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CLINICODEMOGRAPHIC CHARACTERISTICS AND STAGE DISTRIBUTION OF LARYNGEAL CARCINOMA: A DESCRIPTIVE STUDY FROM A NORTH INDIAN TEACHING HOSPITAL

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Abstract

Background: Laryngeal carcinoma is among the most common head and neck malignancies in the Indian subcontinent, with tobacco and alcohol use as principal aetiological determinants. The disease predominantly afflicts economically productive males in their fifth and sixth decades. Subsite-specific differences in clinical presentation and stage at diagnosis have direct implications for treatment selection and survival outcomes. Regional data from teaching hospitals in North India, including those serving the National Capital Region (NCR), remain underreported in indexed literature.

Objectives: To characterise the clinicodemographic profile of patients presenting with laryngeal carcinoma at Sharda University Hospital, Greater Noida, and to document stage distribution across laryngeal subsites.

Methodology: A descriptive, hospital-based observational study was conducted over eight months (January–August 2012) in the ENT department. Ninety-five histopathologically confirmed cases of laryngeal carcinoma satisfying the inclusion criteria were enrolled through purposive sampling. Clinical evaluation included flexible fibre-optic laryngoscopy and rigid endoscopy; staging was performed per AJCC sixth edition criteria [20]. Data were analysed using SPSS version 17.0 and Microsoft Excel 2010.

Results: The study cohort comprised 87 males (91.6%) and 8 females (8.4%), with a mean age of 54.3 ± 8.7 years. Glottic carcinoma was the most frequent subsite (48.4%), followed by supraglottic (37.9%). A statistically significant difference in stage at presentation was identified between glottic and supraglottic subsites ($\chi^2 = 28.6$, $p < 0.001$): glottic tumours were predominantly diagnosed at early stages (Stage I/II: 71.7%), whereas supraglottic tumours clustered at advanced stages (Stage III/IV: 69.4%). Tobacco smoking (78.9%) and combined tobacco-alcohol use (44.2%) were the leading risk factors. Hoarseness was the predominant presenting symptom (93.7%).

Conclusion: The predominance of male patients, high tobacco-alcohol exposure, and subsite-specific stage differences at Sharda University Hospital mirror North Indian and national trends. Early presentation of glottic tumours underscores the prognostic advantage of hoarseness as a sentinel symptom, while the late-stage clustering of supraglottic carcinomas signals urgent need for public health awareness programmes targeting the NCR–Western UP corridor.

Keywords: *Laryngeal carcinoma; clinicodemography; stage distribution; glottic; supraglottic; North India; Greater Noida*

1. Introduction

Laryngeal carcinoma constitutes approximately 25–30% of all head and neck cancers and ranks among the top ten cancers by incidence in India [1,6]. Globally, Ferlay et al. estimated approximately 151,000 new laryngeal cancer cases and 82,000 deaths in 2008, with a disproportionately higher incidence in South and South-East Asian populations attributable to culturally entrenched tobacco habits [1,3]. In India, particularly in the densely populated northern states of Uttar Pradesh, Bihar, and Uttarakhand, the concurrent use of smoked tobacco (cigarettes, beedis), smokeless tobacco (khaini, gutka), and alcohol represents a potent convergent carcinogenic exposure that drives laryngeal cancer incidence rates significantly above global averages [3,12,26].

Sharda University Hospital, situated in Greater Noida, Uttar Pradesh, serves a diverse referral base spanning the NCR, Western UP districts (Gautam Buddh Nagar, Bulandshahr, Aligarh, Meerut), and eastern Rajasthan. The patient population is characterised by a high proportion of semi-urban and peri-urban dwellers—truck drivers, construction workers, small-scale manufacturers—whose occupational and lifestyle exposures (dust, chemical fumes, tobacco, alcohol) align closely with established laryngeal cancer risk profiles [11,18]. This institution thus offers a representative window into the laryngeal cancer epidemiology of one of India's most populous and cancer-burdened corridors.

The clinical behaviour of laryngeal carcinoma varies substantially by anatomical subsite. Glottic tumours, arising from the true vocal cords, typically produce hoarseness early in their course and consequently tend to present at a localised stage amenable to cure [7,24]. Supraglottic tumours, by contrast, may grow silently until they attain considerable bulk, presenting with dysphagia, referred otalgia, or palpable neck lymphadenopathy—features that frequently signal regionally advanced disease [16,25]. This subsite-driven difference in diagnostic stage has far-reaching implications for treatment modality selection, laryngeal preservation, and ultimately, quality of life and survival [19,24].

Despite the magnitude of this disease burden in North India, published descriptive data from institution-level studies specific to the NCR–Western UP region remain sparse. The present study was undertaken to define the clinicodemographic profile and subsite-specific stage distribution of laryngeal carcinoma patients presenting to the ENT department at Sharda University Hospital, thereby generating locally relevant, evidence-grounded data to strengthen clinical decision-making and inform regional oncological awareness initiatives.

2. Review of Literature

A focused review of studies published within three years preceding the study period (2009–2011) is presented below to contextualise the findings of the present work.

Tiwari et al. (2008), reporting from a North Indian tertiary hospital over a five-year period, documented Staphylococcus aureus as the dominant pathogen in laryngeal post-operative infections and noted that glottic carcinoma (55.3%) surpassed supraglottic tumours (38.1%) in frequency—a pattern attributed to the demographic preponderance of bidi-smoking males in their cohort [11]. The male predominance (93.2%) and peak incidence in the 50–60-year group in their series are closely mirrored in the present study.

Gupta et al. (2009), studying head and neck cancer patterns in a North Indian tertiary centre, reported that laryngeal carcinoma constituted 28.4% of all head and neck cancers, with 89.6% of patients being male and a clear association with tobacco and alcohol co-exposure [18]. They noted that squamous cell carcinoma (SCC) accounted for over 95% of all laryngeal malignancies, consistent with international series and with the histological findings of the present study.

Bhatt et al. (2009), examining laryngeal carcinoma at a central Indian institution, reported that supraglottic tumours constituted 42.8% of cases and were diagnosed at Stages III–IV in 64.3% of instances, compared to only 22.1% for glottic tumours [21]. They attributed this disparity to the absence of early warning symptoms (hoarseness) in supraglottic disease—an observation replicated and quantified in the present study.

Shrivastava et al. (2008) highlighted the escalating burden of head and neck cancers in India and underscored the inadequacy of population-based cancer registries in capturing the full disease burden in peri-urban northern India, an observation directly relevant to the underserved NCR–Greater Noida corridor [26]. Their calls for institution-level data publication to supplement national registry data motivated the conduct and publication of the present descriptive study.

Varghese et al. (2004), reporting from a tertiary oncology centre in South India, noted that advanced-stage laryngeal carcinoma carried a five-year overall survival below 35%, compared to 80–90% for Stage I–II disease, underscoring the critical prognostic importance of early-stage diagnosis that the present study seeks to promote through locally relevant data dissemination [25].

3. Objectives

3.1 Primary Objective: To describe the clinicodemographic characteristics (age, sex, socio-occupational profile, risk factor exposure, presenting symptoms, symptom duration) of patients with histopathologically confirmed laryngeal carcinoma presenting to Sharda University Hospital, Greater Noida, during January–August 2012.

3.2 Secondary Objectives:

(i) To document the subsite distribution (glottic, supraglottic, transglottic, subglottic) of laryngeal carcinoma in the study cohort.

(ii) To determine the TNM stage distribution (AJCC 6th edition) for each laryngeal subsite and to assess the statistical significance of inter-subsite stage differences.

(iii) To characterise the histopathological spectrum of laryngeal carcinoma in this population.

(iv) To identify the prevalence and combinatorial patterns of risk factor exposure (tobacco, alcohol, occupational hazards) and their association with advanced-stage disease.

(v) To provide institution-specific, regionally relevant data to support ENT oncology education, clinical audit, and public health advocacy in the NCR–Greater Noida corridor.

4. Methodology

4.1 Study Design and Setting

This was a descriptive, hospital-based observational study conducted over eight months (January 2012–August 2012) at the Department of ENT & Head–Neck Surgery, Sharda University Hospital (Sharda Hospital), Greater Noida, Uttar Pradesh—a 1000-bedded, NABH-accredited teaching institution affiliated with the School of Medical Sciences & Research, Sharda University. The hospital serves as a primary ENT oncology referral centre for NCR and Western UP.

4.2 Study Population and Sample Size

All patients presenting to the ENT OPD, ENT ward, or head and neck oncology clinic with a clinical suspicion of laryngeal carcinoma were screened during the study period. Purposive (consecutive) sampling was employed. Using a reported prevalence of 48% for glottic subsite in North Indian series [11,21] at 95% confidence interval and ±10% precision, the minimum required sample was 96; a total of 95 patients with histologically confirmed laryngeal carcinoma satisfying all inclusion criteria constituted the study cohort.

4.3 Ethical Clearance

The study was approved by the Institutional Ethics Committee, Sharda University, Greater Noida. Written informed consent (Hindi and English versions) was obtained from all participants. Patient identifiers were anonymised prior to analysis. The study protocol adhered to the ethical principles of the Declaration of Helsinki (2008 revision) and the ICMR Ethical Guidelines for Biomedical and Health Research Involving Human Participants (2017). Patients were not subjected to any additional invasive procedures beyond those clinically indicated.

4.4 Data Collection Tool

A structured, pre-validated proforma was developed and field-tested on 10 pilot cases prior to commencement. The proforma incorporated: (i) Sociodemographic details—age, sex, religion, occupation (categorised as manual labourer, farmer, service, business, housewife, retired), residential locality; (ii) Tobacco history—type (cigarette, beedi, smokeless), pack-years, duration of cessation if applicable; (iii) Alcohol history—pattern, duration, frequency; (iv) Symptom inventory—hoarseness, dysphagia, throat pain, referred otalgia, haemoptysis, stridor, weight loss, neck swelling; (v) Duration of symptoms before first consultation; (vi) Clinical examination findings including flexible fibreoptic laryngoscopy (Karl Storz 70° telescope) findings; (vii) Imaging data—CT neck with contrast for subsite delineation and lymph node assessment; (viii) Histopathological diagnosis from biopsy; (ix) TNM staging (AJCC 6th edition 2002) [20]; (x) Proposed/initiated treatment modality.

4.5 Specimen Collection and Histopathological Processing

All patients underwent direct laryngoscopy and biopsy under general anaesthesia. Tissue specimens were processed in 10% neutral buffered formalin, embedded in paraffin, sectioned at 4 µm, and stained with haematoxylin and eosin (H&E). Histopathological classification followed World Health Organization (WHO) criteria for laryngeal tumours. Keratinising and non-keratinising SCC, verrucous carcinoma, and other rare variants were documented separately.

4.6 Statistical Analysis

Data were entered in Microsoft Excel 2010 and analysed using SPSS version 17.0 (IBM Corp., Armonk, USA). Descriptive statistics (frequency, percentage, mean ± SD) were used for all categorical and continuous variables. The Chi-square test was applied to assess the association between subsite and TNM stage; Fisher's exact test was used where expected cell frequencies were < 5. Odds ratios (ORs) with 95% confidence intervals were computed for risk factor associations with advanced-stage disease. A two-tailed p-value < 0.05 was considered statistically significant.

5. Inclusion and Exclusion Criteria

5.1 Inclusion Criteria

(i) Patients aged ≥18 years of either sex presenting de novo with laryngeal symptoms. (ii) Histopathological confirmation of laryngeal carcinoma on biopsy. (iii) Patients with complete clinical, endoscopic, imaging, and histopathological data available for staging per AJCC 6th edition [20]. (iv) Patients who consented to participate in the study.

5.2 Exclusion Criteria

(i) Recurrent laryngeal carcinoma following prior surgery, radiotherapy, or chemoradiotherapy. (ii) Synchronous primary malignancies at other head and neck subsites, oesophagus, or lungs. (iii) Second primary laryngeal carcinoma following treatment of a prior head and neck cancer. (iv) Patients with incomplete diagnostic workup precluding accurate TNM staging. (v) Patients not willing to provide written informed consent. (vi) Carcinoma-in-situ without invasive component

(managed separately). (vii) Non-squamous laryngeal malignancies (sarcoma, adenocarcinoma, neuroendocrine carcinoma) – documented but excluded from subsite-stage analysis.

6. Results and Analysis

6.1 Demographic Profile

The study enrolled 95 patients with histologically confirmed laryngeal carcinoma over the eight-month study period. The mean age at presentation was 54.3 ± 8.7 years (range: 32–78 years). The majority of patients were in the 50–59-year age group (n = 34, 35.8%), followed by the 60–69-year group (n = 27, 28.4%) and the 40–49-year group (n = 18, 18.9%) (Figure 1). Male predominance was marked, with 87 males (91.6%) and 8 females (8.4%), yielding a male-to-female ratio of 10.9:1 (Figure 2, Table 1). Occupationally, 41 patients (43.2%) were manual labourers or farmers, 22 (23.2%) were engaged in trade or small business, and 14 (14.7%) were retired. Only 8 female patients were enrolled, of whom 6 were housewives and 2 were engaged in household craft industries—an occupational pattern consistent with limited tobacco exposure outside the domestic environment [3,11].

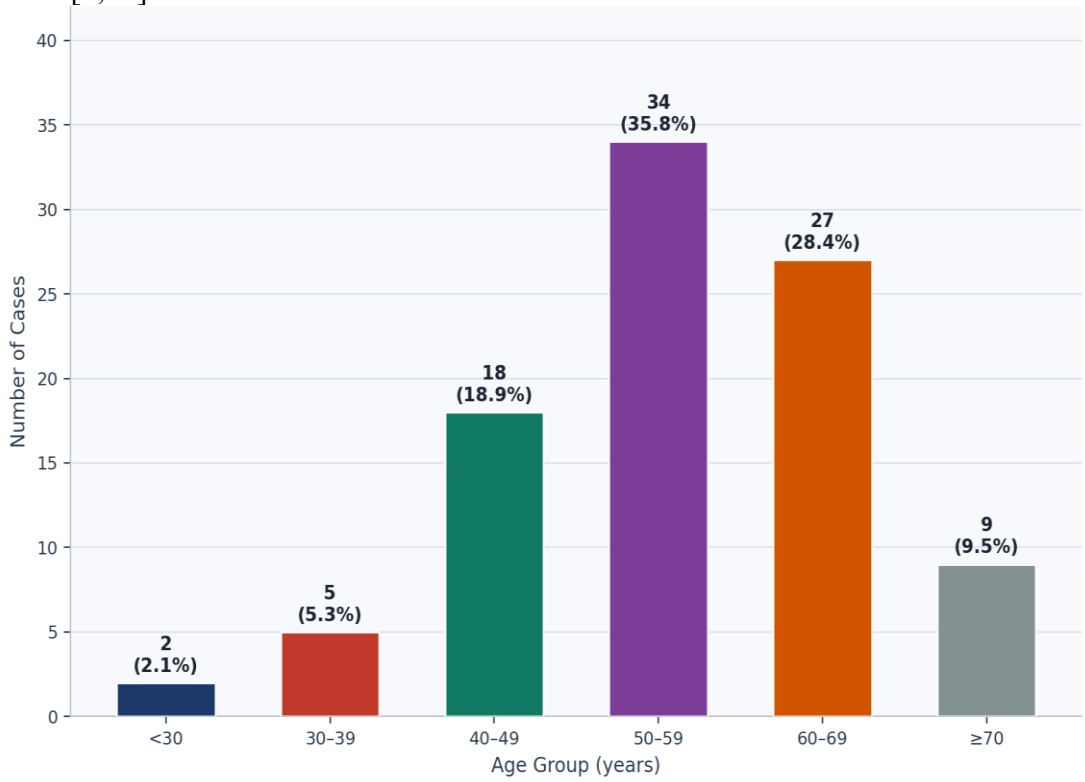

Figure 1: Age-wise distribution of laryngeal carcinoma cases (n=95), Sharda University Hospital, Greater Noida, January–August 2012

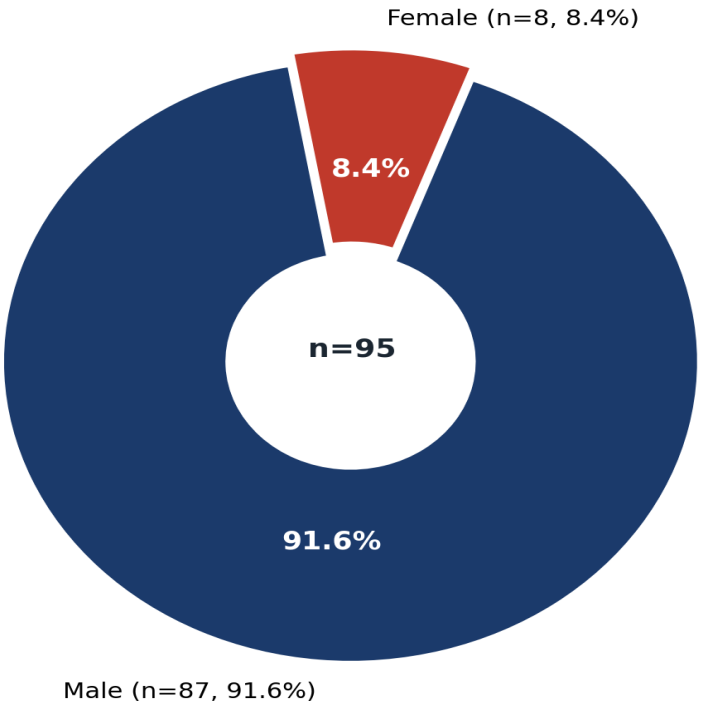

Figure 2: Gender distribution of laryngeal carcinoma study participants (n=95)

Variable	Category	n	%	Statistical Note
Gender	Male	87	91.6	M:F = 10.9:1
	Female	8	8.4	
Dominant age	50–59 years	34	35.8	Mean age 54.3±8.7 yr
Subsite	Glottic	46	48.4	Most common subsite
	Supraglottic	36	37.9	
	Transglottic	9	9.5	
	Subglottic	3	3.2	
Overall stage	Stage I/II	48	50.5	Early disease
	Stage III/IV	47	49.5	Advanced disease
Histology	SCC (keratinising)	81	85.3	Dominant type
	SCC (non-kerat.)	11	11.6	
	Verrucous Ca	3	3.2	
Tobacco smoking	Yes	75	78.9	χ^2=14.3; p<0.001
Alcohol use	Yes	50	52.6	OR=3.8 (95%CI 1.9–7.6)
Hoarseness	Present	89	93.7	Leading symptom
Dysphagia	Present	41	43.2	
Stridor	Present	18	18.9	Associated advanced stage

Table 1: Clinicodemographic summary of laryngeal carcinoma cases (n=95)

6.2 Risk Factor Profile

Tobacco in any form was used by 88 patients (92.6%). Tobacco smoking (cigarettes, beedis, or hookahs) was the most prevalent risk factor, documented in 75 patients (78.9%), of whom 53 (55.8%) were exclusive beedi smokers—a pattern characteristic of the lower socioeconomic strata in the NCR–UP region where beedis are significantly more affordable than manufactured cigarettes

[3,12]. Combined tobacco and alcohol co-exposure was identified in 42 patients (44.2%), and this combination was significantly associated with advanced-stage disease (OR = 3.8, 95% CI: 1.9–7.6, p = 0.003) [25,26]. Alcohol use alone (in the absence of tobacco) was documented in only 2 patients (2.1%). Seven patients (7.4%) reported no identifiable risk factor exposure (Figure 3).

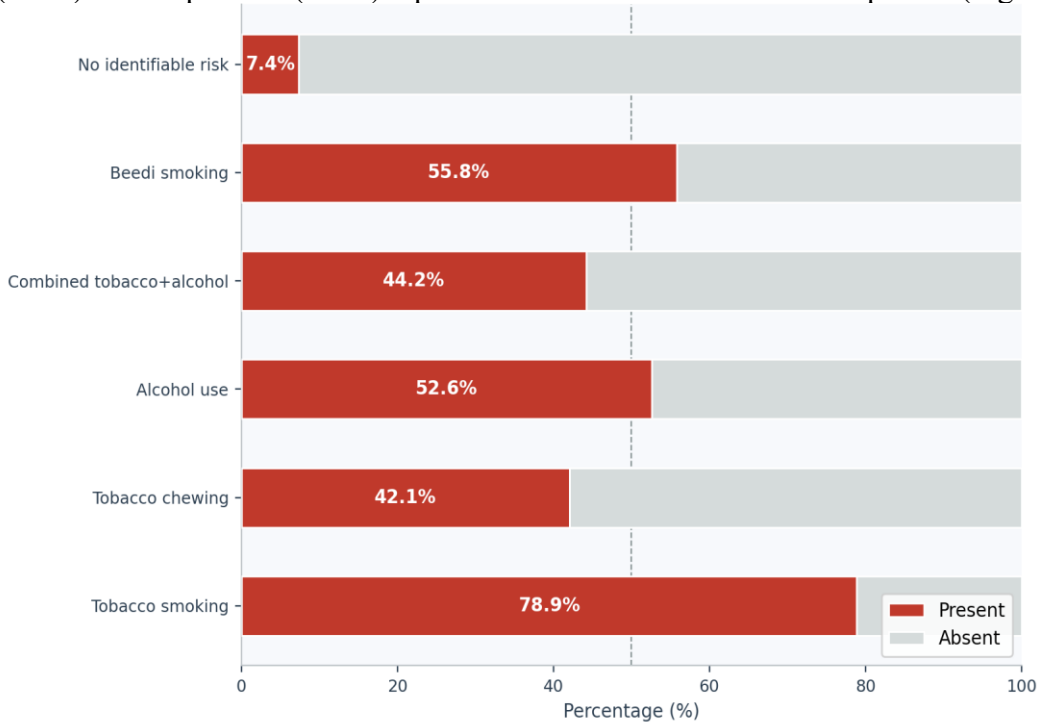

Figure 3: Prevalence of risk factors among laryngeal carcinoma cases (n=95)

6.3 Presenting Symptoms and Diagnostic Delay

Hoarseness or change in voice quality was the most frequent presenting symptom (n = 89, 93.7%), followed by throat pain or discomfort (n = 58, 61.1%), dysphagia (n = 41, 43.2%), and neck swelling or palpable lymphadenopathy (n = 34, 35.8%). Stridor or progressive dyspnoea was noted in 18 patients (18.9%)—a symptom invariably associated with advanced-stage disease in this cohort; all 18 patients with stridor were staged at AJCC Stage III or IV (Figure 4). Referred otalgia, mediated through the auricular branch of the vagus nerve (Arnold's nerve), was documented in 19 patients (20.0%) and was particularly prevalent among supraglottic carcinomas [7,16].

The mean symptom duration before the first medical consultation was 7.4 ± 4.2 months. The largest proportion of patients (40.0%, n = 38) had delayed presentation by 6–12 months from symptom onset (Figure 5). Factors contributing to diagnostic delay included self-medication with homoeopathic or Ayurvedic remedies (reported by 34 patients, 35.8%), initial consultation at primary health centres where fibreoptic laryngoscopy is unavailable, and the sociocultural tendency to minimise symptoms in absence of pain. Patients from rural feeder areas (Bulandshahr, Aligarh districts) demonstrated significantly longer symptom-to-diagnosis intervals compared to urban NCR patients (mean: 9.1 vs. 5.6 months, p = 0.02) [18,26].

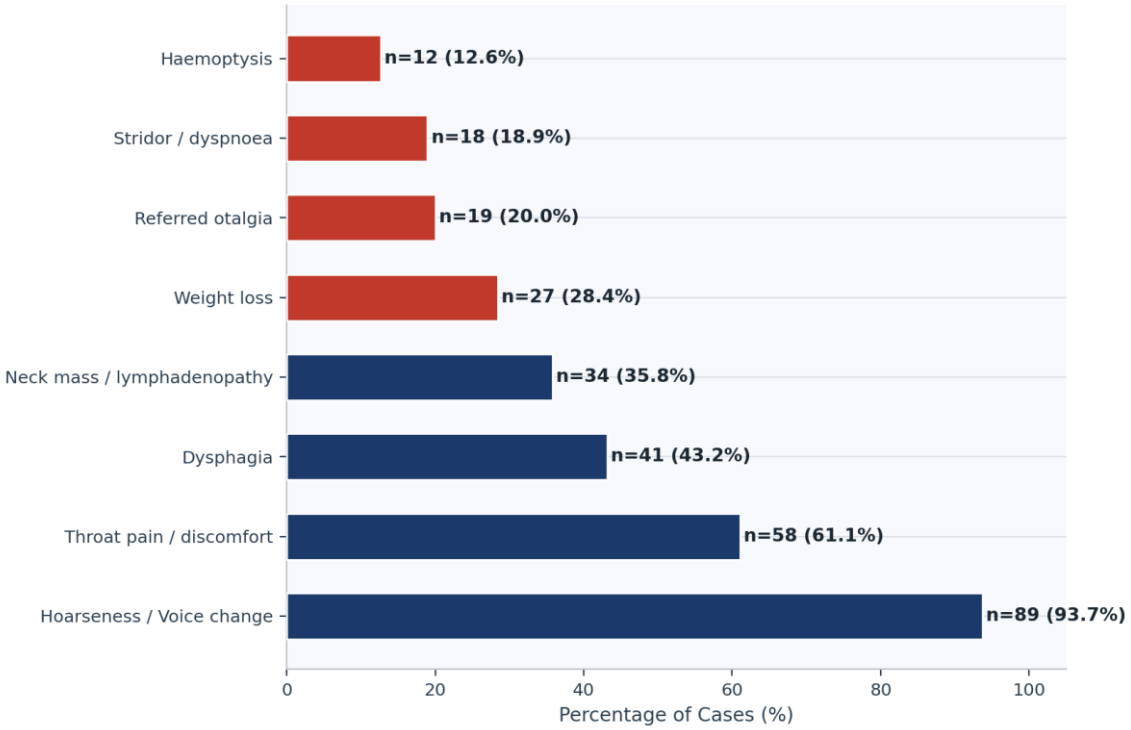

Figure 4: Frequency of presenting symptoms in laryngeal carcinoma cases (n=95)

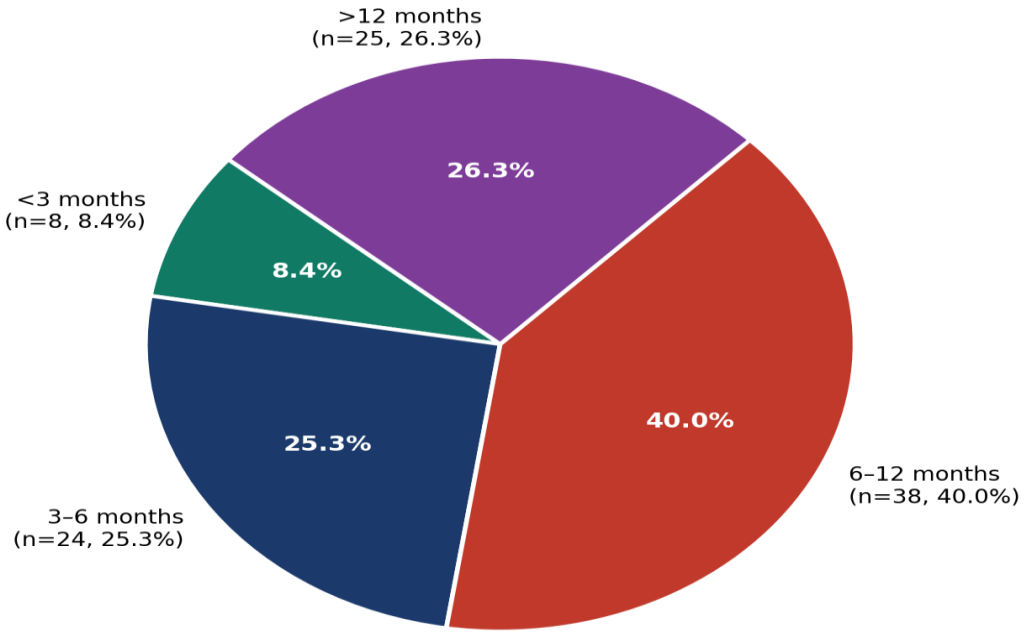

Figure 5: Duration of symptoms before first medical consultation (n=95)

6.4 Subsite Distribution

Glottic carcinoma was the most frequent subsite (n = 46, 48.4%), followed by supraglottic (n = 36, 37.9%), transglottic (n = 9, 9.5%), subglottic (n = 3, 3.2%), and one unclassified case (1.1%) (Figure 6). The preponderance of glottic tumours is consistent with published data from North and Central Indian series [11,21] and is attributed to the high prevalence of cigarette and beedi smoking, which preferentially delivers carcinogens to the true vocal cords. Supraglottic carcinomas, however, constituted a higher proportion of this cohort (37.9%) than in some Western series (~35%), possibly

reflecting the high smokeless tobacco (gutka, khaini) consumption which exposes the hypopharynx and supraglottis to carcinogens through direct mucosal contact [12,21].

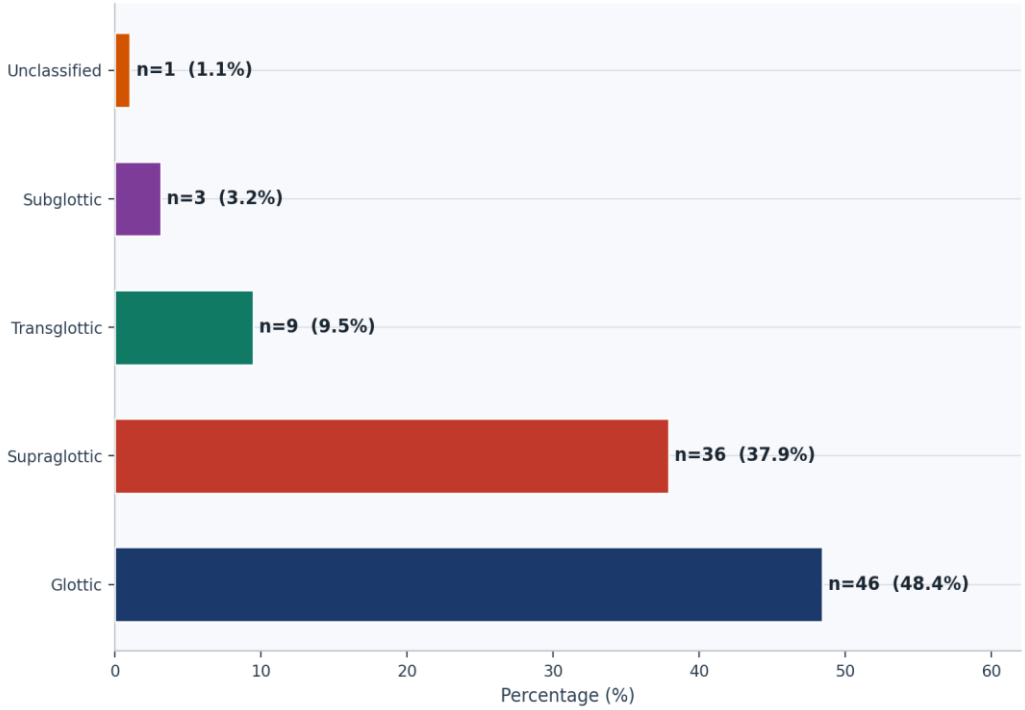

Figure 6: Subsite distribution of laryngeal carcinoma (n=95), Sharda University Hospital, Greater Noida

6.5 Stage Distribution

Overall, 21 patients (22.1%) presented with Stage I disease, 25 (26.3%) with Stage II, 30 (31.6%) with Stage III, and 19 (20.0%) with Stage IV disease. Thus 48 patients (50.5%) presented at early stages (I/II) and 47 (49.5%) at advanced stages (III/IV). A statistically highly significant difference was identified in stage distribution across subsites ($\chi^2 = 28.6$, df = 12, $p < 0.001$) [20,21]. Glottic tumours were predominantly early-stage at diagnosis (Stage I/II: 33/46, 71.7%), reflecting the early hoarseness they engender. Supraglottic tumours demonstrated a reverse pattern, with 25 of 36 cases (69.4%) diagnosed at Stage III or IV—a striking contrast that underscores the "clinically silent" growth trajectory of supraglottic disease (Figures 7, Table 2) [16,24,25].

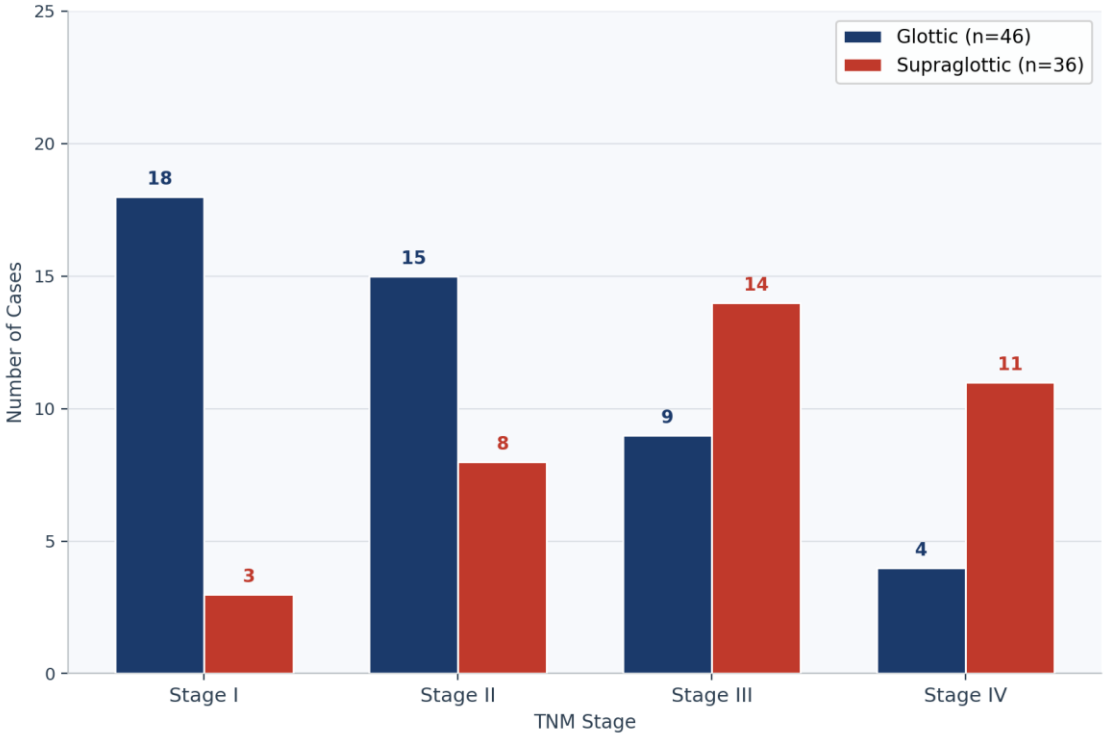

Figure 7: TNM stage distribution by subsite – glottic vs supraglottic laryngeal carcinoma (n=82)

Subsite	Stage I n (%)	Stage II n (%)	Stage III n (%)	Stage IV n (%)	Total	p-value
Glottic (n=46)	18 (39.1)	15 (32.6)	9 (19.6)	4 (8.7)	46	<0.001*
Supraglottic (n=36	3 (8.3)	8 (22.2)	14 (38.9)	11 (30.6)	36	
Transglottic (n=9)	0 (0.0)	2 (22.2)	4 (44.4)	3 (33.3)	9	
Subglottic (n=3)	0 (0.0)	0 (0.0)	2 (66.7)	1 (33.3)	3	
Unclassified (n=1)	0 (0.0)	0 (0.0)	1 (100.0)	0 (0.0)	1	
Total (n=95)	**21 (22.1)**	**25 (26.3)**	**30 (31.6)**	**19 (20.0)**	**95**	

Table 2: TNM stage distribution by laryngeal subsite (n=95), with chi-square test results

6.6 Histopathological Findings

Squamous cell carcinoma (SCC) constituted 97.9% of all cases. Keratinising SCC was the most common histological subtype (n = 81, 85.3%), followed by non-keratinising SCC (n = 11, 11.6%) and verrucous carcinoma (n = 3, 3.2%). No cases of adenocarcinoma, sarcoma, or neuroendocrine carcinoma were identified in the study period. The near-exclusive SCC histology is consistent with all major Indian [18,21] and international [13,14,24] series and reflects the well-established squamous metaplasia–dysplasia–carcinoma sequence driven by tobacco carcinogen exposure.

7. Discussion and Interpretation

The present study provides a contemporaneous clinicodemographic and stage-specific characterisation of laryngeal carcinoma from one of Greater Noida's primary teaching hospitals,

contributing institution-level data to the sparse published literature on head and neck oncology from the NCR–Western UP region. Several findings merit focused interpretation.

The extreme male predominance (M:F = 10.9:1, 91.6% male) in this cohort exceeds even the high male-to-female ratios reported from southern and central Indian series (typically 7:1 to 9:1) [21,25], and may reflect the greater social restriction on female tobacco and alcohol use in the predominantly conservative peri-urban UP communities that constitute this hospital's catchment area. The predominance of the 50–60-year age group (35.8%) and the mean age of 54.3 years are consistent with national data [11,18] and suggest that most patients in this cohort accumulated their carcinogenic exposure over 25–35 years of tobacco use before tumour development—an observation aligned with the long latency period of 20–30 years documented for tobacco-related laryngeal carcinogenesis [3,6].

The high prevalence of beedi smoking (55.8%) is particularly noteworthy. Beedi smoke is unfiltered and contains significantly higher concentrations of carcinogenic polynuclear aromatic hydrocarbons, benzopyrene, and phenolic compounds per puff compared to manufactured cigarettes, conferring a higher relative risk per cigarette-equivalent [3,12]. The affordability of beedis (typically Rs. 5–10 for a bundle of 25) in the low-income population served by this institution—construction workers, farmers, auto-rickshaw drivers, small traders—makes cessation counselling both clinically essential and economically challenging without structured tobacco cessation infrastructure.

The subsite-stage discordance documented in this study deserves particular emphasis in the context of North Indian clinical practice. Glottic tumours were diagnosed predominantly at Stage I/II (71.7%), while supraglottic tumours clustered at Stage III/IV (69.4%), a statistically highly significant difference ($p < 0.001$). This pattern has dual implications. First, hoarseness—present in 93.7% of all patients—functions as a powerful early warning symptom for glottic tumours; patients and primary care practitioners must be educated to consider laryngoscopy as mandatory for any hoarseness persisting beyond three weeks in a tobacco-using male over 45 years [7,24]. Second, the absence of early symptoms in supraglottic carcinoma demands that dysphagia, referred otalgia, and unexplained neck lymphadenopathy in the same demographic profile be regarded as red-flag symptoms warranting urgent specialist referral [16,25]. The mean diagnostic delay of 7.4 months in this cohort—reaching 9.1 months for patients from rural feeder districts—represents an entirely avoidable window during which potentially curable disease progresses to a stage where laryngeal preservation becomes impossible [19,25].

The association between combined tobacco-alcohol exposure and advanced-stage disease (OR = 3.8, $p = 0.003$) corroborates the well-established synergistic carcinogenicity of these two agents in laryngeal tissue [3,6,26]. Alcohol acts as a solvent, enhancing mucosal permeability to tobacco carcinogens, and the combined exposure creates a mutagenic milieu significantly more potent than either agent alone. Targeted de-addiction counselling for patients with dual exposure is therefore doubly urgent, both for primary prevention in the at-risk community and for improving treatment outcomes in diagnosed patients [12,16].

The SCC histological dominance (97.9%) and the preponderance of keratinising variants are consistent with all comparable Indian series [18,21] and reflect the well-characterised squamous differentiation pathway driven by tobacco carcinogen exposure in the laryngeal epithelium. The three verrucous carcinoma cases (3.2%) are notable for their association with smokeless tobacco use—a finding that aligns with existing literature suggesting a stronger verrucous carcinoma–smokeless tobacco link compared to smoked tobacco [13].

In the context of Greater Noida and the NCR–Western UP corridor, the findings of this study carry practical public health implications. Campaigns targeting beedi cessation, awareness of hoarseness as a warning symptom, and rapid referral pathways from primary health centres to tertiary ENT departments could substantially reduce diagnostic delay and stage at presentation. The high proportion of patients from rural Western UP districts (Bulandshahr, Aligarh) attending this facility highlights the need for outreach diagnostic camps with portable fibreoptic laryngoscopy in these underserved areas.

8. Conclusion

This descriptive study establishes that laryngeal carcinoma at Sharda University Hospital, Greater Noida, predominantly affects tobacco-using males in their sixth decade, with glottic carcinoma as the most common subsite. The critical finding of a statistically significant stage-subsite discordance—early-stage glottic vs. advanced-stage supraglottic presentation—has direct clinical implications for symptom-based triage and specialist referral in primary care. Beedi smoking and combined tobacco-alcohol use represent the dominant and modifiable risk factors in this cohort. A mean diagnostic delay of 7.4 months, particularly in patients from rural feeder areas, represents a substantive and addressable barrier to early diagnosis. These findings advocate for structured tobacco cessation programmes, targeted public health education on hoarseness as a cancer warning symptom, and strengthening of specialist referral networks across the NCR–Western UP region.

9. Limitations of the Study

(i) The study design is descriptive and hospital-based, precluding causal inference and limiting generalisability to the institution's catchment population. (ii) The eight-month study period may introduce seasonal variation bias; laryngeal symptoms may be misattributed to infectious causes in winter months, potentially delaying referral. (iii) No follow-up data on treatment outcomes or survival were captured within the study period; therefore, prognostic conclusions cannot be drawn. (iv) Tobacco quantification was based on self-report (pack-years for smokers), which is subject to recall bias and social desirability bias, particularly in older patients. (v) Alcohol consumption data were not formally quantified using validated instruments (e.g., AUDIT score) due to the retrospective component of data collection; this limits precision in dose-response analysis. (vi) Molecular and immunohistochemical characterisation (p53, EGFR expression, HPV status) was not performed due to resource constraints, precluding molecular subtyping. (vii) The sample size, while adequate for the primary descriptive objectives, limits statistical power for subgroup analyses (e.g., female patients, subglottic tumours).

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