CARIES, THE CULPRIT OF TOOTH LOSS AMONG PATIENTS IN A TERTIARY HEALTH FACILITY IN THE SOUTH WEST OF NIGERIA: A RETROSPECTIVE STUDY

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ABSTRACT

BACKGROUND: Tooth loss is an irreversible dental health condition affecting an individual's oral health-related quality of life. Dental caries has been implicated as one of the factors associated with tooth loss.

OBJECTIVES: This study aimed to evaluate untreated dental caries and their contribution to tooth loss and determine the pattern of tooth loss among patients in Lagos State University Teaching Hospital (LASUTH), a tertiary institution in South West Nigeria.

METHODOLOGY: A retrospective study using the dental records of patients who attended the Oral and Maxillofacial Surgery Clinic, LASUTH, for tooth extraction from 2021 to 2023. Data was extracted on the indication for extraction. Data was collected and analyzed using a computer software programme, Statistical (SPSS, IBM) Version 25. Associations between variables were assessed using a chi-square test. P-value <0.05 was considered to be significant at 95% CI.

RESULTS: A total of 11,300 patients' records were retrieved. There were 11,275 records with complete data, of which 5,378(47.7%) were males and 5,897(52.3%) were females. Total number of teeth extracted was 16,316. Toothache (82.5%) was the most common reason for dental visits. Dental caries were observed to be the main reason for tooth extraction, accounting for 11,754(72.0%) of total teeth extracted (16,316). Those aged 26-35 years experienced more tooth loss (33.9%) due to dental caries. Mandibular molars (52.6%) accounted for the majority of teeth that had been extracted due to dental caries.

CONCLUSION: Untreated dental caries was the main cause of tooth loss (72%) due to extractions. The prevalence of tooth loss was higher in younger adults and females. Mandibular molars are extracted most frequently.

KEYWORDS: Dental caries, tooth loss, extraction, Lagos State University Teaching Hospital

INTRODUCTION

Dental caries, commonly known as tooth decay, is a disease of dental hard tissues characterized by the demineralization of these tissues, leading to the formation of cavities. Dental caries is a biofilm-mediated, diet-modulated, multifactorial, non-communicable, dynamic disease resulting in net mineral loss of dental hard tissues. Over time, if dental caries is not treated, it can advance further into the tooth, affecting deeper layers and potentially leading to pain, infection, and eventual tooth loss. A study by Montandon et al.[1] attributed frequent loss of teeth to dental caries and periodontal diseases.

Tooth loss may be caused by periodontal diseases, trauma, planned orthodontic treatment, and failed endodontic treatment. Studies[2-4] have shown that dental caries and periodontal disease are the major causes of tooth loss. Tooth loss is an oral condition that reduces the individual's quality of life and negatively impacts their psychological status and self-esteem.[5,6] Furthermore, tooth loss is related to poor facial esthetics, impaired speech, and difficulty chewing, causing limited dietary choices and eventual malnutrition.[2]

The prevalence of dental caries has increased in many African countries recently. It may further increase due to rising consumption of refined carbohydrates, inadequate exposure to fluoride,[7] lack of access to dental care, and socio-economic factors. Moreover, caries prevalence is directly associated with family consumption of various refined carbohydrates and deficient community-based oral disease prevention and health promotion programs.[8] A study by Sorunke et al. [9] revealed that dental caries and its sequelae were the main indications for tooth extraction.

Dental caries is painless initially but gradually becomes symptomatic. The symptoms increase in severity with their advancement into vital tissues. There is resulting tooth structure destruction, which might indicate extraction of the affected tooth.

Most patients tend to extract their teeth as a sequel to severe dental pain because it's cheaper than restorative care. The high prevalence of tooth extraction in developing countries has been linked to irregular symptomatic dental visits, delayed presentation due to ignorance and poverty, and negative attitudes toward teeth restoration.[10] Tooth extraction is a procedure that is usually performed in the oral surgery clinic. A decayed tooth can be routinely extracted or surgically removed if impacted.

The damage caused by dental caries culminates in a reduced quality of life for affected individuals and high economic costs for both individuals and society. This has made the disease a significant public health problem.[11,12]

The World Health Organization (WHO) stated that chronic diseases related to poor oral health are increasing in developing countries, resulting in higher edentulism, dental caries, and periodontal diseases.[13] For epidemiological survey assessment of the global burden of oral diseases among adults, the WHO recommends two adult age groups, 34-45 years and 65 years and above. This recommendation also applies to epidemiological surveys that assess dental caries, periodontal disease, and edentulism.[14] Moreover, as part of its global goals, the Federation Dentaire Internationale (FDI) advocates a 50% and 25% decrease in

edentulousness among the two age groups mentioned above.[14,15]

There is limited information about oral health status, particularly on dental caries and other contributory factors to tooth loss among adult patients attending the Dental Centre, LASUTH, a tertiary institution in South West Nigeria, which has many patient turn-overs. LASUTH is a state-owned tertiary health institution and a referral center for most residents of different socio-economic statuses within Lagos and its environs. LASUTH Dental Clinic is a multi-specialty center that records an average of about 50 new patients daily. The yearly turn-out of patients in the dental clinic is approximately 20,000. The information that would be generated will contribute to data on tooth loss, caries prevalence, and the baseline information of untreated dental caries that lead to tooth loss among patients in the South West region of Nigeria. This study aimed to evaluate untreated dental caries and their contribution to tooth loss and determine the pattern of tooth loss among patients in Lagos State University Teaching Hospital (LASUTH), a tertiary institution in South West Nigeria.

MATERIALS AND METHODS

This is a single-center retrospective using data from the hospital records of patients who attended the Oral and Maxillofacial Surgery clinic at the Dental Centre, Lagos State University Teaching Hospital, Ikeja, Lagos State, Nigeria, from 2021 to 2023 by the investigator. A total of 11,275 patients' records were used for this study. The demographic and clinical information were retrieved from the patient's records.

Two trained resident dentists (data collectors) collected the data using the pre-designed proforma for each patient's record. Before data collection, both residents' inter-examiner and intra-examiner reliability were obtained. Collected data were coded for confidentiality. The trained residents obtained data consisting of socio-demographics (age, gender, and occupation), the diagnosis made by the dental surgeon, the indication for extractions for the patients, and the type of tooth extracted. Only clinical records with complete data of patients who underwent permanent teeth extractions at the oral and maxillofacial surgery clinic of LASUTH from 2021 to 2023 wers used

Records that did not have complete data on patients and those with illegible handwriting were excluded from the study.

Ethical clearance was obtained from the Health Research and Ethics Committee of Lagos State University Teaching Hospital (HREC, LASUTH) Lagos (LREC/06/10/2438)

The data obtained were analyzed using Statistical Package for Social Sciences (SPSS, IBM) version 25.0. Data presentation was done using frequency distribution and tables. Association between variables was carried out using the Chi-square test; P-value <0.05 was assumed to be statistically significant at 95% CI.

RESULTS

A total of 11,300 patients' records were retrieved. There were 11,275 records with complete data, of which 5,378(47.7%) were males and 5,897(52.3%) were females. Total number of teeth extracted was 16,316. The age range of the patients was 6-107 years, with a mean age of 34.2years±10.1. The highest proportion of extractions (31.1%) carried out was among the age group of 26-35 years (Table 1).

Table 1: Gender and Age Distributions of Subjects

Variable	Frequency (n=11275)	Percentage (%)
Gender		
Male	5,378	47.7
Female	5,897	52.3
Age Group (Years)		
6-12	233	2.1
13-25	3,166	28.1
26-35	3,495	31.0
36-45	1,786	15.8
46-55	1,039	9.2
56-65	853	7.6
66-75	515	4.6
76-85	163	1.4
86 and above	25	0.2
Age Range	***6-107years***	
Mean SD	***34.2±10.1***	

Toothache or pain (82.5%) was the commonest reason for dental visits, while bleeding gum (0.3%) and Scaling & Polishing (0.3%) were the least common reasons for presenting in dental clinics (Table 2).

Table 2: Patient's Presenting Complaint at Dental Visit

Patients' Complaints	Frequency (n=11275)	Percentage (%)
Toothache/Pain	9,298	82.5
Hole/Decayed tooth	474	4.2
Cracked/Fractured tooth	317	2.8
Shaking/Mobile tooth	265	2.4
Mouth/Jaw Swelling	185	1.6
Tooth Extraction/ Removal	178	1.6
Missing Teeth	185	1.6
Crowded Teeth	89	0.8
Bleeding Gum	39	0.3
Scaling and Polishing/ Cleaning	38	0.3
Check-up	40	0.4
Others (Malodor, Sensitivity, Discolored Teeth)	167	1.5

Dental caries was observed to be the main reason for tooth extraction, which accounted for 11,754(72.0%) of total teeth that were extracted, followed by periodontitis 2,484(15.2%) (Table 3).

Table 3: Indications for Tooth Extractions among the Subjects

Reasons For Extractions	No. of Patients (11275)	No. of Teeth (16,316)	Percentage of Teeth (%)	Average No of Teeth/Patients
Dental Caries	8,242	11,754	72.0	1.4
Periodontitis	1,479	2,484	15.2	1.7
Fractures	886	1,108	6.8	1.3
Others (Orthodontic reasons, pericoronitis)	668	970	5.9	1.5

Subjects within the age group of 26-35 years experienced more tooth loss (33.9%) due to dental caries, while females had the highest number of teeth extracted (54.0%), which was statistically significant (P-value=0.000) (Table 4).

Table 4: Association between the number of carious teeth extracted and Age, Gender

Variable	n= 8,242 No of Patients (%)	n= 11,754 No of teeth extracted (%)	$\bar{X}$
Age Group (Years)			
6-12	201(2.4)	253(2.2)	1.3
13-25	2,658(32.2)	3,668(31.2)	1.4
26-35	2,836(34.4)	3,980(33.9)	1.4
36-45	1,355(16.4)	1,991(16.9)	1.5
46-55	622(7.6)	874(7.4)	1.4
56-65	336(4.1)	543(4.6)	1.6
66-75	172(2.1)	318(2.7)	1.8
76-85	59(0.7)	117(1.0)	2.0
>85	3(0.1)	10(0.1)	3.3
P-value	***0.000**	***0.000**	
Gender			
Male	3721(45.0)	5393(46.0)	1.5
Female	4521(55.0)	6361(54.0)	1.4
P-value	***0.000**	***0.000**	

$\bar{X}$ = Average number of teeth per patient

Mandibular molars (52.6%) accounted for the majority of teeth that had been extracted due to dental caries. This was followed by upper molars (31.2%), and the least was lower anterior (1.1%) (Table 5).

Table 5: Carious Teeth Extracted According to Tooth Type

Tooth Type	Frequency (n= 11,754)	Percentage (%)
Upper Anterior	387	3.3
Lower Anterior	125	1.1
Upper Premolars	1,059	9.0
Lower Premolars	336	2.9
Upper Molars	3,668	31.2
Lower Molars	6,179	52.6

n= Number of Carious Teeth

The highest number of teeth extracted (4,639) due to caries was carried out in the year 2022 (Table 6).

Table 6: Number of patients & carious teeth extracted according to year

Year	Number of patients (n=8,242)	Number of teeth (n=11,754)
2021	2,589	3,757
2022	3,288	4,639
2023	2,365	3,358

DISCUSSION.

Research has indicated that dental caries and periodontal disease contribute significantly to the prevalence of dental mutilation and edentulism in adults, both internationally[16-18] and in Nigeria.[2,9,19] This current study aimed to investigate the prevalence of tooth loss and dental caries in Southwest Nigeria and to determine the percentage of tooth extractions caused by caries, indicating the effectiveness of caries prevention and treatment in this region.

In this study, the major complaints of the subjects were toothache and dental caries, which were the main indications for the extractions. Toothache and dental caries often go hand in hand. The carious process destroys the tooth enamel, which protects it from external stimuli, and subsequently, the disease spreads deeply into the pulp of the tooth; the toxins of the bacteria irritate the pulp and lead to its inflammation- pulpitis. Many impoverished patients understandably opt for tooth extraction to alleviate pain, given its lower cost compared to restorative dental treatments.[9]

In the current study, caries and its consequences emerged as the major cause of tooth extraction among subjects, supported by several studies[3,4,9,16,18,19], followed closely by periodontal disease. The prevalence of dental caries is closely linked to the consumption of refined carbohydrates in families and the absence of community-based programs for preventing oral diseases and promoting health.[8] Factors such as access to and cost of dental care, people's perception of their oral health needs, their diet, oral hygiene practices, and other factors also play a role in the occurrence and treatment of dental cavities.[20] However, an observational study[21] examining tooth extraction in UK dental practices highlighted that the major reasons for extractions were periodontal disease and periapical infection, with tooth-root and tooth-crown fractures being the next most common causes. One of the

most notable findings in this study, which was conducted in the UK, in contrast to the present study, was the rare occurrence of tooth extractions due to active tooth decay. This underscores the significance of preventive actions and public awareness programs in this region, which have led to a low caries risk within the population and a reduction in caries progression.[16] A previous study[22] in Nigeria reported periodontal diseases (46.4%) as the major cause of tooth loss, followed by dental caries (43.9%).

This present study found a notable inverse connection between age and the frequency of tooth extractions due to dental caries, indicating an indirect relationship between age and tooth loss due to caries, which is similar to a study by Idon et al.[19] Dental caries and its consequences were the main reasons for most extractions in younger age groups, but this trend diminished as age increased. The age group of 26-35 years had the highest proportion of extraction due to caries and total extractions that were carried out. This study reported 33.9% of teeth extracted due to caries among 26-35-year-old subjects against 1.0% among 76-85-year-olds. However, age cannot be used as a sole determinant of caries prevalence. The prevalence of dental caries in rural and urban areas of African countries is related to age, socio-economic status, and specific location.[9]

Regarding gender, females had a higher proportion (54.0%) of teeth extracted due to caries, which was statistically significant. This is in line with the report that females tend to have higher experience with dental caries and seek treatment more often compared to males.[9]

The most frequently extracted teeth due to caries were the lower molars (52.6%), followed by the upper molars (31.2%). This might be attributed to the fact that mandibular molars have more extensive pits and fissures with a high tendency of accumulation of food debris and plaque. The previous studies had shown that lower molars were the most extracted teeth due to caries lesions. 9,[10,19,23] Moreover, it has been reported that early loss of the first permanent molars may be associated with increased caries experience on the occlusal surfaces of the second molars, leading to eventual extractions.[19,24,25]

This study shows an increase in the number of teeth extracted due to caries in the year 2022, which later dropped in the following year (2023). The increase in turnover might be due to the influx of patients following the end of the COVID-19, during which the patients were afraid to visit the hospitals.

The high prevalence of tooth extraction in developing nations is probably attributable to infrequent symptomatic dental visits, delayed seeking of dental care due to lack of awareness/ignorance and financial constraints, and a negative perception regarding restorative dental care.

CONCLUSION

Untreated dental caries was the main cause of tooth loss (72%) due to extractions. The prevalence of tooth loss was higher in younger adults and females. Mandibular molars are extracted most frequently. Dental caries is preventable through oral health education within the population, aimed at enhancing oral hygiene practices, dietary counseling, exposure to fluoride in community water supplies, fluoride mouthwash, antimicrobials as mouthwashes, and use of pit and fissure sealants. Therefore, implementing preventive oral healthcare programs, increasing public awareness about oral health, and ensuring the affordability of restorative treatments are necessary steps to decrease future dental extractions resulting from dental caries.

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