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Prevalence of Depression and Anxiety in Patients with Chronic Obstructive Pulmonary Disease and Their Severity: A Cross-Sectional Study

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ABSTRACT

Background: Chronic Obstructive Pulmonary Disease (COPD) is a progressive respiratory disorder characterized by persistent airflow limitation and chronic inflammation. It is increasingly recognized as a systemic disease with important extrapulmonary manifestations, including psychiatric illnesses, which significantly affect treatment adherence, disease progression, and quality of life. This study aimed to evaluate the prevalence of depression and anxiety in COPD patients and their severity.

Materials and Methods: This single-centre, hospital-based, cross-sectional observational study was conducted in the Department of Respiratory Medicine, Santosh Hospital, Ghaziabad, over 18 months. A total of 260 adult COPD patients diagnosed as per GOLD criteria were enrolled using consecutive non-probability sampling. Clinical and sociodemographic data were recorded. Disease was diagnosed using spirometry/ clinical grading and severity was assessed using, GOLD grading, mMRC dyspnoea scale, and St. George's Respiratory Questionnaire (SGRQ). Possible etiology of COPD was also documented. Psychological assessment was performed using the Depression Anxiety Stress Scale-21 (DASS-21). Statistical analysis was done using appropriate tests.

Results: The mean age of participants was 63.84 years, with male predominance (68.07%). Tobacco exposure was the leading etiological factor (51.15%). Most patients had moderate COPD (68.08%) with moderate-to-severe dyspnoea (mMRC 2–4). The mean SGRQ scores was 53 , reflecting substantial symptom burden and impaired quality of life. Mean DASS-21 scores for depression, anxiety were 14.33, 12.20, respectively. Depression was present in 62.69% of patients, predominantly moderate (46.54%), while anxiety was observed in 66.92%, with moderate anxiety being the most common category (38.46%).

Conclusion: Depression and anxiety are highly prevalent in COPD. Routine mental health screening and integrated psychological care should be incorporated into standard COPD management for improved overall outcomes.

Keywords: Chronic Obstructive Pulmonary Disease (COPD), Depression, Anxiety, DASS-21, Quality of Life.

INTRODUCTION

Chronic Obstructive Pulmonary Disease (COPD) is a progressive respiratory disorder characterized by persistent airflow limitation and chronic airway inflammation. Earlier management of COPD mainly focused on symptomatic relief using antibiotics, bronchodilators, and mucolytics. With advancements such as spirometry and pulmonary rehabilitation, control over respiratory symptoms has improved considerably; however, the overall impact on patients' quality of life remains a major concern.

Traditionally regarded as a respiratory illness, COPD is now increasingly recognized as a systemic disease affecting multiple aspects of health. In addition to pulmonary complications, COPD is associated with several extrapulmonary manifestations, including cardiovascular comorbidities, metabolic disturbances, and socio-psychological distress. The chronicity of the disease, coupled with physical disability, financial burden, and social limitations, significantly reduces the quality of life of affected individuals.

Among psychiatric comorbidities, depression and anxiety are one of the most frequently observed in COPD patients. Studies report that nearly 15% of stable COPD patients experience anxiety, while depression may affect up to 40% of this population [1]. These mental health conditions adversely impact treatment adherence, self-management, and disease progression, making patients more vulnerable to exacerbations and hospitalizations [1]. The National Emphysema Treatment Trial also demonstrated increased mortality among COPD patients with depression over a three-year period [1]. Despite their high prevalence and impact, depression and anxiety often remain underdiagnosed and undertreated in COPD patients, especially in resource-limited settings. This gap in recognition creates a significant barrier to comprehensive disease management. Therefore, COPD care should extend beyond respiratory symptom control to include psychological well-being, patient motivation, and adaptation to lifestyle changes. The present study was undertaken to evaluate the incidence of depression and anxiety among COPD patients and to highlight the importance of integrating mental health screening into routine COPD management for improving overall outcomes.

MATERIALS AND METHODS

Study Design: This was a single-centre, hospital-based, cross-sectional observational study conducted to assess the incidence of depression and anxiety among patients with COPD.

Study Area: The study was carried out in the Department of Respiratory Medicine at Santosh Hospital, Ghaziabad, Uttar Pradesh, over a period of 18 months.

Study Population: The study population comprised adult patients diagnosed with COPD who attended the outpatient department (OPD) or were admitted under the Department of Respiratory Medicine during the study period.

Inclusion Criteria:

- Adults aged ≥18 years.
- Established diagnosis of COPD based on GOLD criteria.
- Diagnosis confirmed by either clinical evaluation or spirometry.
- Post-bronchodilator FEV1/FVC ratio <0.70 on spirometry.
- Willingness to provide written informed consent.

Exclusion Criteria:

- Patients aged <18 years.
- Presence of other respiratory diseases such as bronchial asthma, active tuberculosis, lung cancer, bronchiectasis, sarcoidosis, pulmonary fibrosis, interstitial lung disease, primary pulmonary hypertension, or asthma-COPD overlap syndrome.
- Known pre-existing major psychiatric illness.
- Patients unwilling to participate or provide consent.

Sample Size: The sample size was calculated using a standard formula, with an additional 10% added to account for non-responders, incomplete data, and withdrawals. The final target sample size was set at 280 participants. After excluding 20 non-responders (7.14%), data from 260 participants were included in the final analysis.

Sampling Methodology: A consecutive non-probability sampling technique was employed. All eligible patients presenting during the study period and fulfilling the inclusion criteria were enrolled consecutively.

Data Collection and Procedure:

- After obtaining written informed consent, all eligible participants were enrolled using a predesigned and pretested proforma in accordance with the study objectives.
- A detailed clinical history was recorded, including, smoking history, occupational exposure, alcohol consumption, dietary habits, and factors directing to possible etiology.

- Sociodemographic variables such as age, gender, and socioeconomic status (classified using the modified Kuppuswamy scale) were documented.
- A thorough general physical examination and respiratory system examination were performed for all participants.
- Diagnosis of COPD was confirmed by spirometry according to the American Thoracic Society/European Respiratory Society (ATS/ERS) guidelines. Bronchodilator reversibility testing was performed using 400 µg salbutamol, and a post-bronchodilator FEV1/FVC ratio of <0.70 was considered confirmatory of COPD as per GOLD criteria. In selected cases where spirometry could not be immediately performed, diagnosis was made based on clinical symptoms and history of exposure to risk factors.
- Severity of COPD was assessed using validated tools including GOLD spirometric grading based on post-bronchodilator FEV1 % predicted, Modified Medical Research Council (mMRC) dyspnoea scale for breathlessness assessment, and St. George's Respiratory Questionnaire (SGRQ) for evaluation of health-related quality of life.
- Psychological assessment was conducted in a quiet and private setting using the Depression Anxiety Stress Scale – 21 Item Version (DASS-21), a validated self-administered questionnaire consisting of 21 items divided into three subscales of depression, anxiety, and stress, with seven items each. Participants rated their symptoms over the preceding week, and scores were categorized into normal, mild, moderate, severe, and extremely severe according to standard DASS-21 scoring guidelines.
- The primary outcome variables included the prevalence and severity of depression and anxiety among COPD patients based on DASS-21 scores. Secondary variables included age, gender, body mass index (BMI), socioeconomic status, smoking and alcohol consumption status, possible etiological factors.

Data Analysis:

- Data were entered into Microsoft Excel and analysed using appropriate statistical software.
- Continuous variables were expressed as mean ± standard deviation or median (interquartile range) after testing for normality.
- Categorical variables were expressed as frequencies and percentages.
- Continuous variables between groups were compared using Student's t-test.

Ethical Considerations:

- Ethical approval was obtained from the Institutional Ethics Committee (IEC) of Santosh Hospital, Ghaziabad, prior to commencement of the study.
- The study was conducted in accordance with the ethical principles of the Declaration of Helsinki.
- Written informed consent was obtained from all participants in English/ Hindi.
- Participation was entirely voluntary, and participants had the right to withdraw at any point without affecting their treatment.
- Patient confidentiality was maintained by anonymizing all collected data and securely storing records with restricted access.

RESULTS

A total of 260 COPD patients were included in the study. The age of the participants ranged from 40 to 89 years, with a mean age of 63.84 years and a median age of 64 years. The highest number of patients belonged to the 40–49 years and 60–69 years age groups (57 cases each, 21.92%), followed by the 70–79 years age group (55 cases, 21.15%). The 80–89 years and 50–59 years age groups accounted for 46 (17.69%) and 45 (17.31%) cases, respectively.

Gender distribution showed a male predominance, with 177 (68.07%) male patients and 83 (31.92%) female patients. Dietary pattern analysis revealed that 160 (61.53%) patients were non-vegetarian, while 100 (38.46%) followed a vegetarian diet. The mean Body Mass Index (BMI) of the study population was 23.3 ± 3.1 kg/m², with values ranging from 15.5 to 31.1 kg/m² and a median BMI of 23.2 kg/m². Socioeconomic status assessment showed that the lower middle class constituted the largest group with 65 (25%) patients, followed by the upper class with 52 (20%), upper middle class with 50 (19.23%), upper lower class with 47 (18.07%), and lower class with 46 (17.6%) patients.

Addictive habits were highly prevalent in COPD patients, with smoking either alone or in combination with alcohol being the predominant risk factor, highlighting tobacco exposure as a major contributor to disease burden (Table 1). Tobacco smoke, cannabis, and vaping exposure emerged as the leading etiological factors, while occupational/environmental exposures and childhood infections also contributed substantially.

The diagnosis of COPD was predominantly established by spirometry, while a smaller proportion was diagnosed clinically (Table 2). Baseline assessment of dyspnoea showed that most patients had moderate to severe breathlessness, with mMRC grade 2 being the most frequently observed category (Table 2). Severity grading of COPD revealed that the majority of patients were classified under moderate disease, whereas fewer patients had severe or very severe disease. A proportion of patients remained ungraded according to GOLD scale due to clinical diagnosis without spirometric confirmation. (Table

2). Health-related quality of life evaluation using SGRQ indicated a considerable impact of COPD on daily functioning and overall well-being (Table 2).

Assessment of psychological parameters using DASS-21 demonstrated that depression scores were comparatively higher than anxiety scores, indicating a greater burden of depressive symptoms among COPD patients (Table 3). The severity distribution further showed that a substantial proportion of patients had moderate levels of both depression and anxiety, while severe and extremely severe categories were also observed in a notable subset, reflecting the significant psychological impact associated with COPD (Table 4).

Table 1: Clinical profile and risk factors of COPD patients (N = 260)

Variable	Category	n (%)
Addiction Status	None	51 (19.62)
	Alcohol	21 (8.08)
	Smoking	88 (33.85)
	Smoking + Alcohol	100 (38.46)
Etiology of COPD	Tobacco smoke / cannabis / vaping exposure	133 (51.15)
	Occupational hazards / environmental pollution	41 (15.77)
	Childhood infections / TB / HIV	41 (15.77)
	Childhood asthma associated	26 (10.00)
	Unknown cause	18 (6.92)
	Premature birth / low birth weight	1 (0.38)
	α-1 antitrypsin deficiency	0 (0.00)

Table 2: Clinical Characteristics and Severity Assessment of COPD Patients (n=260)

Variable	Category / Value	n (%) / Statistics
Type of Diagnosis	Clinical	32 (12.31%)
	Spirometry	228 (87.69%)
Baseline mMRC Grade	0	44 (16.9%)
	1	44 (16.9%)
	2	62 (23.84%)
	3	52 (20.0%)
	4	58 (22.3%)
COPD Grade	Grade 1	27 (10.38%)
	Grade 2	177 (68.08%)
	Grade 3	14 (5.38%)
	Grade 4	10 (3.85%)
	No Grade	32 (12.31%)
SGRQ Score	Mean ± Median	53 / 54
	Range	20–79

Table 3: DASS-21 Score Characteristics among COPD Patients (n=260)

Parameter	Depression	Anxiety
Minimum score	0	0
Maximum score	40	42
Range	40	42
Mean ± SD	14.33 ± 7.34	12.20 ± 7.70
Median	16	12

Table 4: Severity Distribution of Depression and Anxiety among COPD Patients (n=260)

Severity level	Depression	Anxiety
Normal	97 (37.31%)	86 (33.08%)
Mild	16 (6.15%)	10 (3.85%)
Moderate	121 (46.54%)	100 (38.46%)
Severe	17 (6.54%)	36 (13.85%)
Extremely severe	9 (3.46%)	28 (10.77%)

DISCUSSION

COPD is a progressive respiratory disorder characterized by persistent airflow limitation and chronic airway inflammation. It remains one of the leading causes of morbidity and mortality worldwide, imposing a significant burden on healthcare systems due to recurrent exacerbations, hospital admissions, and long-term treatment requirements [2]. While the physical manifestations of COPD, such as dyspnea, chronic cough, and reduced exercise tolerance, are well recognized, its psychological burden often remains underdiagnosed and undertreated [3].

Depression and anxiety are among the most common psychiatric comorbidities in COPD patients. [4] The chronic and debilitating nature of COPD, progressive loss of lung function, social isolation, dependence on caregivers, and uncertainty regarding disease progression contribute significantly to psychological distress [4]. Anxiety is frequently linked to episodes of breathlessness and fear of suffocation, whereas depression is associated with loss of independence, reduced quality of life, and chronic symptom burden. These psychiatric conditions negatively influence treatment adherence, self-management, and overall disease outcomes [5]. Therefore, understanding their prevalence in COPD patients is essential for comprehensive disease management [6].

In the present study, the mean age of the study population was 63.84 years, with the majority of patients belonging to older age groups. This finding is consistent with the natural history of COPD as a disease of advancing age. Similar findings were reported in other studies, where the mean age ranged from 56 to 75 years, demonstrating that COPD predominantly affects older adults [7][8]. However, some studies have shown that younger COPD patients may experience greater psychological distress, suggesting that depression and anxiety are not confined to older populations alone [7].

Gender distribution in our study revealed a marked male predominance, with males accounting for 68.07% of cases. This finding aligns with the traditionally higher prevalence of smoking and occupational exposure among males in developing countries. In contrast, a study involving 275 COPD patients showed nearly equal gender distribution and reported higher anxiety levels among females [9]. This variation may be due to geographical and sociocultural differences in smoking patterns and healthcare-seeking behavior.

Behavioural factors such as smoking and alcohol use were highly prevalent in our cohort. More than three-fourths of patients had some form of addiction, predominantly smoking either alone or in combination with alcohol. Tobacco exposure emerged as the leading etiological factor, accounting for over half of all cases. Similar findings have been reported in previous studies, where smoking was consistently identified as the strongest risk factor for COPD and was also associated with increased psychiatric morbidity [10][11].

The mean BMI in our study was 23.3 kg/m², suggesting a largely normal-weight population. Comparable studies have reported slightly higher mean BMI values in COPD cohorts assessed for depression and anxiety [9][12]. Although BMI is not directly linked to psychological morbidity, it serves as an indicator of nutritional and general health status, which may influence disease severity and quality of life.

Socioeconomic analysis showed that most patients belonged to middle and lower-middle socioeconomic classes. Lower socioeconomic status has been associated with poor healthcare access, and increased symptom burden, all of which may contribute to worsened quality of life and greater psychological stress [13]. This finding highlights the socioeconomic dimensions of COPD management.

Spirometry was the primary method of diagnosis in the majority of patients, reflecting adherence to GOLD recommendations. Similar methodology has been used in studies assessing psychiatric comorbidities in COPD. [11][14]. Assessment of dyspnea using the mMRC scale showed that most patients had moderate to severe breathlessness. This is clinically important, as increasing dyspnea severity has been shown to correlate strongly with depression and anxiety. Previous studies have reported that higher mMRC grades are independent predictors of psychological distress. [15][16]. Similarly, the mean SGRQ score in our cohort indicated considerable health-related quality-of-life impairment. This is comparable to findings from a Nordic multicenter study, where higher SGRQ scores were strongly associated with anxiety and depression [17][18]. This supports the view that poorer respiratory health status contributes to greater psychological burden.

The DASS-21 assessment in our study revealed that depression had the highest mean score among the psychological domains, followed by anxiety and stress. These findings are in agreement with Akalu et al. and Yohannes et al., who reported significantly elevated depression and anxiety levels among COPD patients compared to healthy controls [19][7]. Depression of any grade was present in 62.69% of our patients, with moderate depression being the most common severity category. This prevalence is comparable to Indian studies by Agarwal et al. and other recent reports, which documented depression rates ranging from 50–60% [12][13][11]. Our findings are higher than population-based studies such as de la Cruz and Cebrino, likely because our hospital-based sample included more symptomatic patients [10]. This highlights the importance of active screening for depression in clinical COPD populations.

Anxiety was present in 66.92% of our cohort, with moderate anxiety being the most common category. Severe to extremely severe anxiety accounted for nearly one-fourth of patients, indicating a substantial burden. This prevalence lies at the higher end of previously reported literature, where anxiety rates ranged from 10–60% [23][24]. Studies such as the China Pulmonary Health study reported much lower prevalence, likely due to community-based sampling [17], whereas outpatient and hospital-based cohorts showed higher rates, similar to our findings [24].

Overall, the findings of the present study highlight the high burden of depression and anxiety among COPD patients, particularly those with greater symptom severity and impaired quality of life. These psychological comorbidities are often overlooked but significantly influence disease outcomes, and healthcare utilization. Routine psychological screening using simple validated tools such as DASS-21 should therefore be integrated into standard COPD management protocols. Early identification and intervention for depression and anxiety may improve overall quality of life and clinical outcomes in these patients.

CONCLUSION

This cross-sectional study highlights the substantial psychological burden among COPD patients, demonstrating a high prevalence of both depression (62.69%) and anxiety (66.92%). Most patients had moderate COPD with significant symptom burden, dyspnea, and impaired quality of life. The findings reinforce that COPD is not merely a pulmonary disorder but a systemic illness with important psychological implications. Routine screening for psychiatric illness should be incorporated into standard COPD care to enable early identification, timely intervention, and a more holistic, patient-centered approach to improve overall outcomes and quality of life.

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