Patterns and reasons for childhood tooth extraction in Northwest Nigeria

Olanrewaju Abdurrazaq Taiwo[1*], Amidu Omotayo Sulaiman[2], Mutiat Feyisetan Obileye[3], Abdulwarith Akinshipo[4], Alfred Osamudiame Uwumwonse[1], Olubunmi Omoyeni Soremi[5]

[1]Department of Surgery/Dental and Maxillofacial Surgery, College of Health Sciences, Usmanu Danfodiyo University, Usmanu Danfodiyo University Teaching Hospital, Sokoto, [2]Department of Restorative Dentistry, Faculty of Dentistry, University College Hospital, Ibadan, [3]Department of Oral Pathology and Oral Medicine, Faculty of Dentistry, Lagos University College of Medicine, Lagos, [4]Department of Dental and Maxillofacial Surgery, Federal Medical Centre, Birnin-Kebbi, Kebbi State, [5]Department of Dental and Maxillofacial Surgery, Federal Medical Centre, Gusau, Zamfara State, Nigeria

ABSTRACT

Childhood tooth extraction is widespread in developing nations especially in sub-Saharan African owing to high prevalence of oral diseases in the population. Purpose of this study is to analyze the reasons and pattern of tooth extraction among children from Northwest Nigeria. Case records of children <14 years seen at the dental clinic of the Federal Medical centre, Gusau, Zamfara state between January 2011 and December 2012 were retrieved from the Medical Records Department and analyzed for analyzed for gender, age, indication for extraction and tooth/teeth extracted. A total of 181 teeth were extracted in 127 patients (1.4 extractions per patients) over a 2 years study period. There were 66 (51.9%) males and 61 (48.1%) females (M:F = 1.08:1). Dental caries and its sequelae 141 (77.9%) was the leading aetiology for tooth extraction followed by trauma 24 (13.3%). Permanent teeth 121 (66.9%) were twice frequently extracted than primary teeth 60 (33.1%). Mandibular teeth 112 (61.9%) were more commonly extracted than maxillary teeth 69 (38.1%). Posterior teeth 115 (63.5%) extractions nearly double that of anterior teeth 66 (36.5%). First permanent molar extraction predominates 51 (28.1%). Majority of the extractions occurred in the 6-9 years age group 96 (53%). Mandibular posteriors constituted the principal teeth removed in the 6-9 years and 10-13 years age groups. In contrast, maxillary anteriors were the main teeth extracted in the younger age group of 0-5 years. For maxillary anteriors trauma was the highest indication for tooth extraction. In conclusion, dental caries and its sequelae was the primary reason for tooth extraction in the study across all age groups and trauma accounted significantly for removal of maxillary anteriors. Thus, there is a need to critically embark on public enlightenment campaign on preventive oral health.

Key words: Childhood, Dental caries, Reason, Trauma, Tooth extraction

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INTRODUCTION

Childhood tooth extraction is widespread in developing nations, especially in sub-Saharan African owing to high prevalence of oral diseases in the population.[1,2] The consequence huge financial expenditure coupled with significant deterioration in quality-of-life, general and oral health put colossal burden on the public health system.[3,4]

Several reasons have been incriminated in tooth extraction in children. Prominent factors comprise dental caries, periodontal diseases, trauma and orthodontics.[5,6] Reports from industrialized nations demonstrated a significant decrease in dental caries as the cause of tooth extraction.[7,8] In contrast, findings from developing countries showed no U-turn in the current paradigm.[1,9]

In Nigeria, most studies done on tooth extraction have been in adults,[10-12] the few ones focusing on children are

***Address for correspondence**

Dr. Taiwo Olanrewaju Abdurrazaq, Department of Surgery, College of Health Sciences, Usmanu Danfodiyo University, Sokoto, Nigeria. E-mail: droataiwo@yahoo.com

from the south.[1,5,13-15] Thus, the purpose of this study is to analyze the reasons and pattern of tooth extraction among children from Northwest Nigeria. To the best of our knowledge, this is the first of such reports emanating from this region.

The information obtained; we hope would shed more light on the reasons for childhood tooth extraction in this region and help to device suitable treatment and preventive strategies.

MATERIALS AND METHODS

Case records of children who had tooth extraction at the dental clinic of the Federal Medical center between January 1, 2011 and December 31, 2012 were retrieved from the Medical Records Department. Information on age, gender, reason of tooth extraction and type of tooth extracted were collected and analyzed. A total of 181 teeth were extracted in 127 patients (1.4 extractions per patients) over a 2 years study period. There were 66 (51.9%) males and 61 (48.1%) females (male:female = 1.08:1).

The hospital is the only tertiary center in the state, and it is strategically located in the state capital, Gusau, Zamfara state.

Included in the study are those patients whose ages were below 14 years at the time of treatment. The reasons for tooth extractions were categorized into the following:
1. Caries and its sequelae,
2. periodontal disease,
3. Trauma.

Data collected were entered into Microsoft Office Excel 2010 and analyses were performed using Analyze-it for Microsoft excel version 2.25, 12+ (2013). Parametric and nonparametric data were evaluated by independent sample *t*-test and Chi-square analysis; $P < 0.05$ was considered as statistically significant.

RESULTS

The age of the patients ranged from 1.5 to 13 years (mean = 8.18 years ± 2.89 standard deviation). There were no difference between the mean age of males (8.07, 3.15) compared to females (8.40, 2.46) ($t = 0.78$, df = 179, $P = 0.4376$). Dental caries and its sequelae 141 (77.9%) was the leading reason for tooth extraction, followed by trauma 24 (13.3%) [Figure 1 and Table 1].

Majority of the individuals had single extractions 85 (66.9%), followed by double extractions 33 (26%), whereas the rest were triple extractions and above 9 (7.1%). Permanent teeth 121 (66.9%) were twice frequently extracted than primary teeth 60 (33.1%) [Table 2].

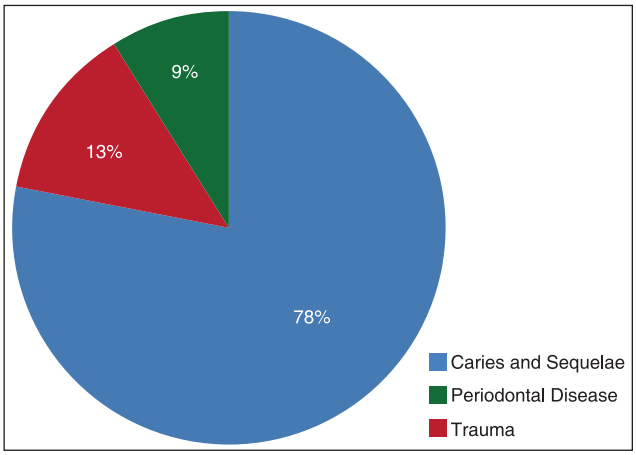

Figure 1: Pie charts of reasons for tooth extractions among patients

Table 1: Reasons for tooth extraction according to gender

Reasons for tooth extractions	Gender (%)		Test statistics	Total (%)
	Female	Male		
Caries and sequelae	66 (36.5)	75 (41.4)	x^2=0.50	141 (77.9)
Periodontal disease	6 (3.3)	10 (5.5)	df=2	16 (8.8)
Trauma	11 (6.1)	13 (7.2)	*P*=0.7782	24 (13.3)
Total	83 (45.9)	98 (54.1)		181 (100)

Table 2: Pattern of tooth extractions

Side of extraction (%)		
Right	98 (54.1)	
Left	83 (45.9)	
Upper	(38.1)	
Lower	112 (61.9)	
Total teeth extracted (%)	181 (100)	
Permanent	121 (66.9)	
Deciduous	60 (33.1)	
	Maxillary (%)	Mandibular (%)
First molar	8 (4.4)	43 (23.8)
Second	10 (5.5)	16 (8.8)
Third	0 (0.0)	0 (0.0)
Total	18 (9.9)	59 (32.6)
First premolars	1 (0.56)	1 (0.56)
Second	0 (0.0)	0 (0.0)
Total	1 (0.56)	1 (0.56)
Central incisor	18 (9.9)	5 (2.8)
Lateral incisor	0 (0.0)	7 (3.9)
Canine	2 (1.1)	10 (5.5)
Total	20 (11.1)	22 (12.2)
Deciduous		
First molar	4 (2.2)	8 (4.4)
Second	7 (3.9)	16 (8.8)
Anteriors	19 (10.5)	6 (3.3)
Total	30 (16.6)	30 (16.6)

Mandibular teeth 112 (61.9%) were more commonly extracted than maxillary teeth 69 (38.1%) [Table 2]. Posterior teeth 115 (63.5%) extractions nearly double that of anterior teeth 66 (36.5%) [Table 2].

Exodontias were more on the left side 98 (54.1%) than the right 83 (45.9%) [Table 2]. First permanent molar extraction predominates 51 (28.1%) followed by second permanent molar 26 (14.4%) [Table 2]. Majority of the extractions occurred in the 6-9 years age group 96 (53%) [Tables 3 and 4]. There was no significant difference, by gender, reason for extraction and tooth type [Tables 1 and 4]. Mandibular posteriors constituted the principal teeth removed in the 6-9 years and 10-13 years age groups [Table 4]. In contrast, maxillary anteriors were the main teeth extracted in the younger age group of 0-5 year [Table 4].

Across all tooth types, dental caries dominated except for maxillary anteriors with trauma the highest indication for tooth extraction [Table 5].

DISCUSSION

Tooth loss is considered as a crucial indicator of oral health status of the individual and the community at large.[1,2] Studies have shown that tooth loss strongly mirrors quality-of-life and nutrition intake of those affected and signal the onset of serious morbidity and disability.[3,14] Findings have shown tooth extraction as the leading dental treatment in children from several resource-constraint nations of Africa despite recent progression in preventive dentistry.[15-17]

Table 3: Reasons for tooth extractions according to age group

Reasons for tooth extraction	Age groups of patients in years (%)			Test statistics	Total (%)
	0-5	6-9	10-13		
Caries and sequelae	16 (8.8)	82 (45.3)	43 (23.8)	x^2=19.53	141 (77.9)
Periodontal disease	2 (1.1)	5 (2.8)	9 (4.9)	df=4	16 (8.8)
Trauma	10 (5.5)	9 (4.9)	5 (2.8)	*P*=0.0006	24 (13.3)
Total	28 (15.5)	96 (53.0)	57 (31.5)		181 (100)

The result of the present study shows a male predominance corresponding with most studies from south western Nigeria,[1,18,19] but in dissonance with others across Nigeria[5,13,20] and Kenya.[16]

Dental caries masks other reasons for tooth extraction accounting for 78% tooth mortality in this series. This attests to similar findings recorded by other investigators across Nigeria and several parts of the world.[1,5-7,10-12,15,16,19-23] Leading organizations in public health (WHO, FDI and IADR) have raised alarm on the surge of dental caries in developing countries and deprived populations across the world. Reports have demonstrated that symptomatic presentation of dental caries is more common.[3,12,20,24,25] There are often severe pain and swelling following long period of comprise in chewing and sleepless nights.[3,24,25] For both parents and children, there is a loss of productivity and valuable schooling to access expensive Curative treatment.[3,20,21] Moreover, future socioeconomic, aesthetic and functional consequences cannot be fully quantified. Our finding points to early exposure to cariogenic food and snacks in this environment; therefore, a lot of work is needed on proper dietary education targeted at mothers, preschool and school age children. It is also exigent to popularize preventive dental care among our young population.

In this study, trauma was the second frequent indication for childhood tooth extraction; accounting for most of anterior teeth mortality. This figure is quite high and in discord with some reports from other parts of Nigeria.[5,13] This finding might be as a result of ignorance resulting in late presentation for appropriate treatment. Epidemiology studies worldwide mentioned high prevalence of childhood traumatic dental injuries.[26,27] Fall, collision and playing are some of the common causes of dental injury in children.[27,28] A West Indies study identified dental trauma as one of leading children dental emergencies in their center.[29] The literature revealed the frequency of traumatic dental injuries in boys to double that of girls.[28,30,31] However, the current study showed an approximate equal gender ratio. Anecdotally, in our settings many children are left unsupervised, while playing both at home and school, sometimes they cross the road without being accompanied by adults and on many occasions they are transported to school and other places sitting behind

Table 4: Types of tooth extracted according to age groups

Tooth types	Age groups of patients in years (%)			Test statistics	Total (%)
	0-5	6-9	10-13		
Mandibular anteriors	1 (0.6)	17 (9.4)	11 (6.1)	x^2=7.51, df=6	29 (16.0)
Mandibular posteriors	17 (9.4)	38 (21.0)	29 (16.0)	*P*=0.276	84 (46.4)
Maxillary anteriors	5 (2.8)	22 (12.2)	10 (5.5)		37 (20.4)
Maxillary posteriors	5 (2.8)	19 (10.5)	7 (3.9)		31 (17.1)
Total	28 (15.5)	96 (53.0)	57 (31.5)		181 (100.0)

Table 5: Reasons for tooth extractions according to tooth types

Tooth type	Reasons for tooth extractions			Test statistics	Total (%)
	Caries and sequelae	Periodontal disease	Trauma		
Mandibular anteriors	24 (13.3)	3 (1.7)	2 (1.1)	x^2=67.99	29 (16.0)
Mandibular posteriors	75 (41.4)	8 (4.4)	1 (0.6)	df=6	84 (46.4)
Maxillary anteriors	15 (8.3)	2 (1.1)	20 (11.1)	*P*<0.0001	37 (20.4)
Maxillary posteriors	27 (14.9)	3 (1.7)	1 (0.6)		31 (17.1)
Total (%)	141 (77.9)	16 (8.8)	24 (13.3)		181 (100)

reckless commercial motorcycle rider without any helmet or protective wear. The consequences of untreated dental trauma might not be apparent immediately, but could lead to the eventual loss of the tooth in the long-term.[32] The study suggests urgent attention in enlightening the public on dental trauma and preventive strategies.

In the present work, periodontal disease accounted for 9% of tooth extractions compared with 0.45% in a previous report from southwest Nigeria.[18] We found that acute necrotizing gingivitis (ANUG) and localized juvenile periodontitis were the principal periodontal diseases implicated in the study. In some parts of sub-Saharan Africa; poverty, malnutrition and ignorance are still major public health problems.[33] Several children mostly from the rural communities present at later stages of the disease when tissue destruction would have been far advanced necessitating extraction in addition to antibiotics treatment.

Finding in this study indicated that more than two-third of extractions involved one tooth similar to various studies.[1,5] In consonance with other reports,[5,13] this current work showed the right side to be more involved in tooth extraction. Some researchers[5,31] postulated that predominance of right-handed individuals might account for this scenario owing to the attendant difficulty in brushing the right quadrants of the mouth.

Our investigation demonstrated a preponderance of permanent teeth extraction over deciduous inconsistent with the literature.[5,13,18,19,21] Majority of children in our cohort fall into the 6-13-year-old group; mixed dentition and taking of cariogenic diet, especially at school might be responsible for the present finding.

Mandibular teeth accounted for overwhelming greater proportion of extraction than maxillary teeth, in consensus with numerous studies.[1,13]

Our study clearly indicates that posterior teeth were mostly extracted than anterior teeth confirming earlier observations in the literature.[1,5,13] Vulnerability of these teeth to caries owing to their anatomy and function of mastication have been adduced as plausible explanation. We also add that poor dexterity in tooth brushing owing to cognitive development compounded by difficulty in accessing these posterior teeth.

Maxillary central incisor was the most frequently extracted anterior teeth in both deciduous and permanent teeth with trauma the common cause. Similar reports from the literature have shown the susceptibility of this tooth to trauma in children.[26-28,30,34] Excess over jet, class II division I malocclusion, inadequate upper lip coverage and nonwearing of protective mouth guard during contact sports have been mentioned as risk factors.[26,27] Anterior teeth occupy conspicuous and vintage position in the mouth. Hence, there losses portend grave esthetic and functional outcomes.[27,28] Thus, oral health education is necessitated regarding the causes, prevention and treatment of injuries to these teeth.

Overall, the result of the current series observed that the first mandibular permanent molars were the most commonly extracted teeth. This conflicts with other works[5,13,18] that establish primary first or second molar to be more involved in childhood tooth extraction. Chukwumah *et al.*[5] mentioned that these observations are due to fact that the second deciduous molar is the last primary teeth to be shed, while the first permanent molar is one of the earliest permanent teeth to erupt; hence, are more subjected to the ravages of dental caries.

The majority of extraction occurred in 6-9 years age group (53%) with mostly posterior teeth removed. This is comparable to earlier research conducted in Nigeria and USA.[1,5,35] Our data revealed that maxillary teeth extractions were dominant in the 0-5 years owing mainly to caries. This result might suggest the urgent need to critically develop extensive preventive strategies targeted at this group to ensure early dental attendance and decrease the ravages of dental caries.

In summary, the results of the present study confirmed dental caries as a substantial public health problem. It accounted for the majority of childhood tooth extractions with lower molars the most frequently extracted tooth type. The study further revealed the high prevalence of trauma-related tooth extractions. It also demonstrates that ANUG and other childhood aggressive periodontitis remain a problem in our locality. Thus, there is urgent effort to embark on oral health awareness campaign in schools and local communities, and promote the benefits of prompt and preventive regular dental attendance so

as to ensure that young patients reach adulthood with optimal dental health.

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