Profile of oral diseases and associated factors in the elderly in the Buea Health District, Cameroon

Abstract

Background: Demographic projections estimate a future global increase in the number of elderly with increase susceptibility to chronic and life-threatening diseases increases such as poor oral health conditions. This reduces quality of life, as it restricts food choices, affects esthetics and reduces self-esteem among the elderly. The aim of this study was to determine the profile of oral health pathologies of the elderly in the Buea Health District.

Materials and Methods: A cross- sectional study was conducted in four communities and major health facilities of the Buea Health District. Participants were interviewed to collect data on socio-demographic characteristics, determinants of oral health, and oral hygiene behavior. Oral cavity examination was also carried out to assess the oral hygiene behavior of the elderly. The data was analyzed in SPSS version 26.

Results: Out of 386 participants examined, 372 (96.4%) had at least one oral pathology. Dental caries was most prevalent (67.9%) with mean decay- missing- filled index (DMF) of 14.3 ± 8.7, followed by periodontitis (45.6%), gingivitis (45.6%) and edentulism (39.1%). Determinants of oral pathologies included tooth brushing frequency, health area, level of education, marital status and occupation. The mean score of oral hygiene behavior was 2.88±1.36, with 71.2% of participants with good oral hygiene behavior. There was a significant association between poor oral hygiene behavior and dental caries.

Conclusion: There was a high prevalence of oral pathologies amongst the elderly of Buea Health District. Poor oral hygiene practice was associated with dental caries which was the most prevalent oral pathology.

Key Words: Oral health, Oral pathologies, Elderly, Buea.

Introduction

In light with the increase in life expectancy, ageing is on the verge of becoming one of the most significant social transformations of the twenty-first century. Despite the high prevalence of oral health problems in this group of persons, little or no importance is given to this problem [1]. Oral health is not separate from general health, but maintaining good oral health is difficult and different in old age. Although a specific protocol must be tailored to meet the unique needs of the individual patient, there are certain factors common to elderly segment of the population that may influence these protocols [2].

Poor oral health can limit food choices and diminish the pleasures of eating [3]. Persons with extensive affections are more likely to substitute easier-to-chew foods such as those rich in saturated fats and cholesterol for foods high in carotenes, vitamin C, and fibers [4,5]. Thus, among older persons, poor oral health status has been shown to be associated with both weight loss, obesity and risk factor for cardiovascular and kidney diseases [6]. Other studies reported an association between oral health and the quality of life [7] as well as respiratory diseases [8].

In many parts of the world, attaining old age is a rare privilege, though old age is often associated with some health challenges. Whether the added years at the end of the life cycle are healthy, enjoyable, and productive depends in part upon preventing and controlling of a number of chronic diseases and conditions [9]. Most of the old people in Cameroon like in most developing countries enter old age after a life of poverty and deprivation, with poor access to healthcare, and inadequate diet in quality and quantity. This situation makes these subjects even more vulnerable health- wise [10]. Data obtained from this study will identify the oral health status of the aged and can then be used by health authorities to plan dental care programs.

Methods

Study Design

The study was a cross-sectional community and hospital-based study carried out in selected communities and health facilities. A structured questionnaire was administered to participants to collect data on sociodemographic characteristics, predisposing factors of oral health, and oral hygiene behavior. Their oral cavities were examined by a dentist for oral pathologies and findings were recorded.

Study setting

This study was carried out in the Buea Health District (BHD) situated in Fako Division of the Southwest region of Cameroon. Fako Division is one of the six administrative divisions of the Southwest Region and has 4 health districts among which is the Buea Health District. With a population of 184, 258 people, BHD has 7 Health Areas: Tole, with a population of 11,101 persons, Muea, with 63,896 persons, Molyko with 21,395 persons, Buea Town having 15, 872 persons, Buea Road 52,667 persons, Bova; 5 740 persons and Bokwango; 13,588 individuals [11]. The population is mainly made up of farmers, students, civil servants who are highly concentrated in Molyko and Buea road health areas.

Study Participants

Included in the study were males and females of age 60 years and above living in the Buea Health District and who were capable of communicating directly or through an interpreter. A sample size of 385 adults was determined using the Cochrane formula with a proportion of 0.5 % since we had no study in literature that reported a prevalence of oral hygiene in elderly people.

Of the 7 health areas in the BHD, 4 were conveniently selected based on security concerns and accessibility. These included Buea Road, Molyko, Buea Town, and Bova health areas.

Enrolment of participants was done in health facilities that granted us authorization. The health facilities used were the Buea Regional Hospital, the integrate health centers of Molyko, Bova, and Buea Town. Participants enrolment was equally done from households in the communities and in community gatherings like Sunday meetings. Community mobilisers helped identify households with elderly and equally provided information on community gatherings of elderly persons. Probability proportionate to size was used to determine the minimum number of elderly people enrolled per health area.

Data collection

A structured questionnaire was administered to participants to collect data on sociodemographic characteristics, predisposing factors of oral health, and oral hygiene behavior. The questionnaire used in data collection was made up of four sections: sociodemographic characteristics, predisposing factors of oral health, oral hygiene behavior and physical examination of the oral cavity. The questionnaire was adapted from the book published by the World Health Organization in 2013 on basic methods for oral health survey [12]. The questionnaire was pretested on 20 participants at the Buea Regional Hospital.

For data collection, participants were administered a questionnaire to collect data on sociodemographic information, determinants of oral health and oral hygiene behavior. After the questionnaire administration, their oral cavities were then examined by a dentist for oral pathologies. Information from participants and examination of the oral cavity was recorded on a printed questionnaire.

Examination of the oral cavity

With the help of a plastic disposable mouth mirror and dental exploratory probe, the oral cavity of participants was examined. Teeth with cavities were identified and noted. The periodontal tissue around each tooth was evaluated and records taken. Absent teeth were noted. The oral mucosa was equally examined.

Determination of oral profile

Participants' mouths were examined by a dentist. The cavities, missing teeth, teeth with filling, periodontal pockets, oral mucosa lesions, saliva quality and quantity were examined. The decay-missing- filled index (DMF) was calculated for each individual. The DMF index was the sum of his/her decayed, missing and filled teeth.

Data analysis

Data was keyed into Microsoft office (MS) excel 2019 and exported to the Statistical Package for Social Sciences (SPSS) software version 25 for analysis. Continuous variables were described using means and standard deviations. Categorical variables were described using frequencies. A logistic regression was fitted to identify factors independently associated with dental caries, gingivitis and periodontitis. Only predictors with $p \leq 0.2$ were eligible for the logistic regression. $P < 0.05$ was considered significant.

Results

Sociodemographic characteristics of the elderly of the Buea Health District

A total of 386 elderly people were enrolled into the study, with age ranging from 60 to 98 years and a mean of 70.02 ± 9.58 years. Most of the participants were female (54.7%), married (74.4%). For the participant's level of education, 24.9% had reached the university level whereas 24.4% had no formal education. Up to 41.2% were of the private sector (Table 1).

Predisposing factors to oral health

Of the 386 participants, 202 (52.3%) were nonsmokers, 256 (66.3%) consumed alcohol, 102 (26.4%) were diabetic and 89 (23.1%) had cardiovascular diseases (table 2). Nine other health complaints were reported, with arthritis (n=26, 6.7%) and gastritis (n=35, 9%) being the most frequent. Others health conditions mentioned were cough, ear and eye problems, kidney problems, neuropathy and paralysis. A majority, 299 (77.5%) reported no health complaints.

Profile of oral pathologies in the elderly of the Buea Health District

It was observed that 372 (96.4%) of the elderly had at least one oral condition, with the most prevalent oral pathology being dental caries 262 (67.9%), periodontitis (45.9%), gingivitis (45.9) and edentulism (39.1%) (Figure 1).

Determinants of dental caries

Factors independently associated with dental caries included frequency of brushing, health area and level of education (Table 3). Compared to those who brushed less than twice daily, the odds of having dental caries was lower for those who brushed twice daily (AOR= 0.301, CI [0.139-0.652], p=0.002). Brushing twice daily was thus identified as a protective factor for dental caries. Participants from Molyko and Buea town health areas were 2.4 times more likely to have caries

compared to those living in Buea road (AOR= 2.471, CI [1.320-4.627], p=0.005; and AOR= 2.146, CI [1.035-4.447], p=0.040) respectively. Education above secondary level seemed to favor dental caries, with those who studied till university13 times more likely to get caries compared to those with no education (AOR= 12.972, CI [3.475-48.432], p<0.001). Meanwhile, those who ended at the primary level were less likely to get the disease (AOR= 0.428, CI [0.187-0.980], p=0.045).

Determinants of gingivitis

The level of education, health area and marital status were independently associated with gingivitis. Compared to the uneducated, the odds of developing gingivitis were significantly lower in those who attained primary (AOR= 0.43, CI [0.19-0.98], p=0.045) and secondary education (AOR= 0.32, CI [0.14-0.71], p=0.005). Those that had university level of education were 13 times at risk of developing gingivitis compared to the uneducated (AOR=12.97, CI[3.48-48.43], p<0.001). Compared to Buea road, elderly people enrolled in Buea town (AOR=2.15, CI[1.04-4.45], p= 0.040) and Molyko (AOR=2.47, CI[1.32-4.63], p= 0.005) were more than 2 times significantly at risk of developing gingivitis (table 4) compared to those enrolled in Buea road.

Determinants of periodontitis

Those who had received any form of education were at lower risk of having the disease. The risk of elderly people in Bova developing periodontitis were 6 times higher compared to Buea road (AOR= 5.84, CI [1.87-18.28], p=0.002). Meanwhile, living in Buea town reduced the risk of

getting the disease (AOR= 0.49, CI [0.26-0.91], p=0.025). Brushing twice daily also significantly reduced the odds of having periodontitis (AOR= 0.21, CI [0.09-0.50], p<0.001). Lastly, compared to the retired elderly people, having any occupation increased the risk of getting the disease by more than five times (table 5).

Oral hygiene practices among elderly in the Buea Health District

It was observed that 275 (71.2%) participants had good oral hygiene behavior. Only 36 (9.3%) participants reported doing yearly routine medical visits as advised by the dentist. A majority (71.2%) did not know about the fluoride content of their toothpaste. Most participants (80.8%) brushed their teeth less than twice daily (table 6).

Oral hygiene behavior among elderly in the Buea Health District

We had a mean oral hygiene score of 2.88 ± 1.363, mode and median of 3 each. Among participants who poor oral hygiene behavior (46.8%) had never been to a dentist. Of those with good behavior, a majority (70.2%) were those who visited a dentist only when necessary. Non toothpaste users constituted a majority of those with poor oral hygiene behavior (96.4%), while toothpaste users made up 97.1% of those with good oral hygiene behavior. The same pattern was observed with the use of toothbrush as 81% of non-toothbrush users had poor oral hygiene behavior and 97% of those with good oral hygiene behavior used toothbrushes. As concerns the knowledge on presence of Fluoride in toothpaste, those who did not know about their toothpaste fluoride content represented a majority of those with poor oral hygiene behavior (82%) and good oral hygiene behavior (66.9%). Although no participant who brushed twice daily had poor oral hygiene behavior, those who brushed less than twice constituted a majority of those with good oral hygiene behavior. Toothpicks and floss were used by a majority of participants but this

group constituted 72% of those with poor oral hygiene (table 7).

Association between oral hygiene practices and oral pathologies

It was observed that those with poor oral hygiene were 11 times more likely to have dental caries ($p<0.001$, AOR=10.99, CI [4.99- 24.23]) (Table 8).

Discussion

Profile of oral pathologies in the elderly in the different health areas of Buea Health Districts.

This study revealed that 96.4% of the population had at least one oral pathology. Dental caries was the most prevalent oral pathology amongst the elderly of the Buea Health District with a prevalence of 67.9 %. This finding was similar to the 67.5% prevalence reported in a similar study carried out in North East China [13]. Our results are however a little higher than the 52% reported in elderly pensioners in Benin city Nigeria [14]. It is worth noting that the participants of the Benin study were exposed to oral health care services throughout their lives. Among Vietnamese elderly, the mean DMFT was 14.3 ± 8.7 [3], higher than 3.977±4.0158 which we got in this study. The Vietnamese study was carried out in a rural area where awareness to oral health is lacking, a factor which explains the higher index.

Though authors in 2014 noted it as the most prevalent oral condition worldwide [15], we found periodontitis occurring in second place in the Buea Health District. This might be due to increase awareness and better healthcare facilities since then. However, the 45.9% prevalence of periodontitis observed in this study is within the 20-50% range stated as global prevalence among the elderly in 2017 [16]. Our findings are however lower than the 90.3% prevalence of WHO on global prevalence [17]. Numerous health campaigns on promotion of oral health since

then, especially highlighting the relationship between periodontal disease and systemic diseases such as cardiovascular diseases, have gone a long way in increasing population awareness and hence their health care seeking behavior.

A study carried out on Nigerian elderly reported a gingivitis prevalence of 60.2% which was higher than the 45.6% prevalence found in this study. The proportion of smokers in that study was as high as 59.9% compared to 47.7% in our study population, a difference which probably explains why gingivitis was more prevalent among the Nigerians [18].

Edentulism or tooth loss is either due to caries or periodontal disease. It constitutes a condition of public health interest and can be used as a measure of the oral health of a population. In this study we had a prevalence of edentulism of 39.1%. This prevalence of edentulism was similar to the prevalence reported in a similar to a prevalence of 43.6% reported in a study carried out in Port Harcourt Nigeria [19].

Determinants of oral health in the Buea Health District.

Determinants of dental caries included frequency of brushing, health area and level of education. The odds of having dental caries was lower for those who brushed twice daily. A finding which is similar to some studies who equally highlight the importance of brushing at least twice daily with respect to incidence of caries, Molyko and Buea town health areas were nearly two and a half times more likely to have caries compared to those living in Buea road. This might be because Buea Road has had a healthcare facility offering dental care services for about 10 years, so proximity to these services accounts for the difference. In this study, those with average or no education had fewer caries. Those who studied till university were about 13 times more likely to get caries compared to those with no education. This trend is different from that of Chinese

elderly. They found higher level of education as a protective factor as this was accompanied by higher income and better socioeconomic status [20]. Westernization with a change in diet among the elderly in urban centers of Cameroon like Buea could explain why those with the highest level of education in our study instead had a high prevalence.

Participants with any form of education were less likely to get gingivitis compared to the uneducated. Previous studies agree with these findings as well [20]. Health Area was also independently associated with gingivitis with the population of Bova, Buea Town and Molyko being at a higher risk compared to those in Buea Road. Again, the presence of a dental health care facility in the Buea Road health area could explain this trend. Widow/widower seemed to also be at higher risk compared to the married ones. The absence of a partner for care and support can be a reason why widows and widowers were more at risk.

Those who had received any form of education were at lower risk of having gingivitis. Increased level of education could translate to increased health literacy as reported in a previous study [21]. The chances of having periodontitis in Bova were about 6 times higher compared to Buea road. In the Bova health area a lot more participants were uneducated, probably explaining why the odds were higher. Brushing of teeth twice daily also significantly reduced the odds of having periodontitis. The Korean national health and nutritional examination survey equally cited twice daily brushing as a protective factor against periodontitis [22].

In our study we could not establish cause-effect relationships. Our sampling technic was convenient, a choice imposed by security threats in the region and limits generalizability of our results. Despite these limitations, the study provides evidence suggestive that oral health amongst the elderly in the Buea Health District is a domain which requires more attention.

Conclusion

This study showed that, a large proportion of participants had at least one oral pathology, with an oral profile for diseases dominated by dental caries, followed by periodontitis and gingivitis. Determinants of oral pathologies identified were frequency of tooth brushing, health area, level of education and marital status. The mean oral hygiene behavior score in this study was 2.88± 1.363, with 71.2% of participants with good oral hygiene behavior. Poor oral hygiene was associated with dental caries.

Ethical Approval and Consent

Ethical clearance for the study was obtained from the institutional review board of the Faculty of Health Sciences in the University of Buea (Ref: 2021/1412-04/UB/SG/IRB/FHS). Administrative authorization was obtained from the district health service of Buea Health District and all health facilities in which enrollment was done and verbal authorization from the quarter heads. All participants signed an informed consent before participating in the study.

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List of Tables

Table 1: Sociodemographic characteristics of the elderly of the Buea Health District

Variable (N=386)	Category	Number	Percentage (%)
Health area	Buea Road	210	54.4
	Molyko	87	22.5
	Bova	25	6.5
	Buea Town	64	16.6
Gender	Male	175	45.3
	Female	211	54.7
Age groups	60 to 80	326	84.5
	Above 80	60	15.5
Level of education	University	96	24.9
	High school	44	11.4
	Secondary school	81	21.0
	Primary school	71	18.4
	None	94	24.4
Marital status	Married	288	74.4
	Single	26	4.9
	Widow/widower	72	18.7
Occupation	Retired	90	23.3
	Civil servant	68	17.6
	Private sector	159	41.2
	House wife	69	17.9
Income	Dependent	81	21.0
	Independent	179	46.4
	Both	126	32.6
Number of children	Less than 5	265	68.7
	Above 5	121	31.3

Table 2: Predisposing factors to oral health among elderly persons in the Buea Health District

Variable(N=386)	Categories	Number	Percentage (%)
Smoker	Yes	184	47.7
	No	202	52.3
Alcohol consumption	Yes	256	66.3
	No	130	33.7
Diabetic	Yes	102	26.4
	No	284	73.6
Cardiovascular disease	Yes	89	23.1
	No	297	76.9

Table 3: Factors independently associated with dental caries among elderly persons in the Buea Health District

Parameter	Categories	P-value	AOR	95% CI	
				Lower	Upper
Frequency of brushing	More than twice daily	0.999	0.99	0.08	12.64
	Twice daily	**0.002**	0.30	0.14	0.65
	Less than twice daily		1		
Health area	Buea town	**0.040**	2.15	1.04	4.45
	Bova	0.874	1.08	0.42	2.79
	Molyko	**0.005**	2.47	1.32	4.63
	Buea road		1		
Level of education	University	**0.000**	12.97	3.48	48.43
	High school	0.414	1.45	0.60	3.51
	Secondary school	**0.005**	0.32	0.14	0.71
	Primary school	**0.045**	0.43	0.19	0.98
	None		1		

Table 4: Factors independently associated with gingivitis.

Variable	Categories	P-value	AOR	95% C I	
				Lower	Upper
Level of education	University	0.542	1.21	0.66	2.24
	High school	0.793	1.09	0.57	2.08
	Secondary school	**<0.001**	0.17	0.08	0.36
	Primary school	**0.021**	0.40	0.18	0.87
	None		1		
Health area	Buea town	**0.001**	2.88	1.52	5.44
	Bova	**0.009**	3.46	1.37	8.73
	Molyko	**<0.001**	2.95	1.68	5.19
	Buea Road		1		
Marital status	Widow/widower	**0.001**	2.57	1.44	4.59
	Single	0.922	0.96	0.38	2.39
	Married		1		

Table 5: Determinants of periodontal disease among elderly persons in the Buea Health District

Variables	Categories	p-value	AOR	95% CI	
				Lower	Upper
Level of education	University	**0.005**	0.260	0.10	0.66
	High school	0.374	0.636	0.23	1.73
	Secondary school	**0.024**	0.342	0.14	0.87
	Primary school	**<0.001**	0.078	0.03	0.22
	None		1		
Health area	Buea Town	**0.025**	0.486	0.26	0.91
	Bova	**0.002**	5.839	1.87	18.28
	Molyko	0.940	0.978	0.55	1.75
	Buea Road		1		
Frequency of brushing	More than twice daily	0.915	1.104	0.18	6.87
	Twice daily	**0.000**	0.205	0.09	0.50
	Less than twice daily		1		
Occupation	House wife	**<0.001**	6.324	2.87	13.95
	Private sector	**<0.001**	5.331	2.78	10.24
	Civil servant	**<0.001**	4.634	2.04	10.53
	Retired		1		

Table 6: Oral hygiene practice among elderly persons in the Buea Health District

Variable	Category	N	Percentage
Oral hygiene	Poor	111	28.80
	Good	275	71.20
Visit to dentist	≥ Visit a year	36	9.30
	Only when necessary	242	62.70
	Never before	108	28.00
Use of toothbrush	No	86	22.30
	Yes	300	77.70
Use of toothpaste	No	115	29.80
	Yes	271	70.20
Presence of fluoride in tooth paste	Yes	97	25.10
	No	14	3.60
	Do not know	275	71.20
Frequency of brushing	< Twice daily	312	80.80
	Twice daily	68	17.60
	> Twice daily	6	1.60
Use of floss/toothpicks	No	13	3.40
	Yes	373	96.60

Table 7: Oral hygiene behavior of elderly persons in the Buea Health District.

Variable	Category	Poor behavior n (%)	Good behavior n (%)
Visit to the dentist	≥ One visit a year	10 (9.0)	26(9.5)
	Only when necessary	49(44.1)	193 (70.2)
	Never before	52(46.8)	56(20.4)
Use of toothpaste	No	107(96.4)	8(2.9)
	Yes	4(3.6)	267(97.1)
Use of tooth brush	No	17 (81.0)	11 (3.0)
	Yes	4 (19.0)	354(97.0)
Presence of fluoride in tooth paste	Yes	6 (5.4)	91(33.1)
	No	14(12.6)	0(0.0)
	Do not know	91 (82.0)	184(66.9)
Frequency of brushing	< Twice daily	107 (96.4)	205(74.5)
	Twice daily	0(0.0)	68(24.7)
	> Twice daily	4(3.6)	2(0.7)
Use of floss/toothpick	No	31 (27.9)	0(0.00)
	Yes	80(72.1)	275(100)

Table 8: Associations between Oral hygiene practices and oral pathologies

Variables	Categories	P-value	AOR	95% CI	
				Lower	Upper
Dental caries	Present	**<0.001**	10.99	4.99	24.22
	Absent		1		
Periodontitis	Yes	0.068	1.61	0.97	2.67
	No		1		
Gingivitis	Yes	0.496	1.18	0.73	1.92
	No		1		

List of Figure

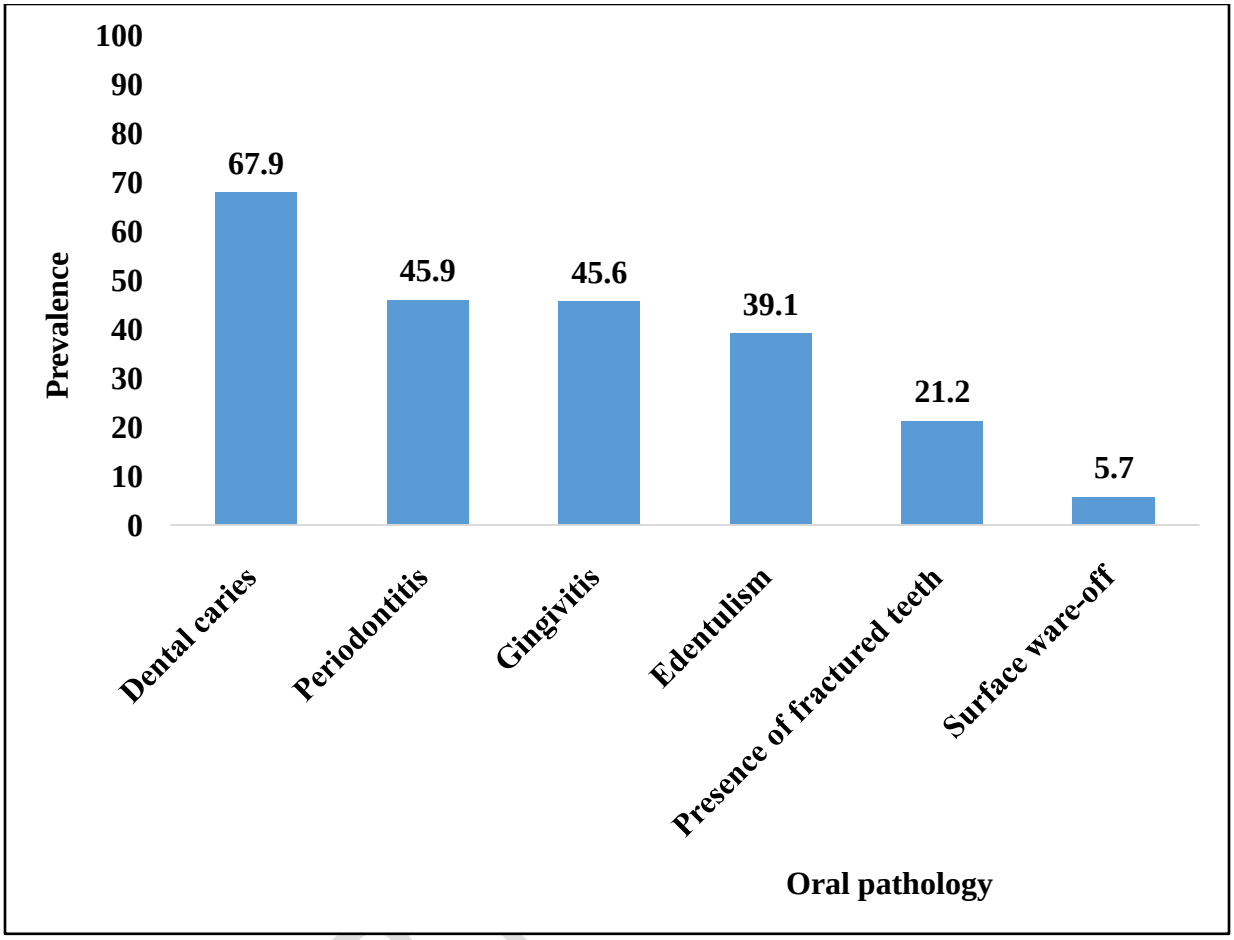

Figure 1: Profile of oral pathologies in the elderly of the Buea Health District