



## Demographics and Histopathological Features of Laryngeal Carcinoma at Mardi Waluyo Hospital

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### ABSTRACT

**Background:** Laryngeal carcinoma is a malignancy arising from squamous cells of the epithelial lining of the larynx. It is one of the more common head and neck cancers, with an incidence of approximately 3.2 cases per 100,000 individuals annually worldwide. Risk factors include smoking, alcohol consumption, gastroesophageal reflux disease, exposure to chemical inhalants, and viral infections, particularly Human Papillomavirus (HPV).

**Objective:** This study aimed to evaluate the demographic characteristics, histopathological features, and risk factors associated with laryngeal carcinoma among patients at Mardi Waluyo Hospital. Methods: This descriptive study utilized data from medical records and histopathological examinations of patients between 2018 and 2023, analyzed in January 2024 at Mardi Waluyo Hospital.

**Results:** Among 39 patients, 34 were male (87%), and 5 were female (13%). Patients aged  $\leq 60$  years accounted for 36%, while those  $>60$  years constituted 64%. Histopathological examination revealed squamous cell carcinoma in 34 cases (87%) and other pathologies in 5 cases (13%). Smoking history was significant: 75% had smoked for more than 10 years, while 25% smoked for less than 10 years or were non-smokers. **Conclusion:** Over the past five years, an average of 8 cases per year of laryngeal carcinoma were reported. Smoking was identified as the most significant risk factor. Squamous cell carcinoma was the predominant histopathological finding in patients at Mardi Waluyo Hospital.

**Keywords:** laryngeal carcinoma, squamous cell carcinoma, smoking

## INTRODUCTION

Laryngeal carcinoma, a malignancy originating from the squamous epithelium of the larynx, is categorized into three regions: supraglottis, glottis, and subglottis. Studies, such as those by Ciolofan et al., have identified squamous cell carcinoma as the most common histopathological finding, often with moderate or well-differentiated characteristics.<sup>1,2</sup> Key risk factors include smoking, alcohol consumption, gastroesophageal reflux, chemical exposure, and HPV infections.<sup>1,3,4,5</sup>

In 2017, approximately 13,150 new cases of laryngeal carcinoma were reported globally, resulting in 3,710 deaths. This cancer is relatively common among head and neck malignancies, with a global incidence of 3.2 cases per 100,000 individuals annually. It predominantly affects males, with a ratio of 5.8 cases per 100,000 men compared to 1.2 cases per 100,000 women. In Indonesia, the

incidence rates are 2 cases per 100,000 men and 0.2 cases per 100,000 women.<sup>2,4,5</sup>

The highest incidence occurs in individuals aged 65 and above.<sup>4,6</sup> At Mardi Waluyo Hospital, 36 cases were documented from 2018 to 2021, underscoring the significant burden of this disease.

Common symptoms include hoarseness, throat pain, dysphagia, otalgia, coughing, dyspnea, and hemoptysis. In some cases, cervical lymphadenopathy may be the only clinical manifestation, necessitating advanced diagnostic tools such as laryngoscopy, CT scans, and MRIs for accurate diagnosis.<sup>1,4,7</sup>

Most patients are diagnosed at advanced stages (III or IV), limiting treatment options and affecting prognosis. Five-year survival rates vary, with 80% for glottic cancers and 50% for supraglottic cancers.<sup>1,7</sup>

Based on the guidelines

provided by the American Joint Committee on Cancer (AJCC), the classification and staging of malignant laryngeal tumors are categorized as follows:<sup>6</sup>

1. Supraglottis: Includes the posterior surface of the epiglottis located near the hyoid bone, aryepiglottic folds, arytenoids, the epiglottis below the hyoid, false vocal cords, and ventricles.
2. Glottis: Encompasses the true vocal cords, anterior commissure, and posterior commissure.
3. Subglottis: Includes the subglottic walls.

#### Staging Classification

##### 1. Supraglottic Tumors

- T1: Tumor confined to the supraglottis with normal vocal cord mobility.
- T2: Tumor invades the mucosa of the supraglottis or glottis or extends outside the

supraglottis (e.g., base of the tongue, vallecula, medial wall of the piriform sinus) without fixation of the larynx.

- T3: Tumor limited to the larynx with fixation of the larynx and/or extension into the post-cricoid region, pre-epiglottic tissues, paraglottic area, or minor erosion of the thyroid cartilage.
- T4a: Tumor invades through the thyroid cartilage or tissues below the larynx, including the trachea, soft tissues of the neck, intrinsic tongue muscles, thyroid, or esophagus.
- T4b: Tumor invades the prevertebral space, encases the carotid artery, or invades mediastinal structures.

##### 2. Glottic Tumors

1. T1: Tumor limited to

the vocal cords with normal movement.

- T1a: Tumor involves one vocal cord.
  - T1b: Tumor involves both vocal cords.
2. T2: Tumor extends to the supraglottis or subglottis with slightly impaired vocal cord mobility.
  3. T3: Tumor confined to the larynx with fixation of the vocal cords and/or invasion into the paraglottic area or minor thyroid cartilage erosion.
  4. T4a: Tumor invades through the outer cortex of the thyroid cartilage or tissues below the larynx, such as the trachea, neck soft tissues, intrinsic tongue muscles, thyroid, or esophagus.
  5. T4b: Tumor invades the

prevertebral space, encases the carotid artery, or invades mediastinal structures.

### 3. Subglottic Tumors

- T1: Tumor confined to the subglottis.
- T2: Tumor involves the vocal cords with slightly impaired movement.
- T3: Tumor confined to the larynx with vocal cord fixation.
- T4a: Tumor invades through the outer cortex of the thyroid cartilage or tissues below the larynx, such as the trachea, neck soft tissues, intrinsic tongue muscles, thyroid, or esophagus.
- T4b: Tumor invades the prevertebral space, encases the carotid artery, or invades mediastinal structures.

### 4. Lymph Node Enlargement (N)

- N0: No clinically detectable lymph nodes.
- N1: A single homolateral lymph node  $\leq 3$  cm in diameter.
- N2: Multiple homolateral lymph nodes  $> 3$  cm and  $\leq 6$  cm, or contralateral or bilateral nodes  $\leq 6$  cm.
  - N2a: Single homolateral lymph node  $> 3$  cm and  $\leq 6$  cm.
  - N2b: Multiple homolateral lymph nodes  $\leq 6$  cm.
  - N2c: Bilateral or contralateral lymph nodes  $\leq 6$  cm.
- N3: Lymph node  $> 6$  cm.

#### 5. Distant Metastasis (M)

- M0: No distant metastasis.
- M1: Presence of distant metastasis.

#### 6. Staging Summary.<sup>4,6</sup>

- Stage 0: Tis, N0, M0.
- Stage I: T1, N0, M0.
- Stage II: T2, N0, M0.
- Stage III: T3, N0, M0, or T1–T3, N1, M0.
- Stage IVA: T1–T4a, N2 or less, M0.
- Stage IVB: T4b, any N, M0, or any T, N3, M0.
- Stage IVC: Any T, any N, M1.

Management of laryngeal cancer treatment options for laryngeal cancer include radiotherapy, chemotherapy, and surgical intervention. The choice of treatment depends on the tumor stage, location, and overall health of the patient.<sup>6,7</sup>

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### OBJECTIVE

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The objective of this study is to evaluate the demographics, patient characteristics, histopathological features, and the relationship between smoking and alcohol consumption in laryngeal carcinoma patients treated at Mardi Waluyo Hospital.

### RESEARCH DESIGN

This study employs a descriptive design to analyze the profiles of laryngeal carcinoma patients at Mardi Waluyo Hospital from 2018 to 2023.

### SAMPLE POPULATION

The population and sample consist of all patients who underwent surgical procedures involving the larynx during the study period, totaling 39 individuals.

### METHODOLOGY

Data collection was conducted in January 2024 using medical records from 2018 to 2023 at Mardi Waluyo Hospital. Histopathological findings were confirmed via tissue examinations, with 100% of the data sourced from the Ear, Nose, and Throat Department. All excised laryngeal tissues were included in the study. Patient demographic data, age, gender, smoking history, and alcohol consumption history were documented and confirmed directly with patients.

### DATA ANALYSIS

All collected data were processed and analyzed using Microsoft Excel, with percentages calculated for each variable to summarize the findings.

### RESULTS

1. Age Distribution: The youngest patient was 35 years old, while the oldest was 86, with an average age of 63 years. Patients under 60 accounted for 36% of cases, while those over 60 made up 64%.

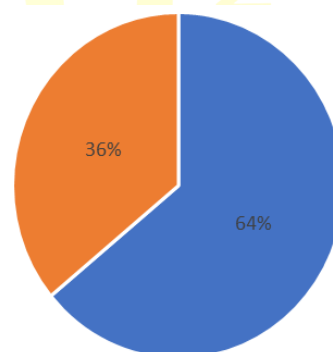


**Figure 1. Age**

■ >60 Years  
■ <60 Years

2. Gender Distribution: Among the 39 cases, 34 patients (87%) were male, and 5 patients (13%) were female.

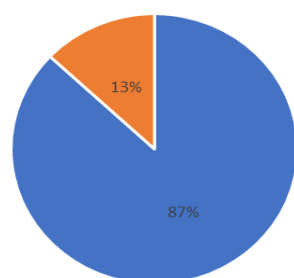
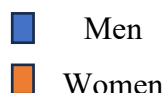


**Figure 2. Gender**



3. Residence: The majority of patients resided in Lampung Province, particularly in East and Central Lampung, where agriculture is the dominant occupation.

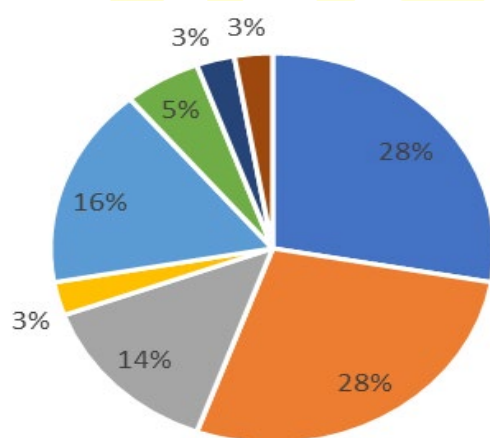
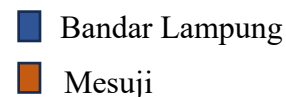
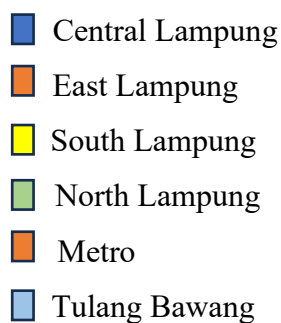


**Figure 3. Residence**



4. Smoking History: Smoking was more prevalent among the patient population, with 75% having a smoking history exceeding 10 years, while the remainder were either non-smokers or smoked for less than 10 years.

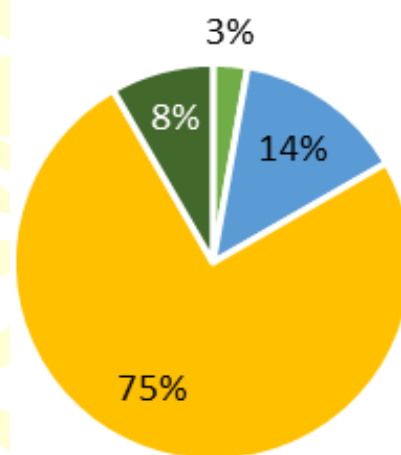
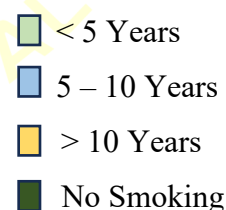


**Figure 4. Smoking**



5. Alcohol Consumption: Most patients reported no history of alcohol consumption throughout their lives.

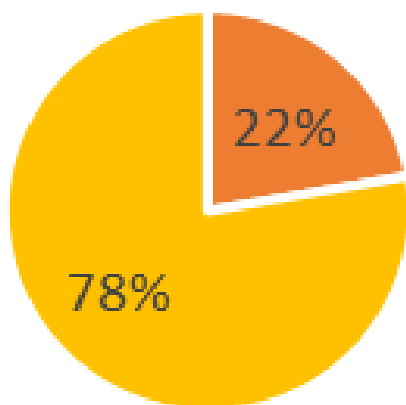


**Figure 5. History of Alcohol**

**Consumption**

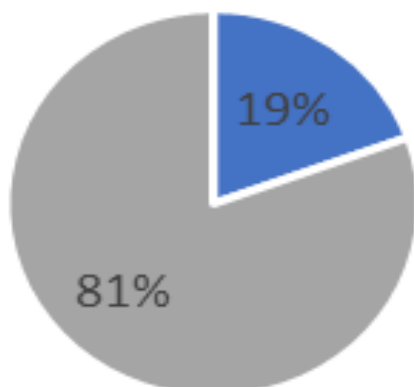


**Figure 6. History of Exposure to Factory Pollution**



6. Histopathological Features: Squamous cell carcinoma was the predominant histopathological finding, with most cases classified as

moderately differentiated. A smaller portion of cases involved well-differentiated squamous cell carcinoma or carcinoma in si

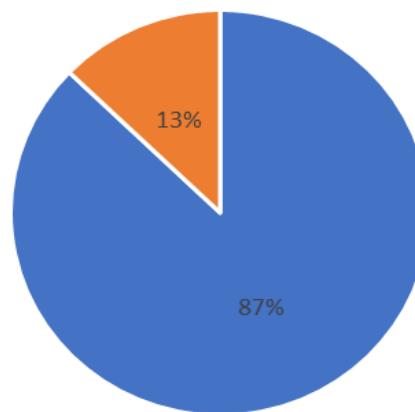
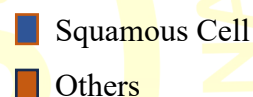


**Figure 7. Histopathological**

**Features**



**DISCUSSION**

The findings highlight that laryngeal carcinoma predominantly affects males, consistent with global and regional trends linking smoking and alcohol consumption to increased cancer risk.<sup>1,2,8,9</sup> In this study, 87% of patients were male, and smoking emerged as a significant risk factor, with 75% of patients having smoked for over 10 years. This aligns with evidence that smoking contributes significantly to carcinogenesis due to its high

concentration of carcinogens and toxins.<sup>3,4,8,10</sup>

Interestingly, the majority of cases were diagnosed in patients over 60 years of age, suggesting a cumulative effect of prolonged exposure to risk factors such as smoking. The youngest diagnosed patient was in their third decade, but cases peaked in later decades, consistent with studies reporting higher laryngeal carcinoma incidence among older populations.<sup>8,10</sup>

The influence of residential areas on the incidence of laryngeal carcinoma appears to be minimal. Most data indicate that Central and East Lampung have the highest incidences. This may be attributed to the predominant occupation of the population in these regions, where many are farmers who tend to smoke frequently during work compared to individuals in larger urban areas. This finding contrasts with a study by Besim et al., which reported that urban populations are more likely to develop laryngeal carcinoma than rural populations.

In some cases, socio-economic factors also influence intellectual capacity and nutritional status, which may contribute to the risk of developing laryngeal carcinoma.<sup>8</sup>

Additionally, alcohol consumption and exposure to industrial pollution were not significant contributors to the incidence of laryngeal carcinoma in this study. This contrasts with findings from other studies that have shown strong associations between alcohol, industrial pollution, and the development of laryngeal carcinoma.<sup>3,8,10</sup> However, a similar observation was made in a study conducted in Bandung, which also reported that alcohol consumption and industrial pollution had minimal impact on laryngeal carcinoma incidence. This may be due to the relatively low prevalence of alcohol consumption in Indonesia, particularly in Lampung, where such habits are uncommon. Furthermore, most of Lampung's residential areas are agricultural, far from industrial zones and factory pollution.<sup>2</sup>

Smoking history, however, remains a significant factor in laryngeal carcinoma, consistent with findings from other studies. Smoking is recognized as a major risk factor for numerous malignancies globally. In developing countries, most cigarettes consumed are industrially manufactured, containing over 7,000 chemical components, including carcinogens and toxins, which contribute to cancer development.<sup>3,4,8,10</sup>

Data collected from Mardi Waluyo Hospital reveal that the majority of laryngeal carcinoma cases involve moderately differentiated squamous cell carcinoma. While there is a slight difference in the incidence of well-differentiated squamous cell carcinoma, the findings are consistent with global trends. However, these results differ from those observed in Kenya, where most cases were reported as well-differentiated squamous cell carcinoma.<sup>10</sup>

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### **CONCLUSION**

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This study identified 39 cases of laryngeal carcinoma over the past five years, with an average incidence of eight cases per year. Smoking emerged as the most significant risk factor for laryngeal carcinoma, followed by male gender dominance and advanced age, which were also key contributing factors.

Residential areas with a predominantly farming population had higher incidences of laryngeal carcinoma. In contrast, alcohol consumption and exposure to industrial pollution appeared to have minimal influence on the disease's occurrence. Histopathological analysis (PA) confirmed that the majority of cases at Mardi Waluyo Hospital involved squamous cell carcinoma, making it the most prevalent histopathological subtype observed in this study.

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