doi: 10.7213/archivesoforalresearch.09.002.AO01 ISSN 2236-8035
Archives of Oral Research, v. 9, n. 2, p. 149-157, May/Aug. 2013


# Reasons and pattern of tooth mortality as perceived by dental professionals in Udaipur City, Rajasthan, India

## *Percepção das razões e do padrão de mortalidade de dentes por profissionais de odontologia da cidade de Udaipur, Rajasthan, Índia*

**Nagesh Bhat[a], Ruchi Mitra[b], Jaddu Jyothirmai Reddy[c], Swapnil Oza[d], Rahul Patel[e], Sopan Singh[f]**

[a] BDS, MDS, Professor and Head of Department, Department of Public Health Dentistry, Darshan Dental College and Hospital, Loyara, Udaipur - 313011, Rajasthan, India.
[b] BDS, Post Graduate Student, Department of Public Health Dentistry, Darshan Dental College and Hospital, Loyara, Udaipur - 313011, Rajasthan, India, drruchimitra@gmail.com
[c] BDS, MDS, Senior Lecturer, Department of Public Health Dentistry, Darshan Dental College and Hospital. Loyara, Udaipur - 313011, Rajasthan, India.
[d] BDS, Post Graduate Student, Department of Public Health Dentistry, Darshan Dental College and Hospital. Loyara, Udaipur - 313011, Rajasthan, India.
[e] BDS, Post Graduate Student, Department of Public Health Dentistry, Darshan Dental College and Hospital. Loyara, Udaipur - 313011, Rajasthan, India.
[f] BDS, Post Graduate Student, Department of Public Health Dentistry, Darshan Dental College and Hospital. Loyara, Udaipur - 313011, Rajasthan, India.

Abstract

**Objectives**: The aim of the present study was to assess the reasons for tooth mortality as perceived by the dentists for the patients attending the dental clinics and hospitals in Udaipur city. **Material and methods**: A closed-ended questionnaire survey was conducted among 211 dental practitioners of Udaipur city. The reasons for extraction of permanent and deciduous teeth among patients who had attended during the study period were categorized and the dentists were requested to record the age and sex of the patient, the tooth extracted, and the reason for the extraction. **Results**: A total of 785 permanent teeth were extracted. There was a significant difference observed between the number of extractions in males (53.1%) and females (46.9%) (P<0.029). Extractions were most common in the 55-64 years of age group (32.7%). Dental caries (206, 26.2%) and periodontitis (188, 23.9%) were the most frequent reasons for tooth extraction. **Conclusion**: The results of the present study revealed caries as the dominant reason given by dentists for tooth extraction in all the age groups of the subjects studied.

**Keywords**: Tooth extraction. Dental caries. Periodontal diseases.

Resumo

***Objetivos**: O objetivo do presente estudo foi avaliar a percepção das razões de mortalidade dentária pelos dentistas em relação aos pacientes que frequentam as clínicas odontológicas e hospitais na cidade de Udaipur. **Materiais e métodos**: Uma pesquisa com questionário fechado foi realizada com 211 dentistas da cidade de Udaipur. As razões para a extração de dentes permanentes e decíduos entre os pacientes que receberam atendimento no período do estudo foram categorizadas e os dentistas foram solicitados a registrar a idade e o sexo do paciente, o dente extraído e a razão para a extração. **Resultados**: Um total de 785 dentes permanentes foi extraído. Houve diferença significativa observada entre o número de extrações no sexo masculino (53,1%) e feminino (46,9%) (P < 0,029). Extrações foram mais comuns no grupo de idade de 55 a 64 anos (32,7%). Cárie dentária (206, 26,2%) e periodontite (188, 23,9%) foram os motivos mais frequentes para extração de dentes. **Conclusão**: Os resultados do presente estudo revelaram a cárie como a razão dominante dada por dentistas para extração de dentes em todas as faixas etárias dos sujeitos estudados.*

***Palavras-chave**: Extração dentária. Cárie dentária. Doenças periodontais.*

## Introduction

Tooth loss is a terminal event in the life of a tooth and a frequent occurence in individuals with uncared and neglected oral cavity (1). Tooth loss has its impact not only on masticatory function but also on the esthetics of an individual. Tooth mortality provides some of the necessary information on the prevalence of dental diseases, on the availability of dental treatments, on the attitude towards dental extractions, and it is crucial for the planning of dental health services (2). The decrease in the number of teeth results in poor dietary habit and deterioration of quality of life (QOL) (3, 4). There has been a shift in emphasis from extraction to prevention, that is, for preserving teeth as much as possible (5-7). The most important function of dental profession is to prevent tooth loss (8). Tooth loss is the ultimate barometer of failure or success in dentistry and dental health programs (9). Success is measured by the declining rates of edentulism and an increase in the number of retained teeth (10). Despite the significant improvements in oral health among adults, tooth mortality remains a dental public health problem. Studies on tooth loss have shown that a substantial proportion of adults are still losing teeth (11).

A recent study found that both dental caries and periodontal reasons accounted equally for tooth loss in Asian population (12). Dental caries was reported to be the most frequent reason for tooth extraction in Japanese (13), Chinese (14), and Sri Lankan population (15). In addition, some authors have reported that markedly higher numbers of teeth have been lost due to periodontal reasons compared to dental caries in United States and Canada (16). However, in India, data available regarding tooth mortality is sparse. A South Indian study conducted to determine the pattern of caries experience among elderly population aged over 60 years showed a mean of 13.51, of which the 'missing' component was 10.98. The sample population had an average of 18.42 teeth present in the total Decayed, Missing, and Filled teeth (DMFT) (17). With no information available on prevalence of tooth mortality in Udaipur City, Rajasthan, India, the present study was undertaken to determine the reasons for tooth mortality as perceived by the dental professionals in Udaipur city, Rajasthan, India.

## Material and methods

A closed-ended questionnaire study was conducted to assess the reasons for tooth mortality as perceived by the dental professionals among the patients attending the three Dental Colleges and Hospitals (Darshan Dental College & Hospital, Loyara, Pacific Dental College & Hospital, Debari, R.R. Dental College, Umeda) and the private dental clinics and the Medical hospitals with a dental wing in the Udaipur city, Rajasthan, India.

The ethical clearance was obtained from the ethical committee of Darshan Dental College and

Hospital, Loyara, Udaipur, Rajasthan, India. The study participants were clearly informed about the study and a written informed consent was obtained.

From the 2011 yellow pages directory (18) and the list of directory of IDA (Indian Dental Association) members from Udaipur city (19) (2011), all the 224 dentists were contacted personally, working in private and public sectors practicing dentistry in Udaipur city. In an attempt to maximize the response rate, a telephone call was made to all dentists before the initial survey. The telephone numbers were not available for 46 dentists and they were contacted personally. Out of the original sample of 224 dentists, 13 were ineligible because 4 of them had retired and they were not in clinical practice, 9 dentists did not respond, and 2 dentists could not be located because they were out of town during the study period. For the remaining 211 dentists, a questionnaire on dentist's demographics and practice characteristics, the detailed criteria for determining the reason for tooth extraction was administered. Each dentist was requested to file a recording sheet for each patient who required the extraction of one or more permanent teeth during a period of two weeks in March 2012 (Table 1). For each extraction of permanent teeth, the dentists recorded the age and sex of the patient, the type of tooth extracted and the main reason for the extraction. The dentists chose from the questionnaire as the reasons for extractions and other reasons as given by the dentists (enclosed in Table 2).

The data was compiled systematically, transferred from a pre-coded performa to a computer, and a master table was prepared using Microsoft Excel 2007. In order to evaluate the test–retest reliability of the questionnaire kappa (k), weighted kappa (kw) were used and internal consistency was assessed by Cronbach's alpha (α) coefficients (k = 0.82) (kw = 0.8) (α = 0.72). Chi- square test was used to find an association between age and gender in relation to tooth loss. Data was statistically computed by using simple descriptive statistics by SPSS 15.0.

## Results

Table1 and Table 2 represent the recording sheet for each patient and the questionnaire for the reasons and pattern of tooth loss as given by the dental professionals respectively.

Table 3 represents the demographic and practice characteristics of the 211 dentists participating. Of these, 107 (50.7%) were in general practice, while

**Table 1** - Recording sheet for each patient

| PATIENT EXTRACTION RECORD |
|---|
| PATIENT'S NAME ..... AGE..... SEX..... |
| OPD no..... DATE..... |
| TOOTH/TEETH EXTRACTED (FDI TOOTH NUMBER)..... |
| REASON FOR EXTRACTION..... |

**Table 2** - Questionnaire for the reasons and pattern of tooth loss

| | |
|---|---|
| | **NAME:..... AGE:..... SEX:.....**<br>**DESIGNATION:..... YEARS OF PRACTICE:.....** |
| 1. | How many patients are treated in a week?<br>a) 1-20 b) 21-40 c) 41-60 d) >60 ☐ |
| 2. | Average number of hours worked per week. |
| 3. | Do you practice extraction of teeth?<br>a) Yes b) No ☐ |
| 4. | Which gender was most commonly involved in the extraction of teeth?<br>a) Male b) Female ☐ |
| 5. | In which age group extraction was more common?<br>a) 15-24 yrs b) 25-34 yrs c) 35-44 yrs d) 45-54 yrs<br>e) 55-64 yrs f) 65-74 yrs g) >75yrs ☐ |
| 6. | What were the reasons for extraction of teeth? (mark any two most appropriate options)<br>a) dental caries b) periodontal problems c) Endodontic Failure d) Tooth fracture<br>e) Tooth impaction f) Orthodontic problem g) prosthodontic purpose<br>h) Overretained i) Supernumerary teeth j) Aberrant tooth position k) Pericoronitis<br>l) Cystic lesion or Tumor m) External or Internal Resorption<br>n) Tooth involving fracture line<br>o) Patient's request: tooth could be saved but patient preferred extraction<br>p) Any other reasons ..... ☐ ☐ |
| 7. | Which tooth was most frequently extracted?<br>PERMANENT MAXILLARY MANDIBULAR<br>a) Central Incisor ☐ ☐<br>b) Lateral Incisor ☐ ☐<br>c) Canine ☐ ☐<br>d) Premolar ☐ ☐<br>e) Ist Molar ☐ ☐<br>f) IInd Molar ☐ ☐<br>g) IIIrd Molar ☐ ☐ |

104 (49.3%) were involved in specialized practice. The majority (122, 57.8%) of the dentists had a practice experience of 1-5 years and 110 (52.1%) of them treated an average of 21-40 patients in a week and 111 (52.6%) worked for 30-40 hours per week.

Table 4 shows the distribution of teeth extracted according to age and sex. The age of the patients ranged between 15 and 96 years. Overall, 785 teeth were extracted during the study period. There was a significant difference observed between the number of extractions in males (417, 53.1%) and females (368, 46.9%) ($P < 0.0292$). The majority of teeth extractions was performed in 55-64 (257, 32.7%) years of age. Among the group of 45-74 years of age, the prevalence of male extraction was predominant when compared to that of females ($P < 0.032$).

**Table 3** - Distribution of dentists according to demographic and practice characteristics

| Characteristics | n (%) |
|---|---|
| **Qualification (211)** | |
| BDS* | 107 (50.7) |
| MDS** | 104 (49.3) |
| **Years of Practice (211)** | |
| Na*** | 11 (5.2) |
| 1-5 | 122 (57.8) |
| 5-10 | 58 (27.5) |
| 10-15 | 16 (7.6) |
| 15-20 | 4 (1.9) |
| **Average number of patients treated in typical week** | |
| 1-20 | 38 (18) |
| 21-40 | 110 (52.1) |
| 41-60 | 53 (25.1) |
| >60 | 10 (4.7) |
| **Average number of hours worked per week** | |
| 30-40 | 111 (52.6) |
| 40-50 | 97 (46.0) |
| ≥50 | 3 (1.4) |

BDS*- Bachelor of Dental Surgery; MDS**- Master of Dental Surgery; Na***- academic postgraduates

**Table 4** - Distribution of number of teeth extracted according to age and sex

| AGE (years) | MALE | FEMALE | TOTAL | PERCENTAGE (%) |
|---|---|---|---|---|
| 15-24 | 12 | 17 | 29 | 3.69 |
| 25-34 | 23 | 18 | 41 | 5.22 |
| 35-44 | 36 | 24 | 60 | 7.64 |
| 45-54 | 58 | 47 | 105 | 13.37 |
| 55-64 | 134 | 123 | 257 | 32.73 |
| 65-74 | 102 | 93 | 195 | 24.84 |
| >75 | 52 | 46 | 98 | 12.48 |
| TOTAL | 417 | 368 | 785 | 100 |

Source: Research data

Figure 1 shows a total of 785 teeth were extracted in the study period due to various reasons. The results of the study showed that the major reason for extraction was dental caries (206, 26.2%) followed by periodontitis (188, 23.9%). Patient's request for extraction was the main reason in 80 (10.2%). This reflects the socioeconomic setup in which dental treatment, due to its cost, was given low priority.

Tooth impaction resulted in 79) (10.06%) extractions. Endodontic failure resulted in extractions mandibular canine followed by maxillary canine (2, 0.25%) (Table 5).

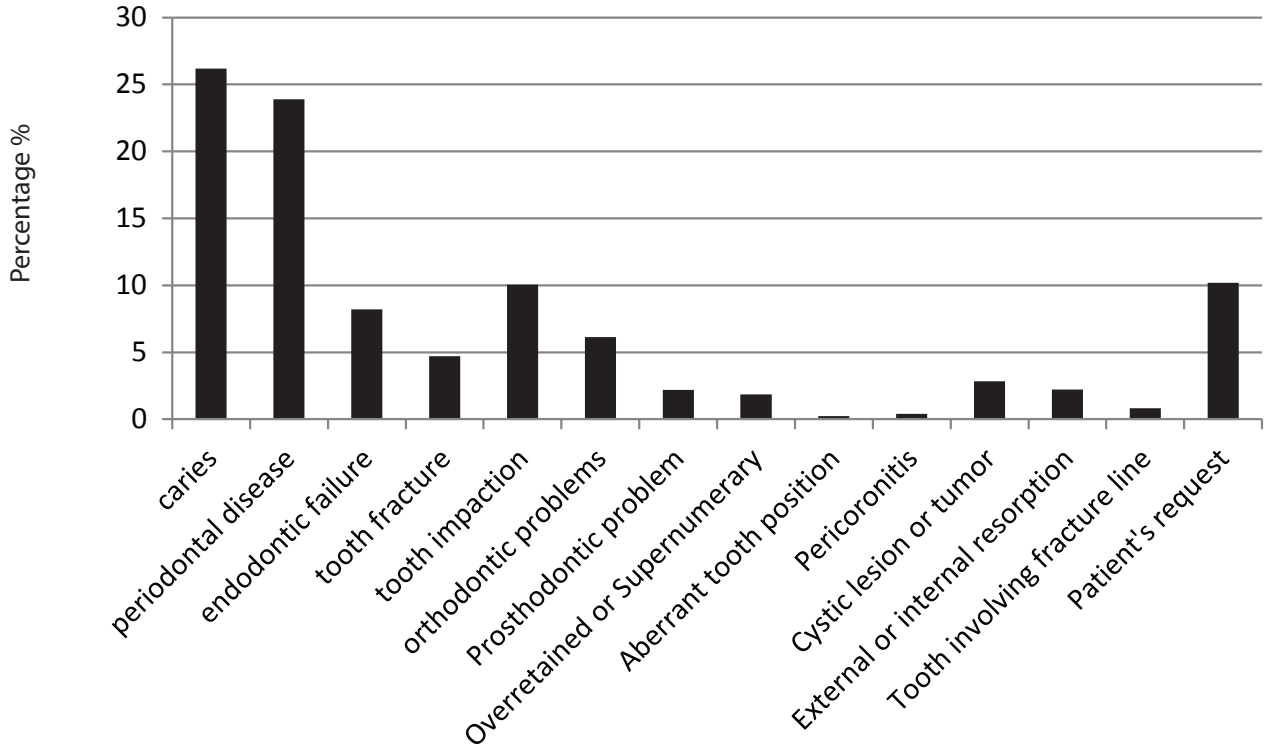


**Figure 1** - Reasons for tooth extraction as reported by the dentists

of 64 (8.2%) and tooth fracture or trauma of 37 (4.7%) teeth.

There was no significant difference between rates of extraction on left and right sides of the oral cavity (P>0.2549). Out of the total 785 teeth extracted, the most frequently extracted were first molars (244, 31.07%), followed by third molars (206, 25.22%), premolars, second molars, incisors, and lateral incisors, respectively. The differences between the teeth extracted from maxillary and mandibular jaws showed that the majority of mandibular first (165, 21.01%) and mandibular third molars (134, 17.07%) were extracted compared to maxillary first (79, 10.06%) and maxillary third molar (72, 9.17%). The least extracted permanent teeth was

## Discussion

The present study was conducted to survey the reasons for tooth mortality as perceived by the dental professionals in patients attending dental clinics and dental hospitals in Udaipur city, Rajasthan, India. The loss of teeth reflects a major public health problem in many developing countries (1, 6). The results of the present study are in agreement with the previous studies in which tooth loss increased as age progressed (1, 10, 17). Maximum tooth loss was observed in subjects of the age group of 55-64 years. The results of the present study showed that dental caries and its sequelae are the principal reason for extraction of teeth followed by periodontal

**Table 5** - Distribution of Permanent teeth type

| Tooth Type | Number of teeth | Percentage of Extraction | Total percentage of Extraction |
|---|---|---|---|
| PERMANENT | | | |
| TEETH | | | |
| Central incisor | | | |
| Maxillary | 45 | 5.73% | |
| Mandibular | 36 | 4.58% | |
| Lateral incisor | | | 10.31% |
| Maxillary | 24 | 3.05% | |
| Mandibular | 35 | 4.45% | |
| Canine | | | 7.50% |
| Maxillary | 2 | 0.25% | |
| Mandibular | 0 | 0.00% | |
| Ist Premolar | | | 0.25% |
| Maxillary | 37 | 4.71% | |
| Mandibular | 38 | 4.84% | |
| IInd Premolar | | | 9.55% |
| Maxillary | 12 | 1.52% | |
| Mandibular | 20 | 2.54% | |
| Ist Molar | | | 4.06% |
| Maxillary | 79 | 10.06% | |
| Mandibular | 165 | 21.01% | |
| IInd Molar | | | 31.07% |
| Maxillary | 41 | 5.22% | |
| Mandibular | 63 | 8.02% | |
| IIIrd Molar | | | 12.14% |
| Maxillary | 72 | 9.17% | |
| Mandibular | 134 | 17.07% | |
| Total | 785 | 100.0% | 25.22% |

disease. Approximately 26.2% of the teeth were extracted due to caries, followed by periodontal diseases (23.9%), similarly to the other studies (20). Trovik et al. (21) reported that 40.2% of teeth were extracted due to caries and its sequelae. Similarly, 43.2% were extracted due to caries in Japan (13). Extraction due to caries was commonly observed in all age groups over 15 years. This result suggested that caries occur throughout the life of the dentulous. The present study showed that 23.9% of the teeth were extracted due to periodontal diseases, and the periodontal disease was the most frequent reason for tooth extraction in patients over 35 years of age, as shown in previous studies (13, 23). Another predisposing factor observed was gender. The present study revealed that, among the males, 417 (53.1%) extractions were performed when compared to females (368, 46.9%), and they were more common in the age group of 55-64 years, similarly to a previous study (22). The females were less frequent visitors than the males, a behavior that contributed to their extraction percentage. At the advanced stage of the disease, the treatment preferred by most males was extraction, and this also reflects the socioeconomic status in which dental treatment, due to its cost, was given low priority. Moreover, in the present study, more posterior than anterior teeth were extracted, a finding consistent with those of others (9, 24).

The limitations in the present study could be due to the presence of some inherent bias resulting from the difference in treatment philosophy and in the classification and definition of reasons for extraction – the socioeconomic factors were also not

taken into consideration. However, these factors are difficult or impossible to control. Furthermore, the study population was selected from 2012 yellow pages directory and the list of directory of IDA members from Udaipur city. Therefore, there might be chances of bias due to noninclusion of the dentists who were not included in the aforementioned directories.

## Conclusion

The present study is probably the first study to report on the trends in tooth loss in general practice in Udaipur city, Rajasthan, India. The results of the present study revealed caries as the dominant reason given by dentists for tooth extractions in all age groups of the subjects studied. Further studies to assess the knowledge about dental treatment, culture, belief, pattern, and barriers to dental visits are needed. Patient motivation plays a major role in retaining patients in the clinics and for dental preventive measures. Hence the preservation of natural dentition and preventive measures should be the ultimate goals of the dental professionals.

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Received: 06/05/2013
*Recebido*: 05/06/2013

Accepted: 12/09/2013
*Aceito*: 09/12/2013