Prevalence, Causes and Pattern of Tooth Loss among Elderly People in Port Harcourt, Nigeria

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Abstract: Tooth loss constitutes a condition of public health interest and can be used as a measure of the oral health of a population. The study was undertaken to determine the prevalence, pattern and causes of tooth loss among the elderly in Port Harcourt, Nigeria. The study was an observational research design carried out using pensioners 60 years and above. Subjects were selected by systematic random sampling and data was collected by the use of questionnaire and clinical oral examination. Collected data was analyzed using SPSS version 20. No case of complete edentulousness was recorded in this study. The prevalence of tooth loss was 43.6%. Although the prevalence was higher in males than in females and older than younger age group, the difference was not significant. The mean tooth loss was 8.9±2.1. Tooth loss was higher in the maxillary anterior segment (14.2%) than the mandibular anterior segment (13.3%) and in the mandibular posterior segments (38.8%) than the maxillary posterior segments (33.7%). These differences were however not significant. Periodontal disease accounted for 50.3% (2435) of the tooth loss, dental caries and trauma accounted for 44.2% (2142) and 5.5% (264) of tooth loss respectively. The prevalence of tooth loss was high among the study population. Periodontal disease and dental caries were the main cause of tooth loss in this group. Therefore, there is need to educate and promote oral health among the populace geared towards improving oral hygiene and change in dietary pattern.

Keywords: Edentulousness, Elderly, Oral Health, Prevalence, Tooth Loss

1. Introduction

Dental caries is the disease of dental hard tissues characterized by loss of minerals from the teeth with subsequent cavity formation. At an early stage it is preventable; however, it may progress to pulpitis, granuloma, abscess, cyst and cellulitis amongst others. Periodontal diseases are a group of diseases which affects one or more of the supporting tissues of the teeth. It is characterized by the inflammation of the gingiva alone or in combination with the irreversible destruction of the deeper supporting structures of the teeth leading to destruction and loss of connective tissue attachment and alveolar bone, periodontal pocket formation and loosening of teeth. Tooth loss is a major consequence of dental caries and periodontal disease [1]. Other causes of tooth loss include trauma, orthodontic consideration, prosthetic reasons, supernumerary teeth, pericoronitis,

impaction, hypoplasia and tooth wear lesions.

Tooth loss constitutes a condition of public health interest and can be used as a measure of the oral health of a population [2, 3]. It is also important for assessing the standard, availability and utilization of both preventive and curative dental care in a population [4]. Tooth loss is associated with restriction of dietary choices, impaired speech, poor facial esthetics, chewing difficulties and malnutrition. The impact on speech and mastication is particularly pronounced among the elderly [5]. Therefore, tooth loss diminishes the quality of life and impacts on the [6] psychological status and self esteem of an individual [7, 8].

Tooth loss was considered as an unavoidable consequence of old age [9]. Generally, aging is associated with some physical changes, making the individuals more vulnerable to chronic diseases. These changes are also observable in the

oral cavity and may manifest as tooth loss in the elderly. The older population even if they were dentate, they often have fewer functional teeth than the adult population [1]. While a number of studies on the prevalence, pattern and causes of tooth loss have been reported in Nigeria [10-13], none to the knowledge of the researchers has been published particularly among the elderly in Port Harcourt, Nigeria. The lack of research on tooth loss from this region of the country made the present research imperative. Therefore, this study was undertaken to determine the prevalence, pattern and causes of tooth loss among the elderly in Port Harcourt Nigeria. This study will provide baseline information on tooth loss among the elderly in Port Harcourt Nigeria, help in the development of intervention programs by policy makers and government agencies to prevent or reduce tooth loss, this is necessary to meet one of the World Health Organization (WHO) global goal for Oral health for the year 2020 which recommended that there should be an increase in the number of individuals with functional dentitions (21 or more natural teeth) at the ages of 65–74 years.

2. Subjects and Methods

The study was an observational research design and the population of the study were pensioners 60 years and above in Port Harcourt, Rivers State. A minimum sample size of 384 was estimated to be adequate. The assumptions made were: prevalence of tooth loss among elderly population of 52% [14], precision (d) 5% and confidence interval of 95%. Although the calculated minimum sample size was 383, a total of 543 elderly participants were recruited for the study. The participants were selected by systematic random sampling where every second subject was selected from the register of the pensioners. Selected subjects who were absent in a particular visit were contacted through their phone numbers to be present in subsequent visit.

Data was collected by the use of questionnaire and clinical oral examination. The questionnaire contained information on age and gender. Oral clinical examination was done for tooth loss using visual and tactile examination. The participants were examined using spatula and mirror with respondent sitting upright under a good source of light. Missing tooth, reason for missing and quadrant from which tooth was missing was recorded.

The reliability of the questionnaire was done using old people other than those recruited for the study. Twenty of them were selected; the selected participants completed the questionnaire and were examined by the researcher. The filling of the questionnaire and examination was repeated after an interval of one week. The reliability of the instrument was determined using the Cronbach alpha and alpha coefficient of 0.82 was obtained. Informed consent was sought from the participant before data collection and the research protocol for this study was approved by University of Port Harcourt Research Ethics Committee. Individuals who retired voluntarily from the Rivers State government public service or retired having put in 35 years of years of

service and were below the age of 60 years were excluded from the study.

A total of 543 copies of the questionnaire were administered to the respondents and all were retrieved. The completed copies of the questionnaires were collated, coded and entered into the Statistical Package for Social Sciences (SPSS) spread sheet. The data was analysed using SPSS version 20 (IBM SPSS Armonk, New York). Descriptive statistics of frequency and percentage was used to present the results. Where appropriate, chi-square text of association was used. Significance was inferred at P-value of < 0.05 and 95% confidence interval.

3. Results

A total of 543 participants were interviewed and examined. This consisted of 295 (54.3%) males and 248 (45.7%) females. The age of the participants ranged from 60 years to 82 years with a mean of 67.6±11.3years (Table 1).

Table 1. *Gender and age distribution of the participants.*

Variables	Frequency	Percent
Gender		
Female	248	45.7
Male	295	54.3
Total	543	100
Age		
60-64 years	234	43.1
65-69 years	206	37.9
≥70 years	103	19.0
Total	543	100

Regarding tooth loss, no case of complete edentulousness was recorded in this study. Two hundred and thirty-seven (237) subjects had lost one or more teeth giving a prevalence rate of 43.6%. Although the prevalence was higher in males than in females and older than younger age group, the difference was not significant (Table 2). Four thousand eight hundred and forty one (4,841) teeth were lost in the 543 participant. The mean tooth loss was 8.9±2.1. Tooth loss was higher in the maxillary anterior segment (14.2%) than the mandibular anterior segment (13.3%). This was in contrast to what was recorded in the posterior segments. More teeth were lost in the mandibular posterior segments (38.8%) than the maxillary posterior segments (33.7%). These differences were however not significant (Table 2).

Table 2. *Prevalence and pattern of tooth loss among the subjects.*

Variables	Frequency	Percent	*P*-value
Gender			
Female	111	20.4	0.45
Male	126	23.2	
Total	237	43.6	
Age			
60-64 years	73	13.4	0.11
65-69 years	86	15.8	
≥70 years	78	14.4	
Total	237	43.6	
Tooth loss per jaw			
Maxillary anterior segment	685	14.2	0.65

Variables	Frequency	Percent	*P*-value
Mandibular anterior segment	646	13.3	
Maxillary posterior segment	1633	33.7	0.33
Mandibular posterior segment	1877	38.8	
Total	4,841	100	

The study showed that periodontal disease and caries were the major cause of tooth loss among the subjects. While periodontal disease accounted for 50.3% (2435) of the tooth loss, dental caries and trauma accounted for 44.2% (2142) and 5.5% (264) of tooth loss respectively (Table 3).

Table 3. Tooth loss due to dental caries, periodontal disease and trauma.

Causes of tooth loss	Frequency	Percent
Dental caries	2142	44.2
Periodontal disease	2435	50.3
Trauma	264	5.5
Total	4841	100

4. Discussion

This study was conducted among retired civil servants as a representative sample of the elderly in Port Harcourt, Rivers State. A possible source of bias was the fact that the survey was conducted in a predetermined location (Secretariat of the retired workers), thus increasing the possibility of excluding persons who would not be able to reach this location or visit the secretariat at the time of this study. In spite of this bias, the findings of this study may provide baseline and useful information on tooth loss among the old people in Port Harcourt, Rivers State.

Complete edentulousness was not recorded in this study; this is comparable to 1.3% edentulousness reported among 690 elderly patients in Ibadan, Nigeria [14]. The prevalence of tooth loss recorded among the study population in this study was 43.6%, this is lower than 52% reported among the elderly 65 years and above residing in various wards of South East Local Government Area of Ibadan [14]. Study population characteristics particularly social-economic and cross-cultural differences may account for this difference in the prevalence. Furthermore, an increase in the number of dentist, dental auxiliaries and dental specialists in Nigeria over the years may have led to improvements in oral health care delivery in the country. Again, it is reported that the incorporation of oral health services into the local and state government health care delivery systems has improved the level of oral health care delivery across the country [15]. This may also play a role in the decline of prevalence of tooth loss observed in this study. Finally, the reduction in prevalence might just be indicative of change in pattern of oral disease among Nigerians due to these improvements and improved self-oral care.

Reports on the relationship between gender and tooth loss is variable. Some studies have reported greater preponderance of tooth loss in females than in males [3, 9, 10]; some others have reported the contrary [16, 17]. Yet some other studies have reported that gender is not a significant predictor of tooth loss [18, 19]. These studies were conducted among children and adult population. The present study showed that tooth loss was higher in males than in females, this result is agreement with the finding of a similar study conducted among the elderly in Ibadan, Nigeria [14].

Unlike gender, there is a general consensus on the influence of age on tooth loss. Tooth loss is reported to rise with an increase in age. The result of this study is in agreement with previous studies where tooth loss increased as the age of the participants increased [3, 9, 16, 17].

More teeth were lost from the mandible than the maxilla and most of the teeth were lost from the posterior segment of the mandible and the maxilla than the anterior region of both bones. Other studies have reported similar findings [10, 17, 20].

Globally, the two major causes of tooth loss are periodontal disease and dental caries. However, earlier research from Nigeria [21, 22] reported that periodontal disease was the main cause of tooth loss. Several years later, Taiwo et al in 2006 reported that 98.7% of tooth loss seen in elderly population from Ibadan, Nigeria was due to periodontal disease. Recently, in 2013 Saheeb et al [23] carried out a study in Benin to find out whether there was change in trend for the reasons for loss of teeth different from previous report from Nigeria. The study concluded that there was a change in trend as more teeth are now being lost as a result of caries. Several other studies have reported similar trend [10, 11]. The finding of the present study is in agreement with this reported change in trend of the causes of tooth loss. In the present study, 50.3% of tooth loss was due to periodontal disease and 44.2% was due to dental caries. While the present study shows that more teeth are now been lost as a result of caries, periodontal disease still remain the major cause of tooth loss among elderly population as document by other studies [14, 24-26]. However, the increase of tooth loss as a result of dental caries may be due to urbanization and an ever-increasing Western influence leading to a change in diet and lifestyle with increase incidence of dental caries.

5. Conclusion

The prevalence of tooth loss was high among the study population. The prevalence was higher in males than in females and increased with an increase in age. Periodontal disease and dental caries were the main cause of tooth loss in this group. Periodontal disease and dental caries are preventable, there is need to educate and promote oral health among the populace geared towards improving oral hygiene and change in dietary pattern.

Authorship

The authors Dr. Braimoh OB and Dr. Alade GO were both involved in the concept and design of this study, collection, analysis and interpretation of data and the final drafting, revising and approval of the manuscript for submission to the

Central African Journal of Public Health. Literature search was done by Dr. Braimoh OB. We take responsibility for the integrity of this work as a whole from inception to publication and give the rights to the corresponding, Dr Braimoh OB author to make necessary changes as per the request of the journal, do the rest of the correspondence on our behalf and he will act as the guarantor for the manuscript.

Source of Support

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