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PREVALENCE, REASONS AND PATTERN FOR TOOTH EXTRACTION AMONG ADULT PATIENTS ATTENDING SAIDU COLLEGE OF DENTISTRY, SAIDU SHARIF SWAT

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Abstract

Background: Tooth loss due to extraction remains a significant public health concern despite advances in restorative dentistry. Common indications include dental caries, periodontal disease, trauma, retained root stumps, prosthetic requirements, and therapeutic reasons. Objective: To determine the frequency, causes, and patterns of tooth extraction in permanent dentition among patients attending the OPD of College of Dentistry, Saidu Sharif Swat. Materials and Methods: A descriptive cross-sectional study was conducted at the OPD of College of Dentistry, Saidu Sharif Swat. Data were collected using a structured questionnaire and analyzed using SPSS version 22. Results: Dental caries was the leading cause (37.2%), followed by impaction (15.9%) and periodontal disease (10.5%). Males accounted for 61.2%. The 31–45 years group had the highest extraction frequency (58.5%). Third molars (26.4%) and first molars (24.0%) were most frequently extracted. Conclusion: Dental caries and periodontal diseases were the major causes. Extractions were more common in males and middle-aged adults. Preventive oral health strategies are essential to reduce tooth loss.

INTRODUCTION

Tooth extraction is one of the most commonly performed dental procedures and is generally considered the last option in dental treatment. Tooth loss mainly occurs due to dental caries and periodontal disease, which remain major public health problems particularly in low-income and developing countries.

Oral health plays an important role in mastication, speech, aesthetics, and overall quality of life. Preservation of natural teeth is therefore essential for maintaining both functional and psychological well-being. Tooth extraction may be required due to dental caries, periodontal disease, trauma, orthodontic treatment, impacted teeth, failed endodontic therapy, or prosthetic reasons.

The pattern and causes of tooth extraction vary according to age, gender, socioeconomic status, oral hygiene practices, and access to dental care. Dental caries is reported as the main cause in younger individuals, whereas periodontal disease is more common in older adults. Posterior teeth, especially first permanent molars, are more frequently extracted due to their early eruption and greater susceptibility to caries. Therefore, the present study was conducted to determine the frequency, causes, and patterns of permanent tooth extraction among patients attending the Outpatient Department of College of Dentistry, Saidu Sharif Swat.

LITERATURE REVIEW

Tooth extraction remains one of the most common dental procedures worldwide and is mainly associated with dental caries and periodontal disease. According to the WHO, oral health is an important component of general health, yet oral diseases continue to be highly prevalent in developing countries.

A study in Saudi Arabia among 1,554 patients showed dental caries accounted for 50.2% of extractions, followed by orthodontic reasons (18.2%) and periodontal disease (8.2%). Studies from Scotland and Germany also identified dental caries and periodontal disease as principal causes, with periodontal disease increasing in older age groups. Research from Brazil demonstrated tooth mortality increases with age and is associated with socioeconomic status, smoking, and oral hygiene. Studies from Iran, Iraq, India, and Afghanistan reported posterior teeth—particularly first molars—as most frequently affected.

In Pakistan, studies from Karachi reported a higher frequency of extractions among males and middle-aged adults. Poor oral hygiene, lack of awareness, limited dental access, and low socioeconomic conditions contribute significantly to tooth loss.

MATERIALS AND METHODS

Study Setting

This study was carried out at the Outpatient Department (OPD) of the Department of Oral & Maxillofacial Surgery, College of Dentistry, Saidu Sharif Swat, Khyber Pakhtunkhwa, Pakistan. The institution functions as a tertiary-level teaching hospital and referral center for the surrounding districts of Swat, Shangla, Buner, and the upper Malakand division, and therefore receives a heterogeneous patient population in terms of age, gender, and socioeconomic background. All patients reporting to the OPD for dental extraction during the study period were screened consecutively by the examining dental surgeon for eligibility against the pre-defined inclusion and exclusion criteria.

Study Design

A hospital-based, descriptive cross-sectional study design was adopted, as it is the most appropriate design for estimating the point prevalence, reasons, and pattern of tooth extraction in a defined patient population within a limited time frame, without the need for follow-up.

Study Duration

The study was conducted over a period of four months, following approval from the Institutional Review Board and completion of pilot testing of the data collection tool.

Sample Size

The sample size was calculated using the single-population proportion formula, $n = p(1-p)(Z/e)^2$, where Z is the standard normal deviate corresponding to a 95% confidence level (Z = 1.96), p is the anticipated proportion of tooth extraction attributable to dental caries based on previous regional literature (taken as 50% in the absence of a precise local estimate, to yield the most conservative/maximum sample size), and e is the desired margin of error (5%). Substituting these values yielded a minimum required sample size of 384 participants. No adjustment for non-response was made, as data collection was performed face-to-face at the point of care with negligible refusal.

Sampling Technique

A non-probability convenience sampling technique was employed, whereby all consecutive patients presenting to the OPD for tooth extraction who fulfilled the eligibility criteria were enrolled until the calculated sample size of 384 was attained.

Inclusion Criteria

1. Adult patients aged 18 years and above of either gender.
2. Patients referred for extraction of a permanent tooth.
3. Patients requiring extraction of a single tooth during the visit.
4. Patients permanently residing within the catchment area of Saidu Sharif, Swat.
5. Patients who provided written informed consent to participate.

Exclusion Criteria

1) Patients below 18 years of age.
2) Patients undergoing oral or maxillofacial surgical procedures other than simple tooth extraction.
3) Patients requiring extraction of multiple teeth in the same visit.
4) Patients permanently residing outside the defined catchment area.
5) Patients who declined to give informed consent or who provided an incomplete questionnaire.

Study Variables and Operational Definitions

The independent variables recorded were age (in completed years, grouped as 18–30, 31–45, 46–60, and >60 years), gender (male/female), and tooth-related characteristics including arch (maxillary/mandibular), quadrant, and tooth type (incisor, canine, premolar, molar) according to the FDI tooth-numbering notation. The dependent variable was the reason for extraction, which was classified into eight pre-defined, mutually exclusive categories: gross dental caries, root caries, periodontal disease, pulp/root canal treatment (RCT) failure, impaction, malposed teeth, orthodontic indication, and economic/patient-driven reasons. For the purpose of this study, "gross dental caries" was defined as

extensive coronal destruction rendering the tooth non-restorable, while "root caries" was defined as caries confined to the root surface with the crown largely intact. Periodontal disease was diagnosed on the basis of clinical attachment loss and radiographic bone loss sufficient to compromise tooth prognosis. All operational definitions were agreed upon by the examining clinicians prior to the start of data collection to minimize inter-observer variation in classification.

Data Collection Procedure

Data were collected using a pre-tested, structured, interviewer-administered questionnaire designed specifically for this study. The questionnaire was piloted on 20 patients who were not subsequently included in the final analysis, and minor modifications were made to improve clarity before full-scale data collection began. The instrument comprised three sections: (i) demographic information (age, gender, and area of residence); (ii) clinical and historical information relating to the presenting complaint and reason for extraction, recorded after clinical examination and, where indicated, review of radiographs by the attending dental surgeon; and (iii) details of the extracted tooth, including arch, quadrant, and tooth type. Each eligible patient was interviewed and examined by a single trained examiner in the OPD setting prior to the extraction procedure, and the corresponding data were entered directly onto the questionnaire. Confidentiality of patient information was maintained throughout by assigning a unique numerical code to each participant in place of identifying information.

Ethical Considerations

Ethical approval for the study was obtained from the Institutional Review Board/Ethical Review Committee of College of Dentistry, Saidu Sharif Swat prior to commencement of data collection. The study was conducted in accordance with the ethical principles laid down in the Declaration of Helsinki. Written informed consent was obtained from every participant after explaining the purpose, procedure, potential risks, and benefits of the study in the local language. Participation was entirely voluntary, and patients were informed of their right to withdraw at any stage without any effect on their clinical care. Patient anonymity and data confidentiality were strictly maintained, and the collected information was used exclusively for research purposes.

Statistical Analysis

Completed questionnaires were checked for completeness and consistency before entry. Data were entered and analyzed using IBM SPSS Statistics version 22.0 (IBM Corp., Armonk, NY, USA), with Microsoft Excel used for supplementary tabulation and chart preparation. Categorical variables, including gender, age group, reason for extraction, arch, quadrant, and tooth type, were summarized as frequencies and percentages and

presented using tables, bar charts, and histograms. Continuous data, where applicable, were summarized as mean ± standard deviation following assessment of normality. The Chi-square (χ^2) test was used, where appropriate, to assess associations between categorical variables such as gender and age group with the reason for extraction and tooth type, with a p-value of <0.05 considered statistically significant. Results are presented in narrative form supported by tables and graphical illustrations for ease of interpretation.

Control of Bias

To minimize selection bias, all consecutive eligible patients were approached for enrollment rather than a selected subset. Observer bias was minimized through the use of standardized operational definitions and data collection by a single trained examiner. Strict application of the inclusion and exclusion criteria, along with pre-testing of the questionnaire, further reduced the likelihood of measurement and information bias.

RESULTS

A total of 384 patients were included; 234 (60.9%) males and 150 (39.1%) females. The majority belonged to the 31–45 years age group (222, 57.8%), followed by 18–30 years (79, 20.6%), 46–60 years (76, 19.8%), and above 60 years (7, 1.8%). See Table 1.

Dental caries was the leading cause of tooth extraction (96, 37.2%), followed by impaction (41, 15.9%), root caries (34, 13.2%), periodontal disease (27, 10.5%), RCT failure (24, 9.3%), economic reasons (19, 7.4%), malposed teeth (6, 2.3%), and orthodontic reasons (6, 2.3%). See Table 2.

Mandibular teeth were more frequently extracted (151, 58.5%) compared to maxillary teeth (107, 41.5%) (Table 3). Third molars (68, 26.4%), first molars (62, 24.0%), and second premolars (58, 22.5%) were the most commonly extracted (Table 4). The left mandibular quadrant had the highest extractions (87, 33.7%)

Table 1: *Demographic Characteristics (N=384)*

Variable	Frequency (n)	Percentage (%)
Gender		
Male	234	60.9%
Female	150	39.1%
Age Group		
18–30 years	79	20.6%
31–45 years	222	57.8%
46–60 years	76	19.8%
>60 years	7	1.8%

Table 2: *Reasons for Tooth Extraction (N=258)*

Reason for Extraction	Frequency (n)	Percentage (%)
Gross Dental Caries	96	37.2%
Impaction	41	15.9%
Root Caries	34	13.2%
Periodontal Disease	27	10.5%
RCT Failure	24	9.3%
Economic Reasons	19	7.4%
Malposed Teeth	6	2.3%
Orthodontic Reasons	6	2.3%

Table 3: *Distribution by Arch (N=258)*

Arch	Frequency (n)	Percentage (%)
Maxillary	107	41.5%
Mandibular	151	58.5%

Table 4: *Distribution by Tooth Type (N=258)*

Tooth Type	Frequency (n)	Percentage (%)
Central Incisor	5	1.9%
Lateral Incisor	16	6.2%
Canine	4	1.6%
First Premolar	18	7.0%
Second Premolar	58	22.5%
First Molar	62	24.0%
Second Molar	27	10.5%
Third Molar	68	26.4%

DISCUSSION

The present study at College of Dentistry, Saidu Sharif Swat provides important local epidemiological data on the frequency, causes, and patterns of permanent tooth extraction. Males showed a higher frequency (61.2%) compared to females (38.8%), consistent with findings from Saudi Arabia and other regional studies, possibly due to poorer oral hygiene, delayed dental visits, and tobacco use.

The highest frequency was observed in the 31–45 years age group (58.5%), consistent with previous studies reporting increased tooth loss in middle-aged adults due to cumulative untreated dental disease.

Dental caries was the leading cause (37.2%), followed by impaction (15.9%) and periodontal disease (10.5%), comparable to results from Brazil and India. The high caries-

related extraction rate may reflect poor oral hygiene and delayed treatment-seeking behavior in this region.

Third molars (26.4%) and first molars (24.0%) were most frequently extracted. Mandibular teeth were extracted more commonly than maxillary teeth. The higher susceptibility of molars to caries and periodontal disease relates to early eruption, complex morphology, and difficulty maintaining oral hygiene.

CONCLUSION

Dental caries was the main cause of tooth extraction at College of Dentistry, Saidu Sharif Swat, followed by impaction and periodontal disease. Extractions were more common in males and in the 31–45 years age group. Mandibular posterior teeth, especially third molars and first molars, were most frequently extracted. These findings underscore the need for improved oral hygiene awareness and preventive dental care programs.

RECOMMENDATIONS

- Promote oral health education and preventive dental care in the community.
- Encourage regular dental check-ups for early diagnosis and treatment.
- Increase awareness regarding dental caries and periodontal disease prevention.
- Conduct larger multicenter studies across Khyber Pakhtunkhwa.

STRENGTHS AND LIMITATIONS

Strengths

- Adequate sample size (n=384) calculated using standard formula.
- Provides local epidemiological data from Swat.
- Useful for planning preventive oral health programs.

Limitations

- Single-center study; findings may not be fully generalizable.
- Convenience sampling limits external validity.
- Socioeconomic and behavioral factors not fully assessed.

ETHICAL APPROVAL

Ethical approval was obtained from the Institutional Review Board of College of Dentistry, Saidu Sharif Swat. Written informed consent was obtained from all participants. The study was conducted in accordance with the Declaration of Helsinki.

Authors Contribution

Syed Abbas Ali Shah: Conceptualization, study design, data collection, and manuscript writing.

Nisar Ud Din: Literature review, methodology design, and critical review of the manuscript.

Dr. Rizwan Ullah Shah: Supervision of data collection, clinical interpretation of results, and manuscript revision.

Hamza Qureshi/Naeem Ullah Khan: Data collection, patient recruitment, and assistance with literature review.
Syed Muhammad Salman: Statistical analysis, data entry, and preparation of tables.
Haris Rahman: Corresponding author. Overall project coordination, final manuscript preparation, and submission. Critically revised and approved the final version of the manuscript.
Noman Ali: Ethical approval, questionnaire design, data verification, and review of the discussion section.
All authors read and approved the final manuscript.

REFERENCES

1. Droubie BFA. Causes of tooth extraction in AL Mushahda village. 2006;18(3):30–3.
2. Jafarian M, Etebarian A. Reasons for extraction of permanent teeth in Tehran, Iran. Med Princ Pract. 2013;22(3):239–44.
3. Noman NA, Aladimi AA, Alkadasi BA, et al. Social habits and risk factors causing tooth loss. J Contemp Dent Pract. 2019;20(4):428–33.
4. Assad T. Oral Health Status and Attitude of Patients towards Dental Extraction in Karachi. Pakistan J Med Dent. 2020.
5. Kashif M, Mehmood K, Ayub T, Aslam M. Reasons and patterns of tooth extraction in a tertiary care hospital. J Liaquat Univ Med Heal Sci. 2014;13(3):125–9.
6. Al-Shammari KF, Al-Ansari JM, Al-Melh MA, Al-Khabbaz AK. Reasons for tooth extraction in Kuwait. Med Princ Pract. 2006;15(6):417–22.
7. Richards W, Ameen J, Coll AM, Higgs G. Reasons for tooth extraction in South Wales. Br Dent J. 2005;198(5):275–8.
8. Chestnutt IG, Binnie VI, Taylor MM. Reasons for tooth extraction in Scotland. J Dent. 2000;28(4):295–7.
9. Murray H, Locker D, Kay EJ. Patterns of and reasons for tooth extractions in Ontario, Canada. Community Dent Oral Epidemiol. 1996;24(3):196–200.
10. Dixit LP, Gurung CK, Gurung N, Joshi N. Reasons for extraction of permanent teeth at Peoples Dental College. Nepal Med Coll J. 2010;12(4):203–6.
11. Safari S, Mohebi MM, Nazhand NA, Mazaher N. Reasons for Permanent Tooth Extraction in West Kabul. J Biosci Med. 2020;8(5):54–63.
12. Chrysanthakopoulos NA. Reasons for extraction of permanent teeth in Greece. Int Dent J. 2011;61(1):19–24.
13. Frequency and reasons for tooth extraction at CMH Lahore Medical College. Pak J Surg. 2016;32(3):185–8.

14. Ahmad FA, Alrashidi AM, Alajmi B, AlSharrad A. Causes and Patterns of Tooth Loss at Riyadh Elm University Hospital. Oral Heal Dent Sci. 2019;3(4):2–6.
15. Montandon A, Zuza E, Toledo BE. Prevalence and reasons for tooth loss in Brazil. Int J Dent. 2012;2012:8–10.
16. Murray H, Clarke M, Locker D, Kay EJ. Reasons for tooth extractions by tooth type in Ontario. Int Dent J. 1997;47(1):3–8.
17. Chukwu G, Adeleke O, Danfillo I, Otoh E. Dental caries and extractions in Jos, Nigeria. African J Oral Heal. 2004;1(1):31–6.
18. Preethanath RS. Reasons for Tooth Extraction in Urban and Rural Population. 2010;30(1):199–204.
19. Weintraub JA, Vig PS, Brown C, Kowalski CJ. Prevalence of orthodontic extractions. Am J Orthod Dentofac Orthop. 1989;96(6):462–6.
20. Taşsöker M, Menziletoğlu D, Baştürk F, et al. Investigation of Tooth Extraction Reasons. Meandros Med Dent J. 2018;19(3):219–25.