

Orofacial Malignancies in Nigerians: an 11 year review in a Teaching Hospital

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Abstract:

Background: Occurrence of Orofacial malignancies (OFM) is a major global public health issue, being the sixth most common cancer in the world with 500,000 new incidences per year. Their pattern of distribution among patients in the younger age groups needs to be explored and compared with their pattern of distribution among patients in older age groups.

Materials and methods: Over an 11 year period, clinical and histologic information on OFM cases were retrieved. Data collected and analyzed with SPSS Statistics version 20 were presented as frequency tables, charts and proportions. A confidence interval of 95% was assumed and the level of significance was set at $p < 0.05$.

Results: A total of 286 cases were OFM and 66.1% occurred among subjects within the 4th – 7th decades of life. 40% of cases occurred in subjects aged ≤ 40 years old. There were site and gender predilections for the mandible (25.2%) and male subjects (M: F = 1.3:1) respectively. Most common major type was Carcinoma (n=239). Older subjects presented with carcinoma, than with lymphoma ($p=0.01$).

Squamous Cell Carcinoma [SCC] was the most common type of OFM and Carcinoma. 40.8% of cases occurred in subjects ≤ 40 years old. There was a general pattern of a male gender predilection (M: F = 1.6:1) though in subjects ≤ 40 years old, the M: F ratio was reversed (M: F = 1:1.23) when compared with subjects > 40 years old (M: F = 2.35:1). SCC mostly showed mandible site predilection. However, there was a Maxilla site predilection among young subjects ≤ 40 years old and a Mandibular site predilection among subjects > 40 years old.

Salivary gland carcinoma accounted for 40.2% of OFM with site and gender predilections for the palate and female respectively. Peak age of occurrence was in the 6th and 7th decades of life and Adenocarcinoma (AC) was the most common observed type.

Sarcoma accounted for 11.8% of OFM and showed a mean age of occurrence of 41 ± 16 years, peak age of occurrence in the 5th decade of life and male gender predilection (M:F = 1.2:1).

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Conclusion: There is an increasing number of cases of OFM especially SCC, in Nigerians. It is plausible that unidentified factors may trigger genetic mutations that predispose to OFM development in this environment hence an urgent need for exploration of molecular landscape that may lead to the development of new molecular markers for qualitative management.

Key words: malignancies: orofacial

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1. INTRODUCTION

Orofacial malignancies (OFM) are malignant lesions restricted to structures within the oral cavity, and adjacent structures such as the maxilla, mandible, cheek, and salivary glands.¹ These lesions are particularly significant because of the obvious aesthetic deficit and functional limitations associated with malignancies in that part of the body.² An important consideration also, is the quality of life of patients before and after treatment.³

Some of the aetiologic factors that have been found to be associated with these malignancies are tobacco use, alcohol intake, genetics, nutritional deficiencies, and infection by oncogenic viruses (such as HPV).⁴⁻⁶ They are a major global public health issue, being the sixth most common cancer in the world with 500,000 new incidences per year.⁷ The epidemiological distribution of these malignancies varies with age, race, gender, and geographic locations.⁸ Malignancies generally, inclusive of those of the orofacial region are more prevalent in adults aged forty years and above, with some reports in the literature reporting up to 53%.⁹⁻¹⁰ Oral Squamous Cell Carcinoma (SCC), which is the most common OFM usually occurs in patients 50 years and above.¹¹

Report from a recent systematic review of head and neck malignancies show an increase in the incidence of OFM (particularly SCC) among patients in younger age groups (below 50 years of age).¹² The incidence of head and neck malignancies among younger patients have been observed to vary world-wide. Investigators report a decline in the frequency

of head and neck SCC over time in the United States and Europe. However, SCC (particularly young onset SCC) of the oral cavity has also been reported to be uniformly increasing in frequency.¹²⁻¹⁴

Although various studies have been conducted to highlight the pattern of distribution of OFM among Nigerian children^{15,16} and among patients across all age groups,^{17,18} perusal of scientific literature shows a dearth in reports focused on the pattern of distribution of OFM in Nigerian patients ≤ 40 years old.¹¹

The precise risk factors responsible for the development and increasing or high frequency of OMF among younger patients remains unknown. A majority of young Nigerian patients do not have significant exposure to postulated risk factors such as excessive tobacco and alcohol consumption. We aim to elucidate the pattern and distribution of OFM in Nigerian patients ≤ 40 years old at presentation, compare this with the pattern of distribution in patients above 40 years old and thereby update existing data in the scientific literature.

2. METHODOLOGY

An exploratory retrospective study carried out at the Oral and Maxillofacial Pathology / Biology Department, Lagos University Teaching Hospital (LUTH), Idi-araba, Lagos, Nigeria, utilizing data from the departmental archives.

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An 11-year (2006 -2016) review of the Oral and Maxillofacial Pathology reports on cases histologically diagnosed as OFM was done. Information on age, gender, site, and duration were retrieved, alongside information on histopathologic diagnosis. For the purpose of comparison, subjects were arbitrarily divided into two age categories namely : Subjects that were 40 years of age and below, and subjects that were above 40 years of age. In addition, for the purpose of simplification, OFM cases which were analyzed were grouped into 3 main categories namely: Carcinomas, Sarcomas and Lymphomas. The Carcinomas category was further grouped into 3 subcategories namely: Squamous cell carcinoma (SCC), Salivary gland carcinoma (SGC) and other carcinomas. Data retrieved were analyzed with IBM SPSS Statistics version 20 (Armonk, NY: IBM Corp) and presented as simple frequency tables, charts and proportions. A confidence interval of 95% was assumed and the level of significance was set at $p < 0.05$. Ethical approval was obtained from the Human Research Ethics committee of LUTH.

3. RESULTS

3.1 General Overview

A total of 1559 orofacial neoplasms were recorded over an 11-year period and 286 were diagnosed as OFM (18.34%, Table 1). Approximately 40% of these lesions occurred in subjects aged 40 years old and below. The age range was 1-97 years (mean age = 46.1 ± 19.742 years) . There was a male gender predilection of 56.3% (M:F = 1.3:1, Mean male age = 48 ± 20 years; Table 2). OFM occurred more commonly among patients in the 4th to 7th decades of life (66.1%) with peak periods of occurrences in the 4th (n =48) and 7th (n=49) decades [Table 2, figure 1]. Mean time of patient presentation was 21 months (± 38 months) and majority of subjects were observed to have presented after 2 years of onset of lesion (modal time of presentation was 2 years).

An overwhelming majority of the lesions were carcinomas (n=239; 83.5%)[Figure 2, table 1]. Subjects with carcinomas, were statistically significantly older than those with lymphomas ($p=0.01$). There were no statistically significant age differences between subjects with carcinomas and sarcomas, and subjects with sarcomas and lymphomas ($p > 0.05$). The most common location for OFM was the Mandible (n=72, 25.2%) [Table 1].

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Table 1: Anatomic Site distribution of OFM in 286 subjects.

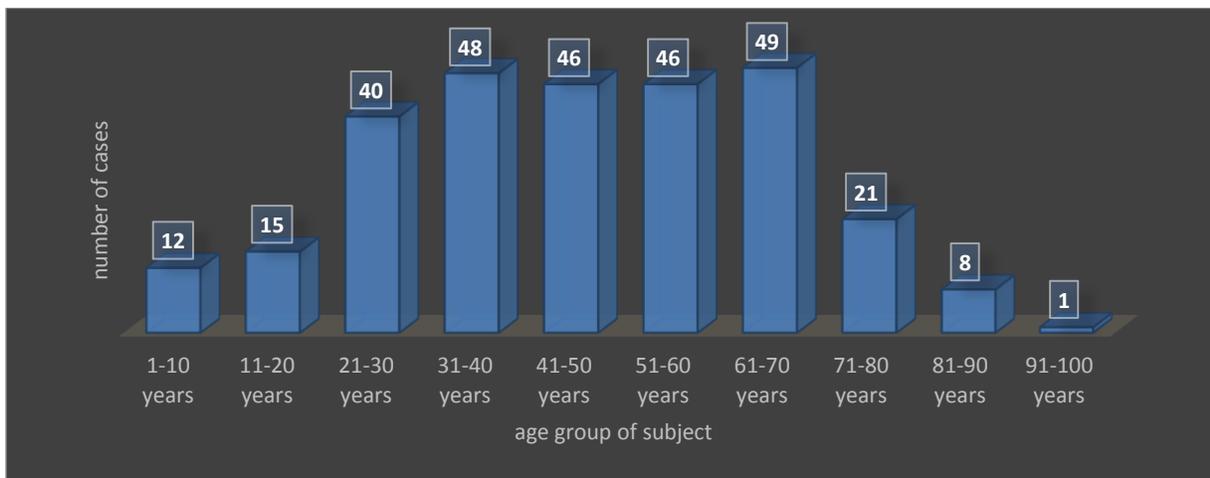
SITE OF OFM	TYPES OF OFM			
	CARCINOMAS	SARCOMAS	LYMPHOMAS	TOTAL
Mandible	57	12	3	72
Maxilla	50	13	2	65
Floor of the mouth	6	0	0	6
Lip	10	0	1	11
Forehead	2	1	0	3
Neck	1	0	0	1
Temporal fossa	1	0	0	1
Cheek	4	0	0	4
Labial mucosa	1	0	0	1
Submental nodes	0	0	1	1
Zygoma	0	1	0	1
Sublingual gland	1	0	0	1
Retromolar	4	0	0	4
Buccal mucosa	9	2	1	12
Submandibular	9	0	1	10
Nasal cavity	3	0	1	4
Gingivae	3	0	0	3
Palate	41	1	1	43
Parotid	21	1	1	23
Tongue	16	3	1	20
Total	239	34	13	286

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Table 2: Age Group and Gender Distributions of OFM in 286 subjects.

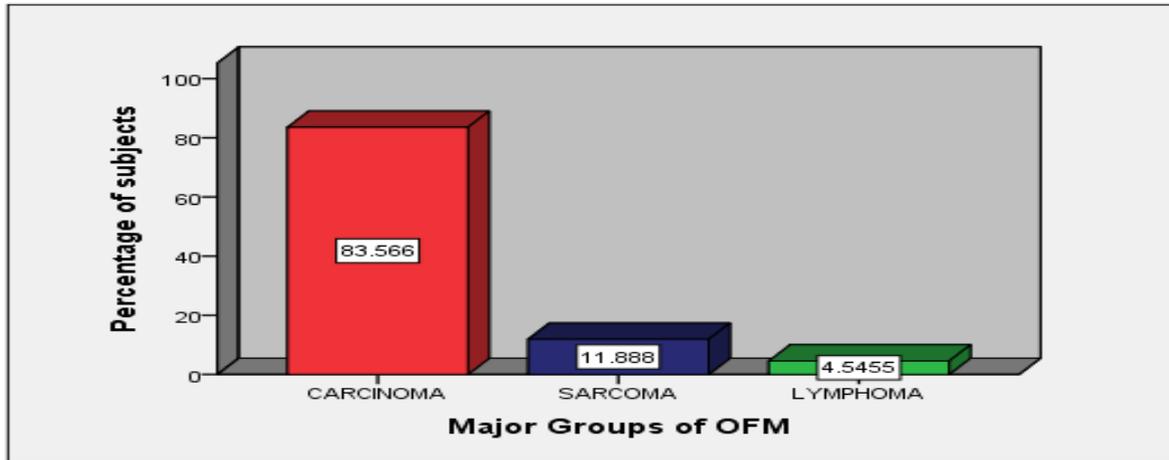
	Frequency	%
Age Group(years)		
Mean Age- 46.1 ±19.7		
1-10	12	4.2
11-20	15	5.2
21-30	40	14.0
31-40	48	16.8
41-50	46	16.1
51-60	46	16.1
61-70	49	17.1
71-80	21	7.3
81-90	8	2.8
91-100	1	0.3
Total	286	100
Gender (M: F = 1.3:1)		
Male	161	56.3
Female	125	43.7
Total	286	100

Figure 1:Age group distribution of OFM in 286 subjects.



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Figure 2: Distribution of major types of OFM in 286 Subjects



3.1.1: Age distribution of OFM.

Total number of malignancies documented during the 1st and 2nd decades of life were 12 and 15 cases respectively which tripled by the 3rd decade (n=40). A more gradual increase occurred in the 4th decade (n=48). A sharp drop occurred in the 8th. [Figure 1].

SCC and ADCC were equally the two most common malignancies in the first decade (n=3), followed by Burkitts Lymphoma (BL)(n=2). From the 2nd through 10th decades, SCC was consistently the most frequently occurring malignancy, peaking in the 7th decade (n=25).

3.1.2: Site distribution of OFM(Table 1)

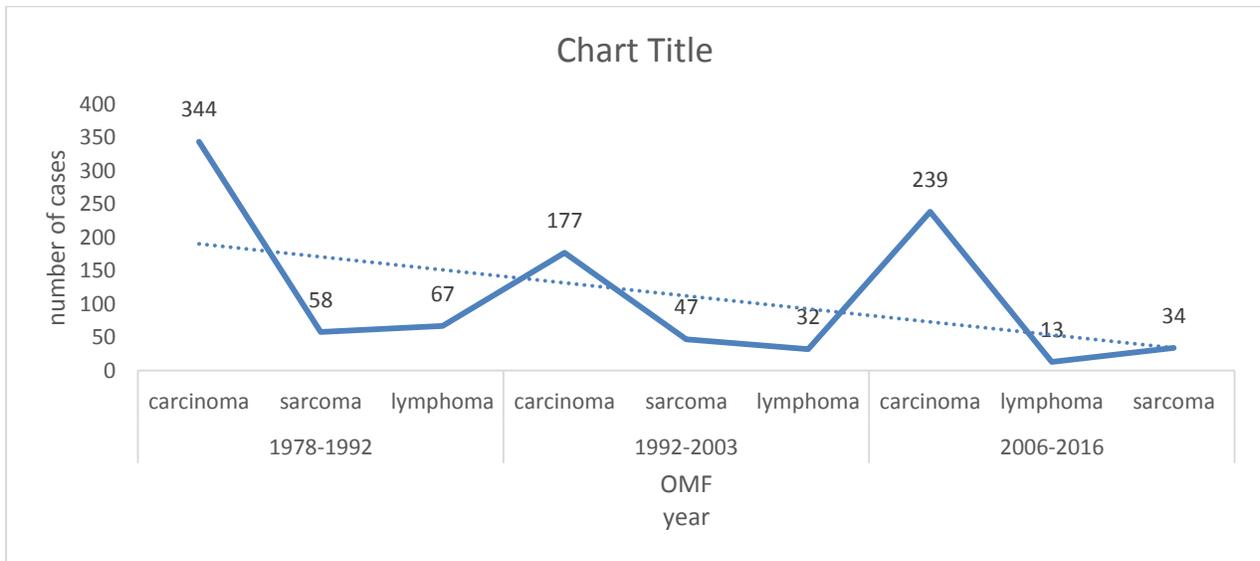
The most common sites of occurrence for carcinomas and sarcomas were the Mandible (n=56) and the Maxilla (n=15) respectively. The Parotid gland was the most common involved major salivary gland site (n=23). Intraorally, the modal site for malignancies was the Palate (n=43).

3.1.3: General trend of OFM (years 1978-2016)

Figure 3 shows a time frequency line chart of OFM subjects seen in LUTH over 36 years. There was a peak in number of subjects with carcinomas between the years 2006 -2016.

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Figure 3: line chart showing 36 yearly trend (1978-2003, 2006-2016) occurrence of OFM in LUTH.



* no available data for 3 years (2004 and 2005)

3.2: Squamous Cell Carcinoma

Frequency, Age, gender and location.

Squamous Cell Carcinoma [SCC] was the most common lesion seen, accounting for 40.2%(115/286 cases) of all malignancies and 48.0% (115/239 cases) of all carcinomas [figures 4 and 5]. Table 3 shows the age, gender and site distributions of SCC. The peak age of occurrence was observed in the 7th decade of life [figure 6]. Age ranged from 5 -97 years with 4 months being the

most common presentation time for the tumour (Mean presentation time of 14 months, ± 22 months). The mean age of males that presented with SCC was relatively higher compared to females (M=50 years ± 20 , F=45 years ± 20).The most frequent site for SCC was the Mandible (n=33, 28.7%) [Table 3]. SCC which was located in almost all the intraoral and extraoral sites showed a male gender predilection except in lip SCC that showed a female predilection. There was a male gender predilection for SCC (1.6:1)

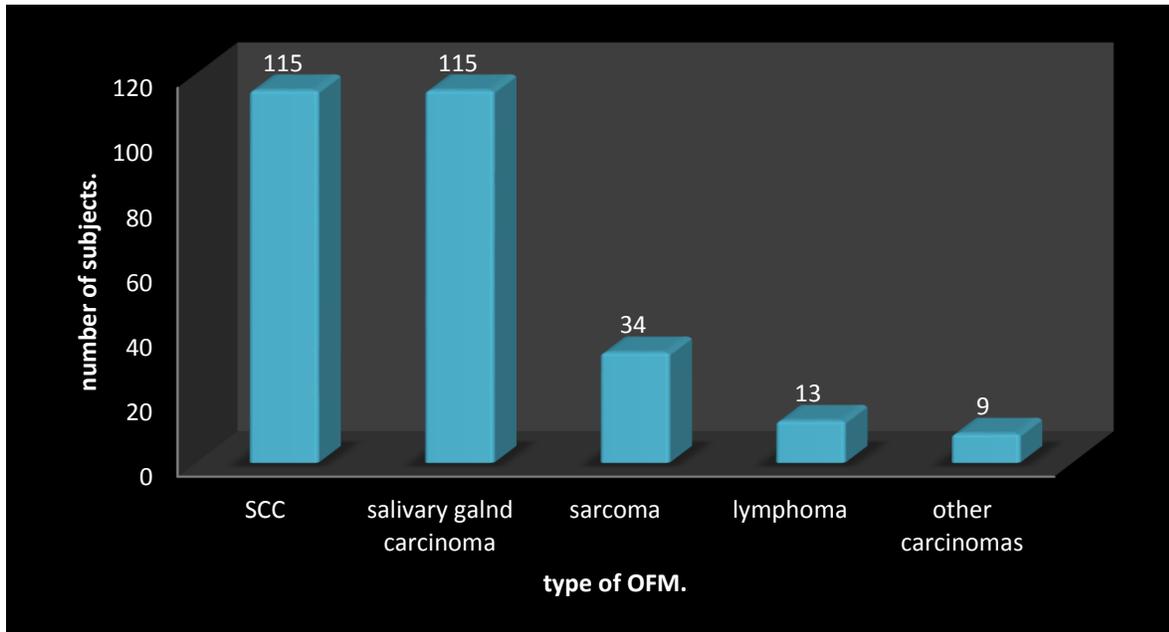
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Table 3: The Site and Age distributions of SCC in 115 subjects.

Anatomical Site	Frequency (%)	M: F Ratio	Mean Age(\pm SD) (Years)
Mandible	33(28.7)	1.5:1	54 (\pm 21)
Maxilla	27(23.5)	1.1:1	38 (\pm 19)
Floor of the Mouth	2(1.7)	Male only	56 (\pm 10)
Tongue	13(11.3)	2.3:1	50 (\pm 17)
Palate	12(10.4)	2:1	50 (\pm 18)
Buccal Mucosa	8(7)	1.7:1	67 (\pm 15)
Lip	7(6.1)	1:1.3	47 (\pm 23)
Parotid	3(2.6)	Male only	49 (\pm 12)
Nasal Cavity	2(1.7)	1:1	26 (\pm 21)
Cheek	2(1.7)	1:1	52 (\pm 12)
Gingivae	2(1.7)	1:1	22 (\pm 24)
Forehead	1(0.9)	Male only	41
Retromolar area	2(1.7)	1:1	50 (\pm 13)
Submandibular Gland	1(0.9)	Male only	26
	total freq: 115	overall: M:F: 1.6:1	mean age: 48(\pm 20)
Age	\leq 40 years	>40 years	
Percentage of SCC	40.8%	59.2%	
M:F ratio	1:1.23	2.35:1	
Most common Site	Maxilla (42.1%)	Mandible (32.8%)	
Mean time of presentation	10 months	17 months	
Modal time of presentation	1 year	4 months	

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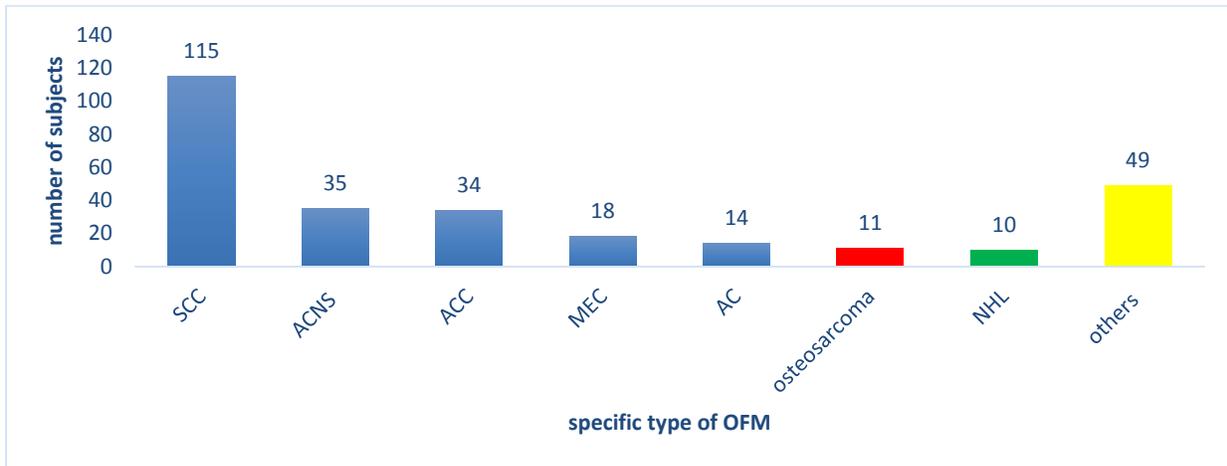
Figure 4: Frequency distribution of OFM in 286 subjects.



*Other carcinomas = include ameloblastic carcinoma and other odontogenic carcinomas which occurred in very low frequencies in the series.

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Figure 5: Frequency distribution of specific types of OFM in 286 subjects

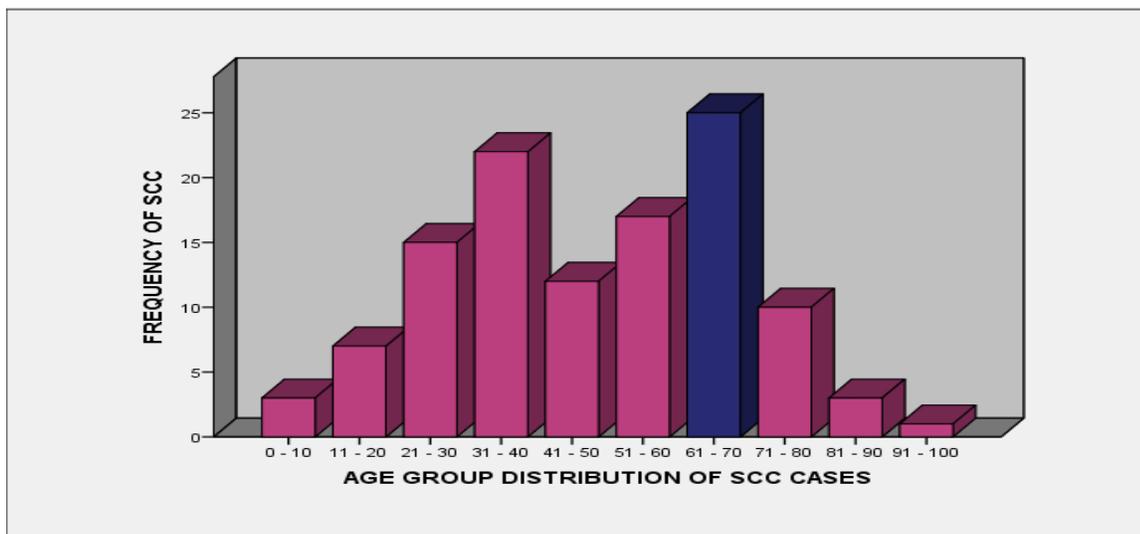


-SCC: squamous cell carcinoma, ACNS: adenocarcinoma otherwise unspecified, ACC: adenoid cystic carcinoma, MEC: mucoepidermoid carcinoma, AC: acinic cell carcinoma.

-NHL: Non-Hodgkin's lymphoma(Burkitt's lymphoma and T-cell lymphoma)

-Others : include other OFM with very low frequencies of occurrence in the series.

Figure 6: Age group distribution of SCC in 115 subjects.



-SCC occurred in 37%(42 cases) of subjects 39 years and below

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3.3: Salivary gland carcinoma(SGC)

Frequency, age, gender and location

A total of 48% (excluding SCC) of carcinomas were histologically diagnosed as SGC [Table 4]. These presented with site and gender predilections for the palate (24.3%) and male (54%; M: F=1.17:1) respectively. The Parotid gland was the most common involved major salivary gland site

(15.7%) . Adenocarcinoma -not otherwise specified (ACNS) and Adenocystic Carcinoma (ADCC) were the most common types of SGC while less frequently occurring types were salivary duct, oncocytic, and trabecular carcinomas [Table 4]. The peak ages of occurrences were in the 6th and 7th decades . Male subjects(mean age = 50 ±21 years) were observed to be on an average older than female subjects (mean age = 45 ±19years).

Table 4: Frequency, gender, and site distributions of SGC in 115 subjects

Histologic Type of SGC	Frequency (%)	M: F Ratio	Most Common Site
Adenocarcinoma	35 (30.43)	1.5:1	Palate
Adenocystic Carcinoma	34 (29.56)	1:1.26	Palate
Mucoepidermoid Carcinoma	18 (15.65)	2:1	Palate
Acinic Cell Carcinoma	14 (12.17)	1:2.5	Palate
Salivary Ductal Carcinoma	5 (4.34)	4:1	Parotid
Oncocytic Carcinoma	1 (0.86)	Male only	Parotid
Malignant Epithelial Salivary Gland Neoplasm	2 (1.73)	1:1	*
Trabecular Carcinoma	3 (2.60)	2:1	Parotid
Anaplastic Carcinoma	3 (2.60)	2:1	*
Total	115 (100)	1.17:1	Most Common Site:
Palate(n=28)			

*no outright modal site.

3.4: Sarcomas

Frequency, location, gender and age:

Sarcomas which constituted 11.8% of OFM(figure 2) had a male gender predilection (53%,) [Table 5]. Osteogenic Sarcoma (OS) was the most common of the sarcomas (32.3% ; Table 5). Sarcomas were mainly located within the jaw bones in 73.5% of subjects and had a predilection for the Maxilla [Table 1].

Peak age of occurrence was in the 5th (mean age± SD =41 ±16 years) decade of life. Relatively younger male (Mean = 42 years, SD ±12) than female subjects (mean = 47 years, SD ±16) were diagnosed with OS. However, the age difference was not statistically significant (p>0.05).

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Table 5: The frequency, gender, site and age distributions of sarcomas in 34 subjects.

Histologic Type of sarcoma	Frequency (%)	M: F Ratio	Most Common Site
Osteogenic Sarcoma	11 (32.4)	1:1.75	Maxilla
Rhabdomyosarcoma	3 (8.8)	2:1	Maxilla
Angiosarcoma	4 (11.8)	3:1	*
Round Cell Liposarcoma	3 (8.8)	2:1	*
Chondrosarcoma	4 (11.8)	1:3	*
Malignant Fibrous Histiocytoma	1 (2.9)	Female only	Mandible
Liposarcoma	4 (11.8)	Male only	Buccal Mucosa
Fibrosarcoma	3 (8.8)	2:1	Maxilla
Neurogenic Sarcoma	1 (2.9)	Female only	Zygoma
Total Sarcoma	34	Overall M:F = 1.13:1	Overall Site Predilection: Maxilla(n=13)
Age	≤40 years	>40 years	
Percentage of Sarcoma	47%	53%	
M:F ratio	1.3:1	1:1	
Most common Site	Maxilla	Mandible	
Mean age(SD)	29(±9)	52(±10)	
Modal time of presentation	3 months	1 year	

* no outright modal site.

3.5: Lymphomas

Lymphomas accounted for 4.5% (figure 2) of OFMs with Non-Hodgkin’s Lymphoma (NHL) occurring in 76.9% of subjects. Burkitt’s Lymphoma occurred in 3 subjects (BL). Two cases of BL occurred in subjects below the age of 20 years and 1 case occurred in a 28 years old male. Hodgkin’s Lymphoma(HL) occurred in 23.1%(n=3) of subjects. The Mandible was the most

common location (n=3), followed by the Maxilla (n=2) [table 1].

Table 6 shows a brief comparison of the reports from the present study with reports from previous studies conducted on Childhood Orofacial Malignancies (COFM) (from Department of Oral and Maxillofacial Pathology/ Biology, Lagos University Teaching Hospital) in 33 years.

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Table 6: Data on frequency and age group distributions of Childhood Orofacial Malignancies in LUTH Patients .

	Arotiba. (1996) ¹⁶	Ajayi et al. (2006) ¹⁵	Present study
Years reviewed	1980-1992	1992-2003	2006-2016
Age groups included	≤15 years	≤19 years	All age groups
Total number of tumours	864	1431	1559
Total number of OFM	70	47	≤15 years n=19 ≤19 years n= 26
% of COFMs (n)	8.1%(n=70)	3.3%(n=47)	1.6%(n=26)
% of BL out of COFMs(n)*	55.7% (n=39)	38.29%(n=18)	7.6%(n=2)*
Top-3 ranking of COFMs(n)	BL(39)>ERS(6)>MFH(4)	BL(18)>RS(4)=OS(4)	SCC(10)>ADCC(4)>MEC(3)
Conclusion	BL most common COFM. Odontogenic tumour not rare. Carcinomas rare	BL most common COFM. Carcinomas rare.	SCC most common

*BL(Burkitt's lymphoma) recorded in patient <20year. ERS = Embryonal Rhabdomyosarcoma, MFH = Malignant Fibrous Histiocytoma, RS = Rhabdomyosarcoma. COFM = Childhood Orofacial Malignancy.

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3.6: OMF among subjects ≤ 40 years old and >40 years old.

Table 7 compares the age, gender and site pattern of OFM in age groups ≤ 40 years old and >40 years old. The most common site of occurrence in subjects ≤ 40 years old was the Maxilla (n=37 ; Figure 7) while conversely, the modal site of occurrence in subjects >40 years old was the Mandible (n=52; Figure 8).

A considerable percentage of SCC (40.8%) occurred in subjects ≤ 40 years old. M:F

ratio among subjects ≤ 40 years old was 1:1.23 compared to among subjects >40 years old(2.35:1 by ratio.) In addition, there was a maxilla site predilection in subjects ≤ 40 years old (n=16, 42.1%) and a Mandible site predilection in subjects >40 years old (n=22, 32.8%) [Table 3].

A considerably high percentage of sarcomas (33%; n=11) occurred in the Maxilla in subjects ≤ 40 years old while only 6% (n=2) occurred in the maxilla of subjects >40 years old.

Table 7: Comparison of OFM in subjects ≤ 40 and >40 years old.

	Subjects ≤ 40 Years Old	Subjects >40 years Old
Total number of cases	115	171
Gender Predilection	Male	Male
M:F ratio	1.05:1	1.48:1
Site Predilection	Maxilla	Mandible
Mean Age(\pm SD) years	26 (\pm 10)	59 (\pm 12)
Mean presentation time in years (\pm SD)	1.9 (\pm 33)	2 (\pm 41)
Most common type of Carcinoma	SCC	SCC
Most common SGC	AC and ADCC equally	AC
Most common sarcoma	Osteogenic Sarcoma	Osteogenic Sarcoma
Most common lymphoma	Non-Hodgkin Lymphoma	Non-Hodgkin Lymphoma

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Figure7 : Site distribution of OFM among 115 subjects \leq 40 years old

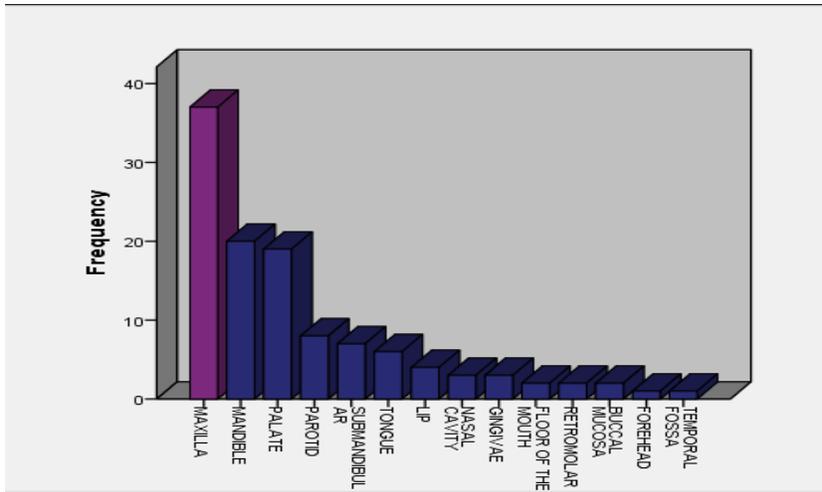
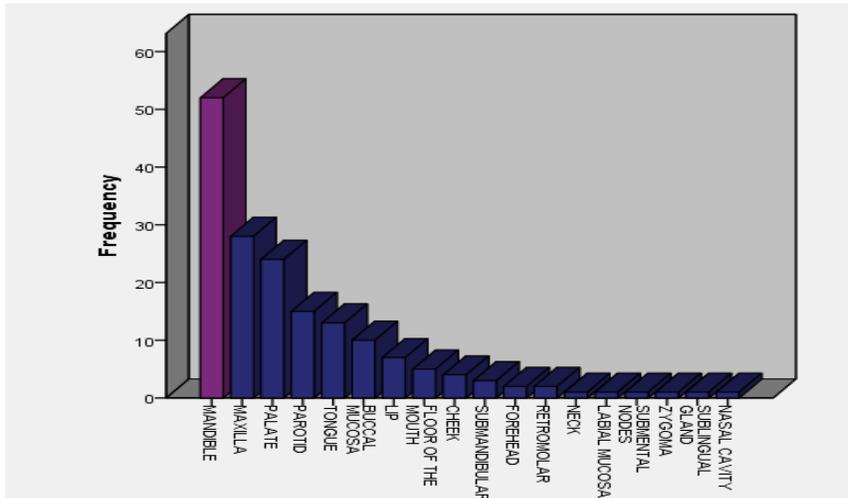


Figure 8: Site distribution of OFM among 171 subjects $>$ 40 years old



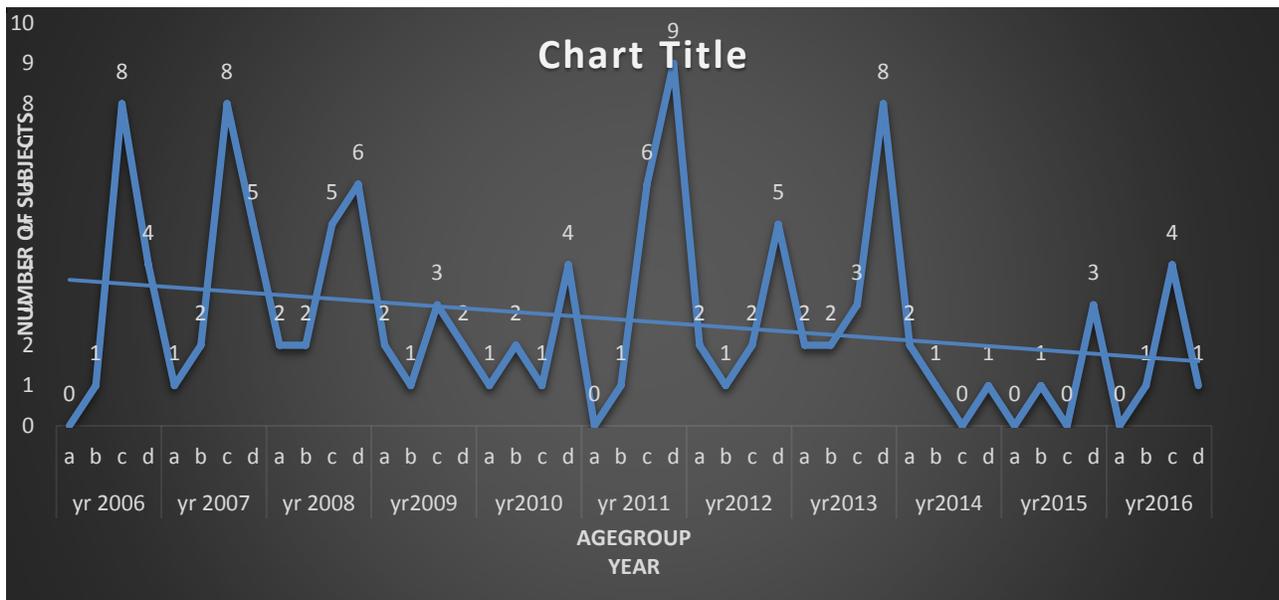
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3.7: Trends

Figures 9 and 10 are time frequency line chart trends in subjects (≤ 40 and > 40 years old) diagnosed with OFM within an 11 year period. There was a peak increase in the number of

cases among subjects in the 6th decade in the year 2012 and a decline from 2014 (figure 9). Number of cases of subjects in the 4th decade increased several times over the time period with the greatest peak in 2011. These cases however started declining after the year 2013.

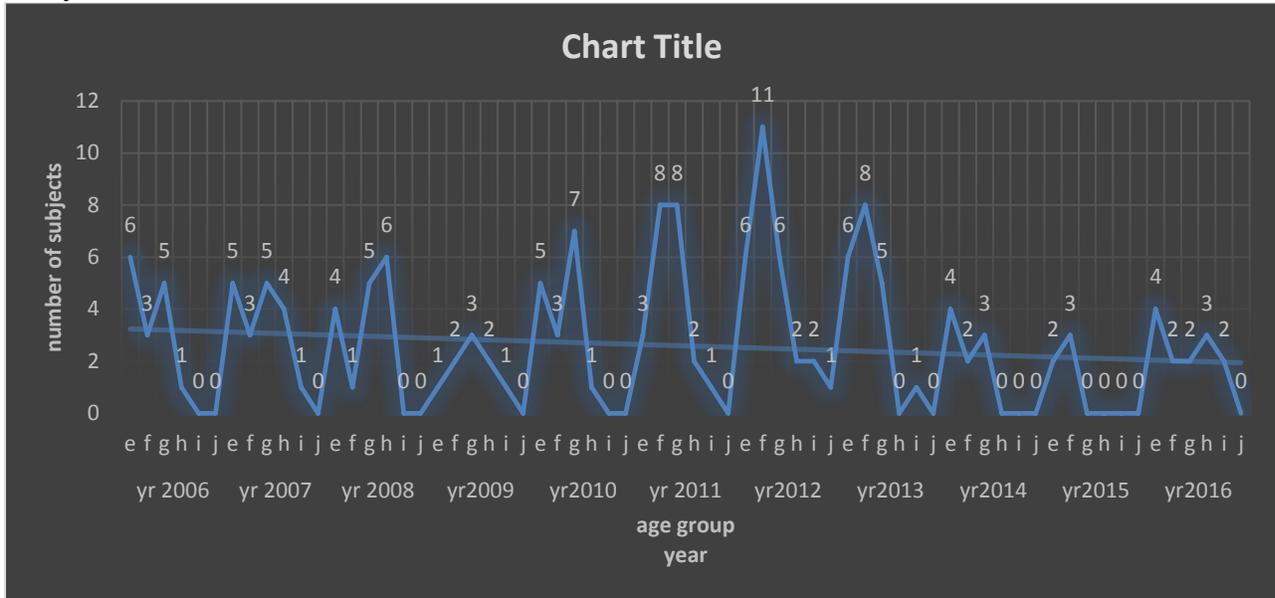
Figure 9: line chart showing 11 yearly trend (2006-2016) occurrence of OFM in 115 subjects ≤ 40 years old.



a = ≤ 10 yrs old, b = 11 - 20 yrs old, c = 21 - 30 yrs old, d = 31 - 40 yrs old.

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Figure 10: line chart showing 11 yearly trend (2006-2016) occurrence of OFM in 171 subjects >40 years old



e =41-50yrsold, f=51 -60yrs old, g=61-70yrs old, h=71-80yrs old. I=81-90, j=91 and above

4. DISCUSSION

A United State’s National Cancer Database article on head and Neck cancer reported that carcinomas account for 75.2% of all malignancies.¹⁹ Presently we report an extremely high number of carcinoma cases in this series which is similar to the report from a previous Nigerian study.⁴ The frequent occurrence of carcinomas in the orofacial region may be as a result of constant irritation to the epithelial lining. The ubiquitous, epithelial lining of the orofacial region , overlies the connective tissue and its components . It is therefore the tissue which is first exposed to the varying degrees of irritation and trauma that the oral cavity is constantly subjected to.

Over a 36-year period we observed a peak in number of LUTH cases of carcinomas

between the years 2006 -2016. These could be attributed to factors such as reduction in dearth of patient due to increased patient flow due to more awareness or hospital preference, more referrals of patients by physicians from other dental centers, or perhaps a reflection of a higher prevalence of carcinomas among Nigerian within that period of time.

From perusal of reports from studies in the scientific literature, SCC has been reported to be the most common lesion among the OFM.¹⁷⁻²⁵ However, we report a lower proportion of 40.2% compared to much higher World -wide proportion of 70-90%.^{26,27} A previous Nigerian study also report a proportion similar to the present series.²³ The lower prevalence among Nigerians may be attributed to dearth of reported cases from patients not reporting in hospitals due to factors such as : ignorance , poverty, lack of access to health care, or

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early death.²⁸ Nigeria in addition has been reported to have a relatively low smoking prevalent rate compared to other countries world- wide.²⁹

We observe a considerably high frequency of SCC among patients below 40 years old (n=42;37%) which is similar to report of 40 % by Effiom et al.²⁵ Nigeria has a large population with a low life expectancy of 54.07 years.³⁰ A considerable percentage of the Nigerian population are therefore below 40 years of age which may be responsible for the high frequency of SCC among this age group. The precise risk factors responsible for the development and high frequency of OMF/SCC among younger patients remain unknown. Genetic factors and unidentified carcinogens may be responsible for the considerably high frequency in these age group as a majority of young Nigerian patients do not have significant exposure to postulated risk factors such as excessive tobacco and alcohol consumption. It is worth nothing that the trend of an increase of OFM (particularly SCC) among patients in younger age groups has been observed in some developed countries.³¹ More research is therefore required to recognize the precise risk factors responsible for the development of OFM among various age groups.

The observed gender pattern for OFM is in agreement with reports of a male predilection from previous Nigerian,^{4,20} Sudanese,²¹ and Chinese²² studies. The higher male prevalence may be attributed to more male exposure than female to risk factors (such as alcohol and tobacco consumption) for OFM.

Strikingly, in patients ≤ 40 years old, there were more documented female cases than were male cases with SCC (M:F = 1:1.23), compared to >40 years old where more male cases were reported . (M:F = 2.3:1). Perhaps there is an increase in environmental risk factors such as smoking and alcohol consumption among young Nigerian women in recent decades.^{32,33} The most prominent sarcoma in this study was Osteogenic Sarcoma (OS). This is similar to a West Iranian study by Azimi et al.³⁴ We also report a rare case of Osteogenic Sarcoma that occurred in the tongue. Only a total of four cases have previously been reported in the literature.³⁵

The mandible jaw bone predilection of OFM in this series contrasts with reports from previous studies that observed oral cavity soft tissue site predilections such as the gingiva (mandible and maxilla), retromolar soft tissue area and buccal mucosa.³⁶⁻³⁸ A large number of subjects presented late and recognition of the initial specific location of the lesion was challenging. This resulted in limitations in site specificity. For example, the mean presentation time for subjects with SCC was observed to be 1 year and 2 months, therefore tumour growth and enlargement may have resulted in invasion into adjacent structures, making the identification of the initial site impossible. Most subjects ≤ 40 years old presented with malignant lesions in the maxilla while subjects >40 years old commonly presented with malignant mandibular lesions. This agrees with the report from an earlier 10-year study conducted in Jos by da Lilly-Tariah.³⁹

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We observed an increase in the number of OFM cases among subjects in the 4th decade during different periods over 11 years. There was however a peak period in the year 2011 and a sharp decline from 2014. Conversely, there was an increase in the number of LUTH subjects in the 6th decades in the year 2011 which peaked in 2012 and dropped by 2014. The precise reasons for this pattern are unclear. There however is the possibility that as the active working class in Nigerians are largely in the 4th decade of life, they may have better financial resources to seek health care than other age groups .

It appears the observed reduction in prevalence of Burkitt's Lymphoma (BL) in Nigeria was not exaggerated.⁴⁰ BL an aggressive B-cell tumour, was a common childhood malignancy in Nigerians, but it's decline is aptly demonstrated by a direct comparison of the current study with previous reports from LUTH.^{15,16} Arotiba et al ¹⁶ initially reviewed child hood OFM over a period of 12 years, and reported 39 cases of BL out of a total 70 . Ajayi et al ¹⁵ reviewed cases over subsequent 10 years and reported only 18 cases of BL out of 256 cases . Presently we report only 3 cases of BL (1 case

was in a 28year old male). This represents a 92% and 83% drop of cases respectively over 33 years . [Table 6] This pattern could be attributed to improved Malaria control and living conditions among Nigerians . Further studies may be conducted to further identify reasons for this reduction of BL among Nigerian children.

In conclusion, there appears to be an increase in the prevalence of OFM (especially SCC) among young Nigerians as we have observed an increasing number of cases in the present study. This cannot be explained solely by exposure to regular environmental risk factors such as alcohol and tobacco. It is plausible that malnutrition, chronic malaria infection, viral infections (seasonal harmattan haze from the sahara desert) and other factors not yet identified, triggers genetic mutations that predispose to the development of some of these OFMs in our enviroment. Therefore, there is an urgent need to explore the molecular landscape of OFMs in Nigerians. This may lead to the development of new molecular markers for preventive, diagnostic, prognostic and therapeutic strategies for better management of these cancers.

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