study.

A study conducted by Nuvvula et al⁴ from 1055 tooth extractions, the most prevalent cause of extraction was dental caries (51.14%) in 3rd and 4th decade, whereas in 5th and 6th decade periodontal diseases 54.11% followed by dental caries 29.11% were the reason behind tooth loss. This study concludes that teeth were lost due to periodontal diseases more predominantly in older population than younger age group. These findings also correlated with our results.

Study conducted by Haseeb et al⁵ in a tertiary care centre of Pakistan concluded a mean age of 46.6 years. Tooth decay was above all reasons for tooth extraction, followed by periodontal diseases as high as 63.1% and 26.2% respectively. These results, to some extent, correlates with our findings.

Medina-Solis et al⁶, Montandon et al⁷, Jafarian et al⁸ and Nikolaos et al⁹ concluded that most prevalent rationale of dental extraction as tooth decay followed by periodontal diseases in various populations worldwide. Male predilection was also found in most of populations except of Medina-Solis et al⁶ states no significant gender predilections in their study.

Nikolaos et al⁹ conducted research work on the same topic in Greece. He also concluded dental caries as the most common cause of dental extractions (45.6%) followed by periodontal diseases (32.1%). Caries was the commonest

cause of tooth extraction in age group up to 44 years old while periodontal diseases were the commonest cause of tooth extraction in age group above 44 years old. Molars were the commonest teeth to be extracted due to dental caries. Mandibular pre molars and maxillary and mandibular anterior teeth were mostly extracted due to periodontal diseases.

In studies over the last three decades; Spyros et al¹³, Nasruddin et al¹⁴, Nico et al¹⁶, Corbetet al²⁵, similar trends have been reported. Caries have been the prime cause of tooth extraction in human race.

CONCLUSION

In this study, the number of dental extractions were found to be highest in males than females. Overall, the most common reason of tooth extraction was dental caries. In younger age group, dental caries was the cause of tooth extraction predominantly and in older group, periodontal diseases were the commonest causes of tooth extraction. Diabetes and smoking was a significant risk factor for extractions. Good oral hygiene measures and better diabetic control can reduce the incidence of tooth extractions.






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2	Maimoona Siddiq	Co-Author	
3	Osama Mushtaq	Conception and design of study.	
4	Syed Ali Raza	Literature review.	
5	Zain Rauf	Literature review.	
6	Ajeet Kumar Rathi	Final critical review of manuscript.	