ADDIS ABABA UNIVERSITY

COLLEGE OF HEALTH SCIENCES, SCHOOL OF MEDICINE

DEPARTMENT OF DENTISTRY

PREVALENCE, PATTERNS, AND DISTRIBUTION OF RISK FACTORS OF HEAD AND NECK CANCER AMONG PATIENTS REFERRED TO AND TREATED AT TIKUR ANBESSA SPECIALIZED HOSPITAL ADDIS ABABA, ETHIOPIA: A FIVE-YEAR RETROSPECTIVE CHART REVIEW FROM APRIL 1, 2020 TO MARCH 31, 2025

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PREVALENCE, PATTERNS, AND DISTRIBUTION OF RISK FACTORS OF HEAD AND NECK CANCER AMONG PATIENTS REFERRED TO AND TREATED AT TIKUR ANBESSA SPECIALIZED HOSPITAL ADDIS ABABA, ETHIOPIA: A FIVE-YEAR RETROSPECTIVE CHART REVIEW FROM APRIL 1, 2020 TO MARCH 31, 2025

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TABLE OF CONTENTS

List of tables

List of figures

Abbreviations and Acronyms

CRUK	Cancer Research UK
ENT	Ear, Nose, and Throat
HNC	Head and neck cancers
IARC	International Agency for Research on Cancer
OMFS	Oral and Maxillofacial Surgery
SCC	Squamous Cell Carcinomas
TASH	Tikur Anbessa Specialized Hospital
WHO ICD	World Health Organization's International Classification of Diseases
WHO	World Health Organization

ABSTRACT

Background: Head and neck cancer encompasses a group of malignancies affecting the oral cavity, pharynx, larynx, and related structures, posing significant global health challenges. Socio-economic and behavioral factors can be associated with head and neck cancer. However, little is known about the prevalence of head and neck cancer and its associated factors among patients in Ethiopia. This study aims to describe the prevalence and patterns of head and neck cancer, as well as the distribution of selected risk factors, among patients referred to and treated at TASH in Addis Ababa, Ethiopia.

Methods: This study was a retrospective chart review conducted at Tikur Anbessa Specialized Hospital. Medical records of all patients diagnosed with head and neck cancer in the Departments of Oral and Maxillofacial Surgery, ENT, and Oncology during the five-year period from April 1, 2020, to March 31, 2025, were included. Data extraction was carried out between July 25 and August 10, 2025, using a standardized checklist. The collected data were cleaned and entered into EpiData version 4.1 and subsequently analyzed using SPSS version 27. Descriptive statistics, including frequencies, percentages, medians, and ratios, were used to summarize the findings.

Results: A total of 818 medical charts were retrospectively reviewed. The mean age was found to be 46.21 years with a standard deviation of 16.83, while the median age was 46 years, with the highest proportion in the 41–50-year age group (21.1%). Males comprised 61.5% of cases (male-to-female ratio: 1.6:1), and most patients were from Addis Ababa (35.5%). The nasopharynx (33.7%), oral cavity (18%), and larynx (9.5%) were the most common primary tumor sites. Squamous cell carcinoma (46.2%) and nasopharyngeal carcinoma (26.9%) were the predominant histologic types. At diagnosis, the majority of patients presented with advanced disease (Stage III: 43.5%; Stage IV: 35.5%), with swelling (70.5%), pain (25.1%), and bleeding (15.2%) being the most frequent presenting symptoms. Combined radiotherapy and chemotherapy was the most commonly administered treatment (37.3%). During follow-up, 83.3% of patients were alive, with airway obstruction being the leading cause of death (58.4%).

Conclusion: The study showed a high prevalence of advanced-stage HNCs, with nasopharyngeal carcinoma being the most common subtype, deviating from global trends where oral cavity and laryngeal cancers typically predominate. While SCC remains the leading histologic type. Improved public awareness, earlier detection, and enhanced access to comprehensive oncologic care are urgently needed to improve outcomes in Ethiopia and similar settings.

Key words: Head and neck cancer, Tikur Anbessa Specialized Hospital, Oral and Maxillofacial Surgery

1. INTRODUCTION

1.1. Background

Head and neck cancers (HNCs) comprise a heterogeneous group of malignancies arising from the mucosal surfaces of the oral cavity, pharynx, larynx, nasal cavity, paranasal sinuses, and salivary glands. Globally, HNCs rank among the most common cancers, with over 900,000 new cases and approximately 400,000 deaths reported annually (1).

Head and neck cancers (HNCs) encompass a variety of malignancies classified by anatomical site, in accordance with the World Health Organization's International Classification of Diseases (ICD-10). Given the differences in presenting symptoms, treatment strategies, and prognostic outcomes across various subsites, these cancers are regarded as distinct clinical entities (2).

Approximately 90% of HNCs are squamous cell carcinomas (SCCs), originating from the epithelial lining of the upper aerodigestive tract (UADT), including the oral cavity, pharynx, and larynx. Due to their shared histological origin, SCCs demonstrate many similarities in terms of etiology, pathogenesis, and classification. Nevertheless, significant variation exists in clinical presentation and management depending on the specific anatomical site involved (3). The burden of HNCs is disproportionately higher in low- and middle-income countries (LMICs), which account for nearly 67% of global incidence and 82% of related mortality (4).

A key distinction is CRUK's inclusion of esophageal cancer within the head and neck cancer (HNC) category, aligning with some epidemiological studies that define these as upper aerodigestive tract cancers. In contrast, thyroid cancers, though occasionally classified as HNC in clinical contexts, are typically excluded from epidemiological definitions (2).

This study is designed to undertake a comprehensive retrospective analysis of medical records collected over a five-year period from Tikur Anbessa Specialized Hospital (TASH) in Addis Ababa, Ethiopia. The primary objectives are to quantify the burden of head and neck cancers (HNCs), identify patterns and trends in incidence and mortality over time, and systematically evaluate the clinical and demographic profiles of affected patients. Additionally, the study seeks to investigate the association between HNCs and major risk factors—including tobacco use, alcohol consumption, khat chewing, human papillomavirus (HPV) infection, and other relevant environmental and behavioral exposures—in the local context. By synthesizing these findings, the study aims to generate evidence that can inform

targeted public health interventions, enhance early detection and screening strategies, and ultimately contribute to improved outcomes for patients with head and neck cancers in Ethiopia.

1.2. Statement of the Problem

The global incidence of head and neck cancer varies widely, ranging from 5 to 45 cases per 100,000 individuals. These wide disparities in incidence can be attributed to ethnic, occupational, environmental, and social factors (5).

Globally, the oral cavity is the most affected subsite, with approximately 274,000 new cases reported annually, making it the 12th most common cancer worldwide. Malignancies of the larynx, pharynx, thyroid, and nasopharynx are comparatively less frequent. However, when head and neck squamous cell carcinomas are grouped together with thyroid cancer, accounting for an estimated 784,882 cases annually—they collectively rank as the fifth most common cancer globally. This highlights the significant global burden posed by these malignancies (5).

Head and neck cancers (HNCs) are a rising public health challenge globally, with a disproportionately high burden in low- and middle-income countries, including those in sub-Saharan Africa. These regions face systemic barriers to early diagnosis, timely treatment, and comprehensive cancer data management. Studies from countries such as Nigeria and Uganda have shown that HNCs frequently present at advanced stages due to delayed referrals, limited public awareness, and restricted access to specialist services (6,7). Such late presentation contributes to poor outcomes and higher mortality rates.

In Ethiopia, and particularly in Addis Ababa, referral hospitals are increasingly encountering cases of head and neck malignancies. However, the current evidence based on the epidemiological trends and associated risk factors remains limited and fragmented. This lack of comprehensive data impedes the development of context-specific prevention strategies, early detection pathways, and effective treatment protocols (8).

Compounding the challenge is the absence of robust cancer registries and standardized documentation systems, a limitation echoed across much of sub-Saharan Africa (7). While known global risk factors—such as tobacco use, alcohol consumption, poor oral hygiene, and infections with human papillomavirus (HPV) and Epstein-Barr virus (EBV)—have been well documented, their prevalence and influence within the Ethiopian population remain poorly understood.

This study aims to address these gaps by conducting a five-year retrospective chart review of patients diagnosed with and treated for head and neck cancers at TASH between April 1, 2020, and March 31, 2025. By exploring the patterns, prevalence, and risk factors associated with HNCs, this research will provide critical local evidence to support targeted cancer control policies and improved clinical outcomes.

1.3. Significance of the Study

This study aims to provide a comprehensive understanding of the prevalence of head and neck cancer in Addis Ababa, Ethiopia. The research seeks to highlight the burden of head and neck cancer and its implications for public health. The study will examine key demographic, socioeconomic, and behavioral factors associated with the occurrence of head and neck cancer, offering valuable insights into at-risk populations. The selected hospital ensures a representative center, capturing a broad spectrum of patient experiences across diverse healthcare settings.

This study distinguishes itself as the first of its kind in Ethiopia to take a comprehensive and multi-dimensional approach to head and neck cancer. By simultaneously examining disease patterns, prevalence, and associated risk factors across a five-year period, and by including data from the largest referral hospital in Ethiopia, the study offers a robust and representative analysis. This breadth of scope enhances the relevance of the findings for informing national cancer control strategies and improving clinical practice.

Ultimately, the findings from this research aim to inform local healthcare policies, guide resource allocation for early detection and prevention, and support initiatives to address the rising burden of head and neck cancer in Ethiopia.

2. LITERATURE REVIEW

2.1. Head and Neck Cancer

A Karachi-based study in Pakistan (1995–2002) examined the epidemiology and incidence of head and neck cancers. These cancers comprised roughly 21% of all male cancers and 11% among females in the study period. Age-standardized incidence rates (ASR) were 37.1/100,000 in men and 21.7/100,000 in women. The mean patient age was 53 years. In men, the oral cavity and larynx were the most affected, followed by the pharynx, whereas in women, the oral cavity predominated. An upward trend in incidence was noted for both sexes, more markedly in men, with peak incidence observed between 64–69 years for all three main cancer types. Oral cavity cancer was the most prevalent, followed by laryngeal and then pharyngeal cancers. Within oral cancers, the cheek mucosa was most involved (55.9%), followed by the tongue (28.4%) and palate (6.8%). Squamous cell carcinoma made up 96.5% of all cases. In men, the site distribution ratio was oral cavity: pharynx: larynx = 2:1:1.5; in women, it was 5:1:0.5. The corresponding male: female ratios were 1.5:3.0:8.0 (1).

A retrospective study conducted in northeastern India from 1993 to 2004 reviewed 1,118 head and neck cancer cases. Oropharyngeal carcinoma was the most prevalent (320 cases; 28.62%), followed by oral cavity cancers (182 cases; 16.28%). The tongue was the most commonly involved site among oral and oropharyngeal cases (32.67%), with cheek and tonsil cancers accounting for over 20% of oral cavity malignancies. Most cases occurred in the sixth decade of life (31.13%), followed by the 40–49 (22.8%) and 60–69 (18%) age groups. Males were more frequently affected (833 cases) than females (285), giving a ratio of 2.9:1. In men, the tongue was the leading site, followed by the tonsil and cheek (35.28%), whereas in women, cheek, tongue, and palate were most common. Squamous cell carcinoma (SCC) accounted for 93.29% of cases, followed by verrucous carcinoma (1.52%). Oropharynx was the most common site (28.62%) with a male-to-female ratio of 3.8:1. Oral cavity cancers made up 16.28% of cases (M:F = 2.14:1), with SCC found in 85.12%. Nose and paranasal sinus cancers were the least frequent (3.13%, M:F = 3.38:1), and SCC remained the dominant histology (9).

A study in Karbala Province, Iraq, spanning from 2012 to 2021, analyzed 302 head and neck cancer (HNC) cases. The median patient age was 58 years. Males made up 67.55% of cases, while females constituted 32.45%, yielding a male-to-female ratio of 2.08:1. The larynx was the most frequently affected site (28.48%), closely followed by the nasopharynx (28.14%). Cancers of the lip and oral cavity accounted for 14.57%, and salivary glands 11.59%. Among males, the larynx was the predominant site, whereas nasopharyngeal cancer was most common in females. The highest incidence occurred in the 61–70 age group (25.17%), followed by the 51–60 group (23.51%) (10).

Between 2011 and 2017, a study in Bhutan analyzed 515 head and neck cancer cases. The crude incidence rate was 10 per 100,000, with an age-adjusted rate of 12.3 per 100,000. Over the seven-year period, prevalence reached 69.1 per 100,000. The most common cancers were of the oral cavity, hypopharynx, larynx, and nasopharynx, in descending order. Males were more frequently affected in nearly all sites except the salivary glands, and sinonasal regions. Mucoepidermoid carcinoma was the most prevalent salivary gland cancer (43.7%). Squamous cell carcinoma was the dominant histological type, representing 88.4% of cases. Risk factors varied: tobacco and betel nut chewing were common in oral cavity cancers, while smoking and alcohol use were more associated with hypopharyngeal, laryngeal, and oropharyngeal cancers (11).

A 12-year retrospective analysis (2001–2012) in India reviewed 9,950 head and neck cancer cases. Males constituted 87% (8,686 cases), and females 13% (1,264), with a male-to-female ratio of 7:1. The most common age of presentation was the fifth decade (3,091 patients), followed by the 41–50 age group (2,783), with a median age of 54. Smoking was reported in 89% of cases (including those who also consumed alcohol), with 36% being smokers only. Alcohol use was found in 59% of patients (including 6% alcohol-only). Dual exposure (both smoking and alcohol) occurred in 53% of patients. The oropharyngeal subtype had the strongest link to alcohol (35%), while oral cavity, hypopharynx, and larynx cancers showed associations of 7.6%, 5%, and 10%, respectively. A synergistic interaction between smoking and alcohol was noted across all subtypes, with smoking emerging as the strongest independent risk factor (12).

A retrospective review in Tanzania (2009–2013) evaluated 346 histopathologically confirmed head and neck cancer cases, accounting for 9.5% of all malignancies. The median age was 42 years, with the 41–50 age group most affected (28.9%). Males outnumbered females (M:F = 2.1:1). Cigarette smoking (76.6%) and heavy alcohol use (69.9%) were the most common risk factors, significantly more frequent in men ($p < 0.001$). The oral cavity was the leading site (37.3%). Carcinomas accounted for 59.6% of cases, with squamous cell carcinoma representing 75.7% of them. Lymphomas were the second most common (25.4%), followed by sarcomas (11%) and neuroendocrine tumors (4%) (13).

Another Tanzanian study on the pattern of head and neck cancers involving 113 patients found that 66.3% were male (M:F = 2:1), with a mean diagnostic age of 51±18 years. The nasal and paranasal sinuses were the most affected regions (23.9%), followed by the larynx (20%). Carcinomas comprised 94% of head and neck cancers, with squamous cell carcinoma accounting for 74%. Lymphomas were the rarest (2%). Most patients were aged 41–60 (42%). Squamous cell carcinoma was the most common histology, followed by mucoepidermoid (6.2%), adenoid cystic (5.3%), and adenocarcinoma

(3.5%). SCC prevalence was highest in hypopharyngeal (94%), oropharyngeal (91%), nasopharyngeal (88%), and laryngeal (87%) cancers. Laryngeal cancers were significantly more common in men (87%) than in women (13%), giving a female-to-male ratio of 1:6.7 (14).

A five-year study of the epidemiology of head and neck cancer (2010–2015) at Tikur Anbessa Specialized Hospital in Ethiopia reviewed 834 head and neck cancer cases, indicating a prevalence of 9.72%. The mean age was 44.56±16.47, with a male-to-female ratio of 2:1. The fifth and sixth decades of life had the highest incidence (306 cases), followed by the third and fourth (256 cases). Lymphomas were most prevalent among those under 20 and those in their 30s and 40s (31.58%). Squamous cell carcinoma was the predominant histologic type (91.3%). Among salivary gland tumors, mucoepidermoid carcinoma was most frequent (32.5%). Common primary sites included the oral cavity and oropharynx (30%) and nasopharynx (27%). Lymphoma was also prominent in the nasopharynx. About 31.88% of patients had known risk factor exposure, with 90.87% being male. Of those exposed, 56.8% had more than one risk factor. Cigarette smoking was reported in 18.5%, alcohol in 13.8%, khat chewing in 21.8%, and HIV/AIDS in 2.1% (15).

In Ethiopia, a clinicopathologic study from 2014 to 2017 examined 321 patient charts with head and neck cancer from a registry of 1,377 cancer cases. The male-to-female ratio was 2:1, with a median age of 45 years. The nasopharynx was the most frequent site (128 of 321 cases; 40%). Squamous cell carcinoma was the predominant histological type, present in 285 of 321 patients (89%) (16).

2.2. Factors Associated with Head and Neck Cancer

Head and neck cancers are influenced by a variety of behavioral, environmental, and biological risk factors, many of which are particularly relevant in low- and middle-income countries, including those in sub-Saharan Africa. One of the most significant risk factors is tobacco use, including both smoked and smokeless forms, which has a well-established association with various forms of HNC, especially cancers of the oral cavity, pharynx, and larynx (7). Alcohol consumption is another major contributor, and its combined use with tobacco has a synergistic effect, significantly increasing the risk of HNC (17).

A sharp rise in oral and pharyngeal cancers has been reported in countries like Germany, Denmark, Scotland, and parts of Central and Eastern Europe. This increase is believed to correlate with rising alcohol consumption, even as cigarette use—measured by tar-adjusted consumption—and lung cancer

rates have declined. These trends suggest a shifting landscape in risk factor dominance, with alcohol emerging as a more prominent carcinogen in these populations (5).

Viral infections also play a critical role. Human papillomavirus (HPV), particularly HPV-16, has been strongly linked to oropharyngeal cancers, with studies showing that up to 15.3% of HNC cases in sub-Saharan Africa test positive for high-risk HPV types (3). Similarly, Epstein-Barr virus (EBV) is closely associated with nasopharyngeal carcinoma, which is more prevalent in regions where EBV is endemic, including parts of Africa (18).

Occupational exposure to carcinogens such as wood dust, formaldehyde, and asbestos has also been implicated, particularly among workers in poorly regulated environments like construction and manufacturing industries (19). Additionally, cultural practices such as chewing betel quid or paan, which often contains tobacco and areca nut, increase the risk of oral cancers due to the carcinogenic properties of these substances (18).

Poor oral hygiene has been identified as a lesser but still relevant risk factor, potentially contributing to oral cavity cancers through chronic inflammation and infection. Dietary habits, including frequent consumption of preserved or salted foods during childhood and diets low in fruits and vegetables, may further elevate the risk of certain HNCs, especially nasopharyngeal cancers (18). Moreover, demographic factors such as age and gender also influence risk, with HNCs being more common in males and in individuals over the age of 40, likely due to longer exposure to behavioral risk factors (20). Finally, immunosuppression, whether due to HIV/AIDS or immunosuppressive therapies, can impair the body's ability to manage oncogenic infections and precancerous changes, thereby increasing susceptibility to HNCs (18).

2.3 Conceptual Framework

2.3.1 Introduction

The conceptual framework for this study is informed by the epidemiological model of disease causation, which emphasizes the interaction between host, agent, and environmental factors in determining health outcomes. In the context of head and neck cancer (HNC), a wide range of behavioral, biological, environmental, and demographic factors contribute to disease risk and outcomes.

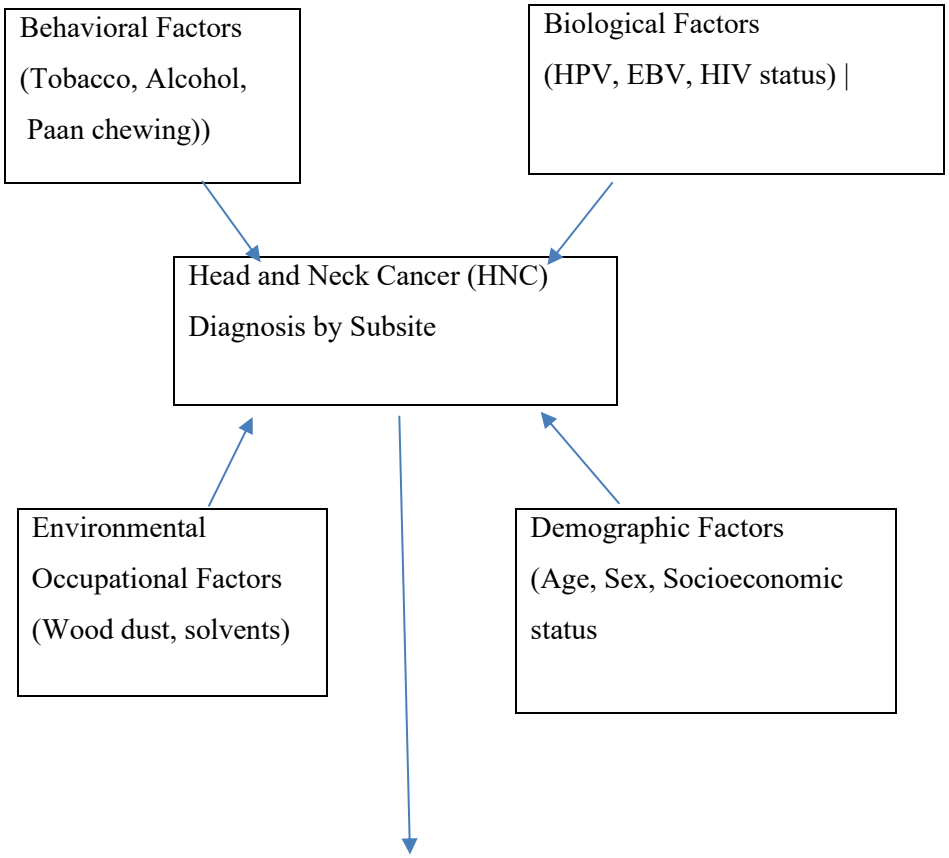
2.3.2 Framework Description

This study proposes that behavioral factors such as tobacco use, alcohol consumption, and paan chewing, as well as biological exposures including HPV, EBV, and HIV status, are key risk factors associated with the development of HNC. In addition, occupational and environmental exposures (e.g., wood dust, formaldehyde), along with demographic variables such as age, sex, and socioeconomic status, are considered important contributors to cancer risk.

Healthcare system-related factors such as referral patterns, diagnostic delays, and access to treatment facilities are proposed as moderating variables that influence both the likelihood of diagnosis and the stage at which patients present. These factors may not directly cause cancer but significantly impact disease progression and outcomes.

This framework guides the retrospective analysis of patient charts, helping to identify high-risk groups and target points for public health intervention and policy.

2.3.3 Visual Framework



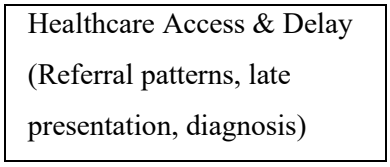


Figure 1 Conceptual framework diagram.

2.3.4 Application to the Study

The framework supports the study's objectives by organizing the relationships between variables and outcomes. It ensures that data collection and analysis are aligned with the research questions and that the interpretation of results considers both direct and indirect influences on head and neck cancer development.

3. OBJECTIVES

3.1 General Objective

To describe the prevalence and patterns of head and neck cancer, as well as the distribution of selected risk factors, among patients referred to and treated at TASH in Addis Ababa, Ethiopia.

3.2 Specific Objectives

To describe the prevalence of head and neck cancer among patients referred to and treated at TASH.

To describe the patterns of head and neck cancer by age, sex, stage, primary site, and geographical distribution.

To summarize the distribution of selected risk factors among patients with head and neck cancer.

4. METHODS and MATERIALS

4.1. Study Area and Study Period

The study was conducted from April 1, 2025 to August 22, 2025, in Addis Ababa, Ethiopia; in patients attended at TASH, which is the largest and major hospital in head and neck malignancy management, from April 1, 2020, to March 31, 2025. TASH is the major hospital where proper and complete head and neck malignancy management is given in the study period. Addis Ababa, the capital city of the country and largest city of Ethiopia, serves as the country's central hub for economic, social, and political activities. It is a primary destination for medical care, receiving patient referrals from across the nation, making it an ideal setting for this study.

The Department of Dentistry and Oral & Maxillofacial Surgery (OMFS) at the School of Medicine (SOM), College of Health Sciences (CHS), Addis Ababa University (AAU) has evolved significantly since its establishment. The department comprises 10 OMFS consultants, several nurses, and residents actively involved in the ongoing and increasing services contributing to the advancement of oral and maxillofacial surgery in the country.

4.2. Study design

This study is Hospital based Cross Sectional Retrospective chart review.

4.3. Population

4.3.1. Source Population

All Patients attending OMFS, ENT, and Oncology units of TASH.

4.3.2. Study Population

Patients attended or referred to OMFS, ENT, and Oncology departments of TASH for treatment of head and neck cancer and have a histopathologic or clinical diagnosis from April 1, 2020- March 31, 2025.

4.4. Inclusion and Exclusion Criteria

4.4.1. Inclusion Criteria

Patients with complete medical records diagnosed with head and neck cancer, confirmed through histopathological or clinical diagnosis, and treated at TASH from April 1, 2020 – March 31, 2025, will be included.

4.4.2. Exclusion Criteria

Medical records with incomplete or missing critical information were excluded.

4.5. Sample Size Determination

All patients who were diagnosed with head and cancer in the study period were included in the study using consensus sampling techniques.

4.6. Sampling Procedure

The study included all patients who presented to TASH with histologically-confirmed cases of head and neck cancers during the period studied and fulfilled the inclusion criteria.

4.6.1. Data collection instruments

A data extraction checklist was prepared based on insight from literature and used to extract necessary data from the charts of the study participants taken from the archives of selected hospitals.

4.6.2. Data collectors and supervisors

Four dental interns were employed to conduct the data collection, and the Principal Investigator (PI) oversaw and supervised the data collection process.

4.6.3. Procedure of data collection

The data collectors filled the check list which is prepared from literatures.

4.6.4. Dependent Variables

The dependent variable is head and neck cancer.

4.6.5. Independent Variables

The independent variables are gender, age, residence area, cigarette smoking, khat chewing, and alcohol drinking.

4.7. Operational Definition

1. In this study, head and neck cancer is defined as any histologically confirmed malignant neoplasm arising from the oral cavity, nasal cavity and paranasal sinuses, salivary glands, nasopharynx, oropharynx, hypopharynx, larynx, and other related head and neck structures

excluding thyroid and esophageal cancers. Only primary malignant tumors were included with metastatic cases to the head and neck from other primary sites excluded.

2. Treatment Follow-up: is defined as the collection and review of patient clinical data, adherence, and treatment response documented in existing medical records from the time of treatment initiation to the last recorded visit within the study period. No active or prospective monitoring was conducted; all follow-up information was obtained retrospectively from archived patient files.
3. Treatment Outcomes: are defined based on the clinical status and disease progression recorded in patient charts or electronic health records during the retrospective study period. Outcomes were identified solely from documented data within the existing records, without prospective patient contact or ongoing observation.
4. In this study the oral cavity is composed of the oral vestibule (between lips/cheeks and teeth) and the oral cavity proper (inside the teeth), which includes the tongue, floor of mouth with sublingual glands, and the hard palate, excluding the maxilla and mandible.

4.8. Data Quality Control

The data extraction checklist was evaluated by subject matter experts and tested on 5% of the sample two weeks before actual data collection to assess its consistency, appropriateness, completeness, linguistic clarity, ease of using, and applicability. Necessary changes and corrections were made based on these pre-test results. One day of training were given to the data collectors by the principal investigator. During data collection, close supervision and monitoring was conducted by the investigator The Principal Investigator was closely monitoring the data collection process throughout data collection, and reviewed data daily to ensure completeness and consistency and provided timely feedback to the data collectors. This study aims to include all relevant case types to ensure comprehensive coverage and validity. Given the inclusion of all case types, there is potential variability in the quality, completeness, and accessibility of collected data. To safeguard the integrity of the dataset and allow sufficient time and resources for quality checks and remedial actions, a 10% contingency buffer has been incorporated into planning. This buffer is designed to mitigate the impact of unforeseen challenges and ensure adequate time and resources are available to maintain data integrity and project continuity.

4.9. Method of data Analysis

Data were collected using a structured checklist and initially entered into EpiData version 4.1 to ensure accuracy and minimize entry errors. The cleaned dataset was then exported to SPSS version 27 for statistical analysis. Descriptive statistics, including frequencies, percentages, means, and medians, were

used to summarize the study variables. Results were presented in the form of tables, graphs, and charts to enhance clarity and interpretation.

4.10. Ethical Consideration

Ethical clearance was obtained for the study protocol from institutional health research and ethics review committee (IHRERC) of AAU, College of Health Science. The head of the hospital and all concerned officials was communicated through letters regarding the study in order to secure informed, voluntary, written and signed official permission and to get full cooperation during the study.

All data extracted from medical records were anonymized with no personal identifiers to protect patient identities and used exclusively for research purposes. No data were shared with third parties. Completed questionnaires were locked in a lockable cabinet and the electronic data were securely stored on a password-protected computer.

4.11. Result Dissemination

This study is submitted and presented to Addis Ababa University, College of Health Science, School of Medicine, as a part of the requirements for postgraduate study in OMFS. The finding of the study will be communicated to and submitted to Ethiopian Dental Professionals Association, and concerned bodies. Furthermore, every effort will be made to ensure the study is published in a peer-reviewed journal.

5. Result

5.1. Sociodemographic characteristics of the cases

This study included a total of 818 cases diagnosed with head and neck cancer. The mean age was found to be 46.21 years with a standard deviation of 16.83, while the median age was 46 years. The largest proportion of patients age were between 41–50 years (21.1%), followed by those aged 51–60 years (19.2%) and 31–40 years (17.2%). Regarding sex, the majority of patients were male (61.5%), while females made up 38.5% with a male to female ratio of 1.6:1. In terms of geographical distribution, most patients came from Addis Ababa (35.5%), followed by Oromia (24.4%) and Amhara (18.5%) regions. Other regions such as South Ethiopia (4.8%), Tigray (4.4%), and Central Ethiopia (3.1%). The least represented regions were Benishangul, Gambella, and Harari, each contributing only 0.5% of the cases. (Table 1)

Table 1. Sociodemographic characteristics of patients with HNC at TASH (n=818)

Variable	frequency	percent
Age in years		
1-10	5	0.6
11-20	50	6.1
21-30	109	13.3
31-40	141	17.2
41-50	173	21.1
51-60	157	19.2
61-70	106	13
>70	77	9.4
Sex		
Male	503	61.5
female	315	38.5
Address		
Addis Ababa	290	35.5
Oromia	200	24.4
Amhara	151	18.5
Tigray	36	4.4

Afar	13	1.6
South Ethiopia	39	4.8
Southwest Ethiopia	6	0.7
Dire Dawa	7	0.9
Central Ethiopia	25	3.1
Sidama	18	2.2
Benishangul	4	0.5
Gambelia	4	0.5
Somali	21	2.6
Harari	4	0.5

5.2. The prevalence of head and neck cancer

This study is a five-year retrospective study, and during the study period a total of 15860 head and neck cases were managed. Among these, malignant tumor accounts 818 with a prevalence of 5.4% as shown in the figure below.

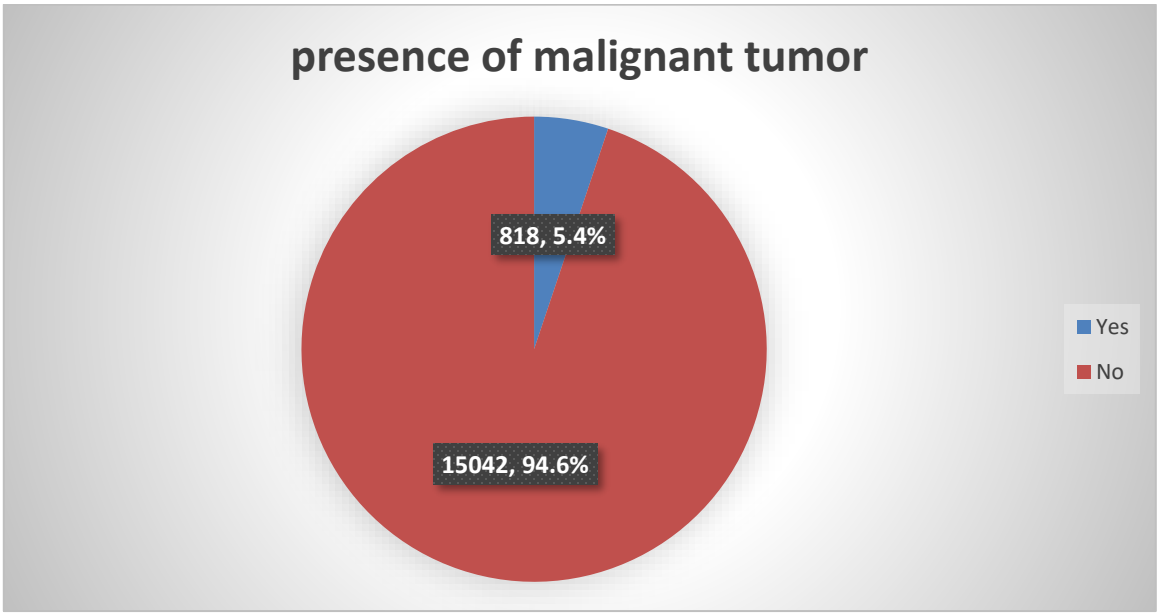


Figure 2. Prevalence of head and neck cancer at TASH

5.3. Primary site of the HNC

Among the 818 patients diagnosed with head and neck cancer, the most common primary site was the nasopharynx, accounting for 33.7% of cases. This was followed by cancers of the oral cavity (18.0%)

and the larynx (9.5%). Other relatively common sites included the maxilla (6.4%), salivary glands (5.0%), and the mandible (4.3%). A number of cases also involved paranasal sinuses (4.2%), nasal cavity (3.8%), and periorbital region (3.4%). Less frequently reported sites included the oropharynx and hypopharynx, each comprising 2.6% of cases, as well as sinonasal regions (2.0%), the neck (1.8%), and the skin (0.7%). (Table 2)

Table 2. Distribution of primary sites of head and neck cancer at TASH

Variable	*frequency*	*Percent*
Primary site of cancer		
Nasopharynx	276	33.7
Oral cavity	147	18.0
Larynx	78	9.5
Maxilla	53	6.5
Mandible	35	4.3
Salivary gland	41	5.0
Paranasal Sinus	35	4.3
Nasal Cavity	31	3.8
Periorbital	28	3.4
Oropharynx	21	2.6
Hypopharynx	21	2.6
Sinonasal	16	2.0
Neck	17	2.0
Ear	3	.4
Parapharyngeal	3	.4
Periauricular	1	.1
Scalp	5	.6
Skin	6	.7
Tonsil	1	.1

5.4. Type of histopathology

Among the 818 patients diagnosed with head and neck cancer, 73.1% of them were diagnosed with squamous cell carcinoma, followed by mucoepidermoid carcinoma which accounted for 4.4% of the cases, while 3.8% had adenoid cystic carcinoma and 3.3% had adenocarcinoma. Additionally, 2.4% were diagnosed with osteosarcoma, and 1.8% each had lymphoma and melanoma. Basal cell carcinoma and rhabdomyosarcoma were each observed in 1.7% of the cases, followed by undifferentiated carcinoma, which was seen in 1.3%. (Table 3)

Table 3. Histopathologic types of head and neck cancer at TASH

Histopathological Type	Frequency	Percent
Squamous Cell Carcinoma	598	73.1
Mucoepidermoid carcinoma	36	4.4
Adenoid cystic carcinoma	31	3.8
Adenocarcinoma	27	3.3
Osteosarcoma	20	2.4
Lymphoma	15	1.8
Melanoma	15	1.8
Basal Cell Carcinoma	14	1.7
Rhabdomyosarcoma	14	1.7
Undifferentiated carcinoma	11	1.3
Acinic cell carcinoma	5	.6
Myxofibrosarcoma	6	.7
Myoepithelial carcinoma	5	.6
Chondrosarcoma	4	0.5
Angiosarcoma	2	.2
Fibromyxoid sarcoma	1	.1
Fibrosarcoma	2	.2
High grade sarcoma	3	.4
Kaposi sarcoma	1	.1
Leiomyosarcoma	2	.2
Low grade sarcoma	1	.1
Merkel cell carcinoma	2	.2
Plasmacytoma	2	.2
Synovial sarcoma	1	.1

5.5. Clinical symptoms and stage at diagnosis

At the time of diagnosis, 43.5% of the patients were in Stage III, followed by 35.5% in Stage IV, indicating that the majority presented with advanced disease. 16.1% were diagnosed at Stage II, while only 4.9% of the cases were identified at Stage I.

Regarding symptoms at presentation, 70.5% of the patients presented with swelling. This was followed by pain in 25.1% and bleeding in 15.2% of cases. Other reported symptoms included difficulty breathing (6.2%), difficulty swallowing (5.6%), and hoarseness of voice (5.5%). Headache was reported by 4.8%, while nasal obstruction affected 4.4% of patients. Less frequent symptoms included ulceration (3.9%), nasal discharge (2.4%), voice change (2.2%).

Table 4. Clinical stage and presenting symptoms of HNC at TASH

Variable	Frequency	Percent
Clinical staging at diagnosis		
Stage I	40	4.9
Stage II	132	16.1
Stage III	356	43.5
Stage IV	290	35.5
Symptom at presentation		
Swelling	577	70.5
Pain	205	25.1
Bleeding	124	15.2
Difficulty breathing	51	6.2
Difficulty swallowing	46	5.6
Hoarseness of voice	69	8.4
Nasal obstruction	36	4.4
Headache	39	4.8
Ulceration	32	3.9
Nasal discharge	20	2.4
Nasal congestion	15	1.8
Difficulty opening mouth	10	1.2
Blurring of vision	10	1.2
Cough	2	.2
Decreased hearing	3	.4
Difficulty speaking	2	.2
Double Vision	3	.4
Epistaxis	5	.6
Facial deviation	5	.6
Itching	2	.2
Loss of smell	2	.2
Loss of vision	4	.5
Purulent discharge	2	.2

Tooth destruction	2	.2
Trismus	7	.9
Others	8	1

5.6. Use of Traditional Treatment, and associated factors

Among the 818 patients, 1.8% reported using traditional medicine, while 0.1% had undergone burning with a metal object, and 2.6% had sought spiritual healing before diagnosis or treatment. Regarding tobacco use, 7.3% of the patients had a history of tobacco use. Among those who used tobacco (n=60), 90% used smoking forms, while 5% each used chewable tobacco or both smoking and chewable forms. In terms of khat chewing, 4.3% of the patients reported a khat chewing habit, 55% did not chew khat. As for alcohol consumption, 4.2% of the patients consumed alcohol, 46.5% did not, and in 49.4%, alcohol use status was unknown. Regarding HIV status, 35.6% of the patients tested negative, 2.6% were HIV-positive, and 61.9% had unknown HIV status. (Table 5)

Table 5. Traditional practices, substance use, and HIV status among patients with HNC at TASH

Variable	frequency	Percent
Traditional medicine treatment	15	1.8
Buring with metal object	1	0.1
Spiritual	21	2.6
Tobacco use		
Yes	60	7.3
No	380	46.5
Unknown	378	46.2
Types of tobacco n=60)		
Chewable	3	5
Chewable, smoking	3	5
Smoking	51	90
Khat chewing habit		
Yes	35	4.3
No	450	55
Unknown	333	40.7
Alcohol consumption		
Yes	34	4.2
No	380	46.5
Unknown	404	49.4
HIV status		
Negative	291	35.6
Positive	21	2.6
Unknown	506	61.9

5.7. Treatment Modality

Among the 818 patients, 37.3% received a combination of radiotherapy and chemotherapy, followed by chemotherapy alone in 16.1%, and surgery alone in 13.3% of the patients. Surgery combined with radiotherapy was used in 10.4%, and radiotherapy alone in 9.8%. Another 9.7% underwent all three modalities—surgery, chemotherapy, and radiotherapy. Less commonly, 2.6% received both surgery and chemotherapy, and 0.9% had not been started on treatment. (Figure 3)

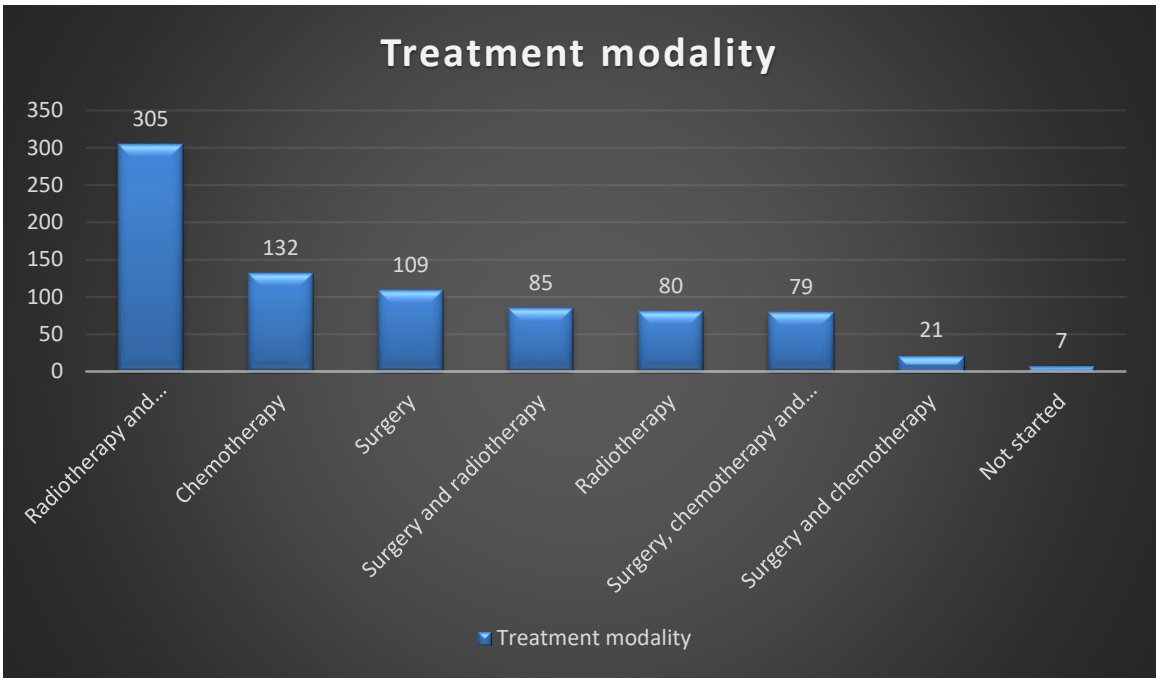


Figure 3. Treatment modality related characteristics of the cases

5.8. Treatment follow-up and treatment outcomes

Regarding treatment outcomes, only 4.3% of patients achieved a complete response, while 22.1% had a partial response and 22.2% maintained stable disease. Unfortunately, 50.5% experienced progressive disease, and 0.9% were not managed. (Table 6)

The duration of follow-up varied, with 31.8% followed for 3 to 6 months, 22.8% for less than 3 months, 22.2% for 6 to 12 months, 16.8% for more than 18 months, and 6.4% for 12 to 18 months. During the last follow up, 83.3% of patients were alive, whereas 16.7% had died. Among the 137 deceased patients, the leading cause of death was airway obstruction (58.4%), followed by disease progression (18.2%) and advanced stage at presentation (9.5%). (Table 6)

Table 6. Treatment follow-up and treatment outcomes of HNC at TASH

Variable	frequency	Percent
Treatment outcome	✓	
Complete response	35	4.3
Partial response	181	22.1
Stable disease	182	22.2
Progressive disease	413	50.5
Not managed	7	0.9
Duration of follow-up in months		
<3	185	22.8
3-6	258	31.8
6-12	180	22.2
12-18	52	6.4
>18	136	16.8
Survival status		
Alive	681	83.3
Deceased	137	16.7
Cause of disease (137)		
Advanced stage at presentation	13	9.5
Airway obstruction	80	58.4
Dead body on arrival	3	2.2
Disease progression	25	18.2
Respiratory failure	15	10.9

6. Discussion

This five-year retrospective study analyzed 818 cases of head and neck cancer (HNC) among a total of 15,860 cases seen at a tertiary care center, representing a 5.4% prevalence of malignancies in this anatomical region. The demographic distribution revealed that the mean and median age were 46.21 and 46 years, respectively, with the largest proportion of patients between 41–50 years (21.1%), followed by 51–60 years (19.2%). These findings are consistent with data from Tanzania (median age 42) and another Ethiopia study (median 45 years), which reported peak incidences in the fourth and fifth decades of life (14, 16). However, the median age in other studies, such as those from India (54 years) and Iraq (58 years), was slightly higher, possibly reflecting differences in life expectancy, access to care, and patterns of risk factor exposure (10, 12).

There was a male predominance, with a male-to-female ratio of 1.6:1, similar to findings in Bhutan (2:1) and India (2.9:1) (11, 9). Male dominance in HNC has been consistently reported in most global studies and is largely attributed to higher exposure to risk factors such as tobacco use, alcohol consumption, occupational hazards, and delayed healthcare-seeking behavior among men. (1, 9,11, 14)

In terms of geographic distribution, a large proportion of cases came from urban areas, with Addis Ababa accounting for 35.5% of patients. This likely reflects better access to referral centers and diagnostic services in urban areas compared to rural regions.

The nasopharynx (33.7%) was the most commonly affected primary site, followed by the oral cavity (18%) and larynx (9.5%). This contrasts with studies in Pakistan, India, and Tanzania, where oral cavity and laryngeal cancers were more prevalent (1, 9, 14). The prominence of nasopharyngeal carcinoma in this study may reflect regional differences in Epstein-Barr virus (EBV) prevalence, dietary habits, or genetic predispositions (18). It may also be influenced by delayed diagnosis due to the anatomical inaccessibility of the nasopharynx.

The dominant histopathological type was squamous cell carcinoma (SCC), accounting for 73.1%, which is lower than other study done in previous Ethiopian study at TASH (91.3%) or India (93.3%) (15, 9). The relatively lower SCC percentage in the current study may be due to the inclusion of a broader variety of histological subtypes, such as mucoepidermoid carcinoma, and osteosarcoma, which together represent a notable portion of cases.

Alarmingly, the majority of patients (79%) were diagnosed at an advanced stage (Stage III or IV). This is a consistent finding in multiple low-resource settings and is frequently attributed to limited public awareness, delay in referrals, and poor access to specialized services. The late-stage presentation has serious implications for prognosis, morbidity, and cost of care. (8, 14, 23)

In terms of clinical presentation, swelling was the most common symptom (70.5%), followed by pain (25.1%), bleeding, and airway-related symptoms like dyspnea and hoarseness. These symptoms are often nonspecific and may mimic benign conditions, potentially contributing to diagnostic delay. (21, 22)

Despite this, only 4.3% of patients achieved complete response, and 22.1% showed partial response to treatment. Notably, 50.5% experienced progressive disease, which reflects both the advanced stage at diagnosis and possible limitations in access to comprehensive multimodal treatment, including radiotherapy, chemotherapy, and surgery. Among treatment modalities, the most common was a combination of radiotherapy and chemotherapy (37.3%), which aligns with current standard protocols for advanced HNC.

Comparatively, other studies in the region reported higher reliance on surgical treatment due to limited radiotherapy access. In this study, however, radiotherapy-based treatments dominated, possibly reflecting improved infrastructure or patient selection based on tumor stage and operability.

On the behavioral front, tobacco use was relatively low (7.3%) in this study, much lower than in studies from India (89%) or Tanzania (76.6%) (12, 13). Likewise, alcohol use (4.2%) and khat chewing (4.3%) were also lower than national averages, though unknown status for many patients (around 40–50%) may have led to underreporting. It's also possible that other non-traditional or less recognized risk factors, such as viral infections (EBV, HPV) or occupational exposures, play a more prominent role. In particular, the high rate of nasopharyngeal cancer suggests a potential viral etiology, especially Epstein-Barr virus (EBV), which has a strong association with this subtype (18).

Regarding survival, 83.3% of patients were alive at the time of the last follow up. The leading cause of death was airway obstruction (58.4%), emphasizing the aggressive nature of advanced HNC and the critical importance of timely airway management. Other causes included disease progression (18.2%) and late presentation (9.5%), further reinforcing the need for early detection strategies.

7. Conclusion

This five-year retrospective study found that the significant burden of head and neck cancers in Ethiopia, with most patients presenting at an advanced stage and experiencing poor treatment outcomes. The nasopharynx emerged as the most common primary site, and squamous cell carcinoma was the predominant histological type. Despite the use of multimodal therapy, over half of the patients experienced disease progression, reflecting the consequences of late presentation.

8. Recommendations

Enhance Public Awareness: Implement targeted educational campaigns to raise awareness of head and neck cancer symptoms and risk factors, emphasizing early medical consultation.

Strengthen Referral Systems: Develop streamlined referral pathways to facilitate timely access to specialized oncology services, reducing treatment delays.

Expand Multidisciplinary Treatment: Increase availability of comprehensive cancer treatment centers.

Support Further Research: Conduct prospective studies to better understand local risk factors, HPV and EBV prevalence, and the impact of socio-cultural determinants on disease patterns.

Implement Patient Follow-Up Systems: Establish robust follow-up mechanisms to monitor treatment response, manage complications, and improve survival outcomes.

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10. ANNEXES

10.1. Annex I. Information Sheet and Informed Voluntary Consent Form for Head of Institution

1. Introduction: My name is Kemer Kedir, and I am the Principal Investigator of a study to be conducted at TASH. I am currently pursuing my specialty program in Oral and maxillofacial surgery at Addis Ababa University, College of Health Sciences. I would like to kindly request your attention as I explain the details about the study.

2. The study/project title: The title for my study is Patterns and Prevalence of Head and Neck Cancer and Associated Risk Factors in Patients Referred to and treated at TASH**.**

3. Purpose/aim of the study: The purpose of the study is to generate institution based local data about Patterns and Prevalence of Head and Neck Cancer and Associated Risk Factors in Patients to understand the prevalence and to estimate the burden of the disease, thereby it will facilitate oral health service planning and evidence-based decision making by stakeholders, and improve oral health. Moreover, the aim is to write a thesis as a partial requirement for the fulfillment of a specialty Program in OMFS for the principal investigator.

4. Procedure and duration: The data collectors will collect data from patients' medical chart seeking head and neck care at TASH using a checklist to get pertinent data that is helpful for the study. The questionnaire consists of 30 questions.

5. Risks and benefits: There will be no risk for the patients for participating in this study. There would not be any direct payment for participating in this study. The findings from this research may reveal important information for the local stakeholders.

6. Confidentiality: The information extracted from medical charts will be kept confidential. There will be no information that will identify the participants in particular. The findings of the study will be general for the study community and will not reflect anything particular of individual persons. The questionnaire will be coded to exclude showing names. No reference will be made in oral or written reports that could link participants to the research.

7. Rights: The hospital has also the right to stop this study from being conducted if any misdeeds and unethical procedures are observed during the data collection process in the Hospital's premises.

8. Contact address: If there are any questions or enquires any time about the study or the procedures, please contact principal investigator:

Name: Dr. Kemer Kedir

Mobile: 0910056584, Email: kemerkeena@gmail.com or the Institutional Health Research Ethics Review Committee of the College of Health Sciences, P.O. Box: 235, Addis Ababa, Ethiopia.

9. Declaration of informed voluntary consent: I have read the participant information sheet. I have clearly understood the purpose of the research, the procedures, the risks and benefits, issues of confidentiality, the rights of participating and the contact address for any queries. I have been given the opportunity to ask questions for things that may have been unclear. I was informed that the Hospital has the right to stop this study from being conducted if any misdeeds and unethical procedures are observed during the data collection process in the Hospital's premises. Therefore, I declare my voluntary consent on behalf of ……. management to allow this study to be conducted in the Hospital with my initials (signature).

Name and Signature of Head of the Hospital: _____ _____ Date _____

Name and Signature of the PI: _____ _____ Date _____

10.2. Annex II: CHECKLIST in English

Data Extraction Form

Study Title: PATTERNS AND PREVALENCE OF HEAD AND NECK CANCER AND ASSOCIATED RISK FACTORS IN PATIENTS REFERRED TO AND TREATED AT TASH, ADDIS ABABA, ETHIOPIA.

Study Design: Retrospective Chart Review

Data Extractor Name: _____

Date of Extraction: _____

Hospital Name: _____

Patient ID: _____

Chart Number: _____

Demographic Information

Age (in years) ……...

Sex ◯ Male ◯ Female

Residence Region ……. Zone …… City …….

Sub-city …… Kebele …….

Occupation (if unknown, write 'not mentioned') …….

Clinical Presentation

Primary Tumor Site ……

(Specify site: e.g., nasopharynx, oropharynx, larynx, specific sites in the oral cavity, etc.)

Histopathological Type ……

(Specify type: e.g., squamous cell carcinoma, adenocarcinoma, etc.)

Clinical Stage at Diagnosis ◯ Stage I ◯ Stage II ◯ Stage III ◯ Stage IV

Symptoms at Presentation ……

(List symptoms: e.g., dysphagia, hoarseness, neck mass, etc.)

Use of Traditional Treatment

◯ Traditional Medicine Rx ◯ Burning with metal objects

◯ Religious (spiritual) Rx ◯ Unknown

Risk Factors

Tobacco Use ☐ Yes ☐ No ☐ Unknown

Khat chewing Habit ☐ Yes ☐ No ☐ Unknown

If yes, type ☐ Chewable ☐ Smoking

Alcohol Consumption ☐ Yes ☐ No ☐ Unknown

HIV Status ☐ Positive ☐ Negative ☐ Unknown

Treatment Details

Treatment Modality

☐ Surgery ☐ Radiotherapy ☐ Chemotherapy ☐ Combination

Treatment Initiation Date (DD/MM/YYYY) …….

Treatment outcome ☐ Complete Response ☐ Partial Response

☐ Stable disease ☐ Progressive disease

Follow-Up and Outcome

Follow-Up Duration (Months) ……

(Years) …….

Survival Status ◯ Alive ◯ Deceased

Cause of Death (specify if applicable) …….....

Notes and Observations

Provide any additional notes or observations relevant to the patient's case.

……

Instructions for Use:

- **Consistency**: Ensure uniformity in data entry to maintain reliability
- **Clarity**: Use clear and unambiguous terms to avoid misinterpretation
- **Completeness**: Fill in all fields; if information is unavailable, mark as "Not Available" or " N/A.
- **Confidentiality**: Handle all patient information with strict confidentiality in accordance with ethical guidelines.