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Tooth extraction: Pattern and etiology from extreme Northwestern Nigeria

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ABSTRACT

Objective: Tooth extraction is a commonly performed procedure in dental clinics. It has been shown that the reasons for and pattern of tooth extraction vary across geographical regions. Few reports on the pattern of extraction among a semi-urban populace exist. To the best of our knowledge, there is no study on the pattern and reasons for tooth mortality from Sokoto, Northwestern Nigeria, which is a semi-urban region. **Materials and Methods:** A review of the records of patients that had tooth extraction at our center between January 2009 and January 2016, was done. Data such as the age, gender, type of tooth extracted, and reasons for extraction were retrieved and analyzed. Cross tabulations for age and gender were also made. The level of statistical significance was set at $P < 0.05$. **Results:** A total of 1167 extractions were performed in 984 patients. An age range of 18–107 years with a mean (\pm standard deviation) of 34.8 (13.3) was observed. Most of the patients were in the 21–30 years age group accounting for 35.7% of cases. Dental caries and its sequelae (DCS) (631, 54.1%) were the most common reasons for extraction, followed by periodontal disease (192, 16.5%). The difference in proportions of reasons for tooth extraction between the gender was statistically significant ($P = 0.02$; $df = 24$). The difference in the reasons for extraction among the age groups was statistically significant ($P < 0.001$; $df = 132$). **Conclusion:** DCS along with periodontal disease were the major reasons for extractions. These are largely preventable causes of tooth extraction; therefore, there is a need for commencement of far-reaching preventative actions.

Key words: Etiology of tooth extraction, pattern of tooth extraction, Northwestern Nigeria

INTRODUCTION

Tooth extraction remains a major cause commonly performed procedure in developing countries.^[1,2] Tooth loss has significant socioeconomic, quality of life general health, and psychological consequences.^[2,3] Indeed, tooth loss has become a global public health concern of immense proportion.^[3,4] Despite being preventable, dental caries and periodontal disease remain the most common reasons for tooth extraction, especially developing nations.^[5,6]

The reasons for tooth extraction and the number of teeth extracted in a population have been linked to the oral hygiene, level of education, socioeconomic status, and individual quality of life.^[3,5,7] Degree of urbanization has also been found to affect the pattern of tooth extractions.^[8,9] Moreover, oral disease burden and its etiological factors exhibit inter- and intra-regional variations.^[10] Although studies on the reasons and pattern of tooth extraction among

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Nigerian patients exist in the literature, most of the studies are from the South, largely urban part of the country, which is sociodemographically different from the extreme northwest of Nigeria.^[11-13] This study highlights the causes and pattern of tooth extraction at a tertiary center in Sokoto, Northwestern Nigeria, and to the best of our knowledge, this is the first study from this geographical entity.

MATERIALS AND METHODS

Records of patients, who had extraction of teeth at the Oral and Maxillofacial Clinic of Usmanu Danfodiyo University Teaching Hospital (UDUTH) between January 2009 and January 2016, were retrieved. UDUTH is a referral hospital located in Sokoto, Northwest Nigeria. It is a 1000-bed capacity hospital which enjoys patronage from over 20 million people from Nigeria and neighboring countries of Niger and Benin republic. It is located in a semi-urban region.

Patients who were <18 years old at the time of treatment were excluded from the study. Data on the age, gender, year of presentation, presenting complaint, type of tooth, and reason for extraction were documented. Reasons for extraction were classified into the following:

- Caries and its sequelae
- Pericoronitis
- Trauma
- Periodontal disease
- Orthodontic
- Others such as impactions, supernumeraries, and prosthetic reasons.

Statistical analyses were done using the Statistical Package for Social Sciences version 20 (IBM SPSS Statistics for Windows, Version 20.0. Armonk, NY: IBM Corp.). Descriptive analyses and cross tabulations

of some variables were done. The level of statistical significance was set at $P < 0.05$.

RESULTS

A total of 1167 extractions were done in 984 patients, giving an average of 1.19 extractions per individual. An age range of 18–107 years with a mean (\pm standard deviation) of 34.8 (13.3) was observed. The male/female proportion was 1.1:1. There was no statistically significant difference in the comparison between the mean age of males and females patients seen ($P = 0.575$). Most of the patients were in the 21–30 years age group accounting for 35.7% of cases [Table 1]. Dental caries and its sequelae (DCS) (631, 54.1%) were the most frequent reasons for extraction [Table 1]. Mandibular teeth were more commonly extracted than maxillary teeth, representing 703 (60.2%) and 464 (39.8%), respectively, of all extractions done. The molars were the most frequently extracted teeth accounting for 780 (66.8%) of all extractions done, while canines (26, 2.2%) were the least frequently extracted teeth [Table 2]. The overall most commonly extracted tooth was the lower left third molar (136, 11.7%).

Extractions were most frequently done on the left side (628, 53.8%), and lower teeth (703, 60.2%) were more frequently extracted than their upper counterparts [Figures 1 and 2]. Pertaining to the frequency of extractions per quadrant, 215, 249, 321, and 382 teeth were extracted from the upper right, upper left, lower right, and lower left quadrants, respectively [Figures 1 and 2].

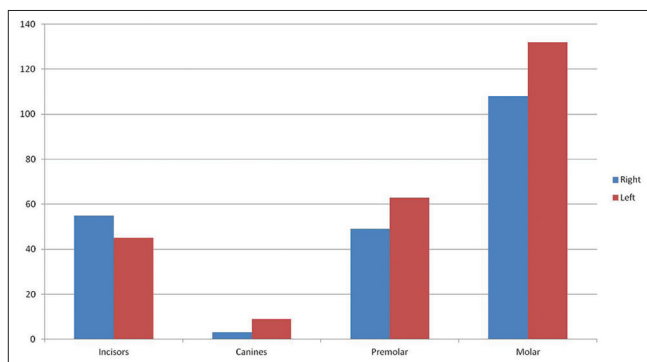
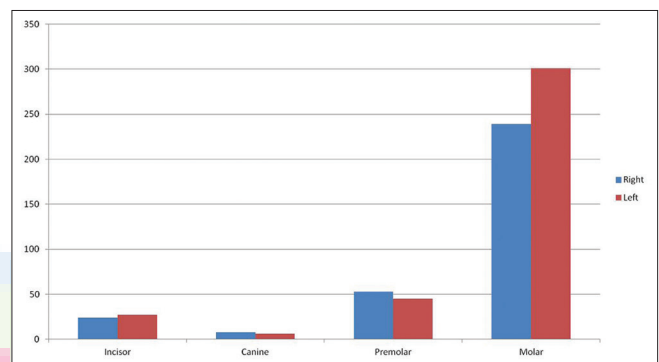
DCS (631, 54.1%) were the most common reasons for extraction, followed by periodontal disease (192, 16.5%) [Figure 3]. DCS was the leading reason for tooth extraction in patients younger than 40 years

Table 1: Gender, age groups, and reasons for dental extraction

	Dental caries and its sequelae	Periodontal disease	Trauma	Pericoronitis	Orthodontic	Others	P, df*
Gender							
Male	353	121	63	104	2	28	0.02, 24
Female	278	71	46	82	1	15	
Age group (years)							
0-10							<0.001, 132
11-20	54	2	15	14	2	4	
21-30	285	27	40	103	1	23	
31-40	166	30	32	49	0	8	
41-50	71	39	9	13	0	7	
51-60	41	53	7	3	0	7	
>60	12	41	3	0	0	4	
Total	631	192	106	182	3	53	

Table 2: The types of tooth extractions according to gender and age group

	Mandibular anteriors	Mandibular posteriors	Maxillary anteriors	Maxillary posteriors	Total
Gender					
Male	34	330	59	194	617
Female	31	308	53	158	550
Total	65	638	112	352	1167
Age group (years)					
0-10					
11-20	4	88	11	34	137
21-30	15	272	44	134	465
31-40	17	149	21	97	284
41-50	15	64	19	46	144
51-60	5	39	10	23	77
>60	9	26	7	18	60
Total	65	638	112	352	1167

**Figure 1:** Frequency of maxillary teeth extraction**Figure 2:** Frequency of mandibular teeth extraction

of age [Table 1]. Its proportion was highest in the 21-30 years age group, being the reason for extraction in 62.5% of extractions done among this age group. The proportion of teeth extracted for periodontal reasons increased with increasing age, constituting over 71.8% of the rationale for tooth extraction in the patients aged 61 years and above [Table 1]. Trauma and impaction as reasons for extraction were observed more commonly among patients in the younger age groups. The difference in proportions of reasons for tooth extraction between gender was statistically significant ($P = 0.02$; $df = 24$) [Table 1]. The difference in the reasons for extraction among the age groups was statistically significant ($P < 0.001$; $df = 132$) [Table 1].

DCS as a reason for extraction was more frequent in males than females although the difference was not statistically significant ($P = 0.171$). Trauma was the main reason for extraction of incisors.

DISCUSSION

Tooth extraction is one of the most frequently performed procedures in dental clinics.^[14] Tooth loss may affect the

quality of life and it is an important marker of oral hygiene and it may predict other conditions such as cardiovascular events and poor cognitive function.^[15] Moreover, it may be an indication of patients' disposition and access to oral care.^[3,4]

There was a slight female predominance, which is in agreement with other studies,^[1,4] but in discordance with the report by Byahatti and Ingafou.^[16] The slight female predominance may be due to the better health-seeking behavior of females compared to their male counterparts.^[17,18] A comparison of the mean age of the patients displayed no statistically significant difference for sex. Majority of the patients were in the third decade of life, which contrasts with the report of Chrysanthakopoulos and Vlassi, who reported the fourth decade of life as the model decade of presentation in a study conducted in Greece.^[19] However, it is in agreement with the report of Saheeb and Sede.^[1] This may suggest geographical variations in the pattern of presentation among patients having dental extractions.

Comparable to some previous studies, mandibular teeth were more often extracted than maxillary teeth

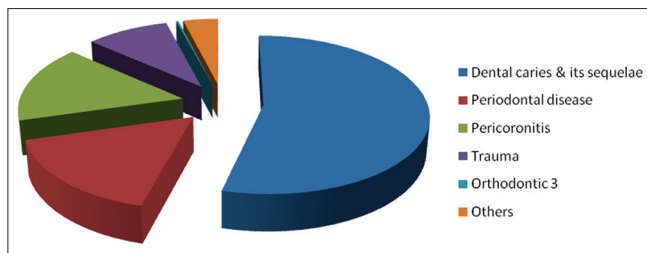


Figure 3: The proportions of the reasons for dental extraction

although other studies observed that maxillary teeth were more often extracted.^[3,20-22] The propensity of food and plaque accumulation to occur more around the mandibular teeth, thus increasing susceptibility to caries formation, may be responsible for this observation.^[23]

DCS were the reasons for extraction in a little over half of the extractions done. This is in sharp contrast with earlier reports by other Nigerian authors, where caries and its sequelae were the reasons for extraction in an overwhelming majority of extractions done. On the other hand, it is similar to the account of Lesolang *et al.*^[24] and Byahatti and Ingafou,^[16] who reported caries and its sequelae as the reasons for extraction in 47.9% and 55.9% of extractions done, respectively. Indeed, caries and its sequelae were the most common reasons for extraction observed in all age groups <60 years of age. The most frequently extracted teeth due to caries and its sequelae were the molars, with the lower left first molar being the most commonly extracted tooth. Treatment preference for carious tooth is often extraction rather than conservation, especially where among patients of low socioeconomic status.^[25,26]

Periodontal disease was the second most frequent reason for dental extractions in this study. Although previous studies in Southwestern Nigeria revealed periodontitis as the most frequent reason for extraction caries was the most commonly encountered reason for extraction in this study.^[27] Periodontal disease was the reason for extraction in 16% of extractions done; this is much lower than the proportions observed by Lesolang *et al.* but higher than figures reported by Alesia and Khalil.^[4,24] A retrospective study among a suburban Southwestern Nigerian population reported periodontal disease as a reason for extraction in a higher proportion of the patients (24.6%).^[28] This may be a reflection of the changing pattern of dental extraction in Nigeria. The increasing consumption of refined food among the population and improved oral hygiene might have led to a reduction in the proportion of extractions due to periodontal disease

and a corresponding increase in the proportion of extractions secondary to caries and its sequelae. Periodontal disease was the major reason for extraction among patients in the 7th decade of life and above.

Recurrent pericoronitis was the third most common reason for extractions, accounting for almost as many extractions as periodontal disease. Tooth impaction represented only 2.4% of extractions among Nigerian patients in a study done by Odusanya, about three decades ago.^[27] Significantly, the proportion of teeth extracted on account of pericoronitis secondary to third molar impaction is much higher than the values reported from other parts of Nigeria.^[1,3,27] However, it is still lower than values reported from the western world where prophylactic extraction of impacted third molars is relatively common.^[29,30]

Trauma was the third most common reason for dental extractions; the proportion observed is approximately twice the figure reported by Odusanya and more recently Saheeb and Sede.^[1,27] This observation may be due to increasing industrialization, increasing rate of road traffic accident, and the high spate in violence in the northern region of Nigeria in recent years.^[31-33] Majority of extractions done due to trauma was mostly among patients in the 18–40 years age bracket. Notably, trauma was not recorded as a cause of extraction in patients older than 70 years. This may be due to the relatively sedentary lifestyle and generally less involvement in assault or interpersonal violence of people with increasing age.^[34] Most teeth extracted due to trauma were the anterior teeth; this may be because of their location in a relatively less protected region.

Orthodontic extractions were quite few in this study, which is comparable to other Nigerian studies.^[3,27] However, this is quite low compared to studies from the western world, where patients are more interested in orthodontic treatment.^[35] The center where this study was done is a developing one which unfortunately lacks an orthodontist presently; this may have influenced the results obtained. Other reasons for extraction observed in this study include failed root canal therapy, prosthetic reasons, and supernumerary teeth. Although these accounted for a comparatively small proportion of the cases seen, the percentages observed are comparable to previous studies.^[4]

CONCLUSION

DCS were the major reasons for tooth mortality in this study, especially among patients in the third and

fourth decades of life. This highlights the importance of dental caries in public health. To stem this trend, we recommend urgent inclusion of oral healthcare in the existing primary healthcare system of our region, improved accessibility of oral healthcare facilities by deploying mobile dental facilities, intensification of oral healthcare awareness campaigns, increased recruitment of dental experts, and fluoridation of community water supply. Furthermore, a research designed to explore the reasons for late presentation among dental patients should be instituted.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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