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Original Article

Impact of Psychiatric Comorbidities On Quality of Life and Disease Severity in Patients with Moderate to Severe Chronic Obstructive Pulmonary Disease: A Cross-Sectional Study from India

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ABSTRACT

Background: Chronic Obstructive Pulmonary Disease (COPD) is a progressive respiratory disorder associated with significant morbidity and mortality. Psychiatric comorbidities such as substance use disorders, depression, and anxiety are common in COPD and can adversely influence disease severity, treatment adherence, and quality of life (QOL). However, data on the burden and impact of these comorbidities in Indian COPD populations remain limited.

Objectives: To assess the prevalence of psychiatric comorbidities in patients with moderate to severe COPD and to evaluate their association with quality of life and spirometric severity.

Methods: This hospital-based, cross-sectional study was conducted at a tertiary care center in Bengaluru, India, over one year. One hundred patients with GOLD grade 3 and 4 COPD were enrolled. Sociodemographic and clinical data were collected using a structured questionnaire. COPD severity was assessed using post-bronchodilator spirometry. Quality of life was evaluated using the St. George's Respiratory Questionnaire-COPD (SGRQ-C), and psychiatric comorbidities were diagnosed using the Mini International Neuropsychiatric Interview (MINI). Statistical analysis included chi-square tests, independent t-tests, Pearson's correlation, and ANOVA, with a significance level of $p < 0.05$.

Results: The mean age of participants was 63.6 ± 6.2 years, and 63% were male. Overall, 64% of patients had at least one psychiatric comorbidity. Tobacco dependence syndrome was the most common (57%), followed by alcohol dependence (13%) and mood and anxiety disorders. Alcohol dependence was strongly associated with tobacco dependence ($\chi^2 = 16.98$, $p < 0.001$). Quality of life was impaired across all SGRQ-C domains, with the symptom domain being most affected. FEV_1 showed a strong negative correlation with SGRQ-C symptom ($r = –0.859$), activity ($r = –0.494$), impact ($r = –0.554$), and total scores ($r = –0.680$) (all $p < 0.001$). Patients with psychiatric morbidity had significantly worse impact domain scores compared to those without ($p = 0.041$), indicating greater psychosocial impairment.

Conclusion: Psychiatric comorbidities are highly prevalent in COPD and significantly worsen quality of life, particularly the psychosocial impact of the disease. Integrated screening and management of mental health and substance use disorders should be an essential component of comprehensive COPD care.

Keywords: *Chronic obstructive pulmonary disease; Psychiatric comorbidity; Tobacco dependence; Alcohol dependence; Quality of life; SGRQ-C; FEV.*

INTRODUCTION

Chronic Obstructive Pulmonary Disease (COPD) is a common, preventable, and treatable chronic respiratory disorder characterized by persistent respiratory symptoms and airflow limitation resulting from airway and/or alveolar abnormalities, usually caused by prolonged exposure to noxious particles or gases [1]. It is a progressive disease in which exacerbations and comorbid conditions significantly contribute to overall severity, functional decline, and mortality [1]. Acute exacerbations of COPD are defined by the Global Initiative for Chronic Obstructive Lung Disease (GOLD) as episodes of acute worsening of baseline dyspnea, cough, and sputum production that require a change in regular medication [2]. These exacerbations accelerate disease progression, increase hospitalization, and adversely affect quality of life.

COPD is a major global public health problem. The Global Burden of Disease (GBD) study estimated that approximately 251 million people worldwide were living with COPD in 2016, and more than 3.17 million deaths were attributed to the disease in 2015, accounting for nearly 5% of all global deaths [3]. COPD is projected to become the fourth leading cause of death worldwide by 2030 [3]. India bears a disproportionately high burden of COPD, with prevalence rates exceeding the global average. Among Indian adults, the prevalence is estimated to be approximately 5% in men and 3.2% in women, with the highest disease burden occurring in individuals above 65 years of age [3]. In addition to tobacco smoking, household and ambient air pollution remain major contributors to COPD in low- and middle-income countries such as India.

Beyond respiratory impairment, COPD is increasingly recognized as a systemic disease associated with multiple comorbidities that significantly influence clinical outcomes [2]. These include cardiovascular diseases, diabetes, osteoporosis, metabolic syndrome, sleep disorders, anemia, and psychiatric illnesses [2]. Among these, psychiatric comorbidities such as substance use disorders, anxiety, and depression are particularly common but remain underdiagnosed and undertreated in routine clinical practice [4]. The interaction between COPD and psychiatric disorders is complex and bidirectional. Chronic respiratory symptoms, physical limitation, and repeated exacerbations predispose patients to psychological distress, while psychiatric illnesses in turn worsen disease outcomes by impairing treatment adherence, increasing symptom perception, and reducing functional capacity [5,6].

Substance use disorders, especially tobacco and alcohol dependence, are highly prevalent in patients with COPD. Tobacco smoking is the principal etiological factor for COPD and also contributes to nicotine dependence, which itself is associated with anxiety, depression, and poorer health behaviors. Alcohol use disorders further compound the disease burden by increasing the risk of exacerbations, impairing immune function, and reducing adherence to inhaled therapies. Mood and anxiety disorders, including major depressive disorder, dysthymia, and generalized anxiety disorder, are also common in COPD and are associated with increased dyspnea, fatigue, healthcare utilization, and mortality [4–6]. Despite their high prevalence and clinical relevance, psychiatric comorbidities are rarely screened for systematically in COPD clinics, particularly in developing countries.

Quality of life (QOL) has emerged as a key outcome measure in the management of chronic diseases such as COPD. QOL reflects the patient's subjective perception of physical, psychological, and social well-being and provides information that is not captured by physiological measures alone. The St. George's Respiratory Questionnaire-COPD (SGRQ-C) is a disease-specific instrument widely used to assess health-related quality of life in patients with COPD [7,8]. It consists of three domains: symptoms, activity, and impact, which together capture the burden of respiratory symptoms, limitation of physical activities, and psychosocial consequences of the disease. Higher scores indicate worse quality of life. Several studies have demonstrated that quality of life deteriorates with increasing severity of airflow limitation, as measured by forced expiratory volume in one second (FEV1), and that patients with severe and very severe COPD have significantly poorer scores across all SGRQ domains [9].

Psychiatric comorbidities further exacerbate the decline in quality of life among patients with COPD. Individuals with depression, anxiety, or substance dependence experience more severe symptoms, greater activity limitation, and worse social functioning compared with those without psychiatric disorders [10]. These patients also have higher rates of hospitalization, poorer adherence to treatment, and worse survival. However, data on the prevalence and impact of psychiatric comorbidities on quality of life in Indian COPD populations are limited.

Given the high burden of COPD in India and the known influence of psychiatric disorders on disease outcomes, there is a need for systematic evaluation of psychiatric comorbidities and their relationship with quality of life and disease severity. The present study was therefore undertaken to assess the prevalence of psychiatric comorbidities in patients with moderate to severe COPD and to examine their impact on health-related quality of life and spirometric severity in a tertiary care setting.

MATERIALS AND METHODS

Study Design and Setting: This was a hospital-based, cross-sectional, exploratory study conducted in the Department of Pulmonology at Kempegowda Institute of Medical Sciences (KIMS), V.V. Puram, Bengaluru, Karnataka, India. The study was carried out over a period of one year, from December 2017 to December 2018.

Study Population: The study population consisted of patients attending the outpatient and inpatient services of the Department of Pulmonology at KIMS who were diagnosed with Chronic Obstructive Pulmonary Disease (COPD).

Sample Size: A total of 100 patients were included in the study. All participants were diagnosed cases of moderate to severe COPD (GOLD grade 3 and grade 4) based on spirometric criteria.

Inclusion Criteria

Patients were included if they met the following criteria:

- Diagnosis of COPD confirmed by pulmonary function testing
- Classified as GOLD grade 3 or GOLD grade 4 based on post-bronchodilator FEV1
- Willingness to participate in the study and provide informed consent

Exclusion Criteria

Patients were excluded if:

- Their current physical or clinical condition prevented them from participating in the study
- They were unable to complete the assessments or questionnaires

Ethical Considerations: The study protocol was reviewed and approved by the Institutional Ethics Committee of Kempegowda Institute of Medical Sciences. Written informed consent was obtained from all participants before enrolment. Confidentiality of participant information was maintained throughout the study.

Data Collection: Sociodemographic data including age, sex, religion, education, occupation, marital status, residence, and monthly income were collected using a structured, self-designed questionnaire.

Clinical evaluation included history, physical examination, and spirometric assessment to determine the severity of COPD.

Assessment of COPD Severity: Severity of COPD was classified using the Global Initiative for Chronic Obstructive Lung Disease (GOLD) 2020 criteria based on post-bronchodilator spirometry. Patients with an FEV1/FVC ratio less than 0.70 were categorized as follows:

- GOLD 3 (Severe): FEV1 between 30% and 49% of predicted
- GOLD 4 (Very severe): FEV1 less than 30% of predicted

Only patients belonging to GOLD grade 3 and 4 were included in this study.

Assessment of Quality of Life: Quality of life was assessed using the St. George's Respiratory Questionnaire – COPD (SGRQ-C), a validated, disease-specific questionnaire designed to measure health-related quality of life in patients with COPD. The questionnaire consists of 40 items and includes three domains:

- Symptoms: severity and frequency of respiratory symptoms
- Activity: activities that cause or are limited by breathlessness
- Impact: social and psychological effects of the disease

Scores for each domain and a total score were calculated and expressed on a scale from 0 to 100, with higher scores indicating poorer quality of life.

Assessment of Psychiatric Morbidity: Psychiatric comorbidities were assessed using the Mini International Neuropsychiatric Interview (MINI). The MINI is a structured diagnostic interview designed to identify major psychiatric disorders according to DSM-IV, DSM-5, and ICD-10 criteria. It evaluates 17 common psychiatric disorders and is administered in approximately 15 minutes. Responses are recorded as "yes" or "no" based on standardized questions.

Statistical Analysis: Data were entered and analyzed using Statistical Package for Social Sciences (SPSS) version 20. Continuous variables were expressed as mean and standard deviation, while categorical variables were expressed as frequencies and percentages. Associations between categorical variables were assessed using the Chi-square test or

Fisher's exact test, as appropriate. Comparisons between two groups were made using the independent sample t-test. Relationships between continuous variables such as FEV1 and quality-of-life scores were evaluated using Pearson's correlation coefficient. One-way analysis of variance (ANOVA) was used to compare mean values across multiple groups, and where applicable, post-hoc analysis using the Tukey test was performed. A p-value of less than 0.05 was considered statistically significant.

RESULTS

A total of 100 patients with moderate to very severe COPD (GOLD 3 and 4) were included in the study.

The mean age of participants was 63.64 ±6.2 years. Males constituted 63% of the sample. More than half (55%) were from rural areas, and 36% were agriculturists. Nearly two-fifths (38%) were illiterate and only 5% had college-level education. The majority (42%) belonged to the middle-income group (₹5001–7500 per month). Table 1 shows the sociodemographic profile of study participants.

Table 1. Sociodemographic profile of study participants (n = 100)

Variable		**n (%)**
Sex	Male	63 (63.0)
	Female	37 (37.0)
Residence	Rural	55 (55.0)
	Urban	45 (45.0)
Education	Illiterate	38 (38.0)
	Primary	40 (40.0)
	Secondary & above	22 (22.0)
Occupation	Agriculture	36 (36.0)
	Skilled/Semiskilled	31 (31.0)
	Unskilled/Unemployed/Housewife	33 (33.0)

Overall, 64% of patients had at least one psychiatric comorbidity. Tobacco dependence was the most prevalent, followed by alcohol dependence and mood disorders. Table 2 shows the distribution of psychiatric comorbidities.

Table 2. Distribution of psychiatric comorbidities

Psychiatric diagnosis	**n (%)**
Tobacco Dependence Syndrome (TDS)	57 (57.0)
Alcohol Dependence Syndrome (ADS)	13 (13.0)
ADS – currently abstinent	4 (4.0)
Major depressive disorder	3 (3.0)
Dysthymia	4 (4.0)
Generalized anxiety disorder	1 (1.0)
Mixed anxiety–depressive disorder	2 (2.0)
No psychiatric morbidity	36 (36.0)

All domains of quality of life were impaired, with the symptom domain showing the highest burden. Table 3 shows the lung function and quality-of-life scores.

Table 3. Lung function and Quality-of-Life scores

Parameter	**Mean ± SD**	**Range**
FEV_1 (% predicted)	43.80 ± 4.40	29–49
SGRQ Symptom score	55.40 ± 20.56	18–82
SGRQ Activity score	36.40 ± 18.83	14–74
SGRQ Impact score	20.20 ± 12.70	5–52
SGRQ Total score	31.41 ± 14.19	11–61

A strong negative correlation was observed between FEV_1 and QOL scores, indicating that worsening airflow limitation was associated with poorer quality of life across all domains. Table 4 shows the correlation between COPD severity (FRV_1) and QOL.

Table 4. Correlation between COPD severity (FEV_1) and QOL

SGRQ domain	Pearson's r	p value
Symptom score	–0.859	<0.001
Activity score	–0.494	<0.001
Impact score	–0.554	<0.001
Total score	–0.680	<0.001

Patients with psychiatric morbidity had significantly worse impact scores, indicating greater impairment in social and psychological functioning. Table 5 shows the association between psychiatric morbidity and quality-of-life impact domain.

Table 5. Association between psychiatric morbidity and quality-of-life impact domain

Impact score	Psychiatric morbidity present (n=64)	Absent (n=36)	p-value
1–25	40	31	0.041
26–50	23	5	
51–75	1	0	

Alcohol dependence was strongly associated with tobacco dependence among COPD patients. Table 6 shows the association between tobacco dependence syndrome and other psychiatric disorder.

Table 6. Association between Tobacco Dependence Syndrome and other psychiatric disorders

Psychiatric morbidity	TDS present	TDS absent	Total
Alcohol dependence	17	0	**17**
Mood & anxiety disorders	3	7	**10**
None	37	36	**73**
Total	**57**	**43**	**100**
Chi-square = 16.98, $p < 0.001$			

Patients without psychiatric comorbidity had slightly better lung function (mean FEV_1 44.50%) than those with psychiatric illness (43.41%), although this difference was not statistically significant. Sociodemographic factors such as gender, residence, education, and income did not significantly influence quality-of-life scores.

DISCUSSION

The present study evaluated the burden of psychiatric comorbidities and their impact on quality of life (QOL) and disease severity among patients with moderate to very severe COPD. The findings demonstrate a high prevalence of psychiatric morbidity (64%), with tobacco dependence syndrome (TDS) being the most common, followed by alcohol dependence syndrome and mood and anxiety disorders. The presence of psychiatric illness was associated with worse quality-of-life scores and more severe airflow limitation, confirming the complex bidirectional relationship between psychological health and COPD.

The sociodemographic profile of our cohort showed male predominance and higher representation of rural and agriculturist populations, consistent with Indian and global epidemiological data [11,12]. The mean age of 63.6 years reflects the cumulative effect of long-term exposure to smoking and biomass fuel, which accelerates airway inflammation and lung function decline. The high proportion of illiteracy and low socioeconomic status further highlights the vulnerability of this population, as poverty and limited health literacy are recognized risk factors for poor COPD outcomes [11,13].

The overall psychiatric morbidity of 64% observed in this study is in line with earlier reports showing high prevalence of mental health disorders in COPD [14,15]. Among the psychiatric conditions, TDS was the most prevalent (57%), emphasizing the continued role of nicotine dependence in COPD progression. Tobacco dependence not only initiates and accelerates airflow obstruction but also worsens symptom perception and psychological distress. Our findings are

supported by Goodwin et al., who demonstrated that nicotine dependence acts as a confounding factor linking COPD with anxiety and depression [16]. Furthermore, Kupiainen et al. reported that smoking-related comorbidities significantly reduce the success of smoking cessation and increase mortality in COPD patients [17].

Alcohol dependence syndrome was the second most common psychiatric morbidity in our study and was strongly associated with TDS. This association reflects shared neurobiological and behavioral pathways between nicotine and alcohol dependence, as well as coping mechanisms adopted by patients with chronic respiratory disability. Similar findings have been reported in Indian studies where substance use disorders were common in COPD populations [14]. Alcohol abuse further compromises immune function, increases exacerbation risk, and impairs medication adherence, thereby worsening disease prognosis.

Mood and anxiety disorders were less prevalent in our cohort compared to substance use disorders, which contrasts with studies from Western populations where depression is often the most common psychiatric comorbidity [15]. However, studies from North India have also reported substance use disorders as a major contributor to psychiatric morbidity in COPD [49]. Cultural differences, social acceptance of tobacco and alcohol use, and underrecognition of affective disorders may explain this variation.

A key finding of this study was the strong negative correlation between FEV_1 and quality-of-life scores across all domains of SGRQ-C. The symptom domain showed the strongest correlation, indicating that worsening airflow limitation directly increases the burden of dyspnea, cough, and sputum production. Similar results have been reported by Agrawal et al. in a rural Indian population, where symptom scores had the highest negative correlation with FEV_1 [18]. Malik et al. also demonstrated that greater disease severity was associated with poorer QOL across all domains [12].

The impact domain of SGRQ-C was significantly worse in patients with psychiatric comorbidities. This domain reflects social functioning, emotional well-being, and perceived disease burden, highlighting that psychiatric illness amplifies the psychosocial consequences of COPD. These findings are consistent with Balcells et al., who demonstrated that psychological distress strongly influences the relationship between clinical severity and perceived quality of life [10]. Mehta et al. similarly showed that psychiatric comorbidities worsen QOL, particularly in the impact and activity domains [15].

Although the difference in FEV_1 between patients with and without psychiatric comorbidity did not reach statistical significance, those with psychiatric illness had lower mean FEV_1 values, indicating more severe disease. This trend aligns with previous studies reporting that depression and anxiety predict worse COPD outcomes and higher mortality [19,20]. Voogd et al. further demonstrated that depressive symptoms independently increase mortality in COPD, suggesting that psychological factors influence both disease behavior and biological vulnerability [21]. Laurin et al. also reported that anxiety and depression increase the frequency of exacerbations, further accelerating lung function decline [22].

The absence of significant associations between sociodemographic variables and QOL in our study contrasts with some European data showing that higher education improves QOL [23]. However, similar to Malik et al., our findings suggest that in Indian populations, disease severity and psychiatric comorbidity are stronger determinants of quality of life than social factors [12].

Overall, the findings of this study reinforce the concept that COPD is not merely a pulmonary disorder but a systemic illness with substantial psychological and behavioral components. The high prevalence of substance dependence and its association with other psychiatric disorders emphasizes the need for integrated care models. Screening for depression, anxiety, and substance use should become a routine part of COPD management. Studies have shown that effective treatment of psychiatric illness improves adherence, reduces hospitalizations, and enhances quality of life [24].

CONCLUSION

This study demonstrates a high burden of psychiatric comorbidity among patients with moderate to very severe COPD, with nearly two-thirds of patients affected. Tobacco dependence was the most prevalent disorder and was strongly associated with alcohol dependence, underscoring the clustering of substance use disorders in this population. Quality of life was markedly impaired across all domains of the SGRQ-C, particularly in the symptom and impact domains. Disease severity, as reflected by FEV_1, showed a strong inverse relationship with quality-of-life scores, indicating that worsening airflow limitation is associated with greater physical and psychosocial burden. Importantly, patients with psychiatric comorbidity had significantly worse impact scores, reflecting greater disruption in social functioning and emotional well-being. These findings highlight that COPD is not merely a respiratory illness but a multidimensional disorder with

substantial psychological components. Routine screening for psychiatric disorders and integrated pulmonary–psychiatric care should be incorporated into COPD management to improve overall outcomes and patient-centered quality of life.

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