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**Research Article**

# Pattern and Reasons for Tooth Extraction in a Dental Clinic of a Teaching Hospital in Maiduguri North Eastern of Nigeria

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**Abstract:** ***Aim:*** The purpose of this study is to evaluate the prevalence and various reasons given for permanent teeth extractions in a dental clinic of a Teaching Hospital in Maiduguri, Nigeria. **Materials & *Methods:*** The clinical records of patients who attended the clinic and the work book of the oral surgery clinic were collected and analyzed according to gender, age and reasons for extraction. The age ranges from 16 to 75 years but this was then grouped according to age groups of ten years each. ***Results:*** Dental caries was the leading cause of extraction (69.9%) disimpation/pericoronitis was 10.9% while periodontal disease, dento-alveolar abscess, failed amalgam restorations, trauma, removal of supernumerary teeth and endodontic failure accounted for 8.6%, 4.0%, 3.8%, 1.2%, 1.0% and 0.6% respectively, 77.5% of all extraction occurred within the age of 16 – 35 years, 90.3% of all extraction were within the age of 16 45 and of the 77.5% extraction in the 16 – 35 years age group, 75.6% of these were due to caries. More extractions were carried out in females (53.6%) than in male (46.4%). ***Conclusion:*** Extraction as a result of dental caries is growing at an alarming rate yet there is no oral health policy in place while place in Nigeria and some developing economics therefore is an urgent need for formulation of oral health policies and effective institution of appropriate dental health care strategies that will ensure and promote oral health care. ***Clinical Significance:*** is to evaluate and analyze the level of loss of teeth in order to dense a means of halting or reducing the rate of tooth extraction.

**Keywords:** Extraction, patterns, Reasons, Teaching Hospital.



## INTRODUCTION

Studies have shown that dental caries and periodontal disease were the most cited pathological conditions affecting the oral cavity and the teeth which is part of the stomatognathic system defines how functional, efficient and much of quality of life the individual enjoys. As a result of this a lot of researchers have found that caries and periodontal diseases may lead to tooth mortality which has been found to be affected by age, region, ethnic or tribal conditions which in turn produced differences in reasons and pattern of tooth extraction (Lundqvist, C. 1967; MacGregor, I. D. M. 1972; & Olaleye, A. O. 2013; & Aida, J. *et al.,* 2006).

Some in the past had suggested that African keep their perpetually (Okoisor, F., & Ana, J.R. 1996) while some later believed periodontal was the major cause of tooth loss especially in the developing countries (Odusanya S.A. 1987).

However, there is a changing tend due to imported civilization worsened by lack of oral preventive policies as seen in the developed economies (Sheiham, A. 1984). Variation in results of several studies may be due to the characteristics of the study population, cultural beliefs, socioeconomic differences and immunologic and genetic factors as contributory factors which may explain why some populations exposed to the same etiologic factors did not develop

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similar pathological conditions (Downer, M.C. 1991; & Marcus, S. E. *et al.*, 1996).

In developing economies with poor socioeconomic conditions and little or no access to adequate, affordable and available oral health care were found to show high prevalence of teeth extraction irrespective of age and in certain instance with aging.The prevalence, extent and risk indicators for tooth were studied in a representative Brazilian population a developing country which showed that 94% of the subjects had experienced tooth loss (Susin,C. *et al.*, 2005).

It has been noted that in developed countries in the past decade there has been a decline in tooth loss due to preventive programs and higher indicators for better and improved oral health care coupled with the fact that dentist now spend more time in re-restorations, availability of improved technologies and technique at endodontic to preserve the teeth (Löe, H. 2000).

Some studies have been carried out in some developing countries showed a prevalence of teeth extractions (Kalyanpur, R., & Prasad, K. V. V. 2011; Anand P.S., & Kuriakoses. 2009; Caldas, A.F. 2000; Adeyemo, W. L. *et al.*, 2008; Oginni, F. O. 2005; & Manji, F. *et al.*, 1988) which all showed that dental caries accounted for the major cause of tooth loss while another one indicated that periodontal disease was the main cause of extraction (Odusanya S.A. 1987) most reported studies in Nigeria, a developing economy were carried out in the south western region of the country whose inhabitants were mainly of Yoruba tribe, However, this study was carried out in the North Eastern Region of the country whose major inhabitants are mainly of Kanuri/Hausa/Fulani tribes.

In developing countries such as Nigeria where the concept of oral health care and delivery is not well described, inadequate or lack of oral health policy coupled with the variations, differences and factors such as age, tribal/ethnic which affects the prevalence and reasons for extractions it is imperative that a study is needed to be carried out in a different location in Nigeria which is over 3000km away from the source of previous studies.

## MATERIAL AND METHOD

This is a review of records in the dental clinic spanning a period of seven years between 2000 – 2006. The peculiarity of this period was that it was just a dental clinic of the teaching Hospital whereas the period from 2007 was the time the clinic became part of the dental school so had to function along specialty line because the first set of clinical dental students were on ground. Also part of the peculiarity was that there was no record folders as patients were registered with sheets of papers which can easily be lost, misplaced or misfiled. The fortunate aspect was that patients treated were recorded in a daily record book which contains the demographic data of each patient and treatment carried out.

A thorough perusal of t\he day book containing this data was done to make sure that all demographic details names, age, sex, address of patients, the specific details of treatment were all available. These data were used to detect those that had more than one visit or courses of treatment over that period of time. The study also took into cognizance the fact that the age of the patient cannot remain the same so it was factored into the data collection. In addition to the demographic data, the diagnosis and the reasons given for extractions were taken into cognizance and these were as follows:

Several reasons were given for the removal of teeth but for better categorization, the reasons were grouped according to the following criteria

- Caries
- Endodontic failure
- Failed amalgam fillings
- Periodontitis
- Tooth mobility/Dento-alveolar abscess
- Disimpaction/Pericoronitis
- Retained roots
- Fracture due to trauma
- Supernumerary tooth

Three different resident doctors examined the records one after the other and the data collected were cross-checked against each other.

## RESULTS

A total of one thousand one hundred and fifty five patients were chosen from the patients file records and the operating record book of the clinic. There was no categorization into operator types but the reason for extraction varied depending on the person who diagnosed the patient or the operator that did the extraction: however all these reasons were re-categorized into

- Caries related
- Periodontal disease
- Impaction and pericoronitis
- Dento-alveolar abscess
- Extraction due to failed amalgam restoration
- Ellis frature/Trauma
- Endodontic failure

**Table 1:** Distribution of Subjects In Relation To the Reasons for Extraction

| | TOTAL | % |
|---|---|---|
| CARIES & RELATED SEQUELAE | 156 | 69.6 |
| IMPACTION/PERICORONTIS | 196 | 10.9 |
| PERIODONTAL DISEASE | 154 | 8.6 |
| DENTOALVEOLOR ABSCESS | 73 | 4.0 |
| FAILED AMALGAM | 68 | 3.8 |
| ELLIS FRACTURE/TRAUMA | 21 | 1.2 |
| SUPERNUMERARY TOOTH | 19 | 1.0 |
| ENDODONTIC FAILURE | 10 | 0.6 |
| **TOTAL** | **1797** | **100%** |

Table 1 showed that there were 1155 subjects whose records were found to have set the criteria set adequate for this study and 71.4% had extractions due to caries 11.1% was due to pericoronitis and impaction, 70% was due to periodontal disease, endodontic failure accounted for 1%, deno-alveolar abscess and failure of amagam filling accounted for 4% each while trauma and removal of supplementary tooth accounted for 1% each.

The total number of female patients that had their teeth extracted were more than males, 621 for female (53%) and 534 for males (46.2%), more females had extractions as a result of caries more than their male counterparts so also were female more affected by periodontal. However more males had their teeth extractions either due to pericorontits or impaction.

**Table 2:** Reasons for Teeth Extraction In Relation To Gender

| | GENDER | | TOTAL | % |
|---|---|---|---|---|
| | M | F | | |
| CARIES & RELATED SEQUELAE | 592 | 664 | 156 | 69.6 |
| IMPACTION/PERICORONTIS | 114 | 82 | 196 | 10.9 |
| PERIODONTAL DISEASE | 168 | 86 | 154 | 8.6 |
| DENTOALVEOLOR ABSCESS | 53 | 73 | 73 | 4.0 |
| FAILED AMALGAM | 54 | 68 | 68 | 3.8 |
| ELLIS FRACTURE/TRAUMA | 11 | 10 | 21 | 1.2 |
| SUPERNUMERARY TOOTH | 10 | 9 | 19 | 1.0 |
| ENDODONTIC FAILURE | 5 | 5 | 10 | 0.6 |
| **TOTAL** | **834** | **963** | **1797** | **100%** |

Table 2 showed 1797 extractions were carried out and the reasons given for the extraction were caries (69.9%), pericoronitis/impaction were responsible for 196 extractions (10.9%) periodontal disease 154 (8.6%), dento-alveolar abscess accounted for 73 extractions (4.05), failed amalgam restoration was the reason given for 68 extractions (3.8%) white trauma, supernumerary tooth and endodontic failures accounted for 21 (1.2%), 19 (1.0%) and 10 (0.6%) of extractions done respectively.

More extractions were carried out in females than their male counter parts as a result of caries, periodontal disease, dento-alveolar abscess and failed amalgam restorations while extraction as a result of pericoronitis was more common in males than females.

**Table 3:** Prevalence of Extraction by Age and Gender Group

| | GENDER | | TOTAL | % |
|---|---|---|---|---|
| | M | F | | |
| 16 – 25 | 361 | 381 | 742 | 41.3 |
| 26 – 35 | 282 | 368 | 650 | 36.2 |
| 36 – 45 | 107 | 124 | 231 | 12.8 |
| 46 – 55 | 42 | 60 | 102 | 5.7 |
| 56 – 65 | 18 | 12 | 30 | 1.7 |
| > 65 | 24 | 18 | 42 | 2.3 |

The sample was divided into age groups and gender types and Table 3 showed that patients between the ages of 16 – 25 had more extractions which reduce gradually till ages 56 – 65 but there is a slight increase again after 65 years and above. There is also a more predominate from the age of 56 and above (Table 3).

**Table 4:** Reasons for Extraction of Teeth Calibrated Against Age & Gender

| | CARIES RELATED | | PERIODONTAL DISEASE | | IMPACTION/ PERICORONITIS | | DENTO-ALVEOLAR ABSCESS | | FAILED AMALGAM **32** RESTORATIONS | | ELLI FRACTURE OR TRAUMA | | REMOVAL OF SUPERNUMERARY TOOTH | | FAILED ENDODONTICS | | TOTAL | | SUM TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | M | F | M | F | M | F | M | F | M | F | M | F | M | F | M | F | M | F | |
| 16-25 | 553 | 282 | NIL | | 109 | 59 | 19 | 5 | 5 | | 0 | 5 | 14 | 5 | 10 | 5 | 361 | 381 | 742 |
| | 271 (74.5%) | | | | 50 (14.7%) | | 14 (2.6%) | | 27 (4.3%) | | 5 (0.7%) | | 9 (1.9%) | | 5 (1.3%) | | | | |
| 26-35 | 499 | 209 | NIL | | 77 | 50 | 28 | 9 | 36 | 9 | | 5 | 5 | 5 | | | 282 | 368 | 650 |
| | 290 (76.8%) | | | | 27 (11.9%) | | 19 (6.1%) | | 27 (5.5%) | | -5 | | - | | - - | | | | |
| 36-45 | 174 | 83 | 28 | 14 | 10 | 5 | 14 | - | | | 5 | 5 | | | | | 107 | 124 | 231 |
| | 91 (75.3%) | | 14 (12.1%) | | 5 (4.3%) | | 14 (6.1%) | | - - | | - (2.2%) | | - - | | - - | | | | |
| 46-55 | 18 | 12 | 84 | 30 | - | - | - | - | - | - | - | - | - | - | - | - | 42 | 60 | 102 |
| | 6 (17.7%) | | 54 (82.3%) | | - | - | - | - | - | - | - | - | - | - | - | - | | | |
| 56-65 | 6 | - | 12 | 12 | - | - | 12 | 6 | - | - | - | - | - | - | - | - | 18 | 12 | 30 |
| | 6 (20%) | | - (40%) | | - | - | 6 (40%) | | - | - | - | - | - | - | - | - | | | |
| > 65 | 6 | 6 | 30 | 12 | - | - | - | - | - | - | 6 | 6 | - | - | - | - | 24 | 18 | 43 |
| | - (14.3%)) | | 18 (71.4%) | | - | - | - | - | - | - | - (14.3%) | | - | - | - | - | | | |
| TOTAL | 1256 | | 154 | | 196 | | 73 | | 68 | | 21 | | 19 | | 10 | | 834 + 963 | | 1797 |
| | 69.9% | | 8.6% | | 10.9% | | 4.0% | | 3.8% | | 1.2% | | 1.0% | | 0.6% | | 100 | | |

MEAN TOOTH LOSS =

Table 4 showed that caries was the most prevalent reason for extraction from the age of 16 till 45 years while periodontal disease was the major reason for extraction from 46 years which became worse after 65 years of age.

Dentoalveolar abscess was also found to be more dominant between 45 age brackets while patients between16–35 had more pericoronitis and disimpaction caries but those between 16 – 25 had more of this condition than those between 26 – 35. Periodontal disease was the major reason for extraction from the age of 46 years.

## DISCUSSION

Several studies have been carried out into causes of tooth loss of permanent teeth and it was observed that this has been found to vary between ages and regions where these studies were carried out.

The number of female patients was more than male in this study which is in agreement with some studies carried out in the past (Oginni, F. O. 2005; Manji, F. *et al.,* 1988; Ali, R. *et al.,* 2012; & Kashif, M. *et al.,* 2014). Some studies showed that the numbers of male and female subject was similar in all age groups (Affonso, A. *et al.,* 2012). Conversely, some studies established that there was a male preponderance (Kalyanpur, R., & Prasad, K. V. V. 2011; Montandon, A. A. B. *et al.,* 2012; & Da'ameh, D. 2006). In this study between the age 16 and 55 more females experienced both loss more than male but is reversed from 56 years and above.

The mean tooth loss in this study was 1.6 which was found to be 1.5 for the ages 16 – 45 and 2.0 for 46 years and above which was lower than some studies. The tooth loss in this study increased slightly over a similar study (Aida, J. *et al.,* 2006) conducted in Nigeria about 3 decades ago which showed a mean tooth loss of 1.5 whereas some studies (Odusanya S.A. 1987; Barbato, P. R. *et al.,* 2007; Susin, C. *et al.,* 2005; & Haseeb, M. *et al.,* 2012) in the past showed that the mean tooth loss varied from 1.5 – 11.

In this study even though there were more females than male patients and, there were also more extractions carried out in females patients the mean tooth loss for both gender was similar.

The prevalence of extraction in young adults between 16 – 25 years in this study is 41.3%, while in a different studies conducted in Brazil showed a prevalence of 14.4%. The outcome of this study is closer to the by Sanya, B. O. (2004) which showed a prevalence of 38.9% in the age between and 19 years of age while this study is between 16 – 25 years and some other study showed an age range between this study and the other studies of 26-35 years whereas some studies has the highest incidence of extraction at the years of 50 years.

Caries and its sequelae have been found to be the major reason for the tooth loss in most of the studies conducted in most regions of the world (Anand, P.S., & Kuriakoses. 2009; Caldas, A.F. 2000; & Barbato, P. R., & Peres, M. A. 2009).

Though a study (Odusanya S.A. 1987) conducted in similar situation in Nigeria in 1987 showed that periodontal disease was the commonest cause of tooth extraction, 46.4% due to periodontal disease and 43.9% for dental caries. However, another study in this same institution conducted almost 2 decades later showed a reversal of the trend with dental caries being the major cause of tooth loss (56.4% for caries and 24.6% for periodontal disease) (Oginni, F. O. 2005).

This study showed that dental caries was most common cause of extraction (69.9%) while periodontal disease accounted for only 8.6% is in contrast to most studies except for that conducted in Brazil18 even though the sample size in that study was small (404 teeth). Studies conducted in the past showed that caries was the major reasons given for extraction (Sheiham, A. 1984; Quteish Taani, D. S. M. 2003; Anand, P.S., & Kuriakoses. 2009; Caldas, A.F. 2000; Oginni, F. O. 2005; Manji, F. *et al.,* 1988; Ali, R. *et al.,* 2012; Barbato, P. R., & Peres, M. A. 2009; & Olaleye, A.O. 1997).

In the present study, no case of tooth loss was due to orthodontics reason and this may be due to lack of personnel and facility for orthodontic treatment at this centre because the clinical faculty and facilities were started in 2006 and the dental school has just started to expand. Another curious trend was that disimpaction was higher (10.9%) than periodontal disease (8.6%) as a reason for extraction. One factor that was captured in this study as a reason for tooth loss which was absent in all the past studies on tooth mortality was dento-alveolar abscess which accounted for 4% of extractions done.

In the study conducted about a decade ago in Nigeria (Oginni, F. O. 2005) trans-alveolar extraction accounted for 4.1% of all extractions while in this study it was 10.9%; this difference seen in both studies may be due to the region where the studies were carried out. This present study was carried out in a very different culture, religion and ethnic region of Hausa/ Fulani population who were dominantly Muslims with a diet basically dependent on high sugar consumption and pastries, whereas the other study was carried out in a Yoruba dominated indigenous community whose general beliefs especially amongst the older generation was sugar consumption was not good for good health and also relish in delicacies that include animal bones. Analysis of the tables therefore showed that caries accounted for the greater percentage of extraction amongst younger generation up to the middle age, whereas in some studies (Da'ameh, D. 2006; Naz, F. 2011; & Jafarian, M., & Etebarian, A. 2013) the highest incidence of extraction was observed on the age 50 years.

The high rate of impaction or pericoronistis in this study (Aslam, M. *et al.,* 2012) may be due to tooth mandibular jaw discrepancy which may indirectly be due to the gradual change of diet from the culturally known hard food to the softer one due to civilization (George, B. *et al.,* 2011).

This confirms the observation in a study that dental pain is the only factor that takes the patient to hospital in the developing countries and most of the time it is at late stages of dental diseases (Olaleye, A.O. 1997). Dento-alveolar abscess is usually a sequelae of untreated carious or periodontal disease and so most of the time leads to extraction because of prolonged self-medication and ultimately very late presentation.

Failed amalgam restorations, endodontic failures, removal of supernumerary tooth as reasons for extraction was a phenomenon seen in the younger adults between the ages of 16 and 35 years and the prevalence is higher in females, while supernumerary removal may be a sign of self-consciousness and aesthetics (Quteish Taani, D. S. M. 2003; Barbato, P. R. *et al.,* 2007; Adeyemo, W. L. *et al.,* 2008; & Barbato, P. R., & Peres, M. A. 2009).

Although periodontal disease in this study was dominantly found in people over the age of 45 years, this was similar to some studies that indicated prevalence from 4th decade of life and above.

It has been observed in the past that dental disease was not an African problem, however, about three decades ago available studies revealed that dental disease was on the rise with periodontal disease more prevalent that dental caries. More recent studies have shown that dental caries has taken over the cause of tooth extraction and an astronomical increase has been noticed. This has confirmed the fears of some researcher (Olaleye, A. O. 2013; Sheiham, A. 1984; Oginni, F. O. 2005; & Aslam, M. *et al.*, 2012) that caries is on the rise in Nigeria. The reasons for increase on caries rate are due to but not limited to lack of oral policy in most developing countries, large increase in availability of sugar/sucrose, lack of water fluoridation policy, increase in consumption of refined sugar in drinks and diet and lack of vigorous pursuance of good and health policy at the national level. As far as 1987 the average 12 years old in developing countries like Nigeria had a higher DMF than those in industrialized countries. The decline in caries in developed countries was association with the widespread availability of fluoridated tooth paste, changes in the pattern and quality of sugar consumption and water fluoridation policy.

In addition the three tripod legs of any health policy which are availability, accessibility and affordability needs to be examined critically as it relates to oral health in the developing countries. In the North Eastern Region of Nigeria where this study was carried out, there are ten dentist serving a population of about 5 million people and these were located in the state capital when it is known that about 70% of the population resides in the rural and sub-urban areas. There are also important public oral health implications as a result of great increase in sugar consumption in developing countries especially in Nigeria.

## CONCLUSION

From this study it can be suggested that caries was the predominant reason for extraction in the North Eastern Region while periocoronits and periodontal diseases are less prominent as reason for extraction. The various reasons given for extraction were found to be age related while females had more extractions than males. It is also noticed that the younger generations have an alarming rate of extraction which should be discouraged by employing and establishing deliberate oral health preventive strategies to combat this loss, if not the whole population may be rendered edentulous early in life.

Tooth loss has various harmful effects an individual which includes but not to impairment of masticatory functions, unpleasant aesthetics, bad phonetics depending on the area of loss, temporomandibular dysfunctions, psychological effects, social withdrawal and decrease in confidence level.

An oral health enlightenment is needed to increase the awareness of the population as to the hazards of lack of or not enough oral health needs.

There is also the need to institute standardized preventive measures such as food policy to reduce the consumption of refined sugars, availability of fluoride and water fluoridation policy, increased funding to produce more dentists, incentives for dentists to accept rural and sub-urban postings, and institution of rural visits through mobile dental clinic and most importantly introduction of appropriate dental health care strategies that will ensure and promote self-oral health care.

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