

Pattern of Tooth Mortality and Incidence of Shortened Dental Arch Among Elderly Patients Seeking Oral Health Care in a Tertiary Health Institution in Nigeria

Enabulele Joan and Omo Julie Omole*

Department of Restorative Dentistry, University of Benin, Benin City, Nigeria

***Corresponding Author:** Omo Julie Omole, Department of Restorative Dentistry, University of Benin, Benin City, Nigeria.

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Abstract

Purpose: To determine the pattern of tooth mortality and incidence of shortened dental arch among elderly patients.

Methods: This was a retrospective study of all elderly patients who sought oral health care at a tertiary hospital in Nigeria. The data of interest retrieved from the case notes were: age, gender, marital status, teeth present and teeth missing. The teeth present were used to determine the presence of SDA with patients who had only anterior and premolar dentition classified as symmetrical SDA and those who had anterior and premolar dentition on one side of an arch as asymmetrical SDA.

Result: There was a female preponderance with a male female ratio of 1:1.48. The number of missing teeth among the patients ranged from 0 to 32 with a mean of 3.06 ± 5.12 . More than half (58.7%) of the patients were partially edentulous while 1.0% were completely edentulous. There was a weak significant positive correlation between age of subjects and number of missing teeth. Of those that had missing teeth, it was observed that more patients (54.2%) had missing teeth in both arches and more posterior teeth were missing. There was statistically significant association between the missing tooth type and the arch. The incidence of shortened dental arch (SDA) among the elderly patients was 5.5%. Majority (63.6%) of those with SDA had asymmetrical SDA.

Conclusion: There was a low prevalence of complete edentulism and shortened dental arch among the elderly in this study. However most of the elderly presented with partial edentulism.

Keywords: *Tooth mortality; Shortened dental arch; Elderly*

Abbreviation: SDA: Shortened Dental Arch

Introduction

Oral health is an important component of an older person's general health and well-being [1]. Although, often overlooked it is important to the appearance, sense of well-being; general body health and quality of life of elderly individuals [2,3]. Monitoring the occurrence of edentulism which can be regarded as an oral "end state" has been reported to be important as it acts as a pointer to the population's health as well as the functioning and adequacy of the country's oral health care system [4].

Improving oral health will significantly enhance the physical, social and mental attributes of geriatric individuals either at home or the work place [3]. The process of ageing may directly or indirectly increase the risk of oral disease, compounded by poor general health, illnesses or chronic diseases [5]. Globally, poor oral health amongst older people has been particularly evident in the high levels of tooth loss, dental caries experience, and the prevalence rates of periodontal disease, xerostomia and oral precancer/cancer [6]. At old age, high prevalence of co-morbidities and barriers to care are observed, together with oral health care challenges in relation to major disease conditions [5].

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Increasing age has been implicated as one of the socio-economic factors associated with edentulism [7-11]. Tooth loss can considerably impact quality of life by affecting the ability to eat, facial esthetics and ultimately affecting an individual's confidence level negatively [12].

The World Health Organization's goal for a functional and esthetic dentition for the elderly is a minimum of at least 20 natural teeth by the year 2000 [13]. Once posterior teeth have been lost, treatment options include replacing the missing teeth with either removable or fixed partial denture or maintaining the existing dentition (Shortened Dental Arch). The concept of shortened dental arch (SDA) has been developed as a treatment option for partially edentulous subject. The SDA protocol de-emphasizes restorative treatment in the posterior regions of the mouth while continuing to offer a high standard of care and minimizing cost [14].

There has been a decline in prevalence of complete edentulism [15,16] however, edentulism still remains a major public health concern [15]. There have been several reports of the prevalence of edentulism among older persons from various countries [17-23] but only a few Nigerian studies [24,25] was found by the authors. This finding and the observation that the rate and pattern of edentulism vary among different regions within a country [26] informed the carrying out of this study which was aimed at determining the pattern of tooth mortality and incidence of shortened dental arch among elderly patients.

Materials and Methods

This was a retrospective study of all elderly (60 years and above in age) patients who sought oral health care at a tertiary hospital in Nigeria (University of Benin Teaching Hospital) over a one-year period. All elderly were identified from the patient's register, the case note numbers were noted and the case notes retrieved.

The data of interest retrieved from the case notes were: age, gender, marital status, teeth present and teeth missing. The teeth present were used to determine the presence of SDA with patients who had only anterior and premolar dentition classified as symmetrical SDA and those who had anterior and premolar dentition on one side of an arch as asymmetrical SDA.

Data collected was analyzed using the Statistical Package for Social Science (SPSS) version 21.0. The data was subjected to descriptive analysis in the form of frequencies, percentages, cross tabulations, test of significance with chi square and correlation of variables using Spearman's rho with $P < 0.05$ considered statistically significant.

Results

This was a one year retrospective study carried between April 2012 and March 2013. Out of 4,183 patients that sought dental treatment at the dental centre where this study was carried out 209 were 60 years and above giving a prevalence of 5.0%. A total of 201 case notes out of 209 elderly patients were retrieved giving a 96.2% retrieval rate. The ages of the patients ranged from 60 to 98 years with a mean age of 72.05 ± 7.24 years. There was a female preponderance with a male female ratio of 1:1.48. Most (68.7%) of them were married with more females widowed and this was statistically significant ($p = 0.0001$).

The number of missing teeth among the patients ranged from 0 to 32 with a mean of 3.06 ± 5.12 . More than half (58.7%) of the patients were partially edentulous while 1.0% were completely edentulous. More of the females retained their teeth however; there was no statistically significant relationship between pattern of edentulism and gender Table 1. There was a weak significant positive correlation between age of subjects and number of missing teeth (Spearman's rho = 0.179, $p = 0.011$). This relationship remained significant even after controlling for gender. Of those that had missing teeth, it was observed that more patients (54.2%) had missing teeth in both arches and more posterior teeth were missing Table 2.

Table 3 depicts statistically significant association between the missing tooth type and the arch ($p = 0.0001$), with more posterior teeth when it involves the maxilla only and more anterior teeth when it involves the mandible only. When both arches were involved, the missing teeth tend to be both anterior and posterior. More teeth were retained in the mandible.

The incidence of shortened dental arch (SDA) among the elderly patients that presented to the clinic during the year under review was 5.5%. Majority (63.6%) of those with SDA had asymmetrical SDA. There was no statistically significant relationship between the type of SDA, gender and arch with missing teeth Table 4.

Discussion

The elderly are a unique group of people which constitute an important part of the general population. With increase in growing number of elderly there is likewise increased concern regarding their health and quality of life [27]. The prevalence of elderly that sought oral health care over the period of this study (5.0%) was lower than that (8.0%) reported for persons > 65years in a previous study in Ibadan [28].

According to World Health Organization (WHO), the default definition of the elderly is the age at which a person becomes eligible for statutory and occupational retirement pensions [5]. The ages of 60 and 65 years are often used. The age range of the patients in this study was 60 to 98 years and this made them eligible to be called the elderly. The mean age of the elderly 72.05 (\pm 7.24) observed in this study was close to the mean age reported in a previous Nigerian study [29].

The pattern of tooth loss has been regarded as one of the most important measures for assessing the standard, availability and utilization of curative and preventive dental care in a given population [16,30]. Edentulism reflects both the accumulated burden of oral diseases as well as the results of dental treatments such as extraction [31].

Being female has been associated with edentulism [8,9,32] however, in this study a higher percentage of males had edentulism which is similar to a previous Nigerian study [25]. The female preponderance of elderly seeking oral health care is in agreement with a Brazilian study [14] and corroborates the assertion that females tend to have longer life expectancy [27]. It also highlights the importance females attach to their health not withstanding their age. Previous studies assessing utilization of oral health care among the young [28,33] and among the elderly [34] demonstrated increased utilization of dental care services among females.

The elderly are more prone to tooth loss since the likelihood of tooth loss increases with age [25,27] as a result of the cumulative effects of caries, periodontal disease, trauma and dental treatment [35]. A higher retention rate of mandibular teeth have been reported [25] and this was also observed in this study. More than half of the elderly in this study were partially edentulous with more posterior teeth missing. This result corroborates the findings of a previous study where more of the elderly were partially edentulous [29]. Also an increase in teeth retention and decline in complete edentulism among the elderly had been previously reported in the literature [24,25,36,37] and this was depicted by the low incidence of complete edentulism observed in this study. However, the incidence of complete edentulism was far lower (1.0%) when compared with 11.7% [23], 14.22% [17] and 19% [18] reported by previous studies and similar to a previous Nigerian study [25] which reported a prevalence of 1.3%. This suggests that there is a low prevalence of complete edentulism in Nigeria.

As regards the pattern of tooth loss in the elderly in this study, there were more posterior teeth missing, when it involved the maxillary arch only. The molars have been found to be the most commonly missing teeth, which could be caused by high vulnerability of these teeth to both periodontal disease and dental caries [30]. However, when it involved the mandible only, it was observed to be more of anterior teeth missing. This observation appears to vary with previous ones where posterior tooth loss is commoner in both arches [38,39].

The increase in missing mandibular anterior teeth may be explained by the presence of the opening of the mandibular salivary duct which secretes saliva containing α -amylase which serves to promote adhesion of *Streptococci* to the tooth surface which can contribute to dental plaque formation and subsequent periodontal disease [40]. Treatment planning for the elderly brings implications for oral health care providers as they tend to have complex and unique requirements [41].

The SDA concept is a minimal treatment interventional approach which is based on the notion that satisfactory oral function can be achieved with complete dental arches and hence teeth lost do not necessarily have to be replaced [42]. This could explain why SDA may not be a very common finding in a hospital based study as people with SDA may not see a need to seek oral healthcare since they have op-

timal oral function. Although, studies have reported incidence as high as 15% [36], there was a low incidence (5.5%) of shortened dental arch (SDA) in this study corroborating previous studies [14,29], and further supporting the findings that SDA was not common in clinical practice [43].

The World Health Organization (WHO) goal on the minimum number of teeth to meet functional demand for the elderly [13]. It has also been demonstrated that there is sufficient adaptive capacity to maintain adequate oral function in SDAs when at least four occlusal units are left, preferably in a symmetrical position [42]. These conditions were not met in this study as most of the patients with SDA had asymmetrical SDA.

Conclusion

There was a low prevalence of complete edentulism and shortened dental arch among the elderly in this study. However most of the elderly presented with partial edentulism with more posterior teeth missing in the maxilla and anterior teeth in the mandible.

Conflict of Interest

There are no conflict of interest among the authors.

Gender P= 0.39	Partially edentulous n (%)	Completely edentulous n (%)	Completely dentate n (%)	Total n (%)
Male	52 (64.2)	1 (1.2)	28 (34.6)	81 (100.0)
Female	66 (55.0)	1 (0.8)	53 (44.2)	120 (100.0)
Total	118 (58.7)	2 (1.0)	81 (40.3)	201 (100.0)

Table 1: Pattern of edentulism by gender of the patients.

Arch	Frequency (n)	Percentage (%)
Maxilla only	34	28.3
Mandible only	21	17.5
Both arches	65	54.2
Tooth type		
Anterior teeth	25	20.7
Posterior teeth	55	45.5
Both anterior and posterior teeth	41	33.9
Total	120	100.0

Table 2: Pattern of distribution of missing teeth by arch and tooth type.

Arch	Anterior n (%)	Posterior n (%)	Both n (%)	Total n (%)
Maxilla only	8 (23.5)	25 (73.5)	1 (2.9)	34 (100.0)
Mandible only	11 (52.4)	9 (42.9)	1 (4.8)	21 (100.)
Both arches	6 (9.2)	21 (32.3)	38 (58.5)	65 (100.0)
Total	25 (20.8)	55 (45.8)	40 (33.3)	120 (100.0)
				P= 0.0001

Table 3: Relationship between Arch and missing tooth type.

Characteristics	SDA classification		
	Normal n (%)	Asymmetrical n (%)	Total p=0.66
Gender			
Male	1 (50.0)	1 (50.0)	2 (100.0)
Female	3 (33.3)	6 (66.7)	9 (100.0)
Arch			P= 0.12
Maxillary only	1 (100.0)	0 (0.0)	1 (100.0)
Mandible only	1 (100.0)	0 (0.0)	1 (100.0)
Both arches	2 (22.2)	7 (77.8)	9 (100.0)
Total	4 (36.4)	7 (63.6)	11 (100.0)

Table 4: Relationship between SDA classification, gender and arch with missing teeth.

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