



A Prospective Cohort Study to Investigate the Association of Depression, Anxiety and Stress Among COPD Patients at Secondary Care Hospital.

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ABSTRACT

Chronic obstructive pulmonary disease (COPD) significantly impacts patients' mental health, often leading to increased levels of depression, stress and anxiety. This study aims to explore the association between these psychological factors in COPD patients at a secondary care hospital. A cross-sectional study was conducted with COPD patients. A total of 70 participants were recruited using convenience sampling. Depression, anxiety, and stress were assessed using standardized questionnaire such as Depression, Anxiety, and Stress Scale (DASS-21). Statistical analyses were performed to evaluate the associations among these variables. The study found a high prevalence of depression (40%), anxiety (64.7%), and stress (51.4%) among COPD patients. The Morisky medication adherence scale was employed to evaluate the patient's adherence to their medication regimen. Following the counselling provided to the patient, there has been an enhancement in medication adherence. Multivariate analysis indicated that factors such as disease severity and social support were significant predictors of these psychological conditions. The findings highlight a substantial burden of depression, anxiety, and stress among COPD patients. Integrating mental health assessment and intervention into the management of COPD may improve patient outcomes and quality of life. Further longitudinal studies are recommended to establish causative relationships and explore intervention strategies.

Keywords: COPD, Depression, Anxiety, Stress.

INTRODUCTION

COPD includes a number of scientific syndrome groups that demonstrate the ubiquitous character of the expiratory airflow issue¹. The American Thoracic Society uses the words emphysema and chronic bronchitis to refer to COPD².

A relatively common but treatable condition, COPD involves decreased lung tissue and narrowed airflow. It is thought to result from chronic inflammation caused by harmful particles or chemicals, of which most is tobacco smoke³. Rebound may not occur in the lungs, and airway constriction may develop as a result of chronic inflammation. Sputum production, dyspnea, and coughing are some symptoms of this disease. The spectrum of symptoms is possible, from absent altogether to respiratory failure⁴. Another illness reviewed is COPD, a lung disease that cannot be cured, and is one of the factors driving sickness and mortality globally. Next only to cancer, coronary heart disease^{5,6} together with cerebrovascular, It ranks as the fourth most frequent cause of death inUS⁵. It is expected to account for 0.33 of all deaths in 2020. In any case, in differentiate with other major inveterate illnesses of the Joined Together States, COPD has been more frequent and its death rate increased⁷; the cost of death doubled between 1970 and 2002⁸, and in 2000, the female mortality rate was finally surpassed that of men^{6,9}.

Hospitalizations, which typically happen during an exacerbation episode, represent 40% of direct costs; 20% is prescription drugs¹⁰. In 2000, an estimated 1.5 million

patients in the United States with COPD visited emergency departments. It is predicted that 10% will die in hospital following a flare up and over 60% in a year if older than age 65¹¹.

It has been determined that in the last 20 years, compared to patients with no comorbidities, those with COPD People with three or more comorbidities are at higher risk of hospitalization and early death¹³. Stress, anxiety, and depression have become a significant burden to morbidity of COPD as they decrease quality of life and adherence to drugs¹⁴. Untreated and misdiagnosed signs of a patient's stress, anxiety, and sadness. Besides increasing tiredness and the need for medical attention, COPD has a grave influence on social interaction and physical functioning^{15, 16}. Anxiety, stress, and depression can be difficult to identify and treat since their symptoms overlap with those of COPD¹⁷.

About depression, stress, anxiety

Mental health issues significantly impact older individuals, especially those with chronic obstructive pulmonary disease (COPD), leading to conditions like major depression, dysthymia, and anxiety disorders. These mood problems can severely hinder daily functioning and overall quality of life^{18,19}. Depressive disorders involve feelings of emptiness and irritability, while anxiety disorders, such as phobias and generalized anxiety disorder (GAD), result in overwhelming fear and excessive worry. Together, these challenges can greatly diminish well-being in older adults coping with chronic illnesses^{20,21}.



Mechanism of potential association with COPD

A recent systematic review of 25 studies suggests a possible bidirectional relationship between depression and COPD²², in which low-grade chronic inflammation may mediate this association. Both COPD²⁴ and late-life depression²³ were associated with increased inflammatory markers.

Pathology of depression, stress, anxiety

The relationship between depression and chronic obstructive pulmonary disease (COPD) is complex and multifaceted. Smoking is a risk factor for COPD, in a bidirectional link. Depression-smokers tend to start smoking and are a challenge to quit, whereas smoking-depressed ones are at a higher risk. Connection could be influenced by smoking's inflammatory effects and its activation of nicotinic acetylcholine receptors²⁵⁻²⁸. In addition, hypoxia and systemic inflammation can also be considered depression-precipitating factors in patients with COPD²⁶. Low levels of arterial oxygen saturation and abnormalities in the periventricular white matter may connect hypoxia to cognitive and emotional challenges²⁹. Functional limitations due to COPD also add to the depression levels. Anxiety symptoms overlap with COPD, making this relationship between mental health and respiratory disorders complicated³⁰. It is important to discern such associations for developing better treatment and care for COPD and depression comorbid patients³¹.

COPD and impact of anxiety and depression

In patients with COPD, depression and anxiety have a significant impact on quality of life, mortality and exacerbations.

Effect On Mortality

The relationship of depressive symptoms in COPD patients to increased mortality in the hospital and community setting has been studied³⁴⁻³⁶. A few studies report anxiety, though in some it hasn't been established that mortality is related to anxiety³⁷⁻³⁹. However, patients with anxiety and depressive symptoms are three times more likely to stop taking prescribed medications according to a meta-analysis⁴⁰.

Effect on quality of life

COPD has such a huge impact on quality of life, with anxiety and depression reported to be the most common mental issues in patients^{41,42}. Such factors as prolonged smoking and a greater burden of symptoms, and declining social and physical functioning are factors contributing to the clinical incidence of depression and anxiety in individuals with COPD⁴³. These mental health challenges extend beyond lung disease severity and delineate the serious impact on crucial life decisions and, ultimately, the well-being of patients. Overcoming these challenges will improve the quality of life in COPD patients³⁷⁻⁴⁵, and efforts shall be integrated over physical health as well as on the emotional welfare of the patient⁴⁶.

Methods of treatment for COPD patients with anxiety and depression

Depression and COPD co-occur often and have an impact on functional results and quality of life. The World Health Organization underscores the need for integrated care programs for patients with chronic diseases⁴⁷. Although there are acceptable treatments for psychiatric comorbidity generally, there is less literature on psychological therapy in the context of COPD⁴⁸. It can be achieved either through pharmaceutical or psychological treatments such as self-management and cognitive behavioral therapy, relaxation, among others. Pulmonary rehabilitation is a particular treatment for COPD that reduces symptoms of anxiety and depression⁴⁹.

METHODOLOGY

- Research Approach: Quantitative
- Design: Prospective Cohort Study
- Sample Size: 70 (after removing 5 cases)
- Study Period: 6 months
- Sampling Technique: Convenience sampling
- Inclusion Criteria: Aged 25-65, Met GOLD requirements in inpatient and outpatient pulmonary medicine departments
- Exclusion Criteria: Mental impairment, no assent, prior mental illness
- Measurement Tool: Depression Anxiety Stress Scale (2021)
- Medication Adherence Tool: Morisky Medication Adherence Scale (8 items)
- Data Analysis Tools: Microsoft Excel, SPSS 16
- Statistical Method: Paired-sample T-test
- Ethical approval: we have got ethical approval (IHEC/GH-VIRUDHUNAGAR/AKCP/PD/202405)

RESULTS

Table 1: distribution of COPD patients on basis of gender.

Gender	Number of patients	Percentage of patients
Male	48	74%
Female	17	26%
Total	65	100%

Table 2: Distribution of COPD patients on basis of age.

Age in years	Number of patients	Percentage of patients
25-35 years	03	5%
36-45 years	14	21%
46-55 years	16	25%
56-65 years	32	49%



Table 3: Distribution of patients on basis of their smoking habit.

Types	Number of patients	Percentage of patients
Smoker	40	62%
Non-smoker	25	38%

Table 4: Categorization of patients on basis of medications prescribed for depression, anxiety and stress:

Drugs	Number of patients	Percentage of patients
Amitriptyline	15	23%
Escitalopram	23	35.4%
Lorazepam	18	27.6%
Clonazepam	4	6.1%
Fluoxetine	8	12.3%

Table 5: Stages of COPD

Stages	Number of patients	Percentage of patients
Mild	8	12.4%
Moderate	52	80%
Severe	5	7.6%
Very severe	0	0

Table 6: Level of depression, anxiety, stress

Level	Number of patients with		
	Depression	Anxiety	Stress
Normal	39	23	31
Mild	12	22	13
Moderate	8	15	10
Severe	5	3	7
Very severe	1	2	4

Table 7: Predicators of DASS

	Distribution of patients with			Percentage of patients with		
	D	A	S	D	A	S
Age in years						
25-35 years	3	2	3	4.6%	3%	4.6%
36-45 years	12	12	10	18.4%	18.4%	15.3%
46-55 years	8	15	10	12.3%	23%	15.3%
56-65 years	3	13	11	4.6%	20%	17%
Gender						
Male	18	35	28	27.7%	53.8%	43%
Female	8	7	6	12.3%	10.7%	9.2%
Living status						
Alone	7	10	8	10.7%	15.3%	12.3%
With family	19	32	26	29.2%	49.2%	40%
Marrital status						
Married	15	30	22	23%	46.1%	33.8%
Unmarried	9	12	9	13.8%	18.4%	13.8%
Divorced	2	0	3	3%	0	4.6%
Diet						
Vegetarian	9	10	11	13.8%	15.3%	17%
Non-vegetarian	17	32	23	26.1%	49.2%	35.3%
Oxygen therapy						
Yes	18	31	26	27.7%	47.6%	40%
No	8	11	8	12.3%	17%	12.3%
Smoking						
Smoker	22	32	20	33.8%	49.2%	30.7%
Non-smoker	4	10	14	6.1%	15.3%	21.5%
Types of smoking						
Cigarette	13	14	8	20%	21.5%	12.8%
Beedi	9	18	12	13.8%	27.7%	18.4%
Non-smoking	4	10	14	6.1%	15.3%	21.5%
Socioeconomic status						
Low	18	24	18	27.7%	36.9%	27.7%
Middle	5	13	10	7.6%	20%	15.3%
High	3	5	6	4.6%	7.6%	9.2%



Duration of disease (years)						
0.5 - 1 years	0	2	2	0	3%	3%
1.1 - 2 years	1	3	7	1.5%	4.6%	10.7%
2.1 - 3 years	3	5	3	4.6%	7.6%	4.6%
3.1 - 4 years	5	9	11	7.6%	13.8%	17%
4.1 - 5 years	10	18	7	15.3%	27.7%	10.7%
5.1 - 10 years	7	5	4	10.7%	7.6%	6.1%

Table 8: DAS Score

Outcome variable	At baseline	At discharge	P value
Depression score	16.15 ± 1.03	13.31 ± 1.08	<0.00
Anxiety score	10.95 ± 0.56	8.86 ± 0.54	<0.00
Stress score	23.02 ± 1.20	20.55 ± 1.36	<0.00

Table 9: Assessment of medication adherence using morisky scale

Score	Pre-counselling		Post-counselling	
	No.of patients	Percentage	No.of patients	Percentage
Low (3-8)	25	49.5%	12	18.6%
Medium (1-2)	28	30.5%	25	38.4%
High (0)	13	20%	28	43%

DISCUSSION

Table 1 shows the amount of distribution by gender among the patients, which totals 65 individuals. Among these, 74% are males, while 26% are females. This shows that there is a high gender difference in that there is a substantially greater proportion of male patients in this group.

Table 2 shows that Most patients are elderly, with 49% of patients in the 56-65 age group and 25% in the 46-55 age group. Meanwhile, the 25-35 age group accounts for 5% and the 36-45 age group for 21%. This trend is on the rise and reflects the growing demand for health policies with a focus on elderly care. This highlights the growing need to address the specific health issues of this population.

Table 3 shows that 62% of 65 respondents were smokers and 38% were not smokers. This deadly disease of tobacco smoking means high association between smoking and researched health problems, with a point stress on the need for a targeted intervention to quit smoking and education. Addressing high rates of tobacco use is an important step toward improving patient care and developing effective public health strategies to reduce impact on health outcomes.

Table 4 shows that the most commonly prescribed was Escitalopram at 35.4%, as it is highly effective for anxiety and depression. Amitriptyline followed at 23% for relief of depression and chronic pain. Lorazepam was used in 27.6%, showing significant benzodiazepine use for anxiety, whereas Clonazepam was only prescribed in 6.1%. Fluoxetine is still being used at 12.3%, as it is very common to be on this long term for depression. This information makes clear the use of treatment in treating all clients through a mix and match approach, where both SSRIs and

benzodiazepines are used according to individual client needs.

Table 5 shows that 80% of patients are moderate level so the commonest level of severity of patients evaluated. Alternatively, 12.4% falls under mild category, 7.6% severe, and no patient was classified under very severe. This pattern underlines the need for targeted management strategies among most patients with moderate symptoms and possibly prevention of reaching the more severe stages early on.

Table 6 shows it can be realized from the above graphs that most patients fall in the range of "normal" depression, anxiety, and stress levels at (39), (23), and (31), respectively, while the numbers drop drastically at higher ranges. There are only 1 and 2 patients marked in the "very severe" category for depression and anxiety, respectively. This demonstrates that as it depicts, while many achieve mental wellness, services need to target those experiencing mild to severe problems because this affect quality of life very much. Of course, these needs need to be met in order to better outcomes from mental health treatment as a whole.

Table 7 shows that shows that the Depression, Anxiety, and Stress Scale (DASS) was used to assess levels of depression, anxiety, and stress, classifying scores into normal, moderate, mild, severe, and very severe categories. For depression, scores of 0 to 9 were considered normal, while 28 and above indicated very severe depression. The anxiety score from 0 to 7 was normal, 20, and was classified as even more serious. The stress was 0-14 Normal beaches and 34 or more mean very serious stress.

The study found that individuals with Chronic Obstructive Pulmonary Disease (COPD) exhibited increased depression, anxiety, and stress, likely due to the physical and social



limitations imposed by COPD, such as dyspnea, exercise restrictions, social isolation, and dependence on caregivers. These daily challenges can contribute to low self-esteem, heightened stress, and an elevated risk of depression.

Furthermore, the research observed that illiteracy was linked to higher depression, anxiety, and stress scores compared to those who were educated. Longer hospital stays were also associated with greater mental health issues, possibly due to environmental stressors like patient deaths, fears of re-admission, and other psychological pressures within the hospital setting. Smoking was found to be a significant predictor, as nicotine can stimulate neurotransmitters, but withdrawal can result in depressive symptoms, and smoking also increases anxiety risk by impacting serotonin metabolism.

Socioeconomic status played a crucial role, with lower socioeconomic status correlated with higher depression, anxiety, and stress, likely due to limited education, healthcare access, and awareness, leading to persistent unhealthy habits. Conversely, higher educational attainment, respected occupations, and better wages were associated with reduced mental health risks, as they provide stability, better working conditions, and a sense of social respect, all contributing to a lower likelihood of developing depression, anxiety, and stress.

Table 8 Values are mean \pm SD (n=26) DEPRESSION: There is a statistically significant relationship between baseline and discharge groups (t=8.471). The result is significant at $p < 0.05$.

Values are mean \pm SD (n=42) ANXIETY: There is a statistically significant difference relationship baseline and discharge groups (t=9.624). The result is significant at $p < 0.05$.

Values are mean \pm SD (n=34) STRESS: There is a statistically significant difference relationship baseline and discharge groups (t=6.414). The result is significant at $p < 0.05$.

Table 9 shows that the data indicate a clear benefit of counseling on the scores of patients. Prior to counseling, 49.5% of patients fell into the low scoring range (3-8); this figure dropped significantly to 18.6% after counseling sessions. In comparison, the high score (0) category increased within the 20% to 43% span. The medium scores group, which comprises 1-2 scores, also witnessed a slight increase from 30.5% to 38.4%. These results, in summary, demonstrate that counseling had a favorable effect on patients' performance.

CONCLUSION

The study reports that a psychiatric illness related to COPD was more prevalent among male patients in the age group of 36 to 45 years, of whom 79% were cigarette smokers. Most of them belonged to the lower class, and the average number of days of hospital stay was 13. Total of the patients diagnosed with COPD among the total were found to be afflicted by high degrees of depression, anxiety, and stress-65% suffering from every, 16% also reported suffering simultaneously from depression and anxiety, 10% had both

depression and stress, 11 patients with anxiety and stress, 15 patients experienced only anxiety, and 13 suffered only from stress.

Those who smoke, experience prolonged stays in the hospital, and have less education were most likely to suffer from severe depression. Anxiety levels also showed relationship with patients' history, education and duration of stay. Factors such as educational levels, income and length of hospital stay jarred stress levels. Increased severity of illness resulted in greater levels of sadness, anxiety and stress indicating that the higher the physical restrictions, the lower the quality of life.

The improvements in psychiatric disorders were observed after counseling and medication with the use of the DASS Scale at admission and at the time of discharge. Quality of life could be dramatically improved with early disease detection and education of a patient on management and adherence to therapy. A pharmacist is very important in informing patients about their diseases and encouraging better lifestyles.

Limitation of study:

The sample size (only 65 COPD patients) allowed detecting only relatively strong association. In addition, the tool used for assessing DAS was used for screening rather than diagnosing the problem.

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