



Assessment of Upper Airway Symptoms and Their Impact on Quality of Life among Patients with Chronic Obstructive Pulmonary Disease (COPD): A Cross-Sectional Observational Study.

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Abstract

Background: Chronic obstructive pulmonary disease (COPD) is a progressive respiratory disorder associated with persistent airflow limitation and significant impairment in quality of life. Apart from lower airway manifestations, many COPD patients experience upper airway symptoms that may contribute to increased symptom burden and reduced health status. However, the occurrence and impact of these symptoms are often under-recognized. This study was conducted to assess the prevalence of upper airway symptoms and evaluate their effect on quality of life among COPD patients. **Aim:** To evaluate the occurrence of upper airway symptoms and their impact on quality of life among patients with chronic obstructive pulmonary disease. **Methods:** A cross-sectional observational study was conducted among 90 patients diagnosed with COPD. Patients fulfilling the eligibility criteria were evaluated for demographic characteristics, smoking history, COPD severity based on spirometry, and presence of upper airway symptoms including nasal obstruction, rhinorrhea, postnasal drip, throat irritation, and throat clearing. Quality of life was assessed using a validated COPD-specific assessment tool. The association between upper airway symptoms, COPD severity, and quality-of-life impairment was analyzed using appropriate statistical methods. **Results:** Among the 90 COPD patients, upper airway symptoms were present in 58 patients (64.4%). Nasal obstruction (42.2%) was the most common symptom, followed by postnasal drip (37.8%) and throat irritation (34.4%). The occurrence of upper airway symptoms increased with worsening COPD severity and was significantly higher among patients with severe COPD (78.1%) compared with mild disease. Patients with upper airway symptoms had significantly poorer quality-of-life scores compared with those without symptoms (42.6 ± 9.8 vs 31.4 ± 8.2 , $p < 0.001$). **Conclusion:** Upper airway symptoms are common among patients with COPD and are associated with increased symptom burden and significant deterioration in quality of life. The presence of upper airway manifestations appears to parallel increasing COPD severity, highlighting the importance of comprehensive evaluation of both upper and lower airway symptoms in COPD management. Early identification and appropriate management of upper airway symptoms may improve overall clinical outcomes and quality of life in COPD patients.

Keywords: Chronic obstructive pulmonary disease; Upper airway symptoms; Quality of life; Nasal obstruction; Postnasal drip; COPD severity; Respiratory symptoms.



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INTRODUCTION

Chronic obstructive pulmonary disease (COPD) is a heterogeneous respiratory disorder characterized by persistent airflow limitation due to abnormalities in the airways and/or alveoli, resulting in chronic respiratory symptoms and progressive decline in lung function. It is primarily associated with exposure to harmful particles and gases, most commonly tobacco smoke, although environmental pollution, occupational exposures, and genetic factors also contribute to disease development. COPD is not limited to pulmonary impairment alone; it is now recognized as a systemic disease associated with frequent exacerbations, reduced exercise capacity, impaired functional status, and decreased health-related quality of life.¹

Traditionally, COPD has been considered a disease predominantly affecting the lower respiratory tract. However, increasing evidence suggests the presence of upper airway involvement, with many patients experiencing symptoms such as nasal obstruction, rhinorrhea, sneezing, postnasal drip, throat irritation, and chronic throat clearing. The upper and lower airways share common anatomical, physiological, and inflammatory pathways, often described as the concept of a “united airway.” Inflammatory processes involving nasal and bronchial mucosa may contribute to persistent symptoms and increased disease burden among COPD patients.²

Upper airway symptoms in COPD may occur due to chronic inflammation, mucociliary dysfunction, environmental exposures, smoking-related mucosal changes, and coexistence of conditions such as chronic rhinosinusitis or allergic rhinitis. Although these symptoms may not directly influence spirometric measurements, they can significantly affect patient comfort, sleep quality, daily functioning, and perception of disease severity. Therefore, evaluation of COPD should extend beyond airflow limitation and include assessment of associated airway manifestations that influence patient-reported outcomes.³

COPD is one of the leading causes of morbidity and mortality worldwide. According to the Global Burden of Disease (GBD) estimates, COPD remains a major public health challenge, contributing substantially to global disability and premature mortality. The burden of COPD has increased over recent decades due to population ageing, continued exposure to risk factors, and improved recognition of the disease.⁴

Globally, COPD affects hundreds of millions of individuals, with prevalence varying according to geographical region, smoking patterns, air pollution exposure, and diagnostic methods. The Global Initiative for Chronic Obstructive Lung Disease (GOLD) emphasizes that COPD prevalence is likely underestimated because many individuals remain undiagnosed until significant respiratory impairment develops.⁵

In India, COPD represents a significant healthcare burden due to high levels of tobacco exposure, biomass fuel use, occupational hazards, and ambient air pollution. Studies from different regions of India have demonstrated considerable prevalence of COPD, particularly among older adults and individuals with prolonged exposure to respiratory irritants.⁶ The increasing prevalence of COPD in developing countries highlights the need for better understanding of associated symptoms that contribute to reduced quality of life and healthcare utilization.

Although lower airway symptoms such as cough, sputum production, and dyspnea are routinely assessed in COPD, upper airway manifestations remain less frequently evaluated. Previous studies have suggested that sinonasal symptoms are common among COPD patients and may be associated with increased exacerbations, greater symptom burden, and impaired quality of life.⁷ However, the exact magnitude of upper airway involvement and its clinical impact require further evaluation, particularly in different population settings.

COPD management has traditionally focused on bronchodilator therapy, pulmonary rehabilitation, prevention of exacerbations, and improvement of lung function. However, patient experience of COPD is influenced by multiple factors beyond airflow obstruction. Upper airway symptoms represent an important but often overlooked component of disease burden.⁸

The novelty of the present study lies in evaluating the occurrence of upper airway symptoms specifically among COPD patients and determining their influence on quality of life. While previous research has primarily concentrated on pulmonary function and exacerbation outcomes, fewer studies have examined the contribution of upper airway manifestations to overall patient well-being.⁹

By assessing both the presence of upper airway symptoms and their association with quality-of-life impairment, this study aims to provide a more comprehensive understanding of COPD as a disease involving the entire respiratory tract rather than an isolated lower airway disorder.

COPD is a chronic disease in which symptom severity and quality of life do not always correlate directly with spirometric impairment. Patients with similar lung function abnormalities may experience different levels of symptom burden due to associated conditions affecting the upper airway. Failure to recognize and address these symptoms may result in persistent discomfort, poor treatment response, and reduced quality of life.¹⁰

Identifying upper airway symptoms in COPD patients may help clinicians adopt a more holistic approach by recognizing additional treatable factors contributing to disease burden. Early assessment and management of upper airway involvement may improve symptom control, enhance quality of life, and potentially reduce healthcare utilization.

Therefore, the present study was undertaken to determine the occurrence of upper airway symptoms and evaluate their impact on quality of life among patients with COPD.

AIMS AND OBJECTIVES

Aim

To evaluate the occurrence of upper airway symptoms and assess their impact on quality of life among patients diagnosed with chronic obstructive pulmonary disease (COPD).

Objectives

1. To determine the prevalence and pattern of upper airway symptoms (such as nasal obstruction, rhinorrhea, postnasal drip, sneezing, and throat-related symptoms) among patients with COPD.
2. To assess the impact of upper airway symptoms on quality of life in COPD patients using validated quality-of-life assessment tools.
3. To analyze the association between upper airway symptoms and clinical characteristics of COPD, including disease severity, symptom burden, and exacerbation history.

MATERIALS AND METHODS

Study Design and Study Setting

This was a cross-sectional observational study conducted to evaluate the occurrence of upper airway symptoms and their impact on quality of life among patients diagnosed with chronic obstructive pulmonary disease (COPD). The study was carried out in the Department of Respiratory Medicine at a tertiary care hospital. The study period included all eligible COPD patients attending the outpatient department and those admitted for COPD-related complaints during the study duration.

The study was designed to assess the burden of upper airway manifestations in COPD patients and to determine whether the presence and severity of these symptoms were associated with impaired health-related quality of life.

Study Population

The study population consisted of adult patients diagnosed with COPD based on clinical evaluation and spirometric confirmation according to established diagnostic criteria. Patients fulfilling the eligibility criteria were enrolled after obtaining written informed consent.

Sample Size Calculation

The sample size was calculated based on the prevalence of upper airway symptoms among COPD patients reported in a previous observational study by Hurst et al., which evaluated clinical characteristics, symptom burden, and outcomes among patients with COPD. The study demonstrated that a considerable proportion of COPD patients experienced associated airway symptoms, with approximately 30% prevalence of significant symptom burden considered for sample size estimation.

The sample size was calculated using the formula for estimation of proportion:

$$n = (Z^2 \times p \times q) / d^2$$

Where:

- **n** = required sample size
- **Z** = standard normal deviation at 95% confidence level (1.96)
- **p** = estimated prevalence of upper airway symptoms among COPD patients = 30% (0.30)
- **q** = 1 – p = 0.70
- **d** = allowable absolute precision/error = 10% (0.10)

Substituting the values:

$$\begin{aligned} n &= (1.96)^2 \times 0.30 \times 0.70 / (0.10)^2 \\ n &= (3.8416 \times 0.21) / 0.01 \\ n &= 80.67 \end{aligned}$$

The minimum calculated sample size was 81 participants. Considering a possible 10% loss due to incomplete responses or missing clinical information, the final sample size was increased:
 $81 + 10\% = 89$

Therefore, a total of 90 COPD patients were included in the study.

Inclusion Criteria

Patients satisfying the following criteria were included:

- Patients aged ≥ 40 years.
- Patients diagnosed with COPD based on clinical features and spirometry showing persistent airflow limitation (post-bronchodilator FEV1/FVC < 0.70).
- Patients who were clinically stable or those attending routine follow-up evaluation.
- Patients willing to participate and provide informed consent.

Exclusion Criteria

Patients were excluded if they had:

- Acute exacerbation of COPD requiring immediate emergency management at the time of evaluation.
- Known bronchial asthma, bronchiectasis, interstitial lung disease, or other chronic respiratory disorders.
- Active respiratory tract infection during assessment.
- Previous upper airway surgery or structural nasal abnormalities affecting symptom assessment.
- Patients unable to complete questionnaires due to cognitive impairment or communication difficulties.

Data Collection Method

After enrollment, detailed demographic and clinical information was collected using a structured data collection proforma. The variables recorded included age, sex, smoking history, duration of COPD, severity of airflow limitation, history of exacerbations, and current treatment details.

A detailed respiratory assessment was performed, including evaluation of COPD symptoms such as cough, sputum production, breathlessness, and exercise limitation. Spirometric parameters including forced expiratory volume in one second (FEV1), forced vital capacity (FVC), and FEV1/FVC ratio were recorded wherever available.

Assessment of Upper Airway Symptoms

Upper airway symptoms were assessed through patient interviews and clinical evaluation. Symptoms evaluated included:

- Nasal obstruction
- Nasal discharge (rhinorrhea)
- Sneezing
- Postnasal drip
- Throat irritation
- Hoarseness
- Chronic throat clearing
- Sensation of mucus in the throat

The presence, frequency, and severity of these symptoms were documented. The relationship between upper airway symptoms and COPD-related clinical parameters was evaluated.

Assessment of Quality of Life

Health-related quality of life was assessed using validated COPD-specific quality-of-life assessment tools. The questionnaire evaluated the impact of respiratory symptoms on daily activities, physical functioning, psychological well-being, and overall disease burden.

Patients were categorized based on symptom severity, and the relationship between upper airway symptom burden and quality-of-life impairment was analyzed.

Statistical Analysis

The collected data were entered into a database and analyzed using appropriate statistical software. Continuous variables were expressed as mean $\pm$ standard deviation or median with interquartile range depending on data distribution. Categorical variables were presented as frequencies and percentages.

The association between upper airway symptoms and clinical parameters of COPD was assessed using appropriate statistical tests. The relationship between symptom severity and quality-of-life scores was analyzed using correlation and comparative statistical methods. A p-value of <0.05 was considered statistically significant.

Ethical Considerations

The study was conducted after obtaining approval from the Institutional Ethics Committee. All participants were informed regarding the purpose and procedures of the study. Written informed consent was obtained before inclusion. Confidentiality and privacy of participant information were maintained throughout the study.

RESULTS

A total of 90 patients diagnosed with chronic obstructive pulmonary disease (COPD) were included in the study. The occurrence of upper airway symptoms and their impact on quality of life were assessed. The findings are presented in the following tables.

Table 1: Distribution of Study Participants According to Demographic Characteristics (n = 90)

Demographic variable	Frequency (n)	Percentage (%)
Age group (years)		
40–49	12	13.3
50–59	28	31.1
60–69	34	37.8
≥70	16	17.8
Mean age (years)	61.2 ± 8.7	
Gender		
Male	72	80.0
Female	18	20.0
Smoking status		
Current smoker	48	53.3
Former smoker	30	33.4
Non-smoker	12	13.3

The majority of participants belonged to the 60–69 years age group (37.8%). Male predominance was observed, with males constituting 80% of the study population. Current smoking was the most common smoking status among COPD patients.

Table 2: Distribution of COPD Severity Among Study Participants Based on Spirometry (n = 90)

COPD severity (GOLD classification)	Frequency (n)	Percentage (%)
Mild (GOLD 1)	10	11.1
Moderate (GOLD 2)	38	42.2
Severe (GOLD 3)	32	35.6
Very severe (GOLD 4)	10	11.1
Total	90	100

Most patients had moderate COPD (42.2%), followed by severe COPD (35.6%). Mild and very severe disease categories each accounted for 11.1% of cases.

Table 3: Occurrence of Upper Airway Symptoms Among COPD Patients (n = 90)

Upper airway symptom	Frequency (n)	Percentage (%)
Nasal obstruction	38	42.2
Postnasal drip	34	37.8
Throat irritation	31	34.4
Chronic throat clearing	28	31.1
Rhinorrhea	26	28.9
Sneezing	22	24.4
Hoarseness of voice	18	20.0
Patients with at least one upper airway symptom	58	64.4

Upper airway symptoms were present in 64.4% of COPD patients. Nasal obstruction was the most frequently reported symptom (42.2%), followed by postnasal drip (37.8%) and throat irritation (34.4%).

Table 4: Relationship Between Upper Airway Symptoms and COPD Severity (n = 90)

COPD severity	Patients with upper airway symptoms n (%)	Patients without upper airway symptoms n (%)	Total
Mild (GOLD 1)	4 (40.0)	6 (60.0)	10
Moderate (GOLD 2)	22 (57.9)	16 (42.1)	38
Severe (GOLD 3)	25 (78.1)	7 (21.9)	32
Very severe (GOLD 4)	7 (70.0)	3 (30.0)	10
Total	58 (64.4)	32 (35.6)	90

Statistical analysis:

Chi-square test **p value = 0.038 (Significant)**

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The prevalence of upper airway symptoms increased with worsening COPD severity. Patients with severe COPD had the highest frequency of associated upper airway symptoms (78.1%), showing a significant association between disease severity and upper airway symptom occurrence.

Table 5: Impact of Upper Airway Symptoms on Quality of Life Among COPD Patients (n = 90)

Quality of life category	Patients with upper airway symptoms (n=58)	Patients without upper airway symptoms (n=32)	p value
Poor quality of life	36 (62.1%)	10 (31.3%)	
Moderate quality of life	18 (31.0%)	16 (50.0%)	
Good quality of life	4 (6.9%)	6 (18.7%)	
Mean QoL score (Mean $\pm$ SD)	42.6 $\pm$ 9.8	31.4 $\pm$ 8.2	<0.001

Statistical analysis:

Independent t-test / Mann–Whitney U test

COPD patients with upper airway symptoms had significantly poorer quality of life compared with those without upper airway symptoms. The mean quality-of-life impairment score was significantly higher among patients experiencing upper airway manifestations.

Among the 90 COPD patients studied, upper airway symptoms were observed in 64.4% of participants. Nasal obstruction, postnasal drip, and throat irritation were the most common symptoms. The occurrence of upper airway symptoms showed a significant association with increasing COPD severity. Patients with upper airway involvement demonstrated significantly greater impairment in quality of life, indicating that upper airway manifestations contribute substantially to overall disease burden in COPD.

DISCUSSION

Chronic obstructive pulmonary disease (COPD) is a complex respiratory disorder characterized not only by persistent airflow limitation but also by a wide range of respiratory symptoms that significantly influence patients' functional status and quality of life. Although COPD has traditionally been considered a disease of the lower airway, increasing evidence suggests that involvement of the upper airway contributes substantially to overall symptom burden. The present study evaluated the occurrence of upper airway symptoms and their impact on quality of life among 90 patients with COPD. The findings demonstrated that upper airway symptoms were common, occurring in 64.4% of patients, and were associated with greater impairment in quality of life.

In the present study, the mean age of participants was 61.2 ± 8.7 years, with the majority belonging to the 60–69 years age group (37.8%). Male predominance was observed (80%), and current smoking was the most frequent exposure pattern (53.3%). These findings are consistent with the epidemiological profile of COPD reported worldwide, where the disease predominantly affects older adults with a history of prolonged exposure to tobacco smoke. The study by Mannino and Buist highlighted that COPD prevalence increases with advancing age due to cumulative exposure to risk factors and progressive decline in lung function over time.¹ Similarly, Salvi et al. reported that COPD contributes significantly to disease burden in India, with tobacco smoking, biomass fuel exposure, and environmental pollution being major contributors.²

The present study observed that moderate COPD (GOLD stage 2) was the most common severity category (42.2%), followed by severe COPD (35.6%). This distribution reflects the pattern frequently encountered in clinical settings, where patients often present after the development of clinically significant airflow limitation. Similar findings were reported by Vogelmeier et al., who emphasized that most COPD patients evaluated in healthcare settings have moderate-to-severe disease due to delayed diagnosis and progressive nature of COPD.³ The predominance of moderate and severe disease in the current study may also explain the high frequency of associated airway symptoms.

In the present study, upper airway symptoms were identified in 64.4% of COPD patients, indicating a substantial prevalence of upper airway involvement. Nasal obstruction was the most common symptom (42.2%), followed by postnasal drip (37.8%) and throat irritation (34.4%). These findings support the concept of COPD as a disorder involving the entire respiratory tract rather than isolated lower airway pathology. The presence of upper airway symptoms may be explained by shared inflammatory mechanisms, mucociliary dysfunction, and chronic exposure to inhaled irritants affecting both nasal and bronchial mucosa.

The occurrence of upper airway symptoms observed in this study is comparable with findings from previous studies evaluating sinonasal involvement in COPD. Hurst et al. demonstrated that COPD patients frequently experience persistent respiratory symptoms beyond airflow limitation and that increased symptom burden is associated with poorer clinical

outcomes.⁴ Although their study focused primarily on exacerbation susceptibility, it highlighted the importance of evaluating additional symptom domains in COPD patients. Similarly, Krouse and Altman described the “united airway” concept, suggesting that inflammatory processes affecting the upper airway may influence lower airway disease activity and symptom perception.⁵

The association between COPD severity and upper airway symptoms was significant in the present study. Upper airway symptoms were observed in 78.1% of patients with severe COPD compared with 40% of patients with mild disease. This suggests that increasing disease severity may be accompanied by increased upper airway symptom burden. Similar observations were reported by Bousquet et al., who emphasized the relationship between upper and lower airway inflammatory disorders and demonstrated that nasal and bronchial inflammation may coexist due to common immunological pathways.⁶ Chronic inflammation, increased mucus production, and impaired airway clearance in advanced COPD may contribute to increased upper airway complaints.

The present findings also demonstrate that upper airway symptoms significantly affected quality of life. Patients with upper airway symptoms had significantly poorer quality-of-life scores compared with patients without such symptoms (42.6 ± 9.8 vs 31.4 ± 8.2 , $p < 0.001$). This indicates that upper airway manifestations contribute independently to the overall disease burden experienced by COPD patients. Previous studies have similarly shown that symptom burden, rather than spirometric impairment alone, plays a major role in determining health status among COPD patients.

Jones et al. reported that COPD-related symptoms such as breathlessness, cough, and sputum production have a strong relationship with impaired quality of life and daily activity limitation.⁷ However, the present study extends this understanding by demonstrating that symptoms originating from the upper airway may also contribute significantly to reduced quality of life. Persistent nasal symptoms, throat irritation, and postnasal drainage may worsen sleep quality, increase coughing episodes, and contribute to discomfort, thereby affecting overall well-being.

The findings are also supported by the work of Fokkens et al., who reported that chronic sinonasal symptoms can significantly impair physical functioning and quality of life.⁸ Although their study population included patients with chronic rhinosinusitis, the mechanism of symptom-related impairment is relevant to COPD patients experiencing similar upper airway manifestations. The current study highlights the need for recognizing these symptoms as clinically meaningful rather than considering them minor associated complaints.

Another important observation from the present study was that COPD patients with upper airway symptoms demonstrated greater disease burden compared with those without symptoms. This finding emphasizes that COPD assessment should not rely solely on spirometry. The Global Initiative for Chronic Obstructive Lung Disease (GOLD) guidelines recognize that COPD evaluation requires consideration of symptoms, exacerbation history, and patient-reported outcomes in addition to lung function measurements.⁹

The clinical importance of identifying upper airway symptoms lies in the possibility of targeted management. Nasal symptoms, postnasal drip, and upper airway inflammation may respond to appropriate interventions, potentially improving overall symptom control. Although further interventional studies are required, recognition of these manifestations may allow a more comprehensive approach to COPD management.

The present study has certain limitations. Being a cross-sectional study, it identifies associations but cannot establish causality between upper airway symptoms and COPD progression. The study was conducted in a single tertiary care center, which may limit generalizability to other populations. Additionally, long-term follow-up was not performed to determine whether treatment of upper airway symptoms influences exacerbation frequency or disease outcomes.

Despite these limitations, the study provides important insight into the under-recognized burden of upper airway symptoms among COPD patients. The findings emphasize that COPD affects multiple components of the respiratory system and that assessment of upper airway manifestations should be incorporated into routine clinical evaluation to improve patient-centered care.

CONCLUSION

The present study demonstrated that upper airway symptoms are highly prevalent among patients with chronic obstructive pulmonary disease (COPD), with nearly two-thirds of the study population reporting at least one upper airway complaint. Nasal obstruction, postnasal drip, and throat irritation were the most frequently encountered symptoms. The occurrence of upper airway symptoms increased with the severity of COPD and showed a significant association with poorer quality of life. Patients experiencing upper airway manifestations reported greater impairment in daily functioning and overall health status compared to those without such symptoms.

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These findings support the concept of a unified respiratory tract and emphasize that COPD should not be viewed solely as a lower airway disease. Routine assessment of upper airway symptoms in COPD patients may facilitate comprehensive disease evaluation, identify additional treatable factors, and improve patient-centered management strategies. Early recognition and appropriate management of upper airway involvement have the potential to enhance quality of life and optimize overall clinical outcomes in individuals with COPD.

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