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Anxiety, Depression, and Health-Related Quality of Life in Patients with Chronic Obstructive Pulmonary Disease: A Cross-Sectional Study

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ABSTRACT

Background: Chronic Obstructive Pulmonary Disease (COPD) is a multisystem disorder in which psychological comorbidities such as anxiety and depression substantially influence symptom burden, functional status, and health-related quality of life (HRQoL). These factors are often under-recognized in routine clinical practice, particularly in patients with advanced disease. This study aimed to assess the frequency of anxiety and depression in COPD patients, evaluate HRQoL, and examine their association with disease severity, airflow limitation, and smoking status.

Materials and Methods: A hospital-based cross-sectional analytical study was conducted in the Department of Respiratory Medicine at Geetanjali Medical College and Hospital, Udaipur, from December 2017 to June 2019. One hundred adult COPD patients diagnosed according to GOLD criteria were enrolled using consecutive sampling. Anxiety and depression were assessed using the Hospital Anxiety and Depression Scale (HADS), and HRQoL was evaluated using the Short Form-36 (SF-36). COPD severity was classified based on GOLD categories, spirometric indices (FEV_1%), symptom burden (mMRC, CAT), and exacerbation history. Statistical analysis was performed using ANOVA and Chi-square tests, with $p < 0.05$ considered significant.

Results: The study population was predominantly male (82%) with a mean age of 48.67 ± 18.52 years; 71% were former smokers and 23% current smokers. Severe airflow limitation was common (mean FEV_1: 34.72 ± 14.65%), and the mean CAT score was 17.49 ± 9.67. Clinically significant anxiety and depression were present in 64% and 45% of patients, respectively. Psychological morbidity increased significantly with worsening GOLD category and declining FEV_1, with the highest prevalence observed in GOLD D patients (anxiety: 53%; depression: 37%; $p < 0.001$). HRQoL was impaired across all SF-36 domains, with significantly poorer scores in patients with severe airflow limitation, higher GOLD stage, and current smoking status.

Conclusion: Anxiety, depression, and reduced HRQoL are highly prevalent in COPD and closely associated with disease severity, airflow limitation, and symptom burden. Incorporating routine psychological screening and HRQoL assessment into standard COPD care may facilitate early identification of psychiatric comorbidities and support a more comprehensive, patient-centred management approach.

Keywords: *Chronic Obstructive Pulmonary Disease; Anxiety; Depression; Health-related quality of life.*

INTRODUCTION

Chronic Obstructive Pulmonary Disease (COPD) is a prevalent and debilitating global health problem characterized by persistent respiratory symptoms and airflow limitation due to airway and/or alveolar abnormalities, typically caused by significant exposure to noxious particles or gases [1]. The disease is a leading cause of morbidity and mortality worldwide, projected to be the third leading cause of death globally [2]. Beyond its direct respiratory manifestations, COPD is increasingly recognized for its complex interplay with various comorbidities that significantly impact patient prognosis and quality of life [3]. Among these, psychiatric comorbidities, particularly anxiety and depression, are highly prevalent yet frequently underdiagnosed and undertreated [3].

The incidence of anxiety and depression in patients with COPD is substantially high at 50%, than in the general population [4]. Various cross-sectional studies from India, corroborate these findings, reporting significant prevalence rates of anxiety and depression in COPD cohorts [1,5]. These psychological burdens are not merely incidental; they are intrinsically linked to the physical symptoms of COPD, such as dyspnoea, and can exacerbate the disease's progression [6]. The chronic nature of breathlessness in COPD profoundly impacts daily life, contributing to fatigue, poor sleep, and social isolation, which are classic somatic manifestations of major depression [7].

The presence of anxiety and depression in COPD patients significantly worsens various disease outcomes, leading to decreased physical functioning, increased frequency of acute exacerbations, higher hospitalization rates, and a deteriorated health-related quality of life (HRQoL) [3]. HRQoL is a multidimensional construct reflecting a patient's subjective evaluation of their health's impact on their life [3]. In COPD, HRQoL is often severely compromised, and this impairment correlates more strongly with psychological distress than with objective spirometric measures of lung function [8].

The severity of COPD, typically assessed by the Global Initiative for Chronic Obstructive Lung Disease (GOLD) guidelines, which incorporate airflow limitation, symptom assessment and exacerbation history, has been shown to correlate with the severity of anxiety and depression [1]. Several studies report that depression increases with COPD severity, while anxiety is linked to functional limitation and exacerbation frequency, with both anxiety and depressive symptoms significantly associated with a higher rate of acute exacerbations [6,9]. The clinical and economic burden associated with anxiety and depression in older adult COPD patients is also substantial, highlighting the need for early identification and management [10].

Despite the clear impact of these psychological comorbidities, routine screening for anxiety and depression in COPD patients remains inconsistent. Early identification and intervention are critical for improving patient outcomes, enhancing adherence to treatment regimens, and ultimately improving HRQoL. This study aims to investigate the frequency of anxiety and depression in patients with COPD, evaluate their quality of life, and explore the relationships between COPD severity and the prevalence of these psychological comorbidities. By elucidating these relationships, this research seeks to inform the development of integrated care strategies and screening protocols for a more holistic and patient-centred management of COPD.

MATERIALS AND METHODS

Study Design: This study was a **hospital-based, observational, cross-sectional, analytical study** conducted to assess anxiety, depression, and health-related quality of life in patients with COPD.
Study Duration: The study was carried out over a period of **18 months**, from **December 2017 to June 2019.**
Study Area: The study was conducted in the in the **Department of Respiratory Medicine, Geetanjali Medical College and Hospital, Udaipur.**
Study Population: The study population comprised patients **diagnosed with COPD** based on GOLD criteria and confirmed by pulmonary function tests (spirometry), who presented to or were referred from other departments to the **Outpatient and Inpatient Departments of the Department of Respiratory Medicine**, and who fulfilled the eligibility criteria.

Inclusion Criteria:

- Patients of either gender (male and female) aged 18 years and above.
- Patients diagnosed with COPD based on GOLD criteria and spirometric evaluation.
- Patients with sufficient ability to read and understand the study questionnaires and willing to provide written informed consent.

Exclusion Criteria:

- Patients with a history of primary psychiatric disorders, except nicotine and/or caffeine dependence syndrome.
- Patients with terminal illness or those admitted to the Intensive Care Unit.
- Patients with history or objective evidence of other primary pulmonary and/or cardiovascular disorders.
- Patients with history or objective evidence of major medical disorders such as uncontrolled diabetes mellitus, uncontrolled hypertension, thyroid dysfunction, orthopaedic, oncologic, gynaecological, musculoskeletal, neurological, or endocrinal disorders.
- Patients with a history of major surgical procedures under general anaesthesia within the preceding three months.

Sample Size: A total of **100 patients** meeting the inclusion criteria were enrolled in the study.
Sampling Methodology: A **consecutive sampling technique** was employed, where all eligible patients meeting the inclusion criteria during the study period were enrolled.
Data Collection and Procedure:

- A detailed clinical history was obtained from all participants, including demographic data, smoking history (as per Centers for Disease Control and Prevention guidelines), duration of illness, exacerbation history, and treatment details. A complete general and systemic examination was performed, with emphasis on respiratory system examination.
- All participants underwent spirometric evaluation (FEV_1) using standard techniques to confirm the diagnosis of COPD and assess disease severity (Annexure 1).
- COPD severity and grading were assessed according to GOLD guidelines, incorporating symptom assessment using the Modified Medical Research Council (mMRC) dyspnoea scale, COPD Assessment Test (CAT), degree of airflow limitation, and history of exacerbations (Annexure 1).
- Psychiatric assessment was carried out using standardized and validated instruments. Anxiety and depressive symptoms were evaluated using the Hospital Anxiety and Depression Scale (HADS) (Annexure 1). HRQoL was assessed using the Short Form-36 (SF-36) questionnaire (Annexure 1).

Data Analysis:

- Data were recorded systematically and analysed using MS Excel (2024) and SPSS software (version 22.0).
- Continuous variables were expressed as mean ± standard deviation (SD), and categorical variables were presented as frequencies and percentages.
- Statistical analysis was performed using one-way ANOVA and Chi-square test to analyse associations between COPD severity, psychiatric morbidity, and quality of life parameters.
- A p value of <0.05 was considered statistically significant.

Ethical Considerations:

- After obtaining approval from the Institutional Review and Research Committee (IRRC) and Institutional Ethics Committee (IEC), and written informed consent from all participants, the study was conducted in the Department of Respiratory Medicine.
- Patient confidentiality was strictly maintained by anonymising personal data and securely storing medical information.

RESULTS

The study included a total of 100 patients, of whom 82% were male and 18% were female, indicating a clear male predominance. The mean age of the study population was 48.67 ± 18.52 years. Age-wise distribution showed that the majority of patients were in the 50–59 years age group (35%), followed by 40–49 years (22%), 30–39 years (21%), and 60–69 years (21%). A small proportion of patients belonged to the 20–29 years age group (2%), while no patients were aged above 70 years.

In the study population, 71% were former smokers, 23% were current smokers, and 6% were never smokers. Dyspnoea assessment using the mMRC scale showed that 53% had mMRC grade 2, followed by 30% with grade 3, 10% with grade 1, and 7% with grade 4.

The mean number of exacerbations in the preceding one year was 1.90 ± 0.84. Most patients experienced two exacerbations (53%), while 26% had one exacerbation, 13% had three exacerbations, and 2% had four exacerbations. Additionally, 6% had at least one exacerbation requiring hospitalization during the past year.

Spirometric assessment revealed a mean FEV_1 of 34.72 ± 14.65% predicted, indicating predominantly severe airflow limitation. The mean CAT score was 17.49 ± 9.67, reflecting a moderate symptom burden.

The frequency of anxiety and depression among the study participants, was assessed using HADS (Table 1). A substantial proportion of patients demonstrated clinically significant symptoms of both anxiety and depression.

The distribution of anxiety and depression across GOLD categories is presented in Table 2. Psychological morbidity increased with COPD severity, with the highest proportion of patients in GOLD D exhibiting clinically significant anxiety and depression.

The analysis of HADS scores across FEV_1 categories is shown in Table 3. Both anxiety and depression scores increased with worsening airflow limitation, with the highest scores observed in patients with FEV_1 <30%. These differences were statistically significant for anxiety and depression ($p < 0.05$).

The distribution of SF-36 quality of life sub-domains according to GOLD category, FEV_1 severity, and smoking status is summarized in Table 4. HRQoL scores declined significantly with increasing COPD severity and worsening airflow limitation across most domains, while smoking status showed variable associations with quality of life parameters.

Table 1: Frequency Distribution of Anxiety and Depression Based on HADS (n=100).

HADS Domain	Score Category	Percentage (%)
Depression (HADS-D)	< 11 (Normal/Borderline)	55
	≥ 11 (Abnormal – Depression)	45
Anxiety (HADS-A)	< 11 (Normal/Borderline)	36
	≥ 11 (Abnormal – Anxiety)	64

Table 2: Association of Anxiety and Depression (HADS) with GOLD Categories (n=100)

HADS Category	GOLD A (%)	GOLD B (%)	GOLD C (%)	GOLD D (%)	Total (%)
Anxiety (HADS-A): $\chi^2 = 32.81$, $p < 0.001$					
Normal (<8)	5	4	6	8	23
Borderline (8–10)	4	4	2	3	13
Abnormal (>11)	1	6	4	53	64
Depression (HADS-D): $\chi^2 = 14.61$, $p < 0.001$					
Normal (<11)	10	10	8	27	55
Abnormal (≥11)	0	4	4	37	45

Table 3: Association between Anxiety and Depression (HADS) and FEV_1 (%).

HADS Category	FEV_1 Category (%)			ANOVA p-value
	<30 (n=40)	30-49 (n=46)	50-79 (n=14)	
Anxiety (HADS-A)	12.48 ± 5.20	13.35 ± 5.26	8.29 ± 2.37	0.004
Depression (HADS-D)	10.03 ± 4.22	9.37 ± 4.33	6.64 ± 1.86	0.03

Table 4: Distribution of factors for HRQoL (SF36 Sub Domains) According to GOLD Category, FEV_1 (%) and Smoking Status (n=100).

SF-36 Sub-Domain	GOLD Category (Mean ± SD)	FEV_1 (%) (Mean ± SD)	Smoking Status (Mean ± SD)
	A (n=10) / B (n=14) / C (n=12) / D (n=64)	<30 (n=40) / 30–49 (n=46) / 50–79 (n=14)	Former (n=71) / Current (n=23) / Never (n=6)
Physical Functioning	75.00±14.91 / 52.50±13.97 / 60.00±10.22 / 46.17±12.59	47.50±16.87 / 52.83±13.44 / 59.29±15.42	52.32±16.12 / 46.74±11.34 / 61.67±18.35
	$p < 0.001$	$p = 0.04$	$p = 0.08$
Bodily Pain	74.55±19.81 / 61.89±12.57 / 61.13±9.16 / 43.53±8.52	46.70±13.37 / 50.77±13.97 / 66.29±15.99	49.78±14.72 / 50.72±12.49 / 71.75±18.94
	$p < 0.001$	$p = 0.02$	$p = 0.002$
Role Limitation (Physical)	72.50±18.45 / 58.93±15.83 / 60.42±16.71 / 23.91±19.55	29.38±25.25 / 37.07±25.53 / 66.07±12.43	37.04±25.91 / 33.70±27.81 / 66.67±12.91
	$p < 0.001$	$p < 0.001$	$p = 0.02$
Role Limitation (Emotional)	83.33±32.40 / 54.72±24.82 / 58.28±15.06 / 19.78±24.98	26.65±30.37 / 36.93±34.58 / 57.11±27.51	35.66±34.41 / 26.06±24.50 / 72.19±25.10
	$p < 0.001$	$p < 0.001$	$p = 0.009$
Emotional Well-Being	72.60±19.23 / 61.86±11.08 / 58.17±19.21 / 41.19±11.06	43.35±11.67 / 48.78±17.59 / 67.71±17.71	47.86±16.67 / 48.87±18.30 / 67.33±10.56
	$p < 0.001$	$p < 0.001$	$p = 0.02$
Social Functioning	75.00±18.41 / 59.64±18.76 / 68.33±24.27 / 46.85±14.54	47.78±16.20 / 54.35±18.71 / 70.89±22.31	54.13±19.53 / 50.43±19.32 / 66.67±19.15
	$p < 0.001$	$p < 0.001$	$p = 0.19$
Energy / Fatigue	61.40±16.76 / 52.57±16.56 / 57.17±20.10 / 48.31±17.70	50.60±16.82 / 50.30±18.80 / 56.43±19.47	50.62±18.33 / 51.22±16.26 / 59.33±22.65
	$p < 0.001$	$p < 0.001$	$p = 0.53$
General Health Perception	66.00±10.22 / 54.29±16.39 / 55.42±8.38 / 41.95±11.01	42.50±12.61 / 49.89±14.16 / 55.36±13.22	48.10±14.02 / 45.87±14.03 / 50.00±16.73
	$p < 0.001$	$p < 0.001$	$p = 0.74$

DISCUSSION

COPD is a progressive respiratory disorder characterized by persistent respiratory symptoms and airflow limitation, often caused by exposure to noxious particles or gases [2]. Beyond its pulmonary manifestations, COPD is frequently associated with systemic effects, including altered body composition, reduced quality of life (QoL), and significant psychological

distress, notably anxiety and depression [11]. These psychiatric comorbidities are often underdiagnosed yet profoundly impact patient outcomes, increasing mortality, exacerbations, and decreasing physical functioning and health-related quality of life (HRQoL) [12]. This hospital-based cross-sectional study of 100 COPD patients using HADS and SF-36 demonstrated a high prevalence of anxiety and depression and a marked decline in quality of life with increasing disease severity, airflow limitation, and symptom burden, highlighting the multidimensional impact of COPD and the need for routine psychological assessment.

The study population showed a clear male predominance (82%), with a mean age of 48.67 ± 18.52 years, and most patients belonged to the 50–59-year age group. Although females constituted a smaller proportion of the cohort, a higher proportion of women exhibited anxiety and depression compared to men. Similar gender-related differences have been reported by **Di Marco et al. (2010)** [13], who demonstrated higher anxiety and depression scores among female COPD patients, along with worse dyspnoea perception and poorer quality of life. The heightened psychological vulnerability in women has been partly attributed to greater perception of breathlessness, as demonstrated by **Weiner et al. (2002)** [14], who reported significantly higher dyspnoea perception in women despite better inspiratory muscle strength.

Most participants in the present study were former smokers (71%), followed by current smokers (23%), reflecting smoking cessation following disease onset. Dyspnoea severity was moderate to severe in the majority, with 53% having mMRC grade 2 and 30% grade 3. The mean FEV_1 was 34.72 ± 14.65% predicted, indicating predominantly severe airflow limitation, and the mean CAT score of 17.49 ± 9.67 reflected a moderate symptom burden. These findings are consistent with the advanced disease profile of the cohort and explain the high prevalence of psychological morbidity observed. **Hanania et al. (2011)** [15] reported that most COPD patients in the ECLIPSE cohort were current or former smokers and that depression prevalence increased with GOLD-defined disease severity and symptom burden, findings consistent with our predominantly former-smoker cohort with severe airflow limitation and moderate symptom burden. Similarly, **Yohannes and Alexopoulos (2017)** [16] demonstrated that patients with moderate-to-severe COPD and higher depressive symptoms had increased exacerbation risk, supporting our observation that advanced disease severity and frequent symptoms coexist with a high prevalence of psychological morbidity.

The prevalence of clinically significant anxiety (64%) and depression (45%) observed in the present study is comparable to pooled estimates reported in the meta-analysis by **Wang et al. (2023)** [4], which showed anxiety in 40% and depression in 42% of patients with COPD. Lower prevalence rates have been reported in large population-based cohorts, including the HUNT study by **Vikjord et al. (2020)** [17], where anxiety and depression were present in 16.2% and 15.9% of COPD patients, respectively, and in the general population study by **Savenkova et al. (2024)** [18], which reported anxiety in 15% and depression in 14% using HADS. Such differences may be attributed to variations in disease severity distribution, regional healthcare access, or cultural expressions of distress.

Anxiety and depression increased significantly with COPD severity (GOLD categories). In GOLD D patients, 53% had abnormal anxiety and 37% had abnormal depression scores ($p < 0.001$). **Janssen et al. (2010)** [19] reported lower prevalence of 32% and 27% for anxiety and depression, respectively, likely reflecting their inclusion of patients across all GOLD stages, whereas most patients in the present study were GOLD D. Similarly, **Bozkurt et al. (2022)** [20] observed a progressive rise in HADS scores with GOLD stage, with HADS-A increasing from 3.31 ± 2.93 in GOLD A to 5.85 ± 4.67 in GOLD D, and HADS-D from 3.81 ± 2.76 to 6.02 ± 3.94, showing statistically significant trends for both anxiety ($p = 0.029$) and depression ($p = 0.026$).

The association between airflow limitation and psychological morbidity was evident on analysis across FEV_1 categories, with patients having FEV_1 <30% showing the highest anxiety (12.48 ± 5.20) and depression (10.03 ± 4.22) scores, significantly greater than those with milder obstruction. Similar findings were reported by **van Manen et al. (2002)** [21], who observed a 25% prevalence of depression in patients with FEV_1 <50% compared to 17.5% in controls and a 2.5-fold increased risk of depression in severe COPD, with no excess risk in mild-to-moderate disease. Consistent results were also demonstrated by **Kırkil et al. (2015)** [22], who reported significantly higher anxiety and depression scores in severe and very severe COPD, along with strong negative correlations between HADS scores and FEV_1, FVC, and FEV_1/FVC. These observations are further supported by the review by **Rahi et al. (2023)** [23], which emphasizes that psychological morbidity increases markedly with worsening airflow limitation and dyspnoea severity, reinforcing the strong association between advanced COPD and anxiety and depression observed in the present study.

HRQoL assessment using SF-36 demonstrated significant impairment across all eight domains, with progressive deterioration corresponding to increasing GOLD stage and worsening airflow limitation. Patients in GOLD D exhibited the lowest scores across physical functioning, bodily pain, role limitations (physical and emotional), emotional well-being, social functioning, vitality, and general health perception ($p < 0.001$ for most domains), while patients in GOLD C showed better scores than GOLD B in certain domains. This pattern is consistent with findings by **Ståhl et al. (2005)** [24], who evaluated 168 COPD patients and reported a stepwise decline in health-related quality of life with increasing disease severity and age using SF-36, SGRQ, and EQ-5D. Similar results were reported by **Stöber et al. (2021)** [25], who studied 3,016 patients and demonstrated highest HRQoL in GOLD A, followed by C, B, and D, with the poorest scores in GOLD D, supporting the observation of better health status in GOLD C compared with GOLD B.

Analysis of airflow limitation further showed that patients with FEV_1 <30% had the greatest impairment in SF-36 domains, particularly role limitations due to physical and emotional factors ($p < 0.001$), with significant reductions also seen in physical functioning and bodily pain. These findings align with **Di Marco et al. (2010)** [13], who demonstrated a direct association between declining FEV_1, worsening quality-of-life scores, and higher anxiety and depression levels. Concordantly, **Stöber et al. (2021)** [25] reported that decreasing FEV_1 was associated with deterioration in disease-specific HRQoL (CAT), particularly in GOLD AB groups, reinforcing the link between lung function impairment and HRQoL decline.

Consistent associations between disease severity and impaired quality of life have also been reported by **Amer et al. (2019)** [26], who demonstrated significant reductions across all SF-36 domains in elderly COPD patients, with poorer scores in those with advanced airflow limitation.

Smoking status showed variable associations with HRQoL in the present study. Current smokers exhibited poorer scores in bodily pain, role limitation, and emotional well-being, while former smokers demonstrated lower physical functioning. In contrast, **Ståhl et al. (2005)** [24] reported no significant effect of smoking status on HRQoL, suggesting that continued smokers may represent individuals with less severe disease. However, findings from **Coste et al. (2014)** [27] showed modest reductions in physical functioning and general health among male daily smokers and lower mental HRQoL among ex-smokers, paralleling patterns observed in the present study. Similarly, **Moayeri et al. (2021)** [28] reported that smoking cessation was associated with improvements in physical SF-36 domains, while mental health domains remained largely unchanged, supporting the observation that smoking exerts a stronger influence on physical rather than mental aspects of quality of life.

These findings highlight the need for routine screening of anxiety and depression in COPD patients, as psychological comorbidities substantially impair quality of life and prognosis, particularly in those with severe GOLD stages and reduced FEV_1. Given the systemic nature of COPD and its association with mood disorders, integrated multidisciplinary care addressing both physical and psychological components is essential to improve outcomes and overall well-being.

CONCLUSION

The current hospital-based study demonstrates a high burden of anxiety, depression, and impaired HRQoL in COPD patients, particularly in those with severe airflow limitation, frequent exacerbations, higher symptom scores, active smoking, and GOLD group D disease, with psychological morbidity worsening as FEV_1 declines. These findings reinforce COPD as a multidimensional systemic disease requiring routine psychological screening and integrated, multidisciplinary management. Although limited by its cross-sectional design, inpatient-only sample, absence of healthy controls, and use of HADS as a screening rather than diagnostic tool, the study highlights important clinical implications that is, early recognition and treatment of anxiety and depression may improve treatment adherence, rehabilitation outcomes, and overall quality of life in COPD patients.

REFERENCES

[1] Chandra E, Anand S, Gupta A, Jha R, Ahmad I. Prevalence and impact of anxiety and depression in patients with chronic obstructive pulmonary disease: a comparative analysis of post-tuberculosis and non-tuberculosis chronic obstructive pulmonary disease cases. Monaldi Archives for Chest Disease 2025. https://doi.org/10.4081/MONALDI.2025.3278.

[2] Global Initiative for Chronic Obstructive Lung Disease (GOLD). Global Strategy for the Diagnosis, Management, and Prevention of Chronic Obstructive Pulmonary Disease (2026 Report). 2025.

[3] Qiu C-J, Wu S. Depression and anxiety disorders in chronic obstructive pulmonary disease patients: Prevalence, disease impact, treatment. World J Psychiatry 2024;14:1797–803. https://doi.org/10.5498/wjp.v14.i12.1797.

[4] Wang X, Lei L, Deng P. Incidence of Anxiety and Depression in Patients with Chronic Obstructive Pulmonary Disease: A Meta-Analysis. Modern Health Science 2022;5:p1–p1. https://doi.org/10.30560/MHS.V5N1P1.

[5] Sood R, Ahuja G, Sharma S, Dutt Sharma D, Monica, Sachin, et al. Psychiatric Comorbidities in Patients with Chronic Obstructive Pulmonary Disease. Int J Curr Pharm Res 2024;16:38–51. https://doi.org/10.22159/IJCPR.2024V16I2.4026.

[6] Hong YJ, Kim Y, Moon JY, Park S, Lee JK, Jung KS, et al. Associations between depression and anxiety index and frequency of acute exacerbation in chronic obstructive pulmonary disease. Ther Adv Respir Dis 2023;17:1–13. https://doi.org/10.1177/17534666231216591.

[7] Siraj RA. COPD and Comorbid Mental Health: Addressing Anxiety, and Depression, and Their Clinical Management. Medicina (B Aires) 2025;61:1426. https://doi.org/10.3390/MEDICINA61081426.

[8] Özdemir ÖÇ, Ozonay K. Relationship between anxiety, depression, symptom level, and quality of life in individuals with COPD. Journal of Experimental and Clinical Medicine (Turkey) 2022;39:144–8. https://doi.org/10.52142/OMUJECM.39.1.29.

[9] Mason T, Dewar A, Hall J. Integrating Care: screening for anxiety and depression in COPD. European Respiratory Journal 2022;60:2085. https://doi.org/10.1183/13993003.CONGRESS-2022.2085.

[10] Zhao X, Liu G, Liu D, Zou L, Huang Q, Chen M, et al. Clinical and economic burden of anxiety/depression among older adult COPD patients: evidence from the COPD-AD China Registry study. Front Psychiatry 2023;14:1221767. https://doi.org/10.3389/FPSYT.2023.1221767/BIBTEX.
[11] Kurtoğlu A, Eken Ö, Çiftçi R, Balıkçı Çiçek İ, Durmaz D, Argalı Deniz M, et al. Investigating the Impact of Body Composition Analysis on Quality of Life and Anxiety–Depression in Adult Males with Chronic Obstructive Pulmonary Disease. Healthcare 2025;13:1442. https://doi.org/10.3390/HEALTHCARE13121442.
[12] Nikolovski A, Gamgoum L, Deol A, Quilichini S, Kazemir E, Rhodenizer J, et al. Psychometric Properties of the Hospital Anxiety and Depression Scale in Individuals With Chronic Obstructive Pulmonary Disease: Protocol for a Systematic Review. JMIR Res Protoc 2022;11:e37854. https://doi.org/10.2196/37854.
[13] Di Marco F, Verga M, Reggente M, Maria Casanova F, Santus P, Blasi F, et al. Anxiety and depression in COPD patients: The roles of gender and disease severity. Respir Med 2006;100:1767–74. https://doi.org/10.1016/J.RMED.2006.01.026.
[14] Weiner P, Magadle R, Massarwa F, Beckerman M, Berar-Yanay N. Influence of gender and inspiratory muscle training on the perception of dyspnea in patients with asthma. Chest 2002;122:197–201. https://doi.org/10.1378/CHEST.122.1.197.
[15] Hanania NA, Müllerova H, Locantore NW, Vestbo J, Watkins ML, Wouters EFM, et al. Determinants of depression in the ECLIPSE chronic obstructive pulmonary disease cohort. Am J Respir Crit Care Med 2011;183:604–11. https://doi.org/10.1164/RCCM.201003-0472OC.
[16] Yohannes AM, Mülerová H, Lavoie K, Vestbo J, Rennard SI, Wouters E, et al. The Association of Depressive Symptoms With Rates of Acute Exacerbations in Patients With COPD: Results From a 3-year Longitudinal Follow-up of the ECLIPSE Cohort. J Am Med Dir Assoc 2017;18:955-959.e6. https://doi.org/10.1016/J.JAMDA.2017.05.024.
[17] Vikjord SAA, Brumpton BM, Mai XM, Vanfleteren L, Langhammer A. The association of anxiety and depression with mortality in a COPD cohort. The HUNT study, Norway. Respir Med 2020;171:106089. https://doi.org/10.1016/J.RMED.2020.106089.
[18] Savenkova V, Zorkina Y, Ochneva A, Zeltzer A, Ryabinina D, Tsurina A, et al. Prevalence of Anxiety and Depressive Disorders in a Sample of Moscow Residents: Comparison of the GAD-7 and HADS Results with a Clinical Assessment. Consortium Psychiatricum 2024;5:15. https://doi.org/10.17816/CP15487.
[19] Janssen DJA, Spruit MA, Leue C, Gijsen C, Hameleers H, Schols JMGA, et al. Symptoms of anxiety and depression in COPD patients entering pulmonary rehabilitation. Chron Respir Dis 2010;7:147–57. https://doi.org/10.1177/1479972310369285.
[20] Bozkurt N, İhsan Bozkurt A, Dirol H. Anxiety/depression scores and affecting factors in COPD patients. Eurasian J Pulmonol 2022;24:122–9. https://doi.org/10.14744/ejp.2022.9021.
[21] Van Manen JG, Bindels PJE, IJzermans CJ, Schadé E, Dekker FW, Van der Zee JS. Risk of depression in patients with chronic obstructive pulmonary disease and its determinants. Thorax 2002;57:412–6. https://doi.org/10.1136/THORAX.57.5.412.
[22] Kirkil G, Deveci F, Deveci SE, Atmaca M. Anxiety and Depression Symptoms in Patients with Chronic Obstructive Pulmonary Disease. Psychiatry and Clinical Psychopharmacology 2015;25:151–61. https://doi.org/10.5455/BCP.20121130122137.
[23] Rahi MS, Thilagar B, Balaji S, Prabhakaran SY, Mudgal M, Rajoo S, et al. The Impact of Anxiety and Depression in Chronic Obstructive Pulmonary Disease. Adv Respir Med 2023;91:134. https://doi.org/10.3390/ARM91020011.
[24] Ståhl E, Lindberg A, Jansson SA, Rönmark E, Svensson K, Andersson F, et al. Health-related quality of life is related to COPD disease severity. Health Qual Life Outcomes 2005;3. https://doi.org/10.1186/1477-7525-3-56.
[25] Stöber A, Lutter JI, Schwarzkopf L, Kirsch F, Schramm A, Vogelmeier CF, et al. Impact of Lung Function and Exacerbations on Health-Related Quality of Life in COPD Patients Within One Year: Real-World Analysis Based on Claims Data. Int J Chron Obstruct Pulmon Dis 2021;16:2637–51. https://doi.org/10.2147/COPD.S313711.
[26] Amer MS, Farid TM, Aly WW, Mahmoud MA. Aging Medicine and Healthcare Study of Quality of Life and Functional Status among Elderly with Chronic Obstructive Pulmonary Disease. Aging Medicine and Healthcare 2019;10:39–45. https://doi.org/10.33879/AMH.2019.1818.
[27] Coste J, Quinquis L, D'Almeida S, Audureau E. Smoking and Health-Related Quality of Life in the General Population. Independent Relationships and Large Differences According to Patterns and Quantity of Smoking and to Gender. PLoS One 2014;9:e91562. https://doi.org/10.1371/JOURNAL.PONE.0091562.
[28] Moayeri F, Hsueh YS (Arthur), Dunt D, Clarke P. Smoking Cessation and Quality of Life: Insights From Analysis of Longitudinal Australian Data, an Application for Economic Evaluations. Value in Health 2021;24:724–32. https://doi.org/10.1016/J.JVAL.2020.11.022.

Annexure 1: Scoring System

Spirometric Classification of COPD Severity

Severity	FEV_1 % Predicted
Mild	≥ 80%
Moderate	50–79%
Severe	30–49%
Very Severe	< 30%

GOLD Strategy for COPD Categorization

COPD patients were categorized into GOLD Groups A, B, C, and D based on symptom burden and risk of exacerbations, using the following parameters:

- Symptom assessment using COPD Assessment Test (CAT) score and Modified Medical Research Council (mMRC) dyspnoea scale
- Exacerbation history in the previous year, including hospitalizations

Modified Medical Research Council (mMRC) Dyspnoea Scale

Grade	Description
Grade 0	Breathless only with strenuous exercise
Grade 1	Short of breath when hurrying on level ground or walking up a slight hill
Grade 2	Walks slower than people of same age due to breathlessness or stops for breath while walking at own pace
Grade 3	Stops for breath after walking about 100 yards or after a few minutes
Grade 4	Too breathless to leave the house or breathless while dressing

COPD Assessment Test (CAT)

CAT is an eight-item questionnaire evaluating respiratory symptoms and health-related quality of life, including cough, sputum production, chest tightness, breathlessness, activity limitation, confidence in leaving home, sleep quality, and energy levels. Each item is rated on a scale of 0 to 5, yielding a total score between 0 and 40.

CAT score interpretation is as follows:

- Low impact: 0–10
- Medium impact: 11–20
- High impact: 21–30
- Very high impact: >30

Hospital Anxiety and Depression Scale (HADS)

The HADS is a validated, self-administered screening instrument designed to assess symptoms of anxiety and depression in patients with medical illnesses. It consists of 14 items, divided into two subscales: Anxiety (HADS-A) and Depression (HADS-D), each comprising 7 items.

Each item is scored on a 4-point Likert scale (0–3) based on symptom severity experienced during the preceding one week, resulting in a maximum possible score of 21 for each subscale. The scale is specifically constructed to minimize the influence of somatic symptoms such as fatigue, insomnia, and loss of appetite, making it particularly suitable for patients with chronic physical illnesses such as COPD.

Interpretation of HADS Scores:

- 0–7: Normal
- 8–10: Borderline abnormal (borderline case)
- 11–21: Abnormal (definite case)

Short Form-36 Health Survey (SF-36)

The SF-36 consists of 36 items grouped into eight health domains, reflecting both physical and mental components of health.

The eight domains assessed are:

- Physical Functioning
- Role Limitations due to Physical Health
- Bodily Pain
- General Health Perceptions
- Vitality
- Social Functioning
- Role Limitations due to Emotional Problems
- Mental Health

Each domain score is transformed into a 0–100 scale, with higher scores indicating better perceived health status and quality of life. Domain scores are calculated according to standard scoring guidelines.