

# Histopathologic Pattern of Primary Head and Neck Cancers in Nigerian Tertiary Center

**\*Jude Obiora UCHENDU, \*\*Nekwu Emmanuel OKOLUGBO, \*\*\*Okiemute Mabel ETETEFIA**

*\*Department of Histopathology and Morbid Anatomy, Delta State University Abraka/ Delta State University Teaching Hospital Oghara*

*\*\*Department of Surgery, Delta State University, Abraka/Department of ENT/Head and Neck Surgery, Delta State University Teaching Hospital, Oghara*

*\*\*\*Department of Oral and Maxillofacial Surgery, Delta State University Teaching Hospital, Oghara*

Correspondence  
Dr. Jude O. Uchendu  
Department of Histopathology and Morbid Anatomy  
Delta State University  
Abraka, Delta State  
Nigeria.  
Email: ojlinksent@yahoo.com

## ABSTRACT

**Objective:** Head and neck cancers (HNCs) is a major health challenge globally and its incidence in Nigeria is poorly understood. The objective of the study was to evaluate the histologic pattern of HNC in a tertiary hospital in this region.

**Methods:** The study is a 6 year (2014-2019) retrospective descriptive study of age, gender, topography and histological type variation using histopathology reports of patients with diagnosis of HNCs in Delta State University Teaching Hospital (DELSUTH).

**Results:** Sixty-seven HNCs, constituting 10% of hospital cancer cases, were analyzed from 41 males and 26 females, with a mean age of 41.93 years, age range of 1-85 years and rate of 9-13 cases/year. Case distribution in the 1st, 2nd, 3rd, 4th, 5th, 6th, 7th, 8th and 9th decades were 10.5%, 1.5%, 16.4%, 20.9%, 4.5%, 23.9%, 13.4%, 6.0% and 3.0% respectively. The upper digestive tract, the larynx, jaws, eye, upper airways, salivary glands, ear, thyroid, lymph nodes and skin were the sites in 7.5%, 1.5%, 7.5%, 7.5%, 13.4%, 19.4%, 1.5%, 15%, 17.9% and 9.0% of the cases respectively. Carcinoma, lymphoma, blastoma and sarcomas accounted for 65.7%, 20.9%, 7.5% and 6.0% of the cases respectively. The more common histological types are adenoid cystic carcinoma (7.5%), retinoblastoma (7.5%), nasopharyngeal carcinoma (10.5%), papillary carcinoma (10.5%), squamous cell carcinoma (15.0%) and NHL (16.4%). The peak age group for carcinoma, lymphoma, blastoma and sarcoma were the 6th, 7th, 1st and 4th decades of life respectively.

**Conclusion:** HNCs are relatively common with more male sufferers. They are mostly carcinomas, most commonly in salivary glands with Squamous cell cancer being the most common histological type. There is need for policy makers and hospital management to prioritize HNC prevention and management.

**Keywords:** Cancer, Head and Neck, Histopathologic, Pattern

## INTRODUCTION

The head and neck is an anatomically complex region of the body that extends from the base of the skull to the thoracic aperture. Within the region lie the eyes, ears, salivary glands, oral cavity, dental apparatus, nasal cavities, paranasal sinuses, nasopharynx, hypopharynx, oropharynx, larynx, parathyroid and thyroid glands, scalp as well as epithelial, neural, vascular, fibrous, cartilaginous and osseous supporting tissue ((Lingen, 2014). This tissue heterogeneity invariably gives rise to a wide gamut of diseases of varying histology and biological behaviours (Lingen, 2014; Kanu et al., 2016).

Of these diseases, head and neck cancers (HNCs) has attracted much attention from clinical researcher, probably because of the associated morbidity and mortality as well as its public health implication

(Ringström et al., 2002; Lilly-Tariah et al., 2009). Across the globe, HNC constitute about 10% of all cancers, with a marked geographical variation (Fan, 2004). In USA and Europe, it accounts for 5-8% of cancers in the body (Zagar et al., 1993; Watkinson et al., 2000) while in India it accounts for about 30% of all cancers (Sanghvi et al., 1989; Jemal et al., 2006).

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In Nigeria, population-based data on this subject is lacking with most studies being hospital-based and retrospective. In these centres, an annual incidence of 20-99 new HNCs cases have been observed (Bhatia, 1990;

Nwawolo et al., 2001; Amusa et al., 2004; Otoh et al., 2006; Erinoso et al., 2016; Forae & Nwafor, 2017). Unfortunately, little is known about the epidemiology of HNC in Delta State of Nigeria. The present study hopes to evaluate the histologic pattern of HNC in a tertiary hospital in this region. We hope that the result will add to the present body of knowledge and guide health planners and policy makers towards improving the health care of the public.

## MATERIALS AND METHODS

Delta State University Teaching Hospital (DELSUTH) is apex hospital of Delta State. It offers specialized consultative healthcare for inpatients and is also a referral center for primary and secondary healthcare centers within the state and neighboring communities. Her histopathology department serves not only the hospital, but also receives surgical specimens from other hospitals within the state and environs.

The study is a 6 year (1<sup>st</sup> January, 2014 to 31<sup>st</sup> December, 2019) retrospective study of all HNCs submitted to the histopathology department of the hospital. Traditionally, all surgical specimens from head and neck tumours of the corresponding patients were submitted to the department in 10% neutral-buffered formal saline. These specimens were processed in varying grades of alcohol, paraffin embedded, made into 3-5micron tissue sections and subsequently stained using eosin and hematoxylin. Special histochemical and immunohistochemical stains were also utilized in ensuring accurate diagnosis when necessary.

The histopathology reports of the patients were extracted from the archives of the department of Pathology (DELSUTH). The age, gender, anatomical location and histological diagnosis were retrieved from these reports and used for this study.

Exclusion criteria: Cases diagnosed as metastatic diseases, and those with incomplete information, insufficient specimen for diagnosis and inconclusive diagnosis were excluded from the study.

Ethical approval was granted before this study was commenced and the reference number is DELSUTH/HREC/2019/063/0425. Data analysis was done with excel spread sheet 2007 and the results were presented in tables and figures.

## RESULTS

A total 67 head and neck cancers, constituting of 10.0% of all hospital cancer cases, involving 41(61.7%) males and 26(38.3%) females with mean annual rate of 11 cases per year were encountered during the study period. The age

range and the mean age of patients studied were 1-85 years and 41.93 years respectively.

The yearly trend of HNCs is shown in figure 1. These cases were relatively stable across the period under review with 9-13 cases recorded per annum and the highest incidence in the 6th year.

The age distribution of patients with HNCs is shown in table 1. HNCs were less common among patients whose ages were in the 2<sup>nd</sup>, 5<sup>th</sup> and 9<sup>th</sup> decades, accounting for 1.5%, 4.5% and 3.0% of cases respectively while those in the 1<sup>st</sup>, 3<sup>rd</sup>, 4<sup>th</sup>, 6<sup>th</sup> and 7<sup>th</sup> decades accounted for 10.5%, 16.4%, 20.9%, 23.9% and 13.4% of cases respectively.

Table 2 showed the topographic distribution of various histopathologic classes of HNCs. These include the oral cavity and oropharynx [5 (7.5%)], larynx [1(1.5%)], jaws [5(7.5%)], eye [5(7.5%)], nasal, paranasal sinuses and nasopharynx [9(13.4%)], salivary gland [13(19.4%)], ear [1(1.5%)], thyroid [10(15.0%)], lymph nodes and lymphoid organs [12(17.9%)], and skin [6(9.0%)]. Carcinomas, lymphomas, blastomas and sarcomas accounted for 44(65.7%), 14(20.9%), 5(7.5%) and 4(6.0%) cases respectively. Male predominance was observed among oral and oropharyngeal, eye, salivary gland, lymphoid and skin cancers with male to female ratio of 4:1, 1.5:1, 1.2:1, 1.4:1 and 5:1 respectively. The 9 cancer cases of the upper airway affected males exclusively. Female predominance was observed among cancers of jaws, and thyroid with a male to female ratio of 1:1.5 and 1:2.3 respectively. The only case of laryngeal cancer encountered in this study affected a female, while the only case of ear cancer in this study affected a male patient.

The gender and frequency distribution of the histological types of HNC is shown in table 3. The common types include acinic cell carcinoma [2(3.0%)], basal cell carcinoma [2(3.0%)], medullary carcinoma of thyroid [3(4.5%)], basal cell adenocarcinoma of salivary gland [4(6.0%)], adenoid cystic carcinoma [5(7.5%)], retinoblastoma [5(7.5%)], nasopharyngeal carcinoma [7(10.5%)], papillary carcinoma of thyroid [7(10.5%)], squamous cell carcinoma [10(15.0%)], Burkitt lymphoma [2(3.0%)] and all other non-Hodgkin's lymphoma[11(16.4%)]. Male predominance was observed among retinoblastoma, acinic cell carcinoma, basal cell carcinoma, nasopharyngeal carcinoma, polymorphous low grade carcinoma, sinonasal carcinoma, squamous cell carcinoma embryonal rhabdomyosarcoma, osteosarcoma and Non-Hodgkin's lymphoma (NHL). Female predominance was observed among adenoid cystic carcinoma, ameloblastic carcinoma, epithelial-myoeipithelial carcinoma, medullary carcinoma, papillary carcinoma, Kaposi sarcoma and pleomorphic sarcoma.

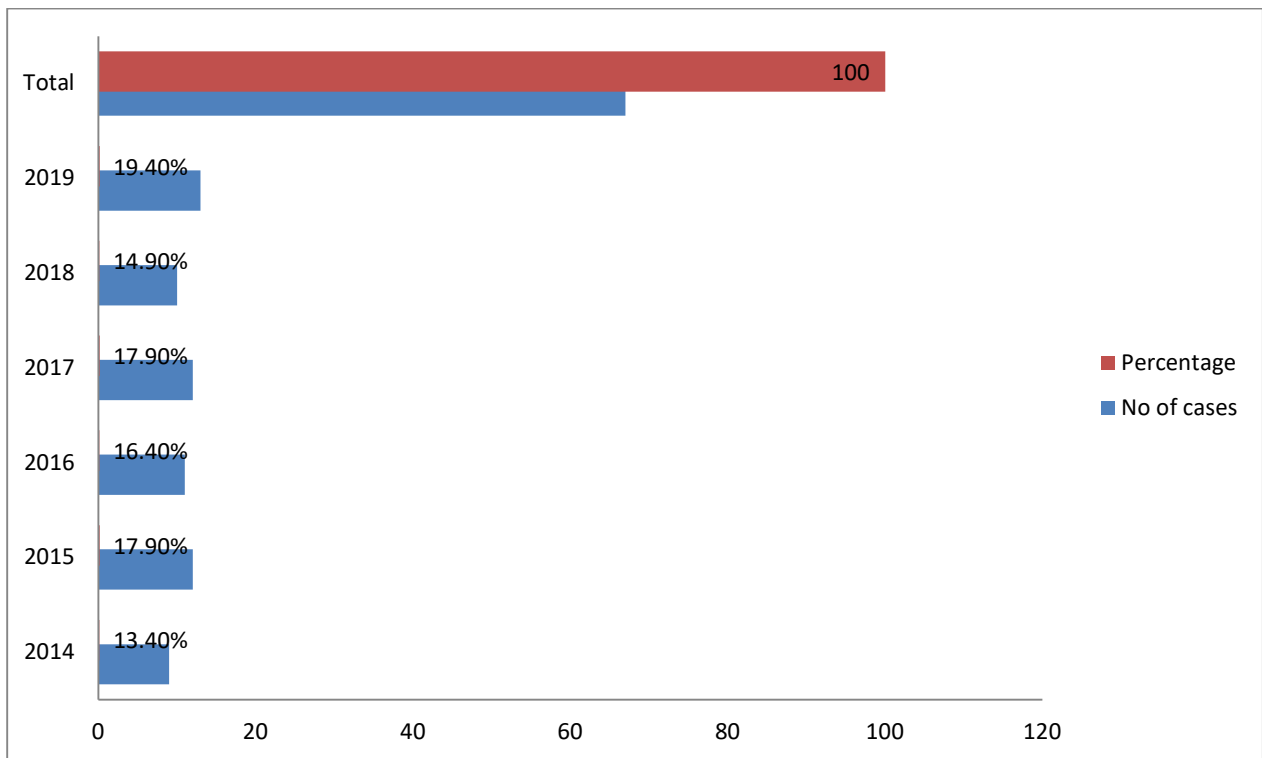


Figure 1: Yearly trend of head and neck cancers

Table 1: Age trend of benign and malignant tumours

Age (years)	No of cases	Percent
0-9	7	10.5
10-19	1	1.5
20-29	11	16.4
30-39	14	20.9
40-49	3	4.5
50-59	16	23.9
60-69	9	13.4
70-79	4	6.0
80-89	2	3.0
Total	67	100

Table 2: Regional distribution malignant tumours

Site	Histological class				Male	Female	Total (%)
	Carcinoma	Lymphoma	Sarcoma	Others (Blastoma)			
Oral cavity/oropharynx	4		1		4	1	5(7.5)
Larynx	1					1	1(1.5)
Jaws	1	2	2		2	3	5(7.5)
Eye				5	3	2	5(7.5)
Nasal cavity, paranasal sinuses, Nasopharynx	8		1		9	0	9(13.4)
Salivary gland	13				7	6	13(19.4)
Ear	1				1		1(1.5)
Thyroid	10				3	7	10(15.0)
Lymph nodes		12			7	5	12(17.9)
Skin	6				5	1	6(9.0)
Total	44	14	4	5	41	26	67(100.0)

Table 3: Histological pattern of head and neck cancers

Histology class	Histology type	Male	Female	Total	Percent (%)
Blastomas	Retinoblastoma	3	2	5	7.5
Carcinoma	Acinic cell ca	2		2	3.0
Carcinoma	Adenoid cystic ca	2	3	5	7.5
Carcinoma	Ameloblastic carcinoma		1	1	1.5
Carcinoma	Basal cell adenocarcinoma	2	2	4	6.0
Carcinoma	Basal cell carcinoma	2		2	3.0
Carcinoma	Epithelial-myoepithelial ca		1	1	1.5
Carcinoma	Medullary carcinoma	1	2	3	4.5
Carcinoma	Nasopharyngeal carcinoma	7		7	10.5
Carcinoma	Papillary carcinoma	2	5	7	10.5
Carcinoma	Polymorphous low grade	1		1	1.5
Carcinoma	Sinonasal carcinoma	1		1	1.5
Carcinoma	Squamous cell carcinoma	8	2	10	15.0
Lymphoma	Burkitt	1	1	2	3.0
Lymphoma	HL		1	1	1.5
Lymphoma	NHL	7	4	11	16.4
Sarcoma	Embryonal Rhabdomyosarcoma	1		1	1.5
Sarcoma	Kaposi sarcoma		1	1	1.5
Sarcoma	Osteosarcoma	1		1	1.5
Sarcoma	Pleomorphic sarcoma		1	1	1.5
	Total	41	26	67	100.0

Key: NHL=Non-Hodgkins lymphoma, HL=Hodgkins lymphoma

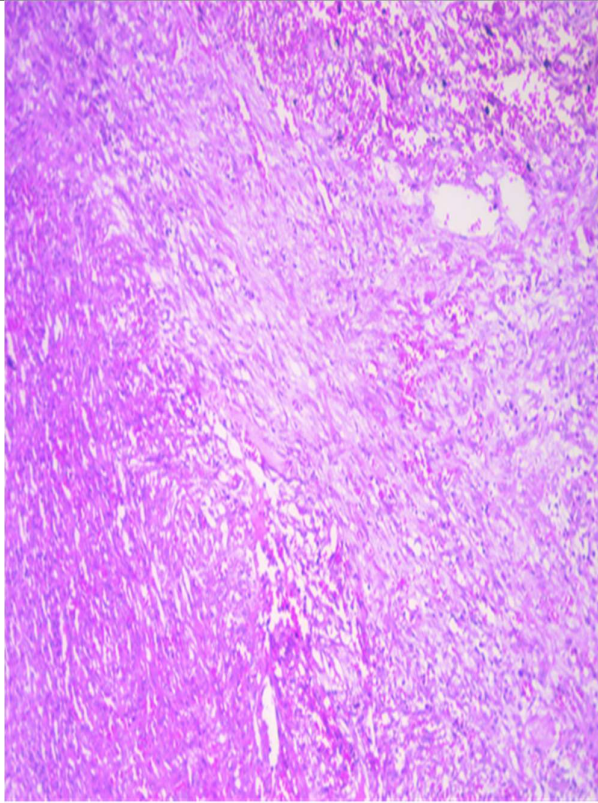
Table 4 shows the age relationship with the histological groups. Sixty percent of the carcinomas occurred among the age group of 20-39 years but none was observed among patients within 0-19 years. The peak age for lymphoma was in the 7th decade, with 71.4% of the lymphomas among patients of 50-79 years age group. All

cases (two case) of Burkitt lymphoma were observed in patients within 0-19 years and all sarcoma cases were encountered in the < 40 years age group while all cases of blastoma [5(7.5%)] were essentially retinoblastoma and were seen among patient within 0-9 years.

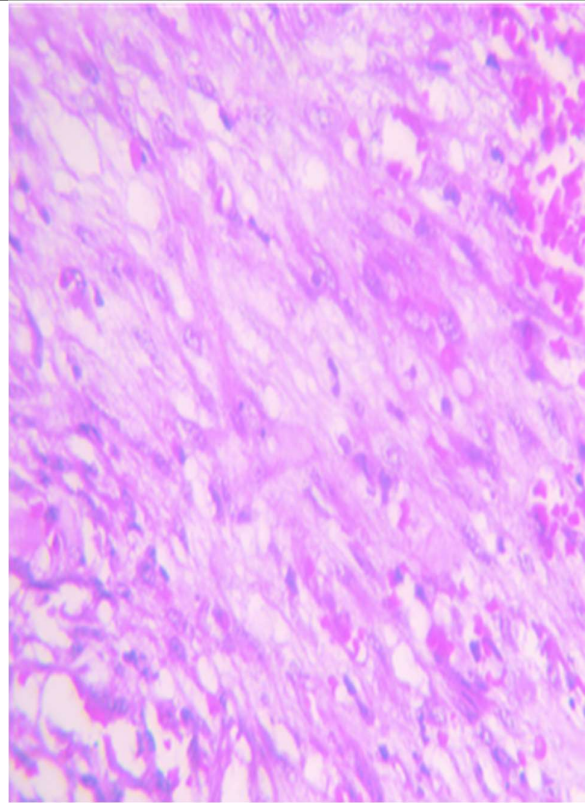
Table 4: Age versus histological type

Age range (years)	Histological class				Male (M)	Female (F)	M:F
	Carcinoma n (%)	Lymphoma n (%)	Sarcoma n (%)	Others (Blastoma) n (%)			
0-9	-	1 (7.1)	1 (25.0)	5 (100.0)	5	2	2.5:1
10-19	-	1 (7.1)	-	-	-	1	Female only
20-29	10 (22.7)	-	1 (25.0)	-	4	7	1:1.8
30-39	12 (27.3)	-	2 (50.0)	-	10	4	2.5:1
40-49	2 (4.6)	1 (7.1)	-	-	1	2	1:2
50-59	13 (29.6)	3 (21.5)	-	-	11	5	2.2:1
60-69	4 (9.1)	5 (35.7)	-	-	7	2	3.5:1
70-79	2 (4.6)	2 (14.2)	-	-	1	3	1:3
80-89	1 (2.3)	1 (7.1)	-	-	2	0	Males only
Total	44 (100.0)	14 (100.0)	4 (100.0)	5 (100.0)	41 (100.0)	26 (100.0)	1.6:1



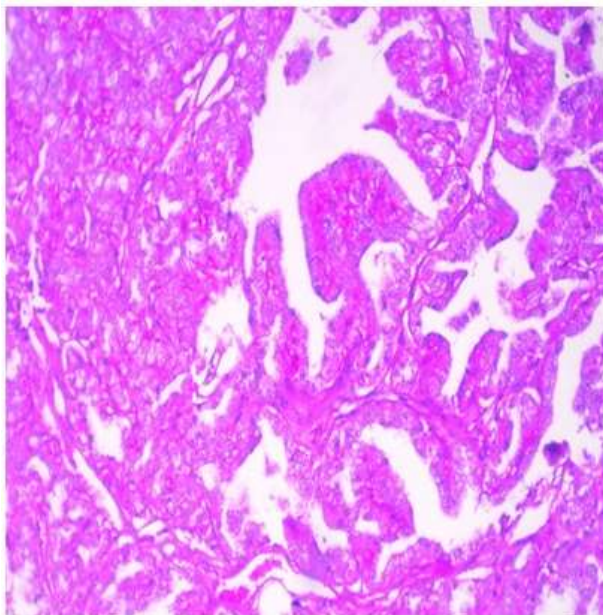


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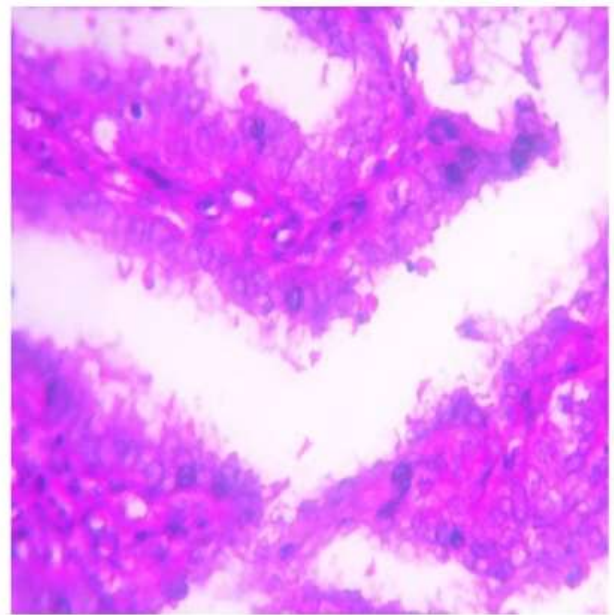


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Figure 2: Oral kaposi sarcoma of oral cavity in a 32 year old female



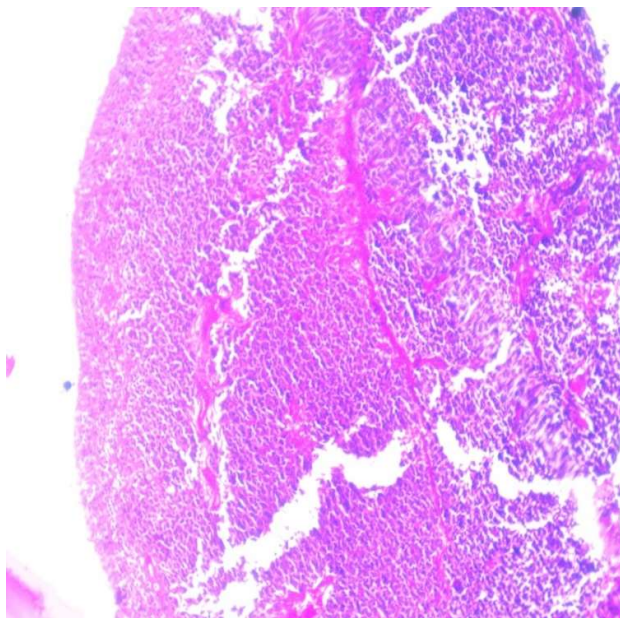
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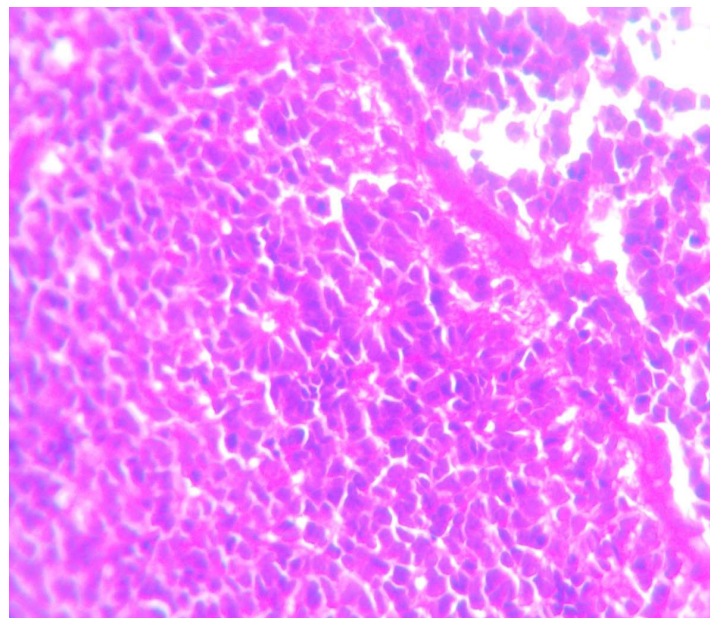
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Figure 3: Papillary carcinoma of the thyroid in a 32-year-old female





X10 magnification



X40 magnification

Figure 4: Retinoblastoma in a 5-year-old male

## DISCUSSION

The study of head and neck cancer is unique because not only did it involve diseases of numerous unique unrelated organs, but it involves collection of data across different specialties such as the ophthalmology, pediatric surgery, Ear, Nose Throat surgery, Oral and Maxillofacial Surgery, General Surgery, Dermatology and the Haematology. This inadvertent diversity, contribute to loss of data and the difficulty in classification of these diseases, further making the study rather challenging. This may account for the proliferation of literature on HNCs. However, in the Nigerian context, almost all these researches are institutional based with diverse and inconsistent methodology (Erinoso et al., 2016). There is therefore need for more integrated or corroborative studies, and better still, a multi-institutional study, and also a uniform classification system or methodology among stakeholders. One way of achieving uniformity is by adopting the latest WHO classification of head and neck tumours (El-Naggar et al., 2017). Notwithstanding these lapses, some credit should be given to pioneer researchers on the epidemiology of HNCs in Nigeria, such as Elmes & Baldwin, (1947), Martinson (1968), Edington & Gilles (1969), Okafor (1983) and Martinson, (1984).

In this study, HNCs accounted for 10.0% of all new cases of cancer diagnosed during the period under review. This concur with 10.3% incidence recorded in South western Nigeria (Sowunmi et al., 2015) and the overall global picture (Fan, 2004). Our finding is however lower than 16.5% incidence observed in Maiduguri/North Eastern Nigeria (Kodiya et al., 2016). These figures no doubt underscores the burden of HNCs in our region and calls for

intense action by policy makers towards its prevention and management.

The yearly trend of HNCs is fairly stable with marginal increase in the last year of the study. It may portray stability of the environmental risk factors such as smoking and drinking habits, the major risk factors for HNCs. The slight increase in the last year of study may be related to increasing population and expansion of man-power resources in the study center which may have attracted more patients especially in dental and general surgery specialties. This may however not be a true representation of the picture across the study population as other factors such as health seeking behavior and financial status of patients, and proximity to hospital facility may influence patient's choices of clinician. On the contrary, reports in North America portrayed a steady increase in new cancer cases (Hoffman et al., 1998).

Male predominance was observed in this study. Similar trend was reported among Nigerian researchers giving a male to female ratio of 1.1-2.3:1 (Okoye & Nwosu, 1995; Amusa et al., 2004; Otoh et al., 2006; Lilly-Tariah et al., 2009; Adisa et al 2011; Onotai & Nwogbo, 2012). A male to female ratio of 1.7:1 and 2.4:1 was reported in Central Sudan and in both Japan and China respectively (Anyu et al., 1993; Takahiro et al., 2003; Abuidris et al., 2008). A contrasting report was published in Ilorin, Nigeria by Ologe et al (2005), which showed a marginal female predominance (a male to female ratio of 1:1.02). In that case, the authors attributed it to better health seeking behavior among the female gender. Notwithstanding this report, there is a general consensus towards male predominance, which may be attributed to greater

consumption of alcohol and cigarette (Adeyemi et al., 2008).

The overall age range in this study was 1-85 years which agreed with the meta-analysis report of HNC in Nigeria by Lilly-Tariah et al. (2009). There was a sharp drop in the incidence in the 2<sup>nd</sup> decade (1.5%), after the 10.5% incidence observed in the first decade. This may be because childhood head and neck blastomas (eg Retinoblastomas) generally occur at in the first decade of life (Lingen, 2014). On the other, HNCs studies has shown that rate of HNC generally increases with advancing age (Kodiya et al., 2016). The peak age for HNCs in this study was at the 50-59 years which is in agreement with the peak incidence in Ibadan, Western Nigeria (Adeyemi et al., 2008). On the contrary, Amusa et al., in a hospital-based study in Ile-Ife recorded the highest incidence of HNC in the first decade (Amusa et al., 2004). Further to this, a peak was observed in the 3<sup>rd</sup> decade in both Jos and Maiduguri (Bhatia, 1990; Adeyemi et al., 2008) while studies in Benin City and Lagos, Nigeria noted a peak incidence among patients within the 4<sup>th</sup> to 5<sup>th</sup> decade of their live (Ologe et al., 2005; Forae & Nwafor, 2017). In Nepal, however, most HNCs were encountered in the 7<sup>th</sup> and 8<sup>th</sup> decades (Lasrado et al., 2012).

The mean age of patients with HNC in this study was 41.92; which is comparable to report by Adisa et al (2012). in Ibadan, Nigeria [43.9 years], but lower than the mean of 57.8 years reported by Onotai and Nwogbo (2012) in Port Harcourt, Nigeria. It has also been shown that HNCs affect Nigerians at a relatively younger age unlike among Caucasians where most cases occur in advanced age (Amusa et al., 2004; Lingen, 2014). This is understandable, in view of our population structure which have a much lower life expectancy (Arikpo et al., 2019).

Carcinoma was seen as the most common histological group in this study. This is in agreement with reports from Otoh et al. (2006) in Jos, Adisa et al. (2012). in Ibadan; Onotai and Nwogbo (2012) in Port Harcourt, and Ologe et al. (2005). in Ilorin but at variance with reports by Bhatia in Jos (Bhatia, 1990) and Amuse et al. in Ile-Ife (Amusa et al., 2004). In their reports, lymphoma was the most common group of HNC (Bhatia, 1990; Amusa et al., 2004). In this study, the topographic distribution was structured into 10 groups. Other studies in Nigerian literary space showed marked differences in topographic classification (Amusa et al., 2004; Ologe et al., 2005; Otoh et al., 2006; Adeyemi et al., 2008 Adisa et al., 2011). The salivary glands were the most common site for HNCs during the period under review, while cancers in the larynx and ear were rare with each site hosting just one case. In Ile-Ife, Southwestern Nigeria, Amusa et al. (2004) reported predominance of oral cancers; while Bhatia in Jos (1990); Forae and Nwafor (2017) in Benin City, Adisa et al. (2012) in Ibadan; Onotai and Nwogbo (2012) in Port Harcourt, and Ologe et al. (2005) in Ilorin; reported predominance of nasal and Paranasal sinuses cancers. In Lagos, Nigeria, Nwawolo et al. (2001) noted that the most common

location of HNCs was the nasopharynx. Rarity of ear cancer as seen in this study is a general observation (Vokes et al., 1993; Amusa et al., 2004; Lingen, 2014; Arikpo et al., 2019). These variation in topographic distribution of HNC seem endless and calls for large scale national survey to highlight the actual picture.

With respect to histological type, squamous cell cancer (SCC) is the most common histologic type followed closely by both nasopharyngeal carcinoma and papillary cancer of thyroid. SCC was also reported as the most common histological type of HNC by many Nigerian and international researchers (Okoye & Nwosu, 1995; Nwawolo et al., 2001; Ahmad & Pindiga, 2004; Ologe et al., 2005; Iseh & Malami, 2006; Adeyemi et al., 2008; Lilly-Tariah et al., 2009; Onotai & Nwogbo, 2012). Lymphoma was rated as the most common histologic type in Jos (Bhatia, 1990) and in Ile-Ife (Amusa et al., 2004), an erroneous picture created by their inability to break down lymphomas into its various histological components. A latter study in Jos however implicated nasopharyngeal cancer as the most common HNC (Lilly-Tariah et al., 2009).

These differences in the patterns of HNCs may be attributed to diversity in diet, differences in exposure to alcohol and cigarette, differences in genetic composition and differences in study methodologies.

Our study also showed that carcinomas are uncommon in childhood which is the general observation (Lingen, 2014). In contrast carcinomas were the most common group of cancer among adults with peak in the 3<sup>rd</sup> and 4<sup>th</sup> decade. This is an interesting observation and calls for further studies.

## CONCLUSION

The study showed that HNCs are relatively common in Delta State. More males are affected than female, with a mean age of 41.9 years. Carcinoma, which is rare in children, is the most common histologic group and SCC is the most common histological type. Salivary gland, lymph node, upper airway and thyroid are the more common sites of HNCs. There is a need for large scale survey and uniformity in methodology and classification and a need to focus on preventing and management of HNCs.

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### Conflict of interest

The authors declare that they have no conflicts of interest.

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