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ORIGINAL ARTICLE

Risk Factors and Presentation Pattern of Laryngeal Cancer

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ABSTRACT

Background: *Laryngeal carcinoma accounts for about 1% of all cancers and 30–40% of head and neck malignancies worldwide, with significant gender disparity and regional variation, including in Bangladesh [1–3]. In view of its strong association with tobacco, alcohol, and betel quid chewing and the frequent late-stage presentation locally, this study was conducted to evaluate the risk factors and presentation patterns of laryngeal cancer.* ***Objective:*** *The aim of the study was to evaluate the risk factors and clinical presentation patterns of laryngeal cancer among affected patients.* ***Methods & Materials:*** *This prospective observational study was conducted at the Department of Otolaryngology–Head & Neck Surgery, Bangladesh Medical University (BMU), Dhaka, Bangladesh, from January 2025 to December 2025, including 80 patients with newly diagnosed laryngeal cancer. Demographic details, risk factors, clinical symptoms, tumor location, and TNM stage were recorded. Data were analyzed using SPSS version 26.0, with categorical variables expressed as frequencies and percentages and continuous variables as mean ± standard deviation.* ***Results:*** *Among 80 patients, the mean age was 56.2 ± 11.1 years, with the majority aged 50–69 years, and males predominating (81.3%). The most common risk factors were combined smoking with betel use (53.8%) and smoking alone (31.3%). Hoarseness of voice was the predominant symptom (56.3%). Tumors were primarily located in the glottic region (52.5%), and most patients presented at advanced stages (62.5%).* ***Conclusion:*** *Laryngeal cancer predominantly affects older males with high exposure to tobacco and betel use, commonly presents with hoarseness and glottic involvement, and is often diagnosed at advanced stages, emphasizing the need for early detection and targeted risk factor mitigation.*

Keywords: *Laryngeal Cancer, Risk Factors, Clinical Presentation*

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INTRODUCTION

Laryngeal carcinoma represents a significant public health concern globally, accounting for approximately 1% of all malignancies and constituting 30–40% of head and neck cancers [1]. Although it predominantly affects individuals aged 65–74 years, there is considerable variation in age distribution across different regions. Worldwide, the lifetime risk of developing laryngeal carcinoma exhibits a notable gender disparity, with men facing a risk of 1 in 200, whereas women have a comparatively lower risk of 1 in 840 [2]. In South Asia, including Bangladesh, laryngeal carcinoma comprises a substantial proportion of head and neck malignancies, reflecting both global patterns and region-specific differences in incidence and demographic characteristics [3].

The etiology of laryngeal carcinoma is multifactorial, with tobacco use and alcohol consumption recognized as the principal risk factors. Studies indicate that approximately 66% of patients with laryngeal squamous cell carcinoma have a history of smoking, with nearly three-quarters of these individuals having smoked for more than 30 years prior to diagnosis [4]. Additional contributing factors include gastroesophageal reflux, occupational exposures to chemicals, genetic predispositions, and culturally specific habits such as betel quid chewing [5]. Supraglottic carcinoma, in particular, has shown strong associations with cigarette smoking, use of tobacco, chewing of betel nut and leaves, and excessive alcohol intake, underscoring the combined impact of lifestyle and environmental factors in the disease's development (Chauhan et al 2018) [6].

The clinical manifestations of laryngeal carcinoma are largely influenced by the tumor's anatomical location. Tumors most commonly develop in the glottic region (49%), followed by the supraglottic (16%) and subglottic (5%) regions [7]. Hoarseness of voice is generally the earliest and most prominent symptom, particularly in patients with glottic involvement. Other frequent presentations include difficulty swallowing, pain during swallowing, noisy breathing, and palpable neck masses [7]. In glottic carcinoma, persistent hoarseness warrants careful evaluation, as delayed or inadequate management may result in airway compromise, dysphagia, and significant pain [8].

Despite the recognition of these established risk factors and clinical features, many cases in Bangladesh are diagnosed at advanced stages, often due to socioeconomic factors such as poverty, illiteracy, limited access to healthcare, and delayed medical consultation. Alarming reports of laryngeal carcinoma in children as young as 10 years further indicate a shift toward

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earlier onset of the disease in this population [9]. These observations underscore the necessity for systematic research to assess risk factors and characterize clinical presentations among Bangladeshi patients, aiming to inform early detection strategies and optimize clinical outcomes. The present study was therefore undertaken to evaluate the risk factors and presentation patterns of laryngeal cancer in patients attending Bangladesh Medical University.

OBJECTIVE

To evaluate the risk factors and clinical presentation patterns of laryngeal cancer among affected patients.

METHOD & MATERIALS

This prospective observational study was conducted at the Department of Otolaryngology–Head & Neck Surgery, Bangladesh Medical University (BMU), Dhaka, Bangladesh, from January 2025 to December 2025. A total of 80 patients with newly diagnosed laryngeal cancer were included, selected based on predefined inclusion and exclusion criteria. Data were systematically collected to evaluate demographic characteristics, risk factors, clinical presentation patterns, tumor location, and stage at presentation.

Inclusion Criteria:

- Patients of all ages diagnosed with laryngeal cancer.
- Both male and female patients.
- Newly diagnosed cases with complete clinical records.

Exclusion Criteria:

- Patients with recurrent laryngeal cancer.
- Patients with a history of prior laryngeal surgery.
- Cases with incomplete or missing clinical records.

Demographic data, including age and sex, were recorded, and a detailed history of potential risk factors—such as smoking, alcohol consumption, chewing betel leaves and nuts, use of smokeless tobacco, occupational chemical exposures, and gastroesophageal reflux disease (GERD)—was obtained for all patients. Clinical symptoms, including hoarseness of voice, dysphagia, odynophagia, and neck mass, were documented. Tumor evaluation was performed using laryngoscopy and imaging studies to determine anatomical location (glottic, supraglottic, subglottic) and clinical stage according to the TNM classification. All collected data were entered into Microsoft Excel and analyzed using SPSS version 26.0 (IBM Corp., Armonk, NY, USA). Descriptive statistics were applied, with categorical variables expressed as frequencies and percentages, and continuous variables, such as age, presented as mean ± standard deviation (SD).

RESULTS

Table I presents the age and sex distribution of the 80 patients with laryngeal cancer. The mean age of the study population was 56.2 ± 11.1 years, with the majority of patients aged 50–59 years (35.0%). Males predominated (n = 65, 81.3%) compared to females (n = 15, 18.7%).

Table – I: Demographic Characteristics of the Study Population (*n* = 80)

Characteristic		Frequency (n)	Percentage (%)
Age (years)	30–39	6	7.5
	40–49	14	17.5
	50–59	28	35.0
	60–69	22	27.5
	≥70	10	12.5
	Mean ± SD	56.2 ± 11.1	
Sex	Male	65	81.3
	Female	15	18.7

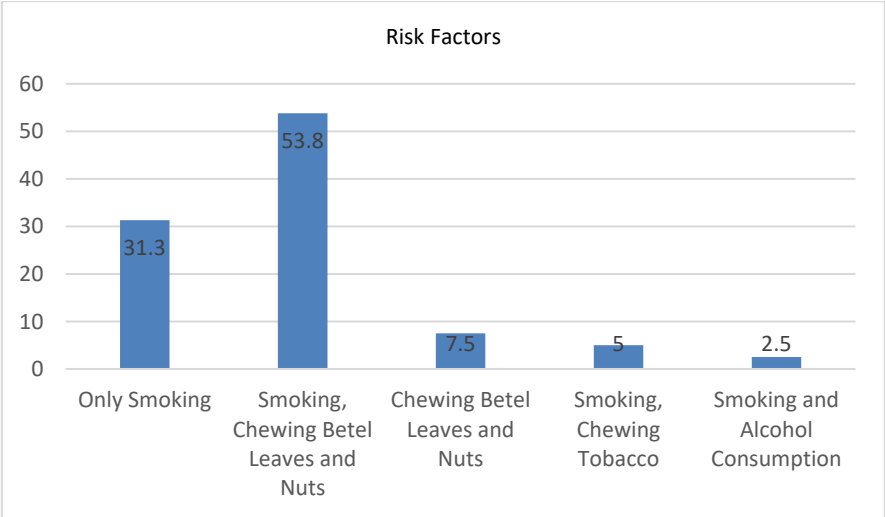

Figure – 1: Risk Factors Observed in Patients with Laryngeal Cancer (*n* = 80)

Figure 1 illustrates the distribution of risk factors among the study participants. The most common exposure was combined smoking with chewing betel leaves and nuts, observed in 43 patients (53.8%), followed by only smoking in 25 patients (31.3%). Chewing betel leaves and nuts alone was reported in 6 patients (7.5%), while 4 patients (5.0%) had a history of smoking with chewing tobacco. Smoking combined with alcohol consumption was the least common exposure, found in 2 patients (2.5%).

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Table II presents the clinical presentation of patients. Hoarseness of voice was the most frequently reported symptom, observed in 45 patients (56.3%), followed by dysphagia and neck mass, which together were present in 25 patients (31.3%). Respiratory distress was reported in 10 patients (12.5%).

Table – II: Clinical Presentation of Patients with Laryngeal Cancer (*n* = 80)

Symptom	Frequency (n)	Percentage (%)
Hoarseness of voice	45	56.3
Dysphagia + Neck Mass	25	31.3
Respiratory Distress	10	12.5

Table III shows the anatomical distribution of tumors among the study participants. The glottic region was most commonly involved (42 patients, 52.5%), followed by the supraglottic region (28 patients, 35.0%) and the subglottic region (10 patients, 12.5%).

Table – III: Tumor Location in Patients with Laryngeal Cancer (*n* = 80)

Tumor Location	Frequency (n)	Percentage (%)
Glottic	42	52.5
Supraglottic	28	35.0
Subglottic	10	12.5

Table IV presents the stage at presentation of the patients. Most patients (50, 62.5%) were diagnosed at advanced stages (III–IV), while 30 patients (37.5%) presented at early stages (I–II).

Table – IV: Stage at Presentation of Laryngeal Cancer (*n* = 80)

Stage	Frequency (n)	Percentage (%)
Early (I–II)	30	37.5
Advanced (III–IV)	50	62.5

DISCUSSION

In this prospective observational study conducted at Bangladesh Medical University, the majority of patients with laryngeal cancer were middle-aged to older males, with combined smoking and betel leaf/nut chewing identified as the most prevalent risk factor. Hoarseness of voice was the most common presenting symptom, and tumors were predominantly glottic in location. A substantial proportion of patients presented at advanced stages, emphasizing the importance of early recognition of risk factors and timely clinical evaluation in this population.

The mean age of patients in our study was 56.2 ± 11.1 years, with the majority aged 50–59 (35.0%) and 60–69 (27.5%) years. Males predominated, accounting for 81.3% of the cohort, while females comprised 18.7%. These findings are consistent with previous studies. Satyani et al., in a descriptive study of 39 patients with laryngeal carcinoma at Mardi Waluyo Hospital, reported a male predominance of 87% and noted that 64% of patients were over 60 years of age, reflecting an older age distribution similar to our study [10]. Similarly, Adeola et al., in a population-based analysis from the SEER database, found that laryngeal carcinoma is predominantly diagnosed in older adults, with median ages in the 60s and approximately three-quarters of cases occurring in males [11]. These studies support the observed trend of higher incidence in older male patients in our cohort.

In the present study, combined smoking with chewing betel leaves and nuts was the most predominant risk factor (53.8%), followed by only smoking (31.3%), while isolated betel chewing (7.5%), smoking with chewing tobacco (5.0%), and smoking with alcohol consumption (2.5%) were less frequent. These findings reflect the characteristic exposure pattern in Bangladesh, where tobacco in both smoked and smokeless forms, often combined with betel nut use, plays a central role in laryngeal carcinogenesis. A similar distribution was reported by Kazi et al., who found combined smoking and betel use to be the most frequent exposure pattern, followed by only smoking, with alcohol-related exposure being relatively low [12]. The dominant role of tobacco in our study is further supported by Vaezi et al., who demonstrated smoking as a strong independent risk factor for laryngeal cancer, with GERD also contributing significantly [13]. Huang et al. corroborated these observations at a global level, identifying smoking as the leading contributor to laryngeal cancer mortality and disease burden, with alcohol acting mainly as a synergistic co-factor [14]. Moreover, Jiang et al. highlighted the carcinogenic potential of occupational exposures such as asbestos and strong acids, reinforcing the multifactorial etiology of the disease [15]. Overall, our findings align with both regional and international evidence, emphasizing the overwhelming impact of tobacco-related habits—particularly when combined with betel use—in the development of laryngeal cancer.

In our study, hoarseness of voice was the most commonly reported symptom, observed in 45 patients (56.3%), followed by dysphagia and neck mass in 25 patients (31.3%), and respiratory distress in 10 patients (12.5%). These results are consistent with previous studies highlighting the predominance of voice changes in laryngeal cancer. Larbcharoensub et al. reported hoarseness as the most frequent symptom (73.6%), followed by odynophagia (14.6%) and cervical lymphadenopathy, showing a symptom distribution comparable to ours [16]. Similarly, Goud et al. noted that hoarseness was present in nearly all malignant cases, with dysphagia and odynophagia reported in 22% and 16% of patients, respectively, supporting the pattern of prominent voice changes often accompanied by swallowing difficulties [17]. These findings emphasize the clinical importance of early recognition of persistent hoarseness and swallowing problems, as they frequently serve as the first indicators of laryngeal malignancy and can aid in prompt diagnosis and intervention.

In our study, the glottic region was the most commonly involved site, affecting 52.5% of patients, followed by the

supraglottic region in 35.0% and the subglottic region in 12.5%. This distribution is consistent with previous reports highlighting the predominance of glottic tumors in laryngeal cancer. Markou et al., in a large epidemiological study in Northern Greece, found that glottic neoplasms were the most frequent site (60.2%), followed by supraglottic tumors (32.8%) and subglottic tumors (1.1%), closely mirroring our findings of glottic predominance and less frequent subglottic involvement [18]. These observations underscore the importance of early evaluation of voice changes, which are often the first clinical manifestation of glottic tumors, and highlight the relatively lower incidence of subglottic lesions, which may present later with more advanced symptoms.

In the present study, the majority of patients (62.5%) were diagnosed at advanced stages (III–IV), while 37.5% presented at early stages (I–II), reflecting a higher proportion of late-stage disease at diagnosis. These findings are consistent with previous literature emphasizing the tendency for laryngeal cancer to be diagnosed at more advanced stages, despite the presence of early symptoms. Sungur et al., in a retrospective analysis of 573 patients with laryngeal squamous cell carcinoma, reported that 56% of patients were early stage and 44% were advanced stage at presentation, highlighting that a significant proportion still present with advanced disease — a pattern comparable to our findings [19]. Similarly, Dragicevic et al. noted that delays in diagnosis often result in patients being identified at later stages (III–IV), supporting the observation in our cohort that advanced-stage presentation predominates [20]. These data underscore the critical importance of early detection and timely evaluation of laryngeal symptoms to improve patient outcomes and reduce the burden of advanced disease.

LIMITATIONS

This study had some limitations:

- The study was conducted at a single center, so the results may limit the generalizability of the findings to other hospitals or regions in Bangladesh.
- The small sample size limits the generalizability of the findings.

CONCLUSION

Laryngeal cancer predominantly affects older adults with a marked male predominance. Tobacco-related habits, particularly combined smoking and betel use, are the major risk factors, while alcohol use, occupational exposures, and GERD are less common. Hoarseness of voice is the most frequent presenting symptom, and tumors are mainly located in the glottic region. The majority of patients present at advanced stages, highlighting the critical need for early recognition of symptoms and timely intervention to improve outcomes.

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CONFLICTS OF INTEREST

There are no conflicts of interest.

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