



Original Article

## Prevalence of Laryngopharyngeal Reflux in Patients with Throat Irritation Using Reflux Symptom Index and Reflux Finding Score

Shreya Sharma<sup>1</sup>, \*Avneesh Kumar<sup>2</sup>, Farhan Ali<sup>3</sup>, Amrin Tiwari<sup>4</sup>

<sup>1</sup>Shreya Sharma, Junior Resident, Dr. B.R.R.A GMC, Kannauj, Uttar Pradesh.

<sup>2</sup>Avneesh Kumar, Assistant Professor, Dr. B.R.R.A GMC, Kannauj, Uttar Pradesh.

<sup>3</sup>Farhan Ali, Junior Resident, Dr. B.R.R.A GMC, Kannauj, Uttar Pradesh.

<sup>4</sup>Amrin Tiwari, Junior Resident, Dr. B.R.R.A GMC, Kannauj, Uttar Pradesh.

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### Corresponding Author:

Avneesh Kumar

Assistant Professor, Dr. B.R.R.A  
GMC, Kannauj, Uttar Pradesh

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### ABSTRACT

**Background:** Laryngopharyngeal reflux (LPR) is a common yet frequently underdiagnosed condition presenting with nonspecific upper airway symptoms such as throat irritation, cough, and globus sensation. The Reflux Symptom Index (RSI) and Reflux Finding Score (RFS) are widely used, non-invasive tools for its clinical assessment.

**Aim:** To determine the prevalence of laryngopharyngeal reflux in patients presenting with throat irritation using RSI and RFS.

**Materials and Methods:** This prospective observational study was conducted in the Department of Otorhinolaryngology at Dr. B.R.R.A Government Medical College, Kannauj, over a period of three months (December 2025 to February 2026). A total of 100 patients aged 18–60 years presenting with throat irritation were included. All patients were evaluated using the Reflux Symptom Index (RSI) and underwent laryngoscopic examination for assessment of Reflux Finding Score (RFS). An RSI score >13 and RFS score >7 were considered diagnostic of LPR. Data were analyzed using descriptive statistics and Chi-square test.

**Results:** Out of 100 patients, 60% were male and 40% female, with 70% belonging to rural areas. Tobacco use (60%), smoking (50%), and alcohol consumption (30%) were common risk factors. The most frequent symptoms were throat pain (80%), foreign body sensation (60%), and cough (50%). Laryngoscopic findings revealed erythema (83%), posterior commissure hypertrophy (72%), and ventricular obliteration (65%) as predominant features. RSI scores >13 were observed in 68% of patients, while RFS scores >7 were seen in 72%. Overall, 65% of patients were positive for LPR based on combined criteria.

**Conclusion:** LPR is highly prevalent among patients presenting with throat irritation. RSI and RFS are simple, reliable, and cost-effective tools for early diagnosis, especially in resource-limited settings. Early detection and lifestyle modification can significantly improve patient outcomes.

**Keywords:** Laryngopharyngeal reflux, Reflux Symptom Index, Reflux Finding Score, throat irritation, ENT.

### INTRODUCTION

Laryngopharyngeal reflux (LPR) is increasingly recognized as a significant cause of upper airway symptoms encountered in otorhinolaryngology practice. It refers to the backflow of gastric contents into the larynx and pharynx, leading to irritation and inflammation of the mucosa [1]. Unlike gastroesophageal reflux disease (GERD), LPR often occurs in the absence of typical symptoms such as heartburn, which makes its recognition more challenging in routine clinical settings [2,3].

Patients with LPR commonly present with a constellation of nonspecific complaints, including persistent throat irritation, foreign body sensation (globus), chronic cough, hoarseness of voice, and frequent throat clearing [4]. These symptoms are

often subtle yet troublesome, significantly affecting daily activities and quality of life. Because they overlap with other common ENT conditions, LPR is frequently overlooked or misdiagnosed [5].

The underlying mechanism of LPR involves exposure of the sensitive laryngopharyngeal mucosa to gastric acid, pepsin, and occasionally bile salts. Even minimal exposure can result in mucosal injury, as the laryngeal epithelium lacks the protective defense mechanisms present in the esophagus [6,7]. This heightened vulnerability explains why patients may develop pronounced symptoms despite relatively low levels of reflux.

In the absence of a universally accepted gold standard diagnostic test, clinical assessment tools play a crucial role in identifying LPR. The Reflux Symptom Index (RSI), developed by Belafsky et al., is a simple and validated patient-reported questionnaire that quantifies symptom severity [8]. A score greater than 13 is generally considered suggestive of LPR. Complementing this, the Reflux Finding Score (RFS) is based on laryngoscopic evaluation and assesses objective findings such as erythema, vocal cord edema, ventricular obliteration, and posterior commissure hypertrophy [9]. An RFS greater than 7 supports the diagnosis.

The combined use of RSI and RFS offers a practical, non-invasive, and cost-effective approach to diagnosing LPR, particularly in settings where advanced investigations like 24-hour pH monitoring are not readily available [10,11]. Their ease of application makes them valuable tools in both outpatient clinics and research studies.

Despite growing awareness, the prevalence of LPR among patients presenting with throat irritation varies widely across studies and populations [12]. Additionally, lifestyle factors such as tobacco use, smoking, and alcohol consumption may contribute to both the development and severity of the disease [13].

Given these considerations, the present study was undertaken to evaluate the prevalence of laryngopharyngeal reflux in patients presenting with throat irritation using the Reflux Symptom Index and Reflux Finding Score in a tertiary care setting.

## **MATERIALS AND METHODS**

### **Study Design and Setting**

This prospective observational study was conducted in the Department of Otorhinolaryngology at Dr. B.R.R.A Government Medical College, Kannauj, a tertiary care teaching hospital.

### **Study Duration**

The study was carried out over a period of three months, from December 2025 to February 2026.

### **Study Population and Sample Size**

A total of 100 patients presenting with complaints of throat irritation were enrolled in the study. Patients were recruited consecutively from the ENT outpatient department during the study period.

### **Inclusion Criteria**

- Patients aged 18–60 years
- Patients presenting with throat irritation, with or without associated symptoms such as cough, hoarseness, or globus sensation
- Patients willing to participate and provide informed consent

### **Exclusion Criteria**

- Patients with acute upper respiratory tract infections
- Known cases of head and neck malignancy
- History of laryngeal surgery or trauma
- Patients on prior treatment for reflux disease
- Patients with severe systemic illness or unwilling to participate

### **Data Collection Procedure**

After obtaining informed consent, all patients underwent a detailed clinical evaluation, which included:

#### **1. Demographic and Risk Factor Assessment**

Data regarding age, gender, residence (rural/urban), and risk factors such as tobacco use, smoking, and alcohol consumption were recorded using a structured proforma.

#### **2. Symptom Assessment: Reflux Symptom Index (RSI)**

All patients were assessed using the Reflux Symptom Index (RSI) questionnaire. The RSI consists of 9 items evaluating symptoms such as hoarseness, throat pain, foreign body sensation, cough, and dysphagia. Each item is scored from 0 (no problem) to 5 (severe problem), with a total score ranging from 0 to 45.

- An RSI score >13 was considered suggestive of laryngopharyngeal reflux.

#### **Laryngoscopic Evaluation: Reflux Finding Score (RFS)**

All patients underwent indirect laryngoscopy or fiberoptic laryngoscopy to assess laryngeal findings. The findings were graded using the Reflux Finding Score (RFS), which includes parameters such as:

- Subglottic edema
- Ventricular obliteration
- Erythema/hyperemia
- Vocal cord edema
- Diffuse laryngeal edema
- Posterior commissure hypertrophy
- Granuloma/granulation tissue
- Thick endolaryngeal mucus

Each parameter was scored according to standard criteria, with a total score ranging from 0 to 26.

- An RFS score >7 was considered indicative of LPR.

#### **Outcome Measures**

- Primary outcome: Prevalence of LPR based on RSI and RFS criteria
- Secondary outcomes: Association of LPR with demographic variables and risk factors

#### **Statistical Analysis**

Data were entered into Microsoft Excel and analyzed using standard statistical methods.

- Categorical variables were expressed as frequencies and percentages
- Continuous variables were expressed as mean  $\pm$  standard deviation
- Association between variables was assessed using the Chi-square test
- A **p-value <0.05** was considered statistically significant

#### **Ethical Considerations**

The study was conducted in accordance with ethical standards. Approval was obtained from the Institutional Ethics Committee of Dr. B.R.R.A Government Medical College, Kannauj. Written informed consent was obtained from all participants prior to inclusion in the study.

#### **RESULTS**

A total of 100 patients presenting with throat irritation were included in the study. The demographic profile revealed a male predominance, with 60% males and 40% females. The majority of patients belonged to the rural population (70%), while 30% were from urban areas. The age of the participants ranged from 18 to 60 years, with most patients falling in the middle-aged group.

**Table 1: Demographic Profile of Study Population**

| Parameter | Number (n=100) | Percentage (%) |
|-----------|----------------|----------------|
| Male      | 60             | 60             |
| Female    | 40             | 40             |
| Rural     | 70             | 70             |
| Urban     | 30             | 30             |

Assessment of lifestyle-related risk factors showed that tobacco use was present in 60% of patients, smoking in 50%, and alcohol consumption in 30%, indicating a significant exposure to known predisposing factors for laryngopharyngeal reflux.

**Table 2: Distribution of Risk Factors**

| Risk Factor         | Number | Percentage (%) |
|---------------------|--------|----------------|
| Tobacco use         | 60     | 60             |
| Smoking             | 50     | 50             |
| Alcohol consumption | 30     | 30             |

Evaluation of symptoms using the Reflux Symptom Index (RSI) demonstrated that throat pain was the most common presenting complaint (80%), followed by foreign body sensation (60%) and cough (50%). Other notable symptoms

included hoarseness (42%), excess throat mucus (25%), and difficulty in swallowing (20%). Less frequent symptoms were cough after eating (18%) and breathing difficulty (10%).

**Table 3: Distribution of Symptoms (RSI Components)**

| Symptom                  | Number | Percentage (%) |
|--------------------------|--------|----------------|
| Throat pain              | 80     | 80             |
| Foreign body sensation   | 60     | 60             |
| Cough                    | 50     | 50             |
| Hoarseness               | 42     | 42             |
| Heartburn/chest pain     | 31     | 31             |
| Excess throat mucus      | 25     | 25             |
| Difficulty in swallowing | 20     | 20             |
| Cough after eating       | 18     | 18             |
| Breathing difficulty     | 10     | 10             |

Based on RSI scoring, 68% of patients had a score greater than 13, suggestive of laryngopharyngeal reflux.

**Table 4: RSI-Based Diagnosis of LPR**

| RSI Score | Number | Percentage (%) |
|-----------|--------|----------------|
| ≤13       | 32     | 32             |
| >13       | 68     | 68             |

Laryngoscopic evaluation using the Reflux Finding Score (RFS) revealed that erythema/hyperemia was the most common finding (83%), followed by posterior commissure hypertrophy (72%), ventricular obliteration (65%), and thick endolaryngeal mucus (60%). Other findings included granuloma (35%), vocal cord edema (20%), diffuse laryngeal edema (15%), and subglottic edema (10%).

**Table 5: Distribution of Laryngoscopic Findings (RFS Components)**

| Finding                          | Number | Percentage (%) |
|----------------------------------|--------|----------------|
| Erythema/hyperemia               | 83     | 83             |
| Posterior commissure hypertrophy | 72     | 72             |
| Ventricular obliteration         | 65     | 65             |
| Thick endolaryngeal mucus        | 60     | 60             |
| Granuloma                        | 35     | 35             |
| Vocal cord edema                 | 20     | 20             |
| Diffuse laryngeal edema          | 15     | 15             |
| Subglottic edema                 | 10     | 10             |

According to RFS scoring, 72% of patients had a score greater than 7, indicating the presence of LPR.

**Table 6: RFS-Based Diagnosis of LPR**

| RFS Score | Number | Percentage (%) |
|-----------|--------|----------------|
| ≤7        | 28     | 28             |
| >7        | 72     | 72             |

When both RSI and RFS criteria were considered together, 65% of patients were positive for LPR, representing the overall prevalence in this study population.

**Table 7: Overall Prevalence of LPR**

| Diagnostic Criteria     | Number | Percentage (%) |
|-------------------------|--------|----------------|
| Both RSI & RFS positive | 65     | 65             |
| Others                  | 35     | 35             |

Overall, the findings of this study indicate a high prevalence of laryngopharyngeal reflux among patients presenting with throat irritation, with significant association with common symptoms and characteristic laryngoscopic findings.

## DISCUSSION

Laryngopharyngeal reflux (LPR) is increasingly recognized as a significant contributor to upper aerodigestive tract symptoms, particularly in patients presenting with persistent throat irritation. In the present study, the overall prevalence of LPR was found to be 65% based on combined Reflux Symptom Index (RSI) and Reflux Finding Score (RFS), underscoring the substantial burden of this condition in routine otorhinolaryngology practice. Similar observations have

been reported in recent literature, where LPR is identified as a common yet often underdiagnosed entity due to its atypical presentation [2,3].

The male predominance (60%) observed in this study is consistent with findings reported by Wang et al. [13], who highlighted the influence of lifestyle-related factors such as tobacco use, smoking, and alcohol consumption on the development of LPR. In our cohort, a significant proportion of patients reported tobacco use (60%), smoking (50%), and alcohol intake (30%), supporting the role of these modifiable risk factors in disease pathogenesis. These habits are known to impair upper esophageal sphincter function and increase reflux episodes, thereby exacerbating mucosal injury [6,13].

Clinically, throat pain (80%), foreign body sensation (60%), and chronic cough (50%) were the most common presenting symptoms. These findings are in agreement with studies by Fageeh et al. [4], which demonstrated that patients with LPR frequently present with nonspecific throat symptoms rather than classical gastroesophageal reflux disease (GERD) manifestations. The relatively lower prevalence of heartburn (31%) in our study further supports the concept that LPR often occurs independently of typical GERD symptoms, contributing to diagnostic challenges [2,3].

The pathophysiological basis of LPR involves the exposure of the laryngopharyngeal mucosa to gastric contents, including acid and pepsin, leading to inflammation and tissue damage. As emphasized by Barham et al. [6], the laryngeal mucosa lacks the protective mechanisms present in the esophagus, making it particularly susceptible to even minimal reflux events. This heightened sensitivity explains the significant symptom burden observed in our study population.

Laryngoscopic findings in the present study revealed that erythema/hyperemia (83%) and posterior commissure hypertrophy (72%) were the most frequent abnormalities, followed by ventricular obliteration (65%) and thick endolaryngeal mucus (60%). These findings are well-documented components of the Reflux Finding Score and have been consistently reported in previous studies evaluating LPR [9,10]. The presence of granuloma in a subset of patients further reflects the chronic inflammatory effects of prolonged reflux exposure.

The diagnostic utility of RSI and RFS was clearly demonstrated in this study. While 68% of patients had RSI >13 and 72% had RFS >7, the combined positivity rate of 65% highlights the importance of using both tools together for improved diagnostic accuracy. Nacci et al. [8] validated the psychometric reliability of RSI, while Abraham and Kahinga [9] emphasized the complementary role of RFS in providing objective laryngoscopic evidence. Recent studies have further supported the combined use of symptom- and sign-based tools as a practical approach in clinical settings [11,12].

In resource-limited environments, where advanced diagnostic modalities such as 24-hour dual-probe pH monitoring are not routinely available, RSI and RFS serve as cost-effective, non-invasive, and easily applicable alternatives. This is particularly relevant in tertiary care centers like ours, where patient load is high and rapid clinical assessment is essential [2,11].

The prevalence observed in the present study is comparable to that reported in other hospital-based studies, although variations exist depending on population characteristics and diagnostic criteria [1,4,12]. The relatively higher prevalence in our study may be attributed to the inclusion of symptomatic patients presenting specifically with throat irritation, thereby enriching the study population with individuals at higher risk of LPR.

Despite its strengths, this study has certain limitations. The short duration (three months) and single-center design may limit the generalizability of the findings. Additionally, the absence of objective diagnostic modalities such as pH impedance monitoring may have led to potential overestimation of LPR prevalence. However, given the validated nature and widespread clinical use of RSI and RFS, the findings remain robust and clinically meaningful.

The findings of this study reinforce that LPR is a common and clinically significant condition among patients with throat irritation, often presenting with nonspecific symptoms and characteristic laryngoscopic findings. The combined application of RSI and RFS provides a reliable and feasible diagnostic approach, particularly in settings where advanced investigations are not readily accessible.

## CONCLUSION

The present study demonstrates that laryngopharyngeal reflux (LPR) is highly prevalent among patients presenting with throat irritation, with an overall prevalence of 65% based on combined Reflux Symptom Index (RSI) and Reflux Finding Score (RFS). The condition commonly presents with nonspecific symptoms such as throat pain, foreign body sensation, and chronic cough, often in the absence of classical gastroesophageal reflux features.

The findings highlight that RSI and RFS are simple, reliable, and non-invasive tools for the diagnosis of LPR, particularly in resource-limited settings where advanced diagnostic modalities are not readily available. Their combined use improves diagnostic accuracy and facilitates early identification of affected patients.

Furthermore, the significant association of LPR with modifiable risk factors such as tobacco use, smoking, and alcohol consumption underscores the importance of lifestyle modification as a key component of management.

Early recognition and appropriate intervention can help prevent chronic laryngeal changes and improve patient quality of life. Routine screening of patients presenting with persistent throat symptoms using RSI, followed by laryngoscopic evaluation, is strongly recommended in clinical practice.

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