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Original Research Article

Clinical Profile of the Patients Presenting with Laryngeal Carcinoma

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Abstract: *Laryngeal carcinoma is a common head and neck malignancy and remains an important cause of morbidity and mortality, particularly in low- and middle-income countries where delayed presentation is frequent. Local data describing the clinical profile of affected patients in Pakistan remains limited.* ***Objective:*** *To determine the demographic characteristics, tumor subsite distribution, stage at presentation, and major clinical features of patients presenting with laryngeal carcinoma at a tertiary care hospital in Lahore, Pakistan.* ***Methods:*** *This descriptive cross-sectional study was conducted in the Department of ENT at the University of Lahore Teaching Hospital, Lahore, from 8 January to 8 April 2025. A total of 134 patients with biopsy-proven laryngeal carcinoma were enrolled through non-probability consecutive sampling. Patients of either gender and any age with histologically confirmed disease were included. Data on age, gender, smoking status, duration of symptoms, family history, tumor site, cancer stage, and presenting clinical features were recorded on a structured proforma. Data were analyzed using SPSS version 25. Quantitative variables were summarized as mean ± standard deviation, while qualitative variables were expressed as frequencies and percentages. Chi-square test was applied after stratification, and p≤0.05 was considered statistically significant.* ***Results:*** *The mean age of patients was 57.8 ± 11.6 years, and 86.6% were male. Smoking was reported in 75.4% of patients. Glottic tumors were the most frequent subtype (39.6%), followed by supraglottic (30.6%), transglottic (19.4%), and subglottic tumors (10.4%). Most patients presented with advanced-stage disease, with stage III and IV accounting for 64.9% of cases. Hoarseness was the most common presenting symptom (88.1%), followed by dysphagia (56.7%) and dyspnea (36.6%). Smoking was significantly associated with advanced-stage disease (p=0.018), and tumor subsite was significantly associated with stage at presentation (p<0.001).* ***Conclusion:*** *Laryngeal carcinoma in this setting predominantly affected middle-aged male smokers and commonly presented at an advanced stage. Hoarseness was the leading presenting complaint, while smoking and non-glottic tumor sites were associated with later-stage disease. Early recognition and timely referral may improve outcomes.*

Keywords: Laryngeal Neoplasms, Carcinoma, Squamous Cell, Hoarseness, Smoking, Dysphagia

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Introduction

Laryngeal carcinoma is one of the most prevalent malignancies of the head and neck region, representing a significant global public health burden. According to GLOBOCAN 2020 data, approximately 177,000 new cases of laryngeal cancer and over 94,000 related deaths are recorded worldwide annually, making it the second most common malignancy of the respiratory tract after lung cancer (1). Updated GLOBOCAN 2022 figures continue to emphasize the substantial global incidence of this disease, with conspicuous geographic variation between high-income and low- to middle-income countries (2).

Laryngeal carcinoma predominantly affects middle-aged to elderly individuals, with a well-recognized male preponderance. Epidemiological analyses confirm that the disease's peak incidence occurs in the sixth and seventh decades of life (3). Global burden analyses further document that men are affected at four to seven times the rate of women, a disparity largely attributable to historically higher rates of tobacco consumption and occupational carcinogen exposure among males (4). Squamous cell carcinoma constitutes more than 95% of all laryngeal malignancies, with all other histological subtypes being exceedingly rare.

Tobacco smoking remains the single most important and well-established modifiable risk factor for laryngeal carcinoma. Temporal analyses of incidence trends demonstrate a close correlation between national smoking rates and laryngeal cancer incidence, with declines observed in countries that have implemented sustained tobacco control policies (5). Human papillomavirus (HPV) infection, particularly high-risk subtypes, has been increasingly recognized as an etiological contributor to a subset of laryngeal carcinomas, with HPV-positive tumors demonstrating distinct molecular profiles and prognostic behavior(6). Alcohol consumption, occupational carcinogen exposure, and gastroesophageal reflux disease have also been implicated as secondary risk factors.

The larynx is anatomically subdivided into three distinct regions: the supraglottis, the glottis, and the subglottis. Glottic tumors are most frequently diagnosed at earlier stages because even minimal vocal cord involvement produces hoarseness, prompting earlier medical consultation (7). Supraglottic and subglottic tumors, by contrast, often remain clinically silent until they attain an advanced stage, given their larger anatomical space for expansion and the absence of a prominent early symptom. Contemporary population-based analyses confirm that tumor subsite is a significant independent predictor of stage at diagnosis, treatment selection, and long-term survival (8).

The management of laryngeal carcinoma has evolved considerably, ranging from transoral laser microsurgery and radiation for early-stage glottic disease to multimodal regimens combining larynx-preservation chemoradiation or total laryngectomy for advanced cases (9). Organ-preservation strategies remain a major focus of contemporary oncological practice, yet their feasibility is fundamentally contingent on the stage at which patients are diagnosed (10). Despite treatment advances, the overall five-year survival for laryngeal carcinoma remains approximately 60–65%, with substantially worse outcomes for patients presenting with advanced-stage disease.

In the Pakistani context, laryngeal carcinoma presents unique epidemiological and clinical challenges. Pakistan has one of the highest rates of tobacco use in South Asia, encompassing cigarette smoking, smokeless tobacco (naswar), and waterpipe use. Socioeconomic barriers, limited specialist ENT services, low health literacy, and cultural

reluctance to seek timely medical care collectively contribute to delayed presentation, with the majority of patients arriving at tertiary care centers at advanced disease stages (1,3,8). Despite this burden, there is a conspicuous paucity of structured, prospectively collected clinical data from Pakistan describing the demographic characteristics, symptom profiles, tumor subsite distribution, and staging patterns of laryngeal carcinoma. The present study was therefore designed to comprehensively characterize the clinical profile of patients presenting with biopsy-proven laryngeal carcinoma at a tertiary care teaching hospital in Lahore, Pakistan, to inform early detection strategies, public health education, and evidence-based resource allocation within the local healthcare system.

Methodology

This descriptive cross-sectional study was conducted in the Department of ENT at the University of Lahore Teaching Hospital, Lahore, from 8 January to 8 April 2025, following approval of the synopsis. The study was designed to determine the clinical profile of patients presenting with laryngeal carcinoma at the study institution. The target population consisted of patients with biopsy-proven laryngeal carcinoma presenting to the ENT department during the study period.

A non-probability consecutive sampling technique was used for patient recruitment. The sample size was calculated at 134 patients using a 95% confidence level, a 7% margin of error, and an expected dysphagia rate of 21.8%. All eligible patients presenting during the study period were enrolled consecutively until the required sample size was achieved. Patients of either gender and any age were included if they had a diagnosis of laryngeal carcinoma confirmed on biopsy according to the operational definition of the study. Patients with non-malignant tumors on histopathology, as well as those with benign or infective lesions on histological examination, were excluded from the study.

For this study, laryngeal carcinoma was operationally defined by primary tumor size, regional lymph node involvement, and distant metastasis, which together determined the overall stage of disease, ranging from stage I to stage IV. The diagnosis and TNM staging were established through a combination of clinical evaluation, physical examination, biopsy findings, and imaging studies. The clinical profile of each patient was assessed for hoarseness, foreign-body sensation or globus pharyngeus, stridor, neck lump, dyspnea, dysphagia, and throat pain. In addition, other important variables recorded for each participant included age, gender, smoking status, duration of symptoms, site involvement of the tumour, stage of cancer, and family history.

After approval by the hospital's ethics committee, written informed consent was obtained from all participants prior to enrolment. A total of 134 patients fulfilling the selection criteria were included in the study. Demographic information, including age and gender, was recorded on a pre-designed pro forma. A detailed clinical history was obtained from every patient, followed by a thorough physical examination. Relevant laboratory, radiological, laryngoscopic, and histological investigations were performed in all patients as part of the diagnostic workup. The collected information was entered systematically into the study proforma to ensure uniformity and completeness of data collection. Bias was minimized by applying the predefined exclusion criteria and by using uniform assessment procedures for all enrolled patients.

Data were entered and analyzed using SPSS version 25.0. Qualitative variables, including gender, tumour site involvement, cancer stage, family history, smoking status, and components of the clinical profile, were summarized as frequencies and percentages. Quantitative variables, specifically age and symptom duration, were reported as mean and standard deviation. To assess the effect of possible modifiers, the data were stratified for age, gender, site involvement of tumour, stage of cancer, family history, smoking status, and duration of symptoms. Post-stratification, the chi-square test was applied to determine statistical significance. A p-value of 0.05 or less was considered statistically significant.

Results

A total of 134 biopsy-proven patients with laryngeal carcinoma were enrolled from the ENT Department at the University of Lahore Teaching Hospital, Lahore, during the six-month study period. The mean age of the patients was 57.8 ± 11.6 years, while the mean duration of symptoms was 5.2 ± 2.7 months. Most patients were male, with 116 (86.6%) men and 18 (13.4%) women. The largest proportion of patients belonged to the 51–60 years age group (34.3%), followed by the 61–70 years age group (25.4%). A history of smoking was present in 101 (75.4%) patients, whereas a positive family history of malignancy was observed in 19 (14.2%) patients (Table 1).

Table 1: Demographic and baseline characteristics of patients with laryngeal carcinoma (n=134)

Variable	Category	Frequency (n)	Percentage (%)
Age (years)	Mean ± SD	57.8 ± 11.6	—
Duration of symptoms (months)	Mean ± SD	5.2 ± 2.7	—
Age group	≤40 years	12	9.0
	41–50 years	28	20.9
	51–60 years	46	34.3
	61–70 years	34	25.4
	>70 years	14	10.4
Gender	Male	116	86.6
	Female	18	13.4
Smoking status	Smoker	101	75.4
	Non-smoker	33	24.6
Family history of malignancy	Yes	19	14.2
	No	115	85.8

Most tumors involved the glottic region, seen in 53 (39.6%) patients, followed by supraglottic involvement in 41 (30.6%), transglottic disease in 26 (19.4%), and subglottic tumors in 14 (10.4%). Regarding overall cancer stage, advanced disease was common at presentation, with stage IV noted in 45 (33.6%) patients and stage III in 42 (31.3%). Early-stage disease was less frequent, with 18 (13.4%) patients presenting in stage I and 29 (21.6%) in stage II (Table 2).

Table 2: Site involvement of tumour and stage of cancer (n=134)

Variable	Category	Frequency (n)	Percentage (%)
Site involvement of tumour	Glottic	53	39.6
	Supraglottic	41	30.6

	Transglottic	26	19.4
	Subglottic	14	10.4
Stage of cancer	Stage I	18	13.4
	Stage II	29	21.6
	Stage III	42	31.3
	Stage IV	45	33.6

Hoarseness was the most frequent presenting complaint, reported by 118 (88.1%) patients. Dysphagia was the second most common symptom, present in 76 (56.7%) patients. Other common clinical features included dyspnea in 49 (36.6%), neck lump in 44 (32.8%), stridor in 39 (29.1%), foreign body sensation/globus pharyngeus in 31 (23.1%), and throat pain in 27 (20.1%) patients (Table 3).

Table 3: Clinical profile of patients presenting with laryngeal carcinoma (n=134)

Clinical Feature	Frequency (n)	Percentage (%)
Hoarseness	118	88.1
Dysphagia	76	56.7
Dyspnea	49	36.6
Neck lump	44	32.8
Stridor	39	29.1
Foreign body sensation / globus pharyngeus	31	23.1
Throat pain	27	20.1

On stratification of stage of cancer by smoking status, smokers were more likely to present with advanced disease. Among smokers, stage III and IV disease accounted for 73 (72.3%) cases, compared with 14 (42.4%) among non-smokers. This association was statistically significant (Chi-square test, p=0.018) (Table 4).

Table 4: Stratification of stage of cancer with smoking status (n=134)

Smoking Status	Stage I	Stage II	Stage III	Stage IV	Total	p-value
Smoker (n=101)	10	18	34	39	101	0.018
Non-smoker (n=33)	8	11	8	6	33	
Total	18	29	42	45	134	

A significant relationship was also observed between tumor subsite and stage at presentation. Glottic tumors were more often identified in earlier stages, whereas supraglottic, transglottic, and subglottic tumors were more frequently associated with stage III and IV disease. This difference was statistically significant (Chi-square test, p<0.001) (Table 5).

Table 5: Stratification of stage of cancer with site involvement of tumour (n=134)

Site Involvement	Stage I	Stage II	Stage III	Stage IV	Total	p-value
Glottic	12	18	15	8	53	<0.001
Supraglottic	3	7	14	17	41	
Transglottic	2	3	8	13	26	
Subglottic	1	1	5	7	14	
Total	18	29	42	45	134	

When symptoms were examined across tumor subsites, hoarseness was predominantly associated with glottic lesions, whereas dysphagia, dyspnea, and neck lump were relatively more frequent in supraglottic and transglottic disease. Stridor was more often observed in subglottic and transglottictumors, reflecting later presentation and airway compromise in these groups (Table 6).

Table 6: Distribution of major presenting symptoms according to site involvement of tumour (n=134)

Symptom	Glottic (n=53)	Supraglottic (n=41)	Transglottic (n=26)	Subglottic (n=14)	Total (n=134)
Hoarseness	50	35	22	11	118
Dysphagia	12	29	22	13	76
Dyspnea	8	13	17	11	49
Neck lump	6	18	13	7	44
Stridor	4	8	15	12	39
Foreign body sensation / globus	5	14	8	4	31
Throat pain	4	11	8	4	27

Discussion

The present study provides a comprehensive clinical characterization of 134 biopsy-proven patients with laryngeal carcinoma at a tertiary care hospital in Lahore, Pakistan. The mean age of 57.8 ± 11.6 years is consistent with patterns documented in the international literature. Bradford et al. reported in a systematic review of prognostic factors in laryngeal squamous cell carcinoma that the disease predominantly affects individuals aged 55–70 years globally, with peak incidence in the sixth decade (11). Igissin et al. corroborated this in a narrative review, noting that the median age at diagnosis of laryngeal cancer ranges from 56 to 63 years across diverse geographic settings (12). Our cohort is therefore demographically consistent with established global patterns.

The pronounced male predominance in our study (86.6%; male-to-female ratio ≈ 6.4:1) aligns with established gender disparities reported worldwide. Huang et al., in a global cancer registry analysis covering 185 countries, confirmed that men account for approximately 80–85% of all laryngeal carcinoma cases, attributing this to differential tobacco and alcohol exposure across genders (13). In South Asian populations specifically, where women have historically had markedly lower tobacco consumption rates, this male preponderance is particularly pronounced. Bagal et al. documented a similarly high male predominance in head and neck cancer across 37 Indian cancer registries, where laryngeal cancer was among the most male-skewed subsites (14). The high smoking prevalence (75.4%) in our cohort reinforces tobacco as the dominant exposure in this population.

Glottic carcinoma was the most common subsite in our cohort (39.6%), followed by supraglottic (30.6%) and transglottic (19.4%) disease. This distribution is broadly consistent with patterns reported from South Asian and Eastern European tertiary centers. Dokanovic et al. described a similar subsite distribution in a single-center retrospective study of laryngeal cancer patients, where glottic predominance was maintained but with a relatively higher burden of supraglottic tumors compared to Western series (15). Gormley et al. highlighted in an epidemiological review that supraglottic tumors are proportionally more prevalent in developing countries and lower-income settings, likely reflecting delayed presentation and limited access to early diagnostic services (16). The higher combined burden of supraglottic and transglottic disease (50%) in our study is consistent with this pattern.

One of the most clinically significant findings of our study was the high proportion of patients presenting with advanced-stage disease, with stage III and IV disease collectively accounting for 64.9% of cases. This substantially exceeds rates reported from high-income countries. In a temporal analysis of laryngeal cancer trends in the United States using population-based registry data, Divakar et al. reported that approximately 40–50% of laryngeal cancers in the US are diagnosed at early stages, facilitated by high rates of primary care access and early symptom recognition (17). By contrast, our findings align with data from comparable resource-constrained settings. Teh and Woon documented that in Malaysia, cancers attributable to modifiable risk factors — including laryngeal cancer — were predominantly detected at advanced stages, with over 60% attributed to tobacco — a pattern driven by late specialist referral and diagnostic delays (18).

Hoarseness was the predominant presenting symptom (88.1%), reflecting its well-established role as the hallmark early sign of glottic carcinoma. Cirstea et al. reported that dysphonia was present in 93% of a 152-patient Eastern European cohort of laryngeal carcinoma. They emphasized that any persistent hoarseness in a tobacco-exposed patient beyond three weeks must prompt urgent laryngoscopy to minimize diagnostic delay (19). The high frequency of dysphagia (56.7%) in our series is consistent with the substantial proportion of supraglottic and transglottictumors, which encroach upon the hypopharynx and impair swallowing earlier than pure glottic lesions. Dyckhoff et al. confirmed in a cohort of 194 supraglottic cancer patients that dysphagia and neck mass were the predominant presenting features, occurring in over 60% of cases. At the same time, hoarseness was relatively less prominent (20).

The statistically significant association between tobacco smoking and advanced-stage disease at presentation ($p=0.018$) is well supported by contemporary global evidence. Zhang et al. demonstrated in a comprehensive global burden analysis across 204 countries that smoking accounted for 63.5% of laryngeal cancer deaths and was independently associated not only with higher incidence but also with more aggressive tumorbehavior at presentation (21). In the Pakistani context, this risk is further compounded by the widespread use of smokeless tobacco products, including naswar and paan, which may delay symptom recognition and specialist consultation.

The highly significant association between tumor subsite and stage at presentation ($p< 0.001$) is well-established in the oncological literature. Kim et al., in a systematic review and meta-analysis of 28 studies encompassing over 32,000 patients with laryngeal squamous cell carcinoma, confirmed that supraglottic and subglottic subsites were independent predictors of advanced-stage diagnosis, attributable to their rich lymphatic drainage and the greater potential space available for tumor expansion before producing overt symptoms (22). Our finding that glottic tumors predominantly presented at early stages (stage I/II: 56.6%) while supraglottic and subglottic lesions were concentrated in advanced stages fully corroborates this well-established oncological principle.

Stridor was present in 29.1% of patients and was predominantly associated with subglottic and transglottictumors, indicating significant airway compromise. Yang et al. performed the largest SEER-based analysis of subglottic squamous cell carcinoma (n=842). They confirmed that subglottic and transglottictumors are associated with significantly higher rates of advanced-stage presentation, airway compromise, and emergency tracheostomy compared to purely glottic or supraglottic disease (23). The high frequency of stridor in our cohort further underscores the pattern of delayed healthcare-seeking in this population. Kulothungan et al. documented in a systematic review and meta-analysis from South Asia that tobacco-associated cancers of the head and neck — including laryngeal carcinoma — carry a pooled attributable risk of 3.95, confirming the critical role of tobacco cessation in primary prevention in this region (24).

Thus, this study demonstrates a male-predominant, middle-aged affected population with a high burden of tobacco exposure, predominantly glottic subsite involvement, a majority presenting with advanced-stage disease, and a symptom profile dominated by hoarseness and dysphagia. These findings carry important implications for public health policy in Pakistan, specifically the urgent need for enhanced tobacco control programs, community-level awareness campaigns to promote early recognition of persistent hoarseness, and strengthened ENT referral pathways within the primary and secondary healthcare systems to facilitate earlier diagnosis and improve overall survival outcomes.

This was a single-center study conducted at one tertiary care hospital, which may limit the generalizability of the findings to other healthcare settings and populations in Pakistan. In addition, the cross-sectional design and non-probability consecutive sampling approach may limit causal interpretation and introduce selection bias.

Conclusion

Laryngeal carcinoma in this study predominantly affected middle-aged male smokers and was usually diagnosed at an advanced stage. Hoarseness was the most frequent presenting symptom, while smoking and non-glottic tumor involvement were linked with later-stage disease. These findings support the need for stronger tobacco control, public awareness, and earlier ENT referral to improve early diagnosis in Pakistan.

Declarations

Data Availability statement

All data generated or analysed during the study are included in the manuscript.

Ethics approval and consent to participate

Approved by the department concerned. (IRBEC-UMDIRB-323-24)

Consent for publication

Approved

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Not applicable

Conflict of interest

The authors declared the absence of a conflict of interest.

Author Contribution

HE (PGR)
Manuscript drafting, Study Design,
ZA (Professor & HOD)
Review of Literature, Data entry, Data analysis, and drafting articles.

All authors reviewed the results and approved the final version of the manuscript. They are also accountable for the integrity of the study.

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