ORIGINAL ARTICLE

Head and Neck Cancers in a Tertiary Care Setting: A Retrospective Analysis

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ABSTRACT

Objective: To determine the site-distribution and relative frequency of head and neck cancers and to study their age and gender distribution and histological types across different anatomical subsites.

Study Design: A Retrospective cross-sectional record-based descriptive study.

Place and Duration of Study: This study was conducted from July 01, 2020, to December 31, 2024, in the ENT Department, Fauji Foundation Hospital Rawalpindi.

Materials and Methods: The record of 305 patients, with age range of 14-79 years, and histologically confirmed cases of head and neck cancers, was reviewed over a period of four and a half years. Data on tumour sites, type, age, and gender were extracted and analyzed using SPSS v26. Descriptive statistics (frequencies and percentages) were calculated for each tumour category, and age was recorded as a range across the study population.

Results: Out of total 305 patients, 211 (69.2%) were males, while 94 (30.8%) were females. Oral cavity tumours were the most common, found in 76 cases (24.9%), followed by hypopharyngeal carcinomas, 51 cases (16.7%), oropharyngeal cancers, 47 cases (15.4%), nasal/paranasal carcinomas, 29 cases (9.5%) nasopharyngeal cancers, 27 cases (8.9%), laryngeal cancers, 23 cases (7.5%), salivary carcinomas in 18 cases (5.9%), thyroid carcinomas and neck tumours with unknown primary each 15 cases (4.9%) and aural cancers in 4 cases (1.4%).

Conclusion: Head and neck cancers predominantly involved the oral cavity, hypopharynx, and oropharynx, together accounting for nearly two-thirds of all cases. An overall male predominance was observed, consistent with reported regional patterns. However, the near-equal gender distribution of hypopharyngeal cancers among males and females was a noteworthy finding and warrants further investigations through larger multicentre studies to explore potential regional demographic, environmental, and risk factor influences.

Key Words*: Head and Neck Neoplasms, Hypopharyngeal Neoplasms, Mouth Neoplasms, Retrospective Studies; Tertiary Healthcare.*

Introduction

Head and neck cancers (HNC) constitute a heterogeneous group of malignancies arising from the oral cavity, pharynx, larynx, salivary glands, nasal cavity and paranasal sinuses, and thyroid gland. Because of this anatomical and histological diversity, patients with HNC may present with widely varying symptoms, ranging from painless neck swelling to hoarseness, nasal obstruction, dysphagia, or a mass discovered incidentally on imaging. Globally, HNC ranks among the common cancer groups making 4.7% of all the cancers. [1] The burden and subsite distribution of HNCs vary considerably by region, reflecting local differences in tobacco and areca nut (Paan & Chalya) use, alcohol consumption, Naswar use and human papillomavirus exposure. [2] In South Asia, including Pakistan, HNC constitute a disproportionately large share of the overall cancer burden. [3]

A recent analysis showed that there are approximately 890,000 new cases of HNC worldwide every year. [4] Lip and oral cavity cancers involve the most, followed by pharyngeal cancers. [5] Overall incidence has traditionally been higher in men, but in recent past a relatively higher incidence has been observed among women, particularly regarding thyroid tumours followed by pharyngeal cancers. [6]

Among these, the hypopharyngeal carcinoma is generally regarded as relatively uncommon, but

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Received: July 28, 2026 ; Revised: August 09, 2026
Accepted: August 10, 2026

https://doi.org/10.57234/jiimc.september26.3170

associated with more morbidity, carrying the poorest prognosis of all head and neck sites. Traditionally the gender distribution has been described as 4:1 to 8:1 with a significant male predominance.[7]

Oral cavity cancer remains a major public health problem in South Asia, where it is among the leading causes of cancer-related mortality. It has been attributed largely to the widespread use of tobacco chewing (Naswar), areca (betel) nut, and paan.[8] Similarly, the incidence of thyroid cancer is increasing with women being affected more frequently than men.[9]

Local epidemiological data on the relative frequency and demographic pattern of HNC subsites are essential for guiding clinical suspicion, resource allocation, and screening priorities, since patterns observed in high-income settings do not always translate to South Asian populations. The present study was undertaken to document the incidence, site distribution, and demographic pattern of HNC in our region, reporting to the ENT department of Fauji Foundation Hospital Rawalpindi. The drainage area of this hospital spans from Azad Kashmir to the Potohar region down to Gujrat.

Therefore, the aim of this study was to determine the distribution and relative frequency of HNC and to determine the age and gender distribution and histological types of HNC across different anatomical subsites.

Materials and Methods

This was a retrospective cross-sectional record-based descriptive study conducted in the ENT Department Fauji Foundation Hospital Rawalpindi from July 01, 2020, to December 31, 2024. Approval of the study was obtained from the Hospital Ethical Committee dated July 24, 2026. Hospital records, operation theatre registers, and histopathology reports of the ENT Department were reviewed.

All patients of either gender, in any age group, with a clinically and histologically confirmed diagnosis of HNC presenting to or admitted under the ENT department during this period were included in the study by census of eligible records. Patients with incomplete records, or with missing reports, and duplicate registrations and metastatic lesions from outside head and neck were excluded from the study.

A structured proforma was used to record patient demographic details (age, sex), site and sub site of the tumour, and histopathological diagnosis. HNCs were categorized into ten anatomical sub-sites: oral cavity, hypopharynx, oropharynx, nasal cavity/ paranasal sinuses, nasopharynx, larynx, neck tumours with unknown primary, salivary gland tumours, thyroid cancers and aural tumours. Tumours were classified histologically according to the WHO Classification of Tumours. Data was collected and analyzed using SPSS v26. Descriptive statistics (frequency and percentages) were calculated for each tumour category. Categorical variables (gender, tumour subsite, histological types) were summarized as frequencies and percentages. Age was recorded as a range across the study population. Age range was divided into seven groups; below 20 years, between 21- 30 years, between 31-40 years, between 41-50 years, between 51-60 years, between 61-70 years, and between 71-80 years. Chi-square test of independence was used to analyze association between gender and tumour site across the age range.

Results

Of the 305 patients recorded with HNC, 211 (69.2%) were males, while 94 (30.8%) were females as shown in Figure 1.

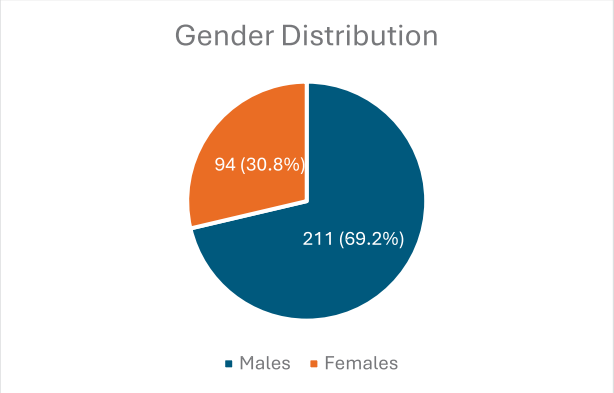

Figure 1: Gender Distribution (n= 305)

These cases fell in an age range of 14 to 79 years with a mean age of 61.76 years SD ± 9.392.

Oral cavity tumours were the leading contributors with 76 cases (24.9%). These were followed by hypopharyngeal carcinomas in 51 cases (16.7%), oropharyngeal cancers in 47 cases (15.4%), nasal/paranasal carcinomas in 29 cases (9.5%),

https://doi.org/10.57234/jiimc.september26.3170

nasopharyngeal cancers in 27 cases (8.9%), and laryngeal cancers in 23 cases (7.5%). Salivary carcinomas in 18 cases (5.9%), thyroid carcinomas and neck tumours with unknown primary 15 cases (4.9%) each, and aural cancers in 4 cases (1.4%) followed these. The site wise distribution of tumours is summarized in Table I.

Table I: Site wise Distribution of Head and Neck Tumours (n=305)

S. No.	Tumour Type	No. of Cases	Percentage (%)
1	Oral Cavity Tumours	76	24.9
2	Hypopharyngeal Tumours	51	16.7
3	Oropharyngeal Tumours	47	15.4
4	Nasal / Paranasal Sinus Tumours	29	9.5
5	Nasopharyngeal Tumours	27	8.9
6	Laryngeal Tumours	23	7.5
7	Salivary Gland Tumours	18	5.9
8	Neck Tumours with Unknown Primary	15	4.9
9	Thyroid Cancers	15	4.9
10	Aural Cancers	4	1.4
	Total	**305**	**100.00**

Gender Wise Tumour Site Distribution is shown in Figure: 2

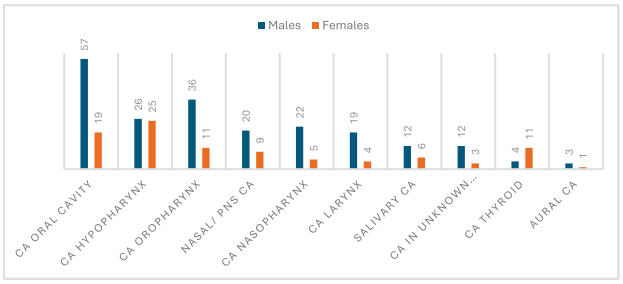

Figure 2: Gender-Wise Distribution of Head and Neck Cancers by Site (n= 305)

The male-to-female ratio was 2.2:1 (211 males and 94 females), most marked in laryngeal tumours (4.75:1) followed by nasopharyngeal tumours (4.4: 1) and neck tumours with unknown primary (4:1). Hypopharyngeal tumours presented with an almost equal gender distribution (1:1). But thyroid tumours showed a prominent female predominance (1: 2.75). The age of patients ranged from 14 to 79 years. Site incidence across the age range is shown in Table II.

Table II: Distribution Of HNC Across Age Groups (n=305)

TUMOUR SITE	AGE RANGE							
Site	Below 20 Yrs	21-30 Yrs	31-40 Yrs	41-50 Yrs	51-60 Yrs	61-70 Yrs	71-80 Yrs	Total
Ca Oral Cavity	0	0	0	2	13	59	2	76
Ca Hypopharynx	0	0	0	6	16	29	0	51
Ca Oropharynx	0	0	0	0	19	26	2	47
Nasal/ PNS Ca	0	3	0	0	3	23	0	29
Ca Nasopharynx	0	0	1	0	9	17	0	27
Ca Larynx	0	0	0	0	1	20	2	23
Ca Salivary Glands	0	0	0	2	1	12	3	18
Ca Unknown Primary	0	0	0	0	0	14	1	15
Ca Thyroid	4	2	0	0	2	3	4	15
Aural Ca	0	0	0	0	0	2	2	4
Total	4	5	1	10	64	205	16	305

There was a statistically significant association between gender and tumour site ($\chi^2(9) = 27.86$, $p = 0.001$, Cramer's V = 0.30). The thyroid and hypopharyngeal carcinomas significantly over-represented among females relative to males. Gender was also significantly associated with age at presentation ($\chi^2(6) = 43.53$, $p < 0.0001$, Cramer's V = 0.38), with males concentrated in the 61–70 year decade and females showing an earlier and broader age distribution.

Comparison of site incidence between both the genders across the age range is shown in Table III.

Well-differentiated squamous cell carcinomas were seen in 190 (62.3%) cases, poorly differentiated squamous cell carcinomas in 65 (21.3%) cases, undifferentiated carcinomas in 13 (4.3%) cases, adenocarcinomas in 15 (4.9%) cases, papillary/ follicular carcinomas in 14 (4.6%) cases, mucoepidermoid carcinomas in 5 (1.6%) cases, adenoid cystic carcinomas in 2 (0.65%) cases and medullary thyroid carcinoma in 1 (0.3%) case as shown in Figure 3.

Discussion

HNCs represent a diverse spectrum of pathology encountered routinely in otorhinolaryngology practice, and their pattern varies with geography, environmental exposures, tobacco and betel-nut use, viral aetiology. The present study describes the pattern of HNC in 305 cases, and highlights oral cavity, hypopharynx and oropharyngeal lesions as

Table III: Distribution of Tumour Sites by Gender and Age Group (n=305)

Gender	Tumour Site	Age Range							Total
		Below 20 Yrs	21-30 Yrs	31-40 Yrs	41-50 Yrs	51-60 Yrs	61-70 Yrs	71-80 Yrs	
Male	Ca Oral Cavity	0	0	0	2	5	49	1	57
	Ca Hypopharynx	0	0	0	0	5	21	0	26
	Ca Oropharynx	0	0	0	0	14	20	2	36
	Nasal/ PNS Ca	0	1	0	0	3	16	0	20
	Ca Nasopharynx	0	0	1	0	8	13	0	22
	Ca Larynx	0	0	0	0	1	16	2	19
	Ca Salivary glands	0	0	0	0	0	9	3	12
	Ca Unknown Primary	0	0	0	0	0	11	1	12
	Ca Thyroid	2	0	0	0	0	0	2	4
	Aural Ca	0	0	0	0	0	2	1	3
Total		**2**	**1**	**1**	**2**	**36**	**157**	**12**	**211**
Female	Ca Oral Cavity	0	0	0	0	8	10	1	19
	Ca Hypopharynx	0	0	0	6	11	8	0	25
	Ca Oropharynx	0	0	0	0	5	6	0	11
	Nasal/ PNS Ca	0	2	0	0	0	7	0	9
	Ca Nasopharynx	0	0	0	0	1	4	0	5
	Ca Larynx	0	0	0	0	0	4	0	4
	Ca Salivary glands	0	0	0	2	1	3	0	6
	Ca Unknown Primary	0	0	0	0	0	3	0	3
	Ca Thyroid	2	2	0	0	2	3	2	11
	Aural Ca	0	0	0	0	0	0	1	1
Total		**2**	**4**	**0**	**8**	**28**	**48**	**4**	**94**
GRAND TOTAL									**305**

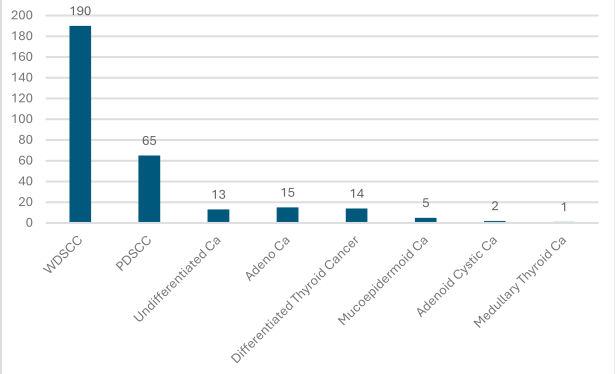

Figure 3: Histological Types of HNC

the leading categories. This pattern is not very different from results of other studies that report oral cavity and laryngeal squamous cell carcinoma as the dominant lesions. [10]

HNCs commonly occur in the fifth, sixth and seventh decades of life. [11] The age range in our study is 14 to 79 years. The occurrence of cases as young as 14 years is consistent with the recognized occurrence of salivary and sinonasal tumours in young adults and underscores the importance of maintaining head and neck tumours in the differential diagnosis across all age groups. [12] A local study also shows this high male predominance among HNC in Asia. [13] Other Pakistani studies also point towards this male predominance among the patients of HNC. [14]

The male predominance observed in this study 69.2% (male: female ratio of 2.2: 1) is in keeping with the well-documented worldwide trend of higher incidence of HNC in males, attributable in large part to the higher prevalence of tobacco smoking, alcohol use, and occupational exposures among men in most populations. [15] Globally, the male-to-female incidence ratio for HNCs typically ranges from about 3:1 to 5:1. [16] This lower ratio may partly be explained by the marked female predominance among patients with thyroid tumours in our study.

This marked male preponderance observed in laryngeal tumours (4.75:1) is consistent with the established association between laryngeal carcinoma and tobacco and alcohol use. [17]

https://doi.org/10.57234/jiimc.september26.3170

Nasopharyngeal carcinoma (4.4:1) and neck masses of unknown primary (4:1) also showed strong male predominance in our series, in keeping with regional and international trends of male-dominant upper aero-digestive tract malignancy.

In contrast, thyroid carcinoma showed a clear female predominance (1:2.75) in our study, which is similar to well-established global epidemiology. It shows papillary thyroid carcinoma incidence to be roughly 2.6 times higher in females than males, a disparity thought to relate to hormonal and reproductive factors rather than classical tobacco/alcohol-related carcinogenesis . [18] The predominance of thyroid tumours showing a marked female preponderance is consistent with the well-documented global rise in thyroid cancer incidence among women. Asia-specific data similarly show that thyroid cancer disproportionately affects women across all age groups, with incidence continuing to rise toward 2040. [9]

The near-equal gender distribution of hypopharyngeal tumours in males and females is a noteworthy finding, since this site is usually reported as one of the least common HNC, comprising only a small percentage of all squamous cell carcinomas of the region.[19] These finding merits particular attention, especially alongside our observation that a majority (17/25) of female hypopharyngeal cancer cases occurred in the fifth and sixth decades of life, a younger age bracket than typically expected. This may reflect true regional variation in risk factor exposure, as incidence of plummer vinson syndrome (PVS) due to iron deficiency anemia is quite common in this region.[20] Given the high prevalence of nutritional iron-deficiency anemia among women in the Indian subcontinent, this mechanism offers a biologically plausible explanation for this unusual gender pattern observed in the present study, although histopathological subtype and a formal assessment of iron status in these patients were beyond the scope of this study. Statistics confirm transformation of postcricoid mucosa towards malignancy in PVS. [21] Oral cavity carcinoma was the most frequently encountered subsite in our study (76 cases, 24.9%). It is consistent with the data that shows oral squamous cell carcinoma to be the most common HNC in South Asia despite an overall global decline in prevalence, largely attributed to the persistently high prevalence of areca nut, betel quid, and tobacco-chewing habits in the region. [22] The high proportion of oral cavity tumours in our study is consistent with the established pattern of dominance of oral cavity tumours due to a common habit of use of smokeless tobacco, betel quid, and areca nut. [4]

Hypopharyngeal (16.7%) and oropharyngeal (15.4%) carcinomas were the next most frequent sites in our series, followed by nasal/paranasal, nasopharyngeal, laryngeal, salivary gland, thyroid, neck node with unknown primary, and aural malignancies. This pattern differs somewhat from other Pakistani series in which nasopharyngeal carcinoma has been reported as the second most common site after the oral cavity. [11] Such variation between centers likely reflects differences in catchment population, referral patterns, and local dietary/occupational exposures, and highlights the value of institution-specific epidemiological data such as ours in guiding local screening and resource allocation strategies rather than relying solely on aggregated national figures.

Overall, these findings reinforce the importance of generating locally derived epidemiological data rather than depending solely on international series, since the demography and risk factors of HNC can vary substantially.

This study has several limitations that merit consideration. First, as a retrospective, single-center, record-based study, our findings are subject to the inherent limitations of incomplete or inconsistently documented clinical records and absence of individual level information on risk factor exposure. And lastly, the relatively small sample size limits the precision of subgroup comparisons and increases the influence of incidental findings.

Conclusion

Head and neck cancers predominantly involved the oral cavity, hypopharynx, and oropharynx, together accounting for nearly two-thirds of all cases. An overall male predominance was observed, consistent with reported regional patterns. However, the near-equal gender distribution of hypopharyngeal cancers among males and females was a noteworthy finding and warrants further investigations through larger multicentre studies to explore potential regional demographic,

environmental, and risk factor influences.

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https://doi.org/10.57234/jiimc.september26.3170

CONFLICT OF INTEREST

Authors declared no conflicts of Interest.

GRANT SUPPORT AND FINANCIAL DISCLOSURE

Authors have declared no specific grant for this research from any funding agency in public, commercial or nonprofit sector.

DATA SHARING STATEMENT

The data that support the findings of this study are available from the corresponding author upon request.