RESEARCH ARTICLE

Oral diseases in Geriatric patients; pattern of presentation and challenges of management in a developing economy.

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Abstract
Objectives: To determine the pattern of orofacial diseases, oral care interventions and co-morbidities in the elderly
Background: Aging is accompanied by changes in every part of the body including orofacial tissues. These changes are often overlooked when considering health care demands of the elderly. Empirical insights into the pattern and risk factors to oral diseases of elderly Nigerians which are of public health importance are scarce.
Materials and Methods: Electronic records of 275 elderly patients aged ≥60 years who attended the dental unit of our facility between 1st January 2013 and 31st December 2015 were analyzed. Data extracted included the sociodemographic characteristics, reasons for encounter, orofacial diagnoses and co-morbidities.
Results: The mean age of the patients studied was 70.8 ± 7.5 years and 185 (67.3%) of these patients were females. The major reasons for the dental visits were toothache (54.9%) and cleaning of teeth (14.2%). Periodontal diseases (68.0%) and endodontic lesions (11.3%) were the commonest orofacial diagnoses. Overall, there were 780 (2.8 per elderly) missing teeth. Scaling and polishing 140 (50.9%) and tooth extraction 98 (35.6%) were the most frequent orofacial procedures. There was an average of 1.5 co-morbid medical condition per elderly patient studied. Hypertension (51.3%) and osteoarthritis (29.1%) were the most common co-morbid medical conditions in the patients we studied.
Conclusion: Periodontal and endodontic lesions were the commonest orofacial infections in these patients while hypertension and osteoarthritis were the most common co-morbid medical conditions seen amongst elderly patients seen at the dental unit of our geriatric health centre. These findings will be useful for the setting up and management of elderly patients needing oral health care in Nigeria.

Keywords: Oral health needs, non-communicable diseases, Geriatric centre, Nigeria

INTRODUCTION

General wellbeing is related to health and disease states of the oral cavity as well as the rest of the body. As the first segment of the gastrointestinal system, the oral cavity provides the point of entry for nutrients. If dietary habits are unfavorably influenced by poor oral health, nutritional status can be compromised. The condition of the oral cavity, therefore, can facilitate or undermine nutritional status however; nutritional status can also contribute to or exacerbate oral disease. The cumulative effects of aging, disease, and trauma contribute to the wide variety of oral health problems that are prevalent in the older adult.[1]

Oral health implies a state that is stable, relatively disease free and comfortable and that permits adequate functioning for mastication, swallowing, and speech. Unfortunately, the mouth often becomes one of the first areas of the body to be neglected by people who have chronic diseases and infirmities in old age.

Poor oral health can be viewed as a state of inadequate functioning resulting from decayed teeth; periodontal disease; ill-fitting dentures or lack of dentures; neglect of oral hygiene; and the presence of pain, inflammation, or infection in the oral cavity. Although few of these conditions pose mortality risks, they can lead to physical dysfunction, pain, and psychological anguish in the older patient.[2]

An awareness of this interrelationship between oral health and systemic health is essential when the clinician is working with the older patient because the incidence of major dental problems and the frequency of chronic illness and pharmacotherapy increase dramatically in older people.[3] Thus, this study determined the pattern of orofacial diseases, various oral care interventions received as well as associated systemic diseases in this age group.

METHODS

Study setting: The study was carried out at the Chief Tony Anenih Geriatric Centre (CTAGC), University College Hospital (UCH), Ibadan. The CTAGC was the pioneer geriatric centre in Nigeria and was commissioned on the 17th November 2012. Patients who are 60 years of age and above are considered geriatric according to our institutional policy and therefore triaged to and managed at the CTAGC. Those needing further specialist care are referred to other units within the hospital. CTAGC has ten service areas in the centre namely outpatient service, inpatient service (9- bedded ward), dental, physiotherapy, dietetics, surgical (theatre), community geriatrics, ophthalmology, rheumatology and medical social work units. An average of 100 older persons attends the centre on daily basis and 15,357 older persons have been registered at the CTAGC as at the time of compiling this work.

Study design: This was a descriptive and retrospective study of all older persons who attended the dental outpatient unit of the CTAGC, UCH Ibadan between 1st January 2013 and 31st December 2015 using the patient's records to get the necessary information.

Inclusion/exclusion criteria: Patients aged 60 years and above who presented to and was treated at the dental unit of the CTAGC

were included into the study, no records were excluded as all health records of patients who presented at the centre during the study period.

Procedure: Electronic records of all patients who were treated at the dental unit of CTAGC were obtained via the Electronic Health System (EHS) with the approval from the Director of the CTAGC and Chief Medical Director of UCH. Information was obtained on the sex, age, ethnicity, marital status, reasons for encounter, frequency of dental visits in the past one-year, orofacial diagnoses and co-morbid medical conditions. We maintained confidentiality of data by the removal of names and hospital numbers from the analysis, leaving only the serial numbers allotted to them.

Data analysis: Data was analysed using the Statistical Package for the Social Sciences (SPSS) version 22. Descriptive and inferential statistics were carried out using appropriate statistical tools. Appropriate charts were used to illustrate categorical variables. Student t-test was used to compare the means and the level of significance was set at $p < 0.05$.

RESULTS

A total of 275 elderly patients visited the dental unit of CTAGC within the period of the study. There were 90 (32.7%) males and 185 (67.3%) females giving a gender ratio (M: F) of 0.5:1. The mean age of the patients was 70.8 ± 7.5 years which was significantly higher among the men compared with the women (72.6 ± 7.9 vs 69.9 ± 7.2 years) $t = 2.761$, $p = 0.006$.

A large population of the respondents (152; 55.5%) were retired, regarding their marital status, while 203 (73.8%) is currently married, 238 (72.8%) and 1 (0.4) were widowed and divorced respectively, table 1.

One hundred and fifty-six (56.8%) patients visited the dental clinic once in the past one year, while 62 (22.5%) visited twice and 57 (20.7%) had three or more visits (range 1 – 7 visits). Toothache (54.9%), need to clean the teeth (14.2%) and seeking care for mouth odour (11.6%) were the commonest reason for dental consultations. Figure 1.

Table 1: Demographic characteristics of the respondents

Variables	Frequency = 275	Percentage
Sex		
Males	90	32.7
Females	185	67.3
Age Groups (years)		
60 – 64	61	22.2
65 – 69	74	26.9
70 – 74	57	20.7
75 – 79	44	16.0
80 – 84	25	9.1
≥ 85	14	5.1

Marital status		
Married	203	73.8
Widowed	71	25.8
Divorced	1	0.4
Religion		
Christianity	210	76.4
Islam	65	23.6
Occupational status		
Still working	123	44.7
Retired	152	55.3
Ethnicity		
Yoruba	257	93.5
Igbo	9	3.3
Hausa	2	0.7
Others	7	2.6

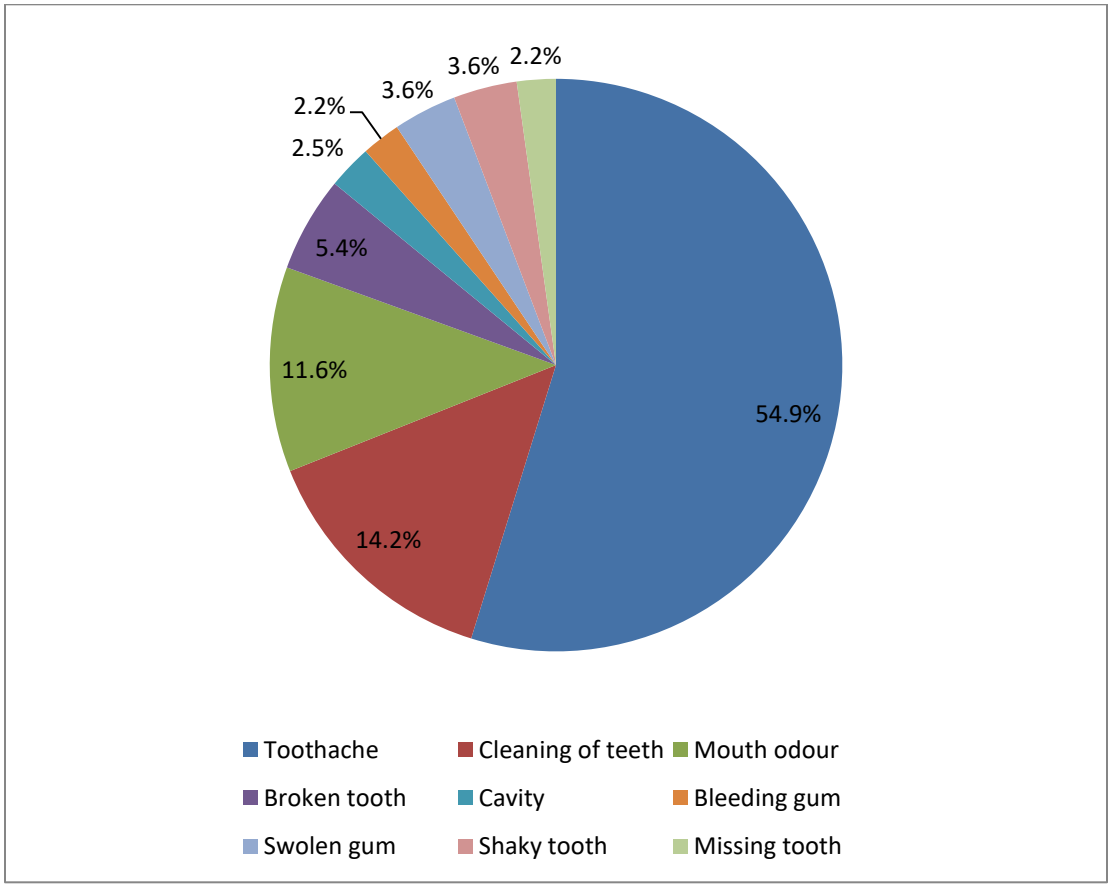

Figure 1: Reasons for dental consultation

Table 2 shows the pattern of medical co-morbidities among the respondents. In total, there were 404 co-morbid medical conditions with an average of 1.5 co-morbid medical conditions per respondent. Hypertension 141 (51.3%), osteoarthritis 80 (29.1%) and osteoporosis 39 (14.2%) were the most frequent co-morbid medical conditions.

Table 2: Pattern of comorbidities among the respondents

Comorbidities	Frequency	Percentage
Hypertension	141	51.3
Osteoarthritis	80	29.1
Osteoporosis	39	14.2
Diabetes mellitus	34	12.4
Cataract	16	5.8
Peripheral neuropathy	15	5.5
Peptic Ulcer Disease	12	4.4
Urinary tract infection	7	2.5
Malaria	7	2.5
Insomnia	6	2.2
Benign prostate enlargement	6	2.2
Malignancy	5	1.8
Dementia	5	1.8
Glaucoma	4	1.5
Obesity	4	1.5
Chronic Obstructive Pulmonary Disease	4	1.5
Poor hearing	4	1.5
Constipation	4	1.5
Allergic reaction	2	0.7
Pneumonia	2	0.7
Hepatitis B infection	1	3.6
Stroke	1	3.6
Anxiety	1	3.6

Conjunctivitis	1	3.6
Depression	1	3.6

Note: Multiple morbidities

The pattern of dental morphology is described in Table 3. Overall, there were a total of 780 missing teeth with an average of 2.8 missing teeth per respondent. Of the available 8,020 teeth, 552 teeth were observed to be associated with periodontal diseases and 19 teeth were present as retained roots. Periodontal lesions 187 (68.0%) was the most diagnosed orofacial disease, while maxillofacial injury was the least diagnosed orofacial problem 1 (0.4%). Table 4.

Table 3: Pattern of dental morphology

Tooth	Missing Tooth	Periodontal issues	Fractured Tooth	Carious Tooth	Retained root	Normal	Tooth wear	Total
Upper right 1	28(10.2)	11(4.0)	9(3.3)	1(0.4)	1(0.4)	214(77.8)	11(4.0)	275(100.0)
Upper right 2	13(4.7)	12(4.4)	3(1.1)	1(0.4)	2(0.7)	236(85.8)	8(2.9)	275(100.0)
Upper right 3	7(2.5)	3(1.1)	4(1.5)	0(0.00)	1(0.4)	255(92.7)	5(1.8)	275(100.0)
Upper right 4	14(5.1)	6(2.2)	16(5.8)	0(0.00)	1(0.4)	228(82.9)	10(3.6)	275(100.0)
Upper right 5	18(6.5)	11(4.0)	18(6.5)	0(0.00)	2(0.7)	220(80.0)	6(2.2)	275(100.0)
Upper right 6	30(10.9)	31(11.3)	14(5.1)	3(1.1)	0(0.00)	187(68.0)	10(3.6)	275(100.0)
Upper right 7	25(9.1)	29(10.5)	3(1.1)	3(1.1)	1(0.4)	209(76.0)	5(1.8)	275(100.0)
Upper right 8	41(14.9)	19(6.9)	2(0.7)	5(1.8)	0(0.00)	204(74.2)	4(1.5)	275(100.0)
Upper left 1	26(9.5)	9(3.3)	8(2.9)	1(0.4)	0(0.00)	221(80.4)	10(3.6)	275(100.0)
Upper left 2	13(4.7)	11(4.0)	0(0.00)	0(0.0)	2(0.7)	238(86.5)	11(4.0)	275(100.0)
Upper left 3	7(2.5)	9(3.3)	2(0.7)	2(0.7)	1(0.4)	247(89.8)	7(2.5)	275(100.0)
Upper left 4	16(5.8)	12(4.4)	14(5.1)	2(0.7)	0(0.00)	223(81.1)	8(2.9)	275(100.0)
Upper left 5	16(5.8)	12(4.4)	8(2.9)	5(1.8)	0(0.00)	230(83.6)	4(1.5)	275(100.0)
Upper left 6	37(13.5)	27(9.8)	5(1.8)	1(0.4)	0(0.00)	193(70.2)	12(4.4)	275(100.0)
Upper left 7	29(10.5)	30(10.9)	3(1.1)	6(2.2)	0(0.00)	201(73.1)	6(2.2)	275(100.0)
Upper left 8	45(16.4)	24(8.7)	1(0.4)	3(1.1)	1(0.4)	196(71.3)	5(1.8)	275(100.0)
Lower left 1	41(14.9)	21(7.6)	3(1.1)	0(0.00)	0(0.00)	202(73.5)	8(2.9)	275(100.0)
Lower left 2	26(9.5)	19(6.9)	1(0.4)	0(0.00)	0(0.00)	222(80.7)	7(2.5)	275(100.0)
Lower left 3	10(3.6)	10(3.6)	2(0.7)	1(0.4)	0(0.00)	242(88.0)	10(3.6)	275(100.0)
Lower left 4	12(4.4)	14(5.1)	9(3.3)	2(0.7)	0(0.00)	229(83.3)	9(3.3)	275(100.0)
Lower left 5	15(5.5)	10(3.6)	16(5.8)	2(0.7)	2(0.7)	225(81.8)	5(1.8)	275(100.0)
Lower left 6	41(14.9)	26(9.5)	11(4.0)	4(1.5)	1(0.4)	177(64.4)	15(5.5)	275(100.0)
Lower left 7	34(12.4)	27(9.8)	4(1.5)	6(2.2)	0(0.00)	197(71.6)	7(2.5)	275(100.0)
Lower left 8	40(14.5)	22(8.0)	3(1.1)	6(2.2)	0(0.00)	198(72.0)	6(2.2)	275(100.0)
Lower right 1	34(12.4)	20(7.3)	3(1.1)	0(0.00)	0(0.00)	212(77.1)	6(2.2)	275(100.0)
Lower right 2	20(7.3)	22(8.0)	1(0.4)	0(0.00)	0(0.00)	226(82.2)	6(2.2)	275(100.0)
Lower right 3	9(3.3)	16(5.8)	4(1.5)	1(0.4)	0(0.00)	237(86.2)	8(2.9)	275(100.0)
Lower right 4	14(5.1)	8(2.9)	12(4.4)	0(0.00)	0(0.00)	230(83.6)	11(4.0)	275(100.0)
Lower right 5	10(3.6)	14(5.1)	12(4.4)	0(0.00)	1(0.4)	227(82.5)	11(4.0)	275(100.0)
Lower right 6	43(15.6)	24(8.7)	15(5.5)	1(0.4)	2(0.7)	175(63.6)	15(5.5)	275(100.0)
Lower right 7	33(12.0)	26(9.5)	8(2.9)	5(1.8)	1(0.4)	196(71.3)	6(2.2)	275(100.0)
Lower right 8	33(12.0)	17(6.2)	3(1.1)	2(0.7)	0(0.00)	214(77.8)	6(2.2)	275(100.0)
TOTAL	**780 (8.9)**	**552 (6.3)**	**217 (2.5)**	**63 (0.7)**	**19 (0.2)**	**6911 (78.5)**	**258 (2.9)**	8800 (100.0)

Table 4: Frequency of orofacial diagnoses by sex

Category of diagnosis	Male = 90 n (%)	Female = 185 n (%)	Total = 275 N (%)
Tooth wear lesion	2(2.2)	4(2.2)	6(2.2)
Dental trauma	7(7.8)	15(29.7)	22(8.0)
Periodontal lesion	65(72.2)	122(65.9)	187(68.0)
Endodontic	11(12.2)	20(10.8)	31(11.3)
Perio-endo lesion	0(0.00)	2(1.1)	2(0.7)
Maxillofacial injury	0(0.00)	1(0.5)	1(0.4)
Dental cares	0(0.00)	2(1.1)	2(0.7)
Infections	0(0.00)	3(1.6)	3(1.1)
Tumours	1(1.1)	1(0.5)	2(0.7)
Halitosis	1(1.1)	2(1.1)	3(1.1)
Others†	0(0.00)	10(5.4)	10(3.6)
Prosthetics	3(3.3)	3(1.6)	6(2.2)

† Others: retained root, dry socket, oral ulcers

Figure 2 describes the frequency of orofacial procedures. A total of 333 orofacial procedures were carried out with scaling and polishing 140 (50.9%) being the commonest. Sequestrectomy, reduction and mobilization and debridement of dry sockets were the least performed procedures.

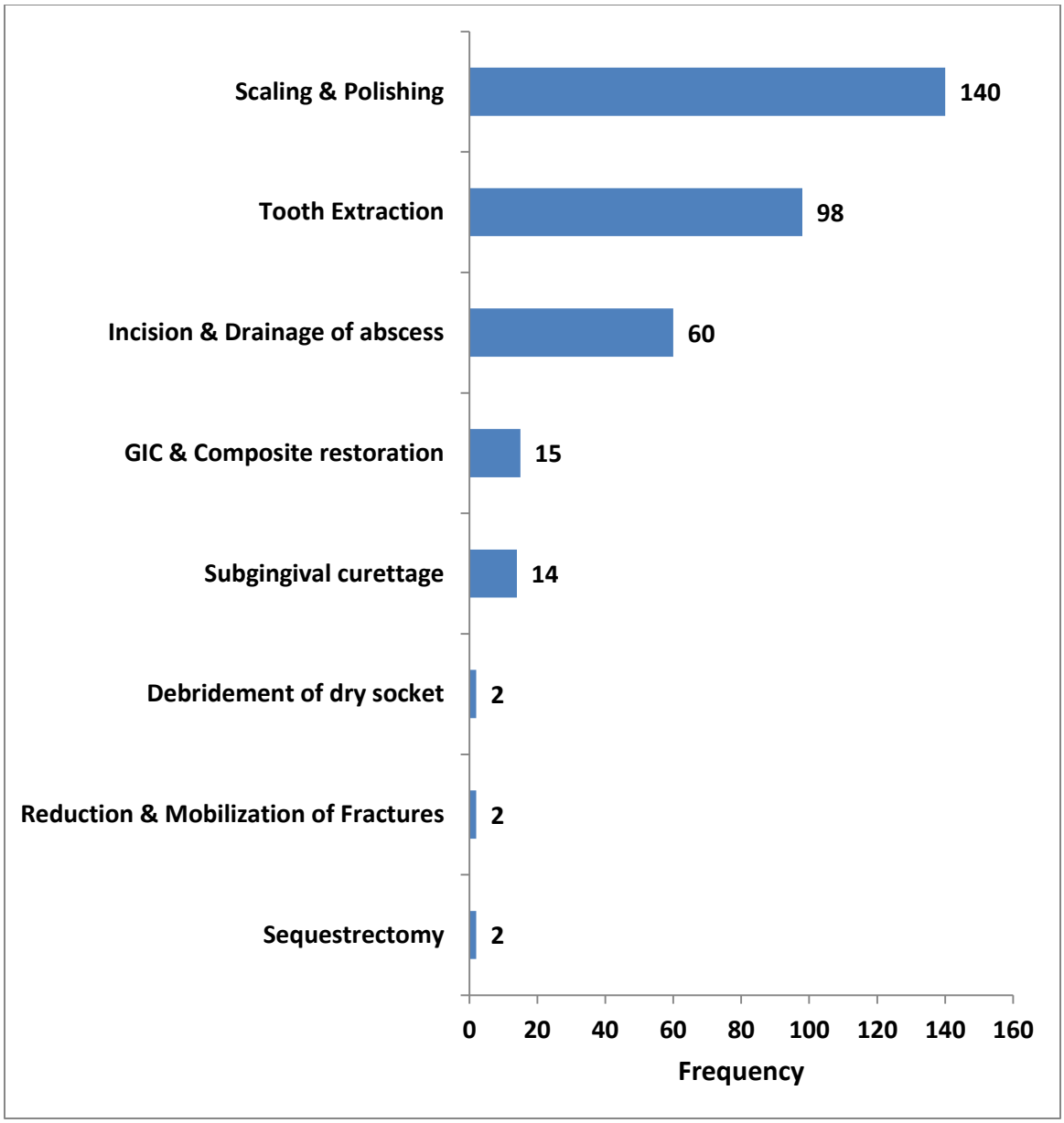

Figure 2: Frequency of orofacial procedures

DISCUSSION

The proportion of older people continues to grow worldwide, especially in developed countries.

This may be related to their attention to cutting edge research which often translates to improvement in the quality of health care and developments in medical practice. It has been projected that in the coming decades, health and social policy-makers will face tremendous challenges posed by the rapidly changing burden of chronic diseases in old age. Increased burden of chronic diseases is also expected to impact negatively on the quality of oral health as oral health is an integral component of general health. Petersen noted that chronic diseases and

most oral diseases share common risk factors. [4]

In general, it is known that unmet dental treatment needs affect a large portion of the non-institutionalized elderly population. This is true whether the study has been conducted by direct examination of patients or by survey. Data from HANES I indicated that 60% of elderly subjects had at least one dental treatment need,[5] our study which also supported the above claim showed that at least 150 (54.9%) of the patients complained of tooth ache.

Previous studies found a high level of unmet oral health needs.[6] Federal interagency Forum on Aging-related statistics of older American in 2012[7] showed that 40% required at least one restoration and 16% at least one extraction. A higher percentage 85 (26.0%) of our patients had tooth extraction done. Our study showed that the most frequent treatment received was scaling and polishing of the teeth for 140 (50.9%) of the patients and this was mostly at the patients' request. The finding of greater need for tooth extraction in our study compared to the finding of Marie Herr et al amongst Americans may not be unconnected to the lack of national health insurance coverage of majority of conservative dental procedures in our clime. Most patients would opt for extraction of teeth because of its lower cost compared to the conservative procedures.

Tooth loss is one general measure of oral health status of a population. While there are many diseases that affect the oral cavity, caries (cavities), periodontal disease (gum disease), and oral and pharyngeal cancer are other sentinel measures used to track oral health at the population level.[8] Tooth loss was recorded as 780 (7.6%) missing teeth and most were UL8, 46 (16.6%) of cases and LR6 43(15.5%). The lower first incisors and the molar teeth appear to be more at risk of being lost by old age in our environment.

Differentiation of normal aging changes from disease processes in old age is of paramount importance. Poor appreciation of the changes that occur with age might lead to excessive or unnecessary treatment. Erroneously evaluating a disease process as normal aging might have equally serious consequences. Unfortunately, lack of research on the aging oral cavity has resulted in a number of stereotypes and generalizations.[1,9]

Of added concern may be the presence of systemic diseases which may not only influences the patient's ability to maintain oral hygiene and promote a good oral health, but be the reason for the occurrence of certain oral diseases. Although these impairments may not be life threatening, they may affect a person's quality-of-life.[1]

Hypertension is a disease that has bearing on oral health. A high percentage of our patients were hypertensive 104 (32.5 %) of these74 (71%) had periodontal diseases.

Furthermore, there are distinct regional and state differences in tooth loss experienced by older Americans (those older than 65 years). According to data from the Behavioural Risk Factor Surveillance System (BRFSS), the highest percentages of edentulous individuals were seen in Kentucky (42.3%) and West Virginia (41.9%), while the lowest percentages were observed in Hawaii (13.1%) and California (13.3%). Determinants of loss of 6 or more teeth include lack of a high school diploma, a

household income of less than $15 000, self-identification as non-Hispanic Black, current smoking, and being in poor to fair health status (including having diabetes).[8] In our study, a relatively lower percentage of teeth, 780 (7.76%) were missing.

The oral health can be complicated by regular use of several prescriptions and/or over the counter medications making them vulnerable to medication errors, drug interactions or adverse drug reactions. Most of the patients with oral diseases also had one or two types of systemic diseases. Many of our patients had systemic health conditions and were on regular medications for various conditions including 104 (32.5 %) were hypertensive, osteoarthritis 17(5.3%) and 10 (3.1 %) were diabetic.

National Health And Nutrition Examination Survey (NHANES) 1990-2004; noted that 18% of adult 65 years and older with retained natural teeth have untreated caries. Caries incidence in our study was only in 2(0.6%) cases. While periodontitis was reported in 68% In the USA, we recorded 191 (59.7%) cases of these 74(38.7% and 23.1% of the study population) were hypertensive. [5]

Increasing number of older adults is retaining their natural teeth compared to previous cohorts. All the elderly patients in this study retained most of their teeth, retaining 92.3% of the expected complete dentition. Several epidemiological surveys have found that the prevalence and severity of periodontal diseases increase with age. Periodontal diseases affected a total of 552 of the remaining dentition in our study.

Periodontal disease in the elderly does not appear to be specific disease but the result of a chronic adult periodontitis since adulthood although age-related changes have been documented in the periodontium of elders; these changes do not appear to be the cause of periodontal disease in the elderly. However, the susceptibility of the periodontium to plaque-induced periodontal breakdown may be influenced by the aging process or by a specific health problem of the aging patient.[10] The patients who have hypertension and diabetes have higher incidence of periodontal diseases in our study as shown on table 2 .

Neurophysiological changes are another determinant. The functional elements in the central nervous system degenerate with advancing age. These changes limit the person's capacity for acquiring new muscle activity patterns. The presence of mental disorders in elderly patients may complicate oral health in the elderly. Oral physiological changes with progressive atrophy of the masticatory, buccal and labial musculature are a sign of aging and instead, it is important to advise the person on how to attain an adequate diet that is easy to chew. Dementia 7 (0.4%) and neuropathy in 13(0.7%) and osteoarthritis in 47 (2.5 %) cases were reported in our study.

Potential physical, sensory and cognitive impairment associated with aging may make oral health self-care and patient education/ communication challenging. We recorded dementia in 3 (0.9%) cases and 7 (2.2%) cases of neuropathy. These conditions apart from impacting on dexterity also have the attendant need for poly pharmacy.[11]

Oral and pharyngeal cancers are predominantly disorders of the elderly; the median age at diagnosis is 64 years.

Cigarette and alcohol use are the primary determinants.[8] We recorded 1 case of breast cancer, eight cases of enlarged prostate and four cases of unspecified oral tumours.

A good percentage of our elderly were seen for routine scaling and polishing of their teeth due to the comprehensive health care being offered at the UCH geriatric centre. One of the major challenges in providing restorative as well as preventive care for elderly people is to develop an appreciation of the need for regular care.12 Globally, poor oral health among older people has particularly been seen in a high level of tooth loss, dental caries experience, high prevalence rates of periodontal disease, xerostomia, and oral precancer/cancer.13 The basis of prevention is related to detecting disease at the earliest possible stage, which requires regular patient contact. Collaboration with other health care providers who routinely treat the elderly should be encouraged, with a focus on increasing their awareness of potential oral health problems. They might be asked to discuss the need for dental care visits and proper dental care with their patients. A cursory oral examination can be conducted by health care professionals other than dentists, who can then make referrals on the basis of their findings or specific patient complaints so we advocate the establishment of more geriatric centers in the country where structured and holistic care of the aged population is prioritized.

Conclusion

The most common oral disease was periodontal diseases with a high prevalence of these patients having chronic medical co-morbid conditions. The most common co-morbidities included Hypertension, osteoarthritis and Diabetes mellitus. This underscores the need for more research into the relationship between periodontal health and general health amongst the elderly population.

Authors' Contributions

1. Victoria Nwebuni Okoje, Lawrence Adekunle Adebusoye, Olufemi Oluwole Olowookere And Temitope Oluwagbemiga Alonge had the concept for the research and contributed to the write up.
2. Grace Faith DANIELS: treated the patients and gathered the data.
3. All the authors contributed to the manuscript writing.

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