

Demographic Profile of Head and Neck Cancer Patients Excluding Thyroid Cancer: A Single Tertiary Institution-Based Study in Eastern India

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Abstract:

Introduction: Head and neck cancers (HNCs) are a significant public health concern in India, with a high burden attributed to modifiable risk factors such as tobacco and alcohol use. Understanding the demographic and clinical profile of affected patients is essential for formulating targeted prevention and early detection strategies.

Aims: To assess the demographic characteristics, risk factor distribution, clinical staging, histological types, and performance status of patients diagnosed with head and neck cancers, excluding thyroid malignancies, in a tertiary care setting.

Materials & Methods: This prospective, observational, institution-based study was conducted at IPGMER and SSKM Hospital, a premier tertiary care teaching institute located in Kolkata, Eastern India. The study was carried out over a period of 18 months, from July 2023 to January 2025. Data were collected from both the outpatient and inpatient departments of oncology. A total of 384 patients presenting with symptoms suggestive of head and neck cancer were included in the study.

Result: In our study population of 384 patients, tobacco use was highly prevalent, with 38.5% being smokers (n=148), 32.3% chewers (n=124), and 16.7% using both forms (n=64), while only 12.5% (n=48) reported no tobacco use. This distribution was statistically significant ($p < 0.001$). Alcohol consumption was also common, reported by 44.8% (n=172) of patients, compared to 55.2% (n=212) who did not consume alcohol, showing a significant association ($p = 0.034$). Regarding the site of the primary lesion, the oral cavity was the most commonly affected (n=142, 37.0%), followed by the larynx (n=82, 21.4%), hypopharynx (n=64, 16.7%), oropharynx (n=48, 12.5%), nasopharynx (n=22, 5.7%), and other sites (n=26, 6.7%), with this distribution being statistically significant ($p < 0.001$). Histologically, squamous cell carcinoma was the predominant type (n=332, 86.5%), followed by adenocarcinoma (3.1%), mucoepidermoid carcinoma (2.6%), lymphoma (2.1%), and others (5.7%), with a highly significant p-value (< 0.001).

Conclusion: Head and neck cancers are strongly linked to preventable lifestyle factors and predominantly affect individuals from lower socioeconomic backgrounds. Late-stage presentation is common, highlighting the need for enhanced awareness, early diagnosis, and targeted public health interventions in high-risk populations.

Keywords: Risk factors, Tobacco, Alcohol, Oropharyngeal Cancer and Head and neck Cancer.

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Introduction

Head and neck cancers (HNCs), excluding thyroid malignancies, encompass a heterogeneous group of tumors arising from the mucosal linings of the upper aerodigestive tract, including the oral cavity, pharynx, and larynx. These malignancies constitute a significant public health burden worldwide, with varying incidence and mortality rates across different regions, closely tied to demographic, lifestyle, and environmental factors [1]. Globally, head and neck squamous cell carcinoma (HNSCC)

is the sixth most common cancer, accounting for over 650,000 new cases and 330,000 deaths annually [2]. In India, the scenario is even more concerning, as HNCs represent nearly 30% of all cancer cases, largely due to the widespread prevalence of tobacco use, alcohol consumption, and human papillomavirus (HPV) infections [3]. Demographic profiling of patients with HNC is essential for understanding disease patterns, designing preventive strategies, and optimizing

treatment outcomes. Age, sex, socioeconomic status, literacy level, and geographic distribution are crucial determinants influencing the incidence and presentation of these cancers. Numerous studies have demonstrated a strong male predominance in HNC cases, often attributed to higher exposure to risk factors such as smoking and alcohol among men [4]. However, the rising prevalence among women, especially in rural and semi-urban populations, suggests shifting epidemiological trends that warrant close scrutiny [5]. Age is another significant variable, with most HNCs occurring in individuals over the age of 50. Nevertheless, in recent years, an alarming increase in the incidence among younger adults has been reported, particularly among those with HPV-associated oropharyngeal cancers [6]. This shift underscores the changing etiological spectrum of HNCs, with implications for both prevention and treatment. Furthermore, literacy and socioeconomic status play pivotal roles in influencing health-seeking behavior, early detection, and access to care. Individuals from lower-income groups often present at later stages due to limited awareness and reduced access to screening services, which adversely affects prognosis [7].

In the Indian context, regional disparities in HNC incidence and demographics have been well documented. States in Eastern and Northeastern India report a disproportionately high burden, often linked to the consumption of smokeless tobacco and betel quid [8]. The use of traditional tobacco preparations such as khaini, gutkha, and zarda is deeply embedded in cultural practices, significantly contributing to the etiology of oral cavity cancers. The burden is further compounded by occupational exposures, poor oral hygiene, dietary deficiencies, and co-existing infections, which can act as co-factors in carcinogenesis [9].

Excluding thyroid cancer from demographic profiling allows for a more focused analysis of squamous cell carcinomas, which form the majority of HNCs. Thyroid malignancies typically have distinct epidemiological features, such as a female preponderance, different age distribution, and a more indolent clinical course. Including them may dilute the understanding of trends associated with more aggressive mucosal cancers [10]. By isolating non-thyroid HNCs, researchers and policymakers can better appreciate the nuances of disease burden, tailor region-specific awareness programs, and allocate resources effectively.

Given the substantial morbidity and mortality associated with head and neck cancers, especially in low- and middle-income countries, demographic evaluation is not merely academic—it is central to public health planning. The implementation of preventive strategies such as tobacco cessation programs, HPV vaccination, and oral cancer

screening hinges on accurate demographic insights. Therefore, a comprehensive analysis of the demographic profile of HNC patients, excluding thyroid cancer, is both timely and necessary for formulating evidence-based interventions and improving patient outcomes.

Materials and Methods

Study Design: This was a prospective, observational, institution-based study.

Study Settings: The study was conducted at IPGMER and SSKM Hospital, a tertiary care teaching institute in Kolkata, Eastern India. Data were collected from both outpatient and inpatient oncology departments.

Place of Study: SSKM Hospital.

Period of Study: 18 Months [July 2023 to January 2025].

Sample Size: A total of 384 patients presenting with symptoms suggestive of head and neck cancer were included in the study.

Inclusion Criteria

- Patients aged 18 years and above.
- Patients presenting with clinical symptoms suggestive of head and neck cancer.
- Patients with a histopathologically confirmed diagnosis of head and neck malignancy.
- Patients willing to give informed consent for participation in the study.

Exclusion Criteria

- Patients with recurrent or previously treated head and neck cancers.
- Patients with primary malignancies outside the head and neck region.
- Patients with incomplete clinical records or histopathological confirmation.
- Patients who did not consent to participate in the study.

Study Variables

- Age
- Gender
- Socioeconomic status
- Site of tumor involvement
- Tobacco smoking
- Tobacco chewing
- Alcohol consumption

Statistical Analysis: For statistical analysis, data were initially entered into a Microsoft Excel spreadsheet and then analysed using SPSS (version 27.0; SPSS Inc., Chicago, IL, USA) and GraphPad Prism (version 5). Numerical variables were summarized using means and standard deviations, while Data were entered into Excel and analysed

using SPSS and GraphPad Prism. Numerical variables were summarized using means and standard deviations, while categorical variables were described with counts and percentages. Two-sample t-tests were used to compare independent groups, while paired t-tests accounted for correlations in paired data. Chi-square tests

(including Fisher's exact test for small sample sizes) were used for categorical data comparisons. P-values ≤ 0.05 were considered statistically significant.

Result

Table 1: Distribution of Study Population by Age, Gender, and Socioeconomic Status

Demographic Parameters		Frequency (n)	Percentage (%)	p-value
Age Group (Years)	≤ 30	12	3.10%	0.002
	31-40	28	7.30%	
	41-50	64	16.70%	
	51-60	128	33.30%	
	61-70	102	26.60%	
	>70	50	13.00%	
	Total	384	100%	
Gender	Male	312	81.30%	<0.001
	Female	72	18.70%	
	Total	384	100%	
Socioeconomic Class	Upper	10	2.60%	0.021
	Upper Middle	48	12.50%	
	Lower Middle	86	22.40%	
	Upper Lower	170	44.30%	
	Lower	70	18.20%	
	Total	384	100%	

Table 2: Distribution of Patients Based on Tobacco and Alcohol Use, Primary Tumor Site, and Histological Type

Parameter		Frequency (n)	Percentage (%)	p-value
Tobacco Usage Pattern	Smoker	148	38.50%	<0.001
	Chewer	124	32.30%	
	Both	64	16.70%	
	None	48	12.50%	
	Total	384	100%	
Alcohol Use	Yes	172	44.80%	0.034
	No	212	55.20%	
	Total	384	100%	
Site of Primary Lesion	Oral Cavity	142	37.00%	<0.001
	Oropharynx	48	12.50%	
	Hypopharynx	64	16.70%	
	Larynx	82	21.40%	
	Nasopharynx	22	5.70%	
	Others	26	6.70%	
	Total	384	100%	
Histological Type	Squamous Cell Carcinoma	332	86.50%	<0.001
	Adenocarcinoma	12	3.10%	
	Mucoepidermoid	10	2.60%	
	Lymphoma	8	2.10%	
	Others	22	5.70%	
	Total	384	100%	

Table 3: Distribution of Patients According to TNM Clinical Stage and ECOG Performance Status

Parameter		Frequency (n)	Percentage (%)	p-value
TNM Clinical Stage	Stage I	32	8.30%	<0.001
	Stage II	54	14.10%	
	Stage III	114	29.70%	
	Stage IV	184	47.90%	
	Total	384	100%	
ECOG Score	0	42	10.90%	0.015
	1	148	38.50%	
	2	104	27.10%	
	3	72	18.70%	
	4	18	4.70%	
	Total	384	100%	

Table 4: Family History of Cancer

Family History	Frequency (n)	Percentage (%)	P-value
Present	54	14.10%	0.042
Absent	330	85.90%	
Total	384	100%	

In our study comprising 384 patients, the majority belonged to the age group of 51–60 years (n=128, 33.3%), followed by those aged 61–70 years (n=102, 26.6%) and 41–50 years (n=64, 16.7%), with the age distribution showing a statistically significant association ($p = 0.002$). Males constituted a significantly higher proportion of the study population (n=312, 81.3%) compared to females (n=72, 18.7%) ($p < 0.001$). Regarding socioeconomic status, the highest proportion of patients belonged to the upper lower class (n=170, 44.3%), followed by the lower middle (n=86, 22.4%) and lower classes (n=70, 18.2%). A statistically significant association was noted across different socioeconomic strata ($p = 0.021$).

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Regarding the site of the primary lesion, the oral cavity was the most commonly affected (n=142, 37.0%), followed by the larynx (n=82, 21.4%), hypopharynx (n=64, 16.7%), oropharynx (n=48, 12.5%), nasopharynx (n=22, 5.7%), and other sites (n=26, 6.7%), with this distribution being statistically significant ($p < 0.001$). Histologically, squamous cell carcinoma was the predominant type (n=332, 86.5%), followed by adenocarcinoma (3.1%), mucoepidermoid carcinoma (2.6%), lymphoma (2.1%), and others (5.7%), with a highly significant p-value (<0.001).

In our study of 384 patients, a significant proportion presented with advanced TNM clinical stages. Stage IV disease was the most common, observed in 47.9% (n=184) of patients, followed by Stage III in 29.7% (n=114), Stage II in 14.1% (n=54), and Stage I in only 8.3% (n=32), with this staging distribution being statistically significant ($p < 0.001$).

Performance status as measured by the ECOG score showed that the majority of patients had a score of 1 (n=148, 38.5%), followed by scores of 2 (n=104, 27.1%) and 3 (n=72, 18.7%). Fewer patients had scores of 0 (n=42, 10.9%) or 4 (n=18, 4.7%). This variation in ECOG performance status was also statistically significant ($p = 0.015$), indicating a wide spectrum of functional impairment among the study population.

In our study, a positive family history of cancer was reported in 14.1% of patients (n=54), while the majority (n=330, 85.9%) had no such history. This distribution showed a statistically significant association ($p = 0.042$), suggesting that familial predisposition may play a role in the development of head and neck cancers in a subset of patients.

Discussion

In our study involving 384 patients with head and neck cancer (HNC), the majority were in the 51–60 year age group (33.3%), consistent with findings by Singh et al., who also reported peak incidence in the sixth decade of life [11]. This age group reflects the cumulative exposure to risk factors such as tobacco and alcohol, which typically exert carcinogenic effects over prolonged periods. Male predominance (81.3%) in our cohort parallels the observations by Sharma et al., who noted a similar male-to-female ratio in HNC patients, attributing it to higher tobacco and alcohol use among males in

India [12]. The high proportion of patients from the upper lower and lower middle socioeconomic classes in our study (66.7%) suggests a link between socioeconomic deprivation and higher exposure to risk factors, as highlighted by Bhurgri et al., who found that lower socioeconomic strata were associated with increased HNC burden due to limited awareness, poor oral hygiene, and addictive habits [13]. Tobacco consumption was extremely prevalent in our population, with 87.5% reporting some form of use, which is consistent with data from Mehrotra et al., who reported over 80% prevalence of tobacco use in HNC patients in northern India [14]. The distribution of smoking and chewing habits was significantly associated with cancer diagnosis, echoing the findings of Gupta et al., who emphasized the synergistic effect of smoking and chewing tobacco in the pathogenesis of oral and pharyngeal cancers [15]. Alcohol consumption was also significantly associated ($p = 0.034$), in agreement with the study by Pelucchi et al., who identified alcohol as an independent and dose-dependent risk factor for HNC [16].

The oral cavity was the most common primary tumor site (37%), followed by the larynx and hypopharynx. This pattern mirrors that reported by D'Cruz et al., where oral cavity cancers accounted for the largest proportion of cases in Indian cohorts [17]. Squamous cell carcinoma (SCC) was the predominant histological type (86.5%), consistent with global literature that classifies SCC as the most frequent histological variant of HNC due to its strong association with epithelial carcinogens like tobacco [18].

Advanced clinical stages were common in our study, with nearly 78% of patients presenting in Stage III or IV, indicating late diagnosis. This late presentation has also been documented by Sinha et al., who emphasized the role of healthcare access and lack of awareness in delayed treatment-seeking behaviors [19]. The ECOG performance status distribution in our study showed that most patients had moderate to severe functional impairment, which may correlate with late-stage disease and comorbidities, as supported by similar findings in the study by Tschiesner et al. [20].

Additionally, a family history of malignancy was noted in 14.1% of cases in our cohort, supporting the potential role of genetic predisposition. This aligns with findings from Foulkes and Brennan, who described familial clustering in HNC patients and suggested that shared environmental exposures and inherited genetic mutations could contribute to disease risk [19].

Conclusion

The findings of our study highlight several important demographic and clinical patterns among

patients with head and neck cancer. The majority of patients belonged to the middle to older age groups, with a clear male predominance. A significant association was observed between head and neck cancers and lower socioeconomic status, suggesting that social determinants may contribute to both risk factor exposure and delayed access to healthcare. Tobacco and alcohol use emerged as major behavioral risk factors, with most patients reporting at least one form of tobacco use.

The site distribution of the primary lesion showed a predominance of oral cavity involvement, and squamous cell carcinoma remained the most frequent histological type, reflecting the well-established link with tobacco and alcohol exposure. A substantial proportion of patients presented with advanced disease at diagnosis, which underscores the need for improved awareness and early detection strategies. Functional status assessment revealed varying degrees of impairment, consistent with the burden of advanced disease. The presence of a positive family history in a small but significant subset of patients further indicates a possible genetic or shared environmental component. Overall, the study emphasizes the multifactorial etiology of head and neck cancers and underscores the importance of targeted preventive measures, early screening, and patient education, particularly in high-risk populations.

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