

Evaluation of Tooth Mortality Among Children Attending a Paediatric Dental Clinic in South East, Nigeria

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ABSTRACT

Objective: To identify the prevalence and pattern of tooth extraction among children attending a Paediatric Dental Clinic.

Methods: This was a retrospective study of 687 children aged 16 years and below seen at the Paediatric Dental Clinic of University of Nigeria Teaching Hospital, Enugu from January 2016 to December 2018. Data on age, sex, tooth type and reasons for tooth extraction was collected retrospectively from dental records. Data was analyzed using IBM SPSS Statistics version 21.

Results: One hundred and four (15.1%) out of 687 children seen within the period had tooth extractions. There were 45 (43.3%) males and 59 (56.7%) females. The modal age group was 6-8 years (39.4%). One hundred and seventy-six teeth were extracted within the period, comprising 146 primary teeth and 30 permanent teeth. Teeth 51, 61, 71, 81 and 11 were the commonest teeth extracted in primary and permanent dentition respectively. The commonest reason for tooth extraction was retained tooth 83 (47.2%).

Conclusion: Less than one-fifth of the children had tooth extraction and the commonest reason for tooth extraction was retained primary teeth. The commonest teeth extracted in primary dentition were primary central incisors while first permanent molars were the commonest teeth extracted in permanent dentition. More females than males had tooth extraction. Tooth extraction was done mostly in 6-8 year old children.

Key words: tooth mortality, paediatric, retained teeth, caries

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INTRODUCTION

Pattern of oral diseases can be assessed by evaluation of tooth mortality in the population.¹ Children lose their teeth for various reasons ranging from caries and the resulting pulpal pathology, trauma, periodontal disease and orthodontic reasons.^{1,2,3,4,5} Causes of tooth extractions have large geographical and cultural differences between various regions in a country and from one country to another.^{4,6} Prior studies showed that dental caries and its sequelae were the most common cause of tooth loss^{1,2,4,7} and primary teeth were usually extracted more than the permanent teeth.^{7,8} It is worth noting that premature loss of primary teeth is associated with malocclusion in the permanent dentition⁹. Early loss of a primary second molar especially in the maxillary arch results in arch length reduction due to mesial migration¹⁰.

In Nigeria, the prevalence of tooth extraction in children ranges from 51.52% to 58.5%^{5,11} probably because children present late with complicated dental lesions. In Sweden, every 25th child in the age group of 3-8 years had extraction performed during one-year period.¹² In Mexico and Mexico-America, the prevalence was 20%¹³ and 2.6%¹⁴ respectively.

However, a few studies have shown that there is a shift in the cause of tooth loss from caries related reasons to orthodontic reasons.^{1,2,3} There is increase in orthodontic needs due to availability of competent manpower.

In Turkey and Jordan, the commonest tooth extracted in primary dentition was molars^{15,16} while in Nigeria, the anterior teeth were mostly extracted.⁷ Scientific search showed that there were significant differences in the reasons for extraction of various tooth types, and, while extractions due to caries predominated overall, this was not the case for all tooth types.² With increase in number of specialist trained, improved restorative materials and increase in awareness programs, the reasons for tooth extraction is changing. Pulp therapies are carried out and improved restorative materials that prevent caries are now available.

A national survey in Nigeria showed that orthodontic reason was the commonest cause of extraction in children in South Western Nigeria while periodontal disease was the major cause of extraction in the Federal Capital Territory.¹⁷ Dental caries and its sequelae remained the commonest reason for extraction in other five regions of the country.

There is limited information on reasons for tooth extraction among children in South Eastern Nigeria.

The only information on reasons for tooth extraction in children in the region was about a decade ago reported in a national survey.¹⁷ With the increase in dental health awareness campaigns, availability of dental specialists especially paediatric dentists and orthodontists in the study area, this study was prompted to evaluate the pattern of tooth mortality in recent time. To fill the gap, the study identified prevalence of tooth extraction, reasons for extraction, the commonest tooth extracted and the number of teeth extracted in each age group.

METHODS

Study Design and Sampling

This was a retrospective study of children aged 16 years and below who attended the paediatric dental clinic of University of Nigeria Teaching Hospital (UNTH), Enugu from January 2016 to December 2018.

The dependent variable was extracted tooth while independent variable included age and sex. All case notes with records of extracted tooth were retrieved from the Department of Dental records, UNTH, Enugu. Case notes with properly documented information were included in the study while those with incomplete information were excluded.

Data Collection

Permission was sought from Department of Medical Records and data was extrapolated from the retrieved case notes. A case record form (CRF) was developed. Information on socio-demographic profile (age, sex), extracted tooth, and number of teeth extracted and reasons for extraction were also recorded.

Statistical Analysis

The data collected from the study was analyzed using the IBMSPSS Statistics Version 21 (Chicago II, USA). Exploratory analysis was conducted to ensure data consistency. Descriptive analysis was conducted using a wide variety of measures of location (mean) and dispersion (deviation). Result was expressed using frequency tables and percentages.

RESULTS

Table 1 highlights that dental caries and its sequelae were the commonest cause of tooth extraction in previous Nigerian studies.

One hundred and four children out of 687 children seen within the study period had their teeth extracted for various reasons. Six case notes with incomplete records were excluded. Many were 6-8 years old (39.4%) and there were more females 59(56.7%) than males 45(43.3%). See Table 2

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Table 3 shows that 176 teeth were extracted and the reasons for tooth extraction were retained primary tooth 83(47.2%), dental caries 62(35.2%), orthodontic reasons 15(8.5%), trauma 4(2.3%), Molar Incisor Hypomineralization (MIH) 5(2.8%), physiologic mobility 4(2.3%), supernumerary teeth 3(1.7%).

Table 4 highlights that the highest number of teeth extraction 69(39.2%) was done on children aged 6-8 years while the least extraction 11(6.3%) was done on those aged 12-14 years. Tooth loss due to retained teeth 37(44.6%), trauma to anterior teeth 3(75%),

malocclusion 7(46.7%), physiological mobility 3(75.0%) was seen mostly in children aged 6-8years. Tooth loss due to caries and its sequelae 22(35.5%) was seen mostly in children aged 9-11 years

Table 5 shows that the commonest tooth extracted in primary dentition were the central incisors 53(36.3%) while the least were the canines 20(13.7%). Table 6 shows that the commonest teeth extracted in the permanent dentition were the first permanent molars 23(76.7%) while none of the anterior teeth were extracted.

Table 1: Pattern of tooth loss from previous Nigerian studies

Authors and year	Study area	No of patients seen within study period	No of teeth lost	Age range of study participants	Major cause of tooth loss (%)	The prevalent sex
Oromakinde et al., 2021 ¹⁸	Maiduguri	244	340	2-16 years	Caries and sequelae (50.0%)	Females
Chukwumah et al, 2014 ¹⁹	Benin	712	1039	16 years and below	Caries and sequelae (84.4%)	Females
Eigbobo et al., 2014 ⁷	Port Harcourt	115	145	2-16 years	Caries and sequelae (61.7%)	Males
Olatosi and Sote, 2012 ²⁰	Lagos	493	673	1-16 years	Caries and sequelae (64.3%)	Females
Ashiwaju et al., 2011 ³	Lagos	235	380	3-15 years	Caries and sequelae (62.5%)	Males
Odai et al., 2011 ⁸	Benin	756	756	1 week to 16 years	Caries and sequelae (82.0%)	Females
Esan et al., 2009 ¹⁷	All regions of Nigeria	557	750	1-16 years	Caries and sequelae (55.5%)	Males
Folayan et al., 2005 ¹	Ile-Ife	144	238	1-16years	Caries and sequelae (33.7%)	Males
Denloye et al.,1999 ¹¹	Ibadan	429	281	0-15years	Caries and sequelae (57.5%)	Females

Table 2: Distribution of study participants by sex and age (N=104)

Age (years)	Frequency N (%)
3-5	18(17.3)
6-8	41(39.4)
9-11	26(25.0)
12-14	9(8.7)
15-16	10(9.6)
Sex	
Males	45(43.3)
Females	59(56.7)
Total	104(100.0)

Table 3: Reasons for tooth extraction

Reasons	Frequency N (%)
Dental caries	62(35.2)
Retained teeth	83(47.2)
Trauma	4(2.3)
Orthodontic reasons	15(8.5)
MIH	5(2.8)
Mobile teeth	4(2.3)
Supernumerary teeth	3(1.7)
Total	176(100.0)

Table 4: Age distribution of children in relation to causes of tooth extraction

Age (Years)	Reasons for tooth extraction							Total number of lost teeth N (%)
	Caries N(%)	Retained N(%)	Trauma N(%)	Orthodontic reasons N(%)	MIH N(%)	Physiologic mobility N(%)	Supernumerary N(%)	
3-5	6(9.7)	1(25.0)	1(25.0)	0(0.0)	0(0.0)	0(0.0)	0(0.0)	31(17.6)
6-8	16(25.8)	37(44.6)	3(75.0)	7(46.7)	2(40.0)	3(75.0)	1(33.3)	69(39.2)
9-11	22(35.5)	16(19.3)	0(0.0)	7(46.7)	0(0.0)	0(0.0)	1(33.3)	46(26.1)
12-14	5(8.1)	1(1.2)	0(0.0)	1(6.7)	3(60.0)	1(25.0)	0(0.0)	11(6.3)
15-16	13(21.0)	5(6.0)	0(0.0)	0(0.0)	0(0.0)	0(0.0)	1(33.3)	19(10.8)
Total	62(100.0)	83(100.0)	4(100.0)	15(100.0)	5(100.0)	4(100.0)	3(100.0)	176(100.0)

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Table 5: Distribution of children in relation to type of primary tooth extracted by age

Age (years)	Tooth extracted										Total N (%)
	51 81 N(%)	61 71	52 82 N(%)	62 72	53 83 N(%)	63 73	54 84 N(%)	64 74	55 85 N(%)	65 75	
3-5	23(43.4)		3(11.1)		2(10.0)		0(0.0)		3(10.0)		31(21.2)
6-8	25(47.2)		18(66.7)		7(35.0)		8(50.0)		7(23.3)		65(44.5)
9-11	4(7.5)		6(22.2)		11(55.0)		7(43.8)		15(50.0)		43(29.5)
12-14	0(0.0)		1(3.7)		0(0.0)		0(0.0)		3(10.0)		4(2.7)
15-16	1(1.9)		0(0.0)		0(0.0)		1(6.3)		2(6.7)		4(2.7)
Total	53(36.3)		27(18.5)		20(13.7)		16(11.0)		30(20.5)		146(100.0)

Table 6: Distribution of children in relation to type of permanent tooth extracted by age

Age(years)	Tooth type extracted in permanent dentition								Total N(%)						
	11	21	12	22	13	23	14	24		15	25	16	26	17	27
	41	31	42	32	43	33	44	34		45	35	46	36	47	37
	N(%)		N(%)		N(%)		N(%)		N(%)		N(%)		N(%)		
3-5	0(0.0)		0(0.0)		0(0.0)		0(0.0)		0(0.0)		0(0.0)		0(0.0)		0(0.0)
6-8	0(0.0)		0(0.0)		0(0.0)		1(50.0)		0(0.0)		3(13.0)		0(0.0)		4(13.3)
9-11	0(0.0)		0(0.0)		0(0.0)		0(0.0)		0(0.0)		3(13.0)		0(0.0)		3(10.0)
12-14	0(0.0)		0(0.0)		0(0.0)		0(0.0)		1(100.0)		7(30.4)		0(0.0)		8(26.7)
15-16	0(0.0)		0(0.0)		0(0.0)		1(50.0)		0(0.0)		10(43.5)		4(100.0)		15(50.0)
Total	0(0.0)		0(0.0)		0(0.00)		2(6.7)		1(3.3)		23(76.7)		4(13.3)		30(100.0)

DISCUSSION

In this study, 15% of the children who attended the Paediatric Dental Clinic had tooth extraction which is similar to the finding in Turkey² but less than that is seen in some previous Nigerian studies^{3,8,19,20} and an India study.²¹ This may be as a result of recent availability of specialists and improved restorative materials that are durable and leach fluoride that prevents caries.

More females than males had tooth extraction in this study similar to the findings by Chukwumah et al¹⁹ and Olatosi et al²⁰ but contrary to the finding in India²⁰ in which more males had tooth extraction. Literature search showed that greater prevalence of dental caries is seen in females who consume cariogenic diet^{22, 23} which if left untreated can get complicated and extraction may be one of the treatment options. Again, females experience early tooth eruption²⁴ with its attendant early exposure to cariogenic diet more than the males. However, a study by Alsheneifi and Hughes² showed no gender difference.

Most extracted teeth were primary teeth (83%) similar to some previous studies.^{3,17,18} This may be because many primary teeth were retained and dental neglect of primary teeth by caregivers who believe that primary teeth are not very important.²⁵ There was a difference in the types of teeth extracted among the different age groups similar to the finding by Alsheneifi and Hughes.² This difference reflects the chronology of dental development and age differences in susceptibility to traumatic injury and dental caries.

Extraction as a result of retained teeth was seen more in children aged 6-8 years because at this age, the primary central incisors exfoliate. The first molars

were the commonest teeth extracted in permanent dentition because it is the first permanent tooth to erupt and the morphology of the occlusal surface encourages food packing. There was no extraction of permanent anterior teeth because they do not have pits and fissures that result in food packing which predisposes to caries and they also erupted at a later age than the primary teeth.⁸

Caries and its sequelae^{1,2,3,8} have been reported by several authors as major cause of tooth loss, but our finding was different. Retained tooth was the major reason for tooth extraction in primary dentition (47.2%) in this population. Retained primary teeth in the presence of its succeeding teeth may be attributed to familial factors, translation or transmigration of successor teeth and presence of odontoma²⁶. The decline in caries and its sequelae as a major cause of tooth loss in this population may be attributed to increase in awareness and oral hygiene practices and the fact that the center has paediatric dentists who conserve carious teeth that are still restorable in children that ordinarily would have been extracted by non-paediatric dentists. Nevertheless, about a third of extractions (35.2%) were as a result of caries and its sequelae in this study. It was the second leading cause of tooth loss – indicating the need for intense efforts in creating awareness for caries prevention and encouraging asymptomatic visit among the study population.

Primary central incisor was the commonest teeth extracted in this study and they were mostly retained.¹⁵ This may be because of early eruption of teeth among black children with non-proportionate growth of the jaw to accommodate the permanent teeth.²⁴ The permanent teeth then erupts lingually or palatally with the primary teeth retained. This is

contrary to Folayan et al¹, Alsheneifi and Hughes² where primary molars were the most prevalent teeth extracted in children in outpatient clinics and even among those undergoing general anaesthesia.

The first permanent molar was the commonest tooth extracted in the permanent dentition. This is not surprising because chronologically, the first permanent molar is the first tooth to erupt in the permanent dentition. It is exposed to cariogenic diet earlier than other permanent teeth in children who indulge in cariogenic diet. It also has broad surface, deep pits and fissures which encourage food packing. More children in the 6-8 years old group had tooth extraction similar to the finding by Ashiwaju et al³. It is, however, contrary to the finding in Nigeria by Odai et al⁸ in which 13- to 16-year-old children had extractions the most because of dental caries and its sequelae when compared to other children. Also, in India the major cause of tooth loss was dental caries.²⁰This was attributed to lack of parental knowledge of importance of primary teeth and non-utilization of dental services by children. In this study, most children aged 6-8 years had retained primary central incisor which was the major cause of tooth loss in this study. There were a few extractions due to orthodontic reasons and trauma similar to Samuel et al.²⁷

Being a retrospective study, some case notes with incomplete records were not included. It is recommended that children utilize the dental clinic on time to enhance early detection and treatment of dental pathology to prevent complications that might lead to tooth mortality.

CONCLUSION: Less than one-fifth of the children had tooth extraction and the commonest reason for tooth extraction was retained primary teeth. The commonest teeth extracted in primary dentition were primary central incisors while first permanent molars were the commonest teeth extracted in permanent dentition. More females than males had tooth extraction. Tooth extraction was done mostly in 6- to 8-year-old children.

Conflict of Interest

None declared

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