

# Analysis of Tooth Mortality Among Nigerian Children in a Tertiary Hospital Setting

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## Abstract

**Background:** Tooth mortality is important in evaluating dental care as tooth loss is a reflection of cumulative effects of past disease and treatment practices. **Aim:** The aim of this study is to analyze the pattern of tooth mortality among pediatric dental patients treated at the University of Benin Teaching Hospital, Benin City, Nigeria. **Subjects and Methods:** This was a retrospective study of patients treated at the Pediatric dental clinic of the University of Benin Teaching Hospital, Benin City between June 2007 and April 2012. Patients' age, sex, indication for extraction and type of tooth were reviewed. Data analysis in the form of frequency, percentages, cross tabulation, Chi-square statistics were performed using the statistical package for the social sciences (SPSS) (Chicago IL, USA) version 17.0. **Results:** A total of 712 patients between the ages 0 and 16 years were seen and 1039 extractions were performed. Tooth extraction was performed more among females 53.4% (380/712) and those aged 6-12 years 54.1% (384/712). About one-third 33.1% (236/712) of the patients had two or more teeth extraction. The deciduous teeth were more frequently extracted 65.2% (677/1039) with second molars being the most frequently extracted deciduous teeth and first molars being the most frequently extracted permanent teeth. Permanent third molar accounted for the 0.7% (7/1039) of the extracted teeth in this study. The extractions were done more on the lower arch and on the right side of the mouth. In this study, dental caries was the leading reason for extraction of the deciduous and permanent teeth. Neonatal teeth and supernumerary accounted for 0.9% (4/438) and 0.7% (2/289) of deciduous and permanent dentition extractions respectively. **Conclusion:** Dental caries was the leading reason for extraction in both deciduous and permanent dentitions with female patients aged 6-12 years receiving the most tooth/teeth extractions. Stakeholder in child health need to pay adequate attention to dental caries preventive approaches to enable the pediatric population reach adulthood with a healthier dentition.

**Keywords:** Deciduous teeth, Extraction, Permanent teeth, Reasons

## Introduction

The analysis of tooth mortality statistics, which is analogous to mortality statistics in the medical field is important in evaluating dental care as tooth loss is a reflection of cumulative effects of past disease and treatment practices.<sup>[1]</sup> Tooth extraction, which is a prevalent oral health procedure among

children attending dental clinics in developing countries, is a predominant cause of tooth mortality. It constitutes 58.8% of rendered procedures among child dental patient in a tertiary hospital in Nigeria<sup>[2]</sup> and also accounts for 25.4% and 21.4% of the rendered treatments to the first visit children at private and public pediatric dental clinic in Kenya respectively.<sup>[3,4]</sup> The noted prevalence of tooth extraction in developing countries is due to the episodic symptomatic dental visit, delayed presentation due to ignorance and poverty and negative attitude toward the restoration of teeth.<sup>[5-7]</sup>

Several studies on the causes of tooth loss and indications for teeth extraction in many countries have been conducted, but most of them were among the adult population.<sup>[8-10]</sup> It has been established that the choice of treatments for the child dental patient depends on effective management of the

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child's behavior, availability of appropriate materials and techniques for the range of encountered situations, thereby having implication on the pattern of tooth extraction among children.<sup>[11]</sup> Despite this, few studies have been conducted to determine the reasons for tooth extraction among children. The studies outside Nigeria did not include all ages that make child dental population<sup>[12,13]</sup> while the studies in Nigeria were conducted mainly in tertiary hospitals in south west geopolitical zone.<sup>[14,15]</sup> The variation of oral diseases in different geopolitical zone due to cultural, socio-economic and religious differences and the influence of belief and culture of the people, oral health awareness, accessibility and availability of dental services may affect reasons for tooth extraction thereby justify the need for such a study in south-south geopolitical zone Nigeria. The information on reason for tooth extraction among children attending tertiary hospital in Benin-City will significantly compliment the available information on tooth extraction among children sourced from private dental practice as the inhabitants of Benin-City dominantly patronize government-owned hospital for dental care.<sup>[16]</sup> The objective of the study was to analyze the pattern of tooth mortality among pediatric dental patients treated in University of Benin Teaching Hospital, Benin City, Nigeria.

### Subjects and Methods

This was a 5 year (from June 2007 to April 2012) retrospective study of patients treated at the Pediatric Dentistry Clinic of the University of Benin Teaching Hospital, Benin-City, Nigeria. Ethical approval for the study was obtained from University of Benin Teaching Hospital Research and Ethics Committee. The criterion for inclusion was all patients within the ages of 0-16 years who had tooth/teeth extraction done under local anesthesia. Those patients whose records were available with the complete research information were included while those with incomplete research information in their records were excluded. The patients' data were obtained from clinic log book and case notes retrieved from the medical records. The data were collected using self-developed data capture form include age, sex, reason for extraction and the extracted tooth/teeth. The data was subjected to descriptive statistics in the form of frequency, percentages, cross tabulation, Chi-square statistics using the statistical package for the social sciences (SPSS) (Chicago IL, USA) version 17.0. The age and gender were considered as independent variables while reasons and type of teeth extractions were the dependent variables.  $P < 0.05$  was considered statistically significant.

### Results

A total of 712 records of patients between the ages 0 and 16 years were seen and 1039 extractions were performed. Among the patients, 697 of them had either deciduous or permanent teeth extraction while 15 of them had both deciduous and permanent teeth extractions. Age distribution of the studied patients was 0-5 years 17.2% (122/712), 6-12 year

54.1% (384/712) and 13-16 years 28.8% (206/712). A total of 46.6% (332/712) of the participants were males while 53.4% (380/712) were females giving a male to female ratio of 1:1.5 [Table 1]. About two-thirds 66.9% (476/712) of patients had only one tooth extraction while the remaining 33.1% (236/712) had more than one tooth extraction [Table 2]. The deciduous teeth were more frequently extracted teeth making 65.2% (677/1039) of extracted teeth. The second molars were the most frequently extracted deciduous teeth while first molars were the most frequently extracted permanent teeth. It was found that permanent third molar accounted for the 0.7% (7/1039) of extracted teeth in this study. The extractions were done more on the lower arch and on the right side of the mouth [Table 3]. Dental caries were

**Table 1: Age and gender distribution of the patients**

Age (years)	Gender n (%)		Total n (%)	df	P value
	Male	Female			
0-5	59 (17.8)	63 (16.6)	122 (17.2)	2	0.19
6-12	188 (56.6)	196 (51.6)	384 (53.9)		
13-16	85 (25.6)	121 (31.8)	206 (28.9)		
Total	332 (46.6)	380 (53.4)	712 (100.0)		

**Table 2: Distribution of number of extracted tooth/teeth among the patients**

No. of teeth	Frequency	Percent
1	476	66.9
2	180	25.3
3	32	4.5
4	18	2.5
5	3	0.4
7	2	0.3
8	1	0.1
Total	712	100.0

**Table 3: Pattern of deciduous and permanent teeth extraction among the patients**

Tooth type	Area of the mouth				Total
	URQ	ULQ	LRQ	LLQ	
Deciduous central incisor	49	35	49	47	180
Deciduous lateral incisor	12	15	22	22	71
Deciduous canine	18	12	12	10	52
Deciduous first molar	38	34	46	53	171
Deciduous second molar	46	46	63	48	203
Permanent central incisor	6	11	0	0	17
Permanent lateral incisor	1	0	0	0	1
Permanent canine	0	0	0	0	0
Permanent first premolar	7	6	5	4	22
Permanent second premolar	0	1	2	2	5
Permanent first molar	36	31	104	105	276
Permanent second molar	2	4	13	13	32
Permanent third molar	1	1	3	2	7
Supernumerary	0	2	0	0	2
Total	216	198	319	306	1039

URQ: Upper right quadrant, ULQ: Upper left quadrant, LRQ: Lower right quadrant, LLQ: Lower left quadrant

the leading common reason for extraction of the deciduous 46.3% (203/438) closely followed by retained deciduous teeth 40.9% (179/438). Among 0-5 year and the 6-12 year old patients, dental caries was the predominant reason for tooth extraction followed by retained deciduous teeth while the reverse was the case among the 13-16 years old patients as retained deciduous teeth was the most common reason for the extraction of deciduous teeth followed by dental caries. Neonatal teeth accounted for 0.9% (4/438) of deciduous dentition extraction [Table 4]. Dental caries were also the leading common reason for extraction of permanent dentitions 84.4% (244/289) and this was evident among the 6-12 and 13-16 year age group. Supernumerary accounted for 0.7% (2/289) of extraction in the permanent dentition [Table 5].

## Discussion

In this study, a total of 1039 extractions were done over the 5 years period translating to 208 extractions per year, which is in keeping with reports of studies at the University College Hospital in Ibadan and general practice clinic in Benin-City.<sup>[14,16]</sup> The fact that one-third (33.1%) of the studied patients had extraction of 2 or more extractions reflects the poor utilization of dental services and late reporting for dental treatment thereby explaining high number of extractions in this study.<sup>[7]</sup> The lower contribution of failed endodontic treatment and orthodontic reasons for tooth extraction in this study is also a supporting explanation.

The extractions both deciduous and permanent dentitions were more commonly performed among females (53.4%) than males (46.6%). This was similar to finding of a previous study among the rural population in Benin-City,<sup>[14]</sup> but contrasted to findings of a study in South Western, Nigeria, which reported more extractions among males than females.<sup>[2]</sup> The heightened tendencies of parents and guardian to seek ways to ameliorate pain for their female children making them, a more frequent dental visitors than male children and this behavior explains their preponderance in receipt of tooth/teeth extraction.<sup>[17]</sup>

The deciduous teeth were more frequently extracted (65.2%) than permanent teeth in this study and this is similar to other studies reported from Southwestern Nigeria.<sup>[14,15]</sup> The significant contribution of retained deciduous teeth as a reason for deciduous teeth extraction and the negative attitude toward the restoration of deciduous teeth among parents may be the explanation.<sup>[7,14]</sup> The deciduous second molars were the most frequently extracted teeth among the studied patients. This is not unconnected with the fact that the 6-12 years old children had more extractions in this study as the permanent first molars are the first teeth to erupt in mixed dentition stage while deciduous second molars are the last set of teeth to exfoliate. This school going children at mixed dentition stage indulgence in more cariogenic snacking with the onset of schooling and subsequently, added to the lack of organized oral preventive strategies increases the pre-disposition to

**Table 4: Reasons for deciduous tooth extraction among the patients**

Reason	Age (years) n (%)			Gender n (%)		Total n (%)
	0-5	6-12	13-16	Male	Female	
Dental caries	54 (44.6)	146 (49.2)	3 (15.0)	102 (47.4)	101 (45.3)	203 (46.3)
Trauma	17 (14.0)	8 (2.7)	0 (0.0)	11 (5.1)	14 (6.3)	25 (5.7)
Retained tooth	40 (33.1)	122 (41.1)	17 (85.0)	90 (41.9)	89 (39.9)	179 (40.9)
Failed endodontic tx	4 (3.3)	5 (1.7)	0 (0.0)	4 (1.9)	5 (2.2)	9 (2.1)
Neonatal	4 (3.3)	0 (0.0)	0 (0.0)	1 (0.5)	3 (1.3)	4 (0.9)
Orthodontic reason	1 (0.8)	2 (0.7)	0 (0.0)	2 (0.9)	1 (0.4)	3 (0.7)
Supernumerary	-	-	-	-	-	-
Multiple reasons	1 (0.8)	14 (4.7)	0 (0.0)	5 (2.3)	10 (4.5)	15 (3.4)
Total	121 (27.6)	297 (67.8)	20 (4.6)	215 (49.1)	223 (50.9)	438 (100.0)

tx: Treatment

**Table 5: Reasons for permanent tooth extraction among the patients**

Reason	Age (years) n (%)			Gender n (%)		Total n (%)
	0-5	6-12	13-16	Male	Female	
Dental caries	0 (0.0)	86 (85.1)	158 (84.5)	98 (79.7)	146 (88.0)	244 (84.4)
Trauma	0 (0.0)	5 (5.0)	6 (3.2)	8 (6.5)	3 (1.8)	11 (3.8)
Retained tooth	1 (100.0)	1 (1.0)	5 (2.7)	4 (3.3)	3 (1.8)	7 (2.4)
Failed endodontic tx	0 (0.0)	3 (3.0)	4 (2.1)	2 (1.6)	5 (3.0)	7 (2.4)
Neonatal teeth	-	-	-	-	-	-
Orthodontic reason	0 (0.0)	2 (2.0)	4 (2.1)	3 (2.4)	3 (1.8)	6 (2.1)
Supernumerary	0 (0.0)	1 (0.1)	1 (0.1)	1 (0.1)	1 (0.1)	2 (0.7)
Multiple reasons	0 (0.0)	3 (4.0)	9 (5.4)	7 (6.5)	5 (3.6)	12 (4.8)
Total	1 (0.3)	101 (35.0)	187 (64.7)	123 (42.6)	166 (57.4)	289 (100.0)

tx: Treatment

dental caries and eventual extraction of affected teeth. It was found that permanent third molar accounted for the 0.7% of extracted teeth in this study signaling early eruption of third molars among some Nigerian children and further study on eruption of these teeth is recommended. The lower molars were noticed to be the most frequently extracted teeth in the permanent dentition especially from the right side of the mouth. The increased time factor in dental caries triad due to earlier eruption of mandibular teeth than their maxillary counterparts may be the explanation. Though not assessed in the study, more individuals are right handed and less likelihood of right handed individual to clean the right side of their mouth is explains why teeth in the right side of the mouth will be diseased leading to extraction.

Dental caries were the leading reason for extraction in both deciduous and primary dentitions. The increasing burden of dental caries in Nigeria especially with D component of Decayed Missing and Filled Teeth (DMFT) constituting the dominant proportion is the obvious explanation. This calls for pediatric oral health-care and prevention policies to reduce the high dental caries prevalence among this population based on established decline in dental caries prevalence with the use of fluorides increased dental awareness, increased availability of dental resources, decreased sucrose consumption, introduction of dental health education programs and improved preventive approaches in dental practices.<sup>[18]</sup> Retained deciduous teeth with a 16.6% documented prevalence among orthodontic patients in Nigeria,<sup>[19]</sup> was the second most common reason for tooth extraction in this study with 13-16 years old receiving more retained deciduous teeth extraction than the other age groups, which reflect late presentation for dental care. However, this highlighted that dental visit for aesthetic reason is common in urban areas where the clinic is located. Trauma as reason for extraction of deciduous teeth was found mostly among the 0-5 years old children which attests to the unsteady step of the young, which increases likelihood of trauma to teeth from fall and subsequent presentation for extraction. The higher permanent teeth extraction due to trauma among the 6-12 years than the 13-16 years may be explained by the reduction of dental trauma prone activity with ageing. Although, neonatal teeth contributed a little to the reasons for tooth extraction among children in this study, it is significant to the dentist because of specific indication for extraction of these teeth which include cultural practices, danger of being swallowed or aspirated and trauma to mother's breast.<sup>[20]</sup> Even though the prevalence of supernumerary teeth is low (1.4%),<sup>[21]</sup> it accounted for 0.7% of extraction in permanent dentition in this study.

This study limitations were that hospital based study as some forms of tooth mortality like avulsion may not present to the dentist in the hospital. However, the results still qualifies as a reasonable standard childhood tooth mortality data in Nigeria based on expected minimal effects of the limitations.

## Conclusion

Dental caries was the leading reason for extraction in both deciduous and permanent dentitions with 6-12 years old female patients receiving most of the tooth/teeth extractions. Stakeholder in child health must therefore pay adequate attention to dental caries preventive approaches to enable the pediatric population reach adulthood with a healthier dentition.

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