

# The Epidemiology Of Primary Head And Neck Cancer In Black Lion Specialized Hospital Oncology Center, Ethiopia: A Hospital Based Retrospective Study

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## Research article

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# Abstract

Background Unfortunately, despite an increase in medical knowledge, the treatment need of head and neck cancers (HNCs) have not been improved in Ethiopia. In addition, there is no published evidence in the epidemiology of head and neck cancer patients in the country. The present study aimed to describe the prevalence and pattern of HNCs among patients seen at Black Lion Hospital oncology center.

## Background

The term primary head and neck cancer (HNCs) may refer exclusively to cancers arising from the upper aerodigestive tract or more broadly to any malignancy originating in the head and neck region. This malignancy arises from epithelial, mesenchyme or hematopoietic origin(1,2). Globally 25 million people are living with cancer and 7 million people die from it annually. The incidence of cancer was 11 million in the world annually(3,4). Among these 500,000 new diagnosed cases are HNCs. The incidence of HNCs differs by subtype, country, and sex. The incidence rate ranges from 5% to 50% with the highest incidence of HNC in south Asia and the southern part of Europe (5–9).

The World health organization (WHO) classify the head and neck tumors based on their location as Tumors of; Nasal Cavity and Paranasal Sinuses, Nasopharynx, Hypopharynx, Larynx and Trachea, Oral Cavity and Oropharynx, Salivary Glands, Odontogenic Tumors, Ear, and Tumors of the Paraganglionic system (5).

Recent advances in health revealed that our health is affected by environmental and behavioral habits. Smoking and alcohol intake were the two determinant factors for the existence of HNCs, however, less is known about the influence of other factors like; pollutants, occupational agents, diet, viral infections and genetic influences [1,2,4,5]

The incidence of cancer was 150,000 cases annually (Ethiopia) and the hospital record revealed cancer leads 4% of all deaths. Until the last five years, less priority was given to cancer treatment and prevention due to the presence of epidemics and other infectious diseases in Ethiopia and sub-Sahara countries(6). HNCs account for 5%–8% of the total body malignancies in Europe and America while this prevalence rises in Asian countries where the prevalence was 41%–54% of all cancers in India(7–10).

A retrospective record analysis of the pathology services done in the university of Gondar Specialized comprehensive hospital in 2014–2015 found that 16.7% of the results were malignant cases. From this, 64% were females and 92% occurred in adults. This result also revealed head and neck squamous cell carcinoma was one of the commonest malignancies in males (11).

Surgery and radiotherapy remain the primary modalities for the management of early and locoregionally advanced head and neck squamous cell carcinoma, with the benefit of adding chemotherapy to radiotherapy have been a major focus of research over the last 25 year. Long-term cure rates for HNCs have not changed appreciably over the past 40 years because ultimate long-term survival was by metastatic disease, the appearance of second primaries, and other smoking-related conditions; but there is good evidence that survival rates up to 10 years have improved steadily(1,2,5,12,13).

Head and neck cancer becomes the public health crisis in low-income countries(14). Cancer becomes the leading non-communicable disease in Africa. Poverty, ignorance, and poor health-seeking behavior lead Africa prone to cancer, irrespective of age and gender. Approaches to tackle the burden of cancer in sub-Saharan countries in the last few years have had less success due to low awareness of the cancer burden and a poor understanding preventive mechanisms of cancer(15).

To the best of our knowledge, there is no data on the epidemiology of HNCs in Ethiopia. Hence, the present study is designed to assess the prevalence and pattern of HNCs in patients who visited the Black lion Specialized oncology center from 2010 to 2015.

## Methods And Materials

### Study design

This is a hospital-based retrospective study was conducted at the black lion specialized hospital oncology center over a period of 5 years (2010–2015) under the approval of the institutional ethics committee of Jimma University. The black lion oncology center is the only cancer center in Ethiopia until now. Black lion hospital provides service for approximately 300,000 people annually and it has 600 beds of which, only 18 beds are allocated to the oncology center.

After getting ethical clearance from the Ethics Committee of the Institutional Review Board of Jimma University, information on socio-demographic characteristics, type of malignancy, histopathology results, predisposing factors, and Stage of the malignancy were extracted from the patient medical record using a well-structured checklist from medical records of patients treated with primary malignancy of head and neck region

During data collection from the medical records, malignancy of head and neck were categorized according to the current WHO international classifications of a disease coding system.

The collected data were cleaned, coded, and entered into Epi Data. Finally finally exported to SPSS 20.0 for analysis. Frequencies, percentages, cross-tabulation, of different variables, were determined. The collected data presented using figures and tables.

#### *Exclusion Criteria*

- Reports with a doubtful or controversial diagnosis
- Benign tumors, skin cancers, cervical esophageal cancers, central nervous system, and eye tumors
- Incomplete medical records

## Results

### Clinical characteristics of the patients

During the 5-year period, 8,580 patients visited the oncology center for treatment and among this 834 patients were diagnosed with HNCs. This indicated the prevalence of HNCs was 9.72% in the study area. Out of 834 h

HNCs patients, 78 medical records were incomplete and excluded from the study and finally, 756 patients' data were included in the study.

The mean age of the study participants was  $44.56 \pm 16.47$  (age range 8–95 years) with a male to female ratio of 2:1. The peak occurrence was in the 5<sup>th</sup> and 6<sup>th</sup> decades (41–60 years) and the lowest prevalence was recorded in less than 21 years (9.1%) (*Table 1*).

### *Age and Gender Distribution*

The commonly affected age group is the 5<sup>th</sup> and 6<sup>th</sup> decade comprising of 306 cases and followed by the 3<sup>rd</sup> and 4<sup>th</sup> decades (256 cases). Only 20 cases were below 21 years of age. The prevalence of lymphoma was relatively high in the under 20 years (31.58%) and the 3<sup>rd</sup> and 4<sup>th</sup> decades (31.58%) (*Table 1*).

The prevalence of HNCs was more common in males comprising 504 cases with a male to female ratio of 2:1 (*Table 1*). Oral cavity and oropharynx cancer is commonest in males (n = 143) as well as in females (n = 83). The prevalence of salivary gland malignancy is relatively equal in both males and females (*Figure 2*).

### *Histopathology Pattern*

Squamous cell carcinoma was the commonest histological type in HNCs comprising of 91.3% of total HNCs. These carcinomas commonly occurred in 21–60-year-old patients. Squamous cell carcinoma was the most common specific histologic finding comprising of 72.0% of patients. Mucoepidermoid carcinoma was the most common salivary gland malignancy with a prevalence of 32.5%. Lymphoma and sarcoma cases had no age difference in their occurrence (*Table 3*).

## **Kind of malignant neoplasm and location**

Oral cavity and oropharynx (30%), and nasopharyngeal (27%) were the commonly affected sites by the primary HNCs (*Figure 1*). Squamous cell carcinoma was most commonly presented in the oral cavity and oropharynx, nasopharynx and larynx while lymphoma was highly prevalent in the nasopharynx.

Ninety-nine patients revealed a malignancy of the salivary glands, 544 cases were squamous cell carcinoma and 35 lymphomas. The different location of the malignant neoplasms is presented in *table 3*.

### *Predisposing factors*

One-third of the patients (31.88%) had a history of exposure to a known predisposing factor to HNCs. Almost all (90.87%) of the cases with predisposing factor history were males. From 241 patients with risk exposure history, 137 (56.8%) were exposed to more than one predisposing factor. One hundred forty patients were (18.5%) cigarette smokers,

104 (13.8%) alcoholic drinker, 165 (21.8%) Chat chewers, and 16 (2.1%) live with HIV/AIDS (*Table 4*).

## *Stages of the malignancy*

Most of the HNCA patients (61.0%) were diagnosed at a late stage with local and regional lymph node involvement, and distant metastasis (stage III and IV) while 29.5% of the patient were in stage I and II (*Figure3*).

## **Discussion**

This hospital-based retrospective study aimed to give baseline data on the epidemiology of HNCs in Ethiopia since the Black Lion oncology center is the only referral center in oncology in Ethiopia. This study is the first to give epidemiological data on HNCA in the country.

This study revealed a male dominance with a male to female ratio of 2:1. This study showed a male preponderance with a male: female ratio of 2:1, which is similar to literature done in Libya, Ghana, and India(6,10,16). The male to female ratio of this HNCs had a wide variation in different sites, from 28.8: 1 for the larynx to 1.06:1 for salivary Gland cancers. This result is supported by studies done in Ghana, and Iran where there was high male to female ration in malignancies located in Larynx(10,17). This high occurrence in males is due to the exposure of males to predisposing factors (chat chewing, cigarette smoking, and alcohol consumption).

The mean age of the present study was  $44.56 \pm 16.47$  years, which corresponds with a study, done in Ghana with a mean age of 45.08 years (16). Youngsters (<21 years) were 9.1% in our study, which is similar to a study done in Ghana(16). Most of the HNCs occurred in the 5<sup>th</sup> and 6<sup>th</sup> decades, which comprises 40.5% that is comparable with a study done in Ghana (16)and the second-highest prevalence was found in 21–40 years patients. This result is relatively low when compared with a study done in Iran and India(5,18). This might be the use smokeless tobacco, use of betel liquid, pan (pieces of Areca nut), processed or unprocessed tobacco, aqueous calcium hydroxide (slaked lime) and some pieces of are a nut wrapped in the leaf of piper betel vine leaf is common in India (18).

In the present study, most HNCs arose from the epithelial origin, among that Squamous cell carcinoma was the commonest tumor type. This finding similarity to studies done in Ghana, Iran, India and others(2,5,17). Unlike another report, (16) adenocarcinoma was the second most common specific histologic type in our study. Hemato-lymphoid malignancies were the second common HNCs following the epithelial (carcinoma) origins. Only 3.7% of the cases were Sarcomas according to the histopathology results, which is in line with a study done in Iran(17). The direct and immediate contact of predisposing factors to the epithelial tissue of the head and neck may be the reason for highest prevalence of carcinoma than lymphoma and sarcoma.

According to the size distribution of HNCs, this study found an oral cavity and oropharyngeal malignancies (28.98%) were the commonly prevalent lesions followed by nasopharyngeal and salivary glands malignancies. Similar results were reported in Pakistan (20), Ghana (35.0%)(10), and India(8,9)]. However, this result is against the study done in Iran that put larynx as the most common site of malignancy(17), and this can be due to the increased history of exposure to the habits of smoking, Kat chewing and alcohol drinking.

The nasopharyngeal carcinoma is unique in its epidemiologic pattern and this study revealed nearly equal prevalence (27.0%) with that of the oral cavity and oropharyngeal cancers. This case is common in certain

ethnic groups, with the highest incidence in southern China, Hong Kong, and Southeast Asia. Nasopharyngeal carcinoma shows a very strong association with Epstein-Barr virus infection(19,20). The reason for this higher prevalence in nasopharyngeal cancer may be due to such undetected factors, which need further study in our country.

In this study, we tried to outline the effect of possible factors to HNCs and found that 31.9% of the patients had a history of exposure to predisposing factors. Among this, 90.9% were males and 47.3% had an oral cavity and oropharyngeal malignancies. Most of them were patients with epithelial origin malignancies (carcinoma). Previous studies (2,7,8,12,13,16) showed that smoking and alcohol drinking were the leading causes of HNCs which supports the present study.

A study done in head and neck cancer in Africa found that 64% mortality rate was reported in the developing world where cancer prognosis tends to be worse, due to late-stage presentation(21). The present study supports the above statement where more than half of the cases (61.0%) were visited the oncology center at a late stage of malignancy (stage III and IV).

### *Conclusion*

- The prevalence of HNCs was 9.7% of the total body cancers and the majority of them are histologically squamous cell carcinomas, commonly affecting adult age groups (21–60 years) and males.
- The highest number of cases was the oral cavity and oropharyngeal cancers followed by nasopharyngeal cancers.
- Nearly 2/3rd of HNCs patients were diagnosed at a late stage of their disease course.

A comprehensive effort is needed to identify the cause of such high prevalence, generate awareness & treatment options suited to meet this challenge.

## **Declarations**

### *Ethical Clearance*

Ethical clearance was obtained from the Research and Ethics Committee of Jimma University (IRB).

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# Availability of data and materials

All the data and available materials are included in the manuscript.

## Consent for publication

Not applicable

## Competing interests

The authors declare that they have no competing interests.

### *Author's contribution*

*BG*: conception of the proposal, proposal writing, data collection, analysis, Manuscript-writing *DD*: proposal revision, training of data collectors, data analysis, and revision of the manuscript *AW*: proposal revision, training of data collectors, data feeding to Epi data, revision of the manuscript. *WT*: Implementing ethical clearance, data collection, data clearance. *AT*: proposal revision, Data collection and analysis, manuscript writing and revision and submission

All authors have read and approved the manuscript.

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## Tables

**Table 1:** Age and Sex distribution of HNCs patients visited black lion Oncology center, Ethiopia (2010-2015).

Socio-demographic Character		Numbers
Gender	Male	504
	Female	252
Age	≤20	69
	21-40	259
	41-60	306
	≥61	122

**Table 2:** Age distribution of HNCs patients based on general histologic types

		General histologic variants			Total
		carcinoma	Sarcoma	Lymphoma	
Age	≤20	50	7	12	69
	21-40	238	9	12	259
	41-60	283	12	11	306
	≥61	119	0	3	122
<b>Total</b>		690	28	38	756

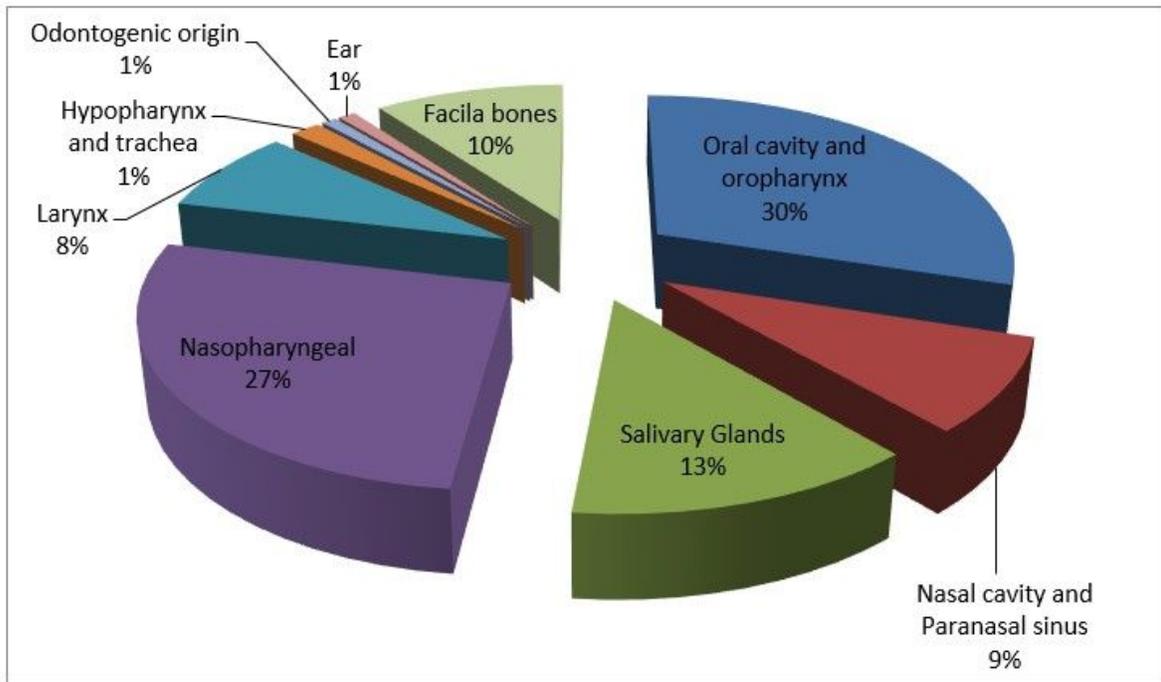
**Table 3:** Specific histologic distribution of different site (location) of HNCs

site	SCC	Soft tissue sarcoma	Lymphoma	Adenocarcinoma	ACC	MEC	Osteosarcoma	Others	Total
Oral cavity & oropharynx	207	4	7	3	0	0	0	5	226
Nasal cavity & Paranasal sinus	35	2	3	13	6	0	0	7	66
Salivary glands	5	0	1	24	21	32	0	16	99
Nasopharynx	177	1	16	2	2	0	0	6	204
Larynx	59	0	0	0	1	0	0	0	60
Hypopharynx and trachea	10	0	1	0	0	0	0	1	12
Odontogenic origin	0	0	0	0	0	0	0	6	6
Ear	6	0	0	0	0	0	0	1	7
Facial bones	45	0	7	1	1	1	12	9	76
Total No.	544	7	35	43	31	33	12	51	756

Table 4: Possible predisposing factors of HNCs and their specific anatomic site

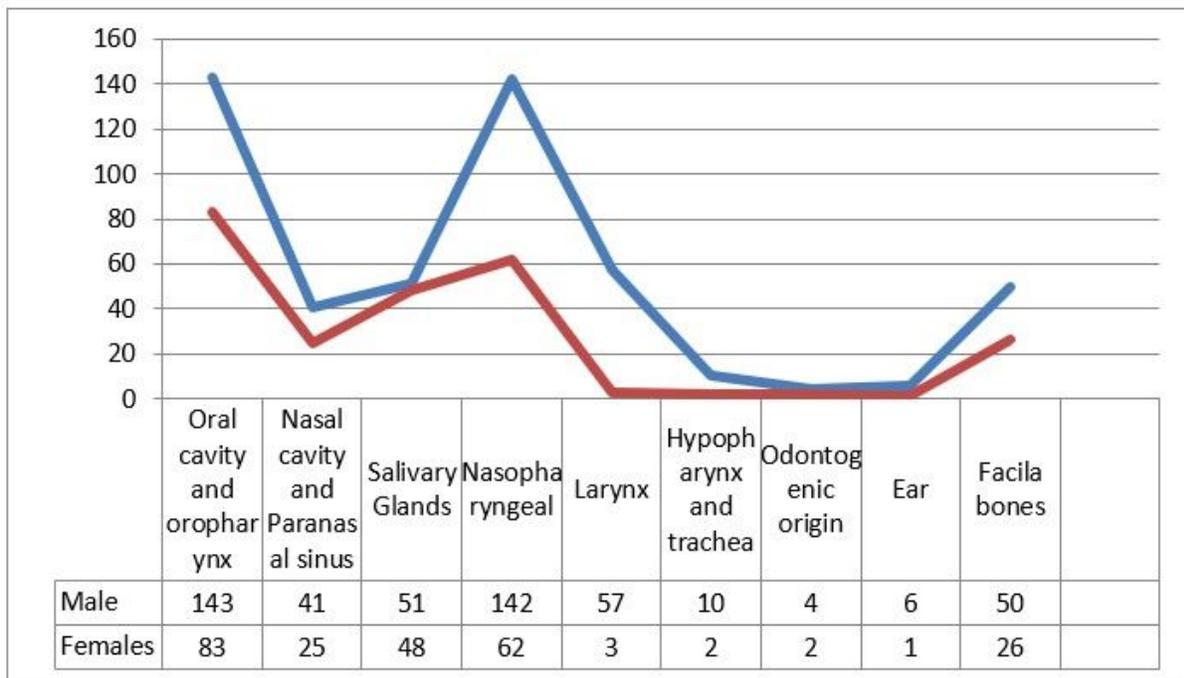
Site	Predisposing Factors				Total
	Cigarette smokers	Alcohol intake	chat chewing	HIV/AIDS	
Oral cavity and oropharynx	69	53	90	5	114
Nasal cavity and Paranasal sinus	8	5	9	1	14
Salivary glands	4	3	4	2	7
Nasopharynx	19	11	29	6	44
Larynx	30	21	17	0	37
Hypopharynx and trachea	3	3	5	1	6
Odontogenic origin	2	2	1	0	2
Ear	0	1	1	0	2
Facial bones	5	5	9	1	15
Total	140	104	165	16	241
(%)	18.5	13.8	21.8	2.1	31.88

## Figures



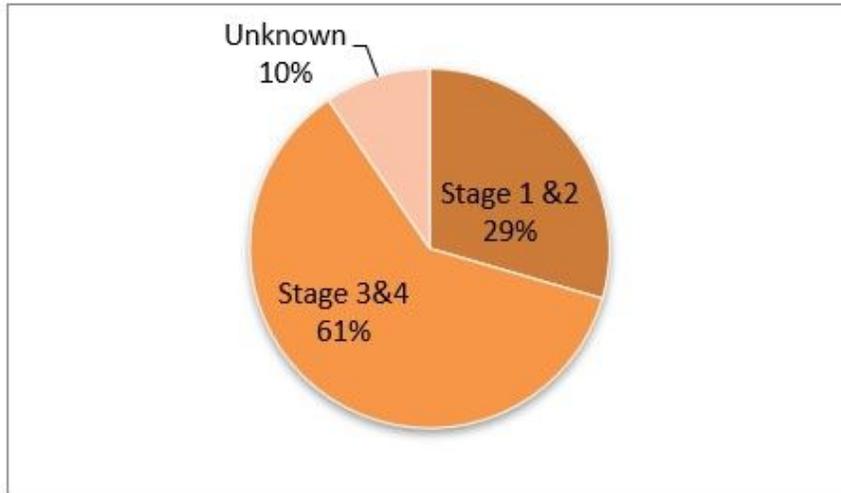
**Figure 1**

Distribution of primary HNCs based on anatomic site



**Figure 2**

Gender distribution of the different type of HNCs



**Figure 3**

Stage of HNCs patient when they arrived at the cancer center of Black lion specialized hospital