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BEYOND BREATHLESSNESS: EXAMINING DEPRESSION IN COPD WITH FOCUS ON PREVALENCE AND IMPACT

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ABSTRACT

Objective: To determine the frequency of depression among COPD patients, and to explore the demographic characteristics associated with depression in these patients.

Methodology: This descriptive cross-sectional study was conducted at Jinnah Post Graduate Medical Center Karachi, Pakistan from May 2022 to May 2024, involving 110 patients diagnosed with moderate to severe COPD based on GOLD criteria. Participants were aged 18 years or above, diagnosed with COPD for at least 5 years, and excluded if they had depression due to other chronic diseases or known psychiatric issues. Ethical approval was obtained, and informed consent was secured. Data collection utilized the Hamilton Depression Rating Scale (HAM-D) to assess depression levels, alongside a structured questionnaire for demographic details. COPD severity was measured using spirometry, with criteria including FEV1 <70% and FEV1/FVC ratio <70%. Statistical analysis employed SPSS version 20 to compute descriptive statistics for numerical factors and frequencies for categorical data, examining relationships between depression and patient characteristics.

Results: This study involved 110 patients with moderate to very severe COPD, with a mean age of 60.5 ± 10.2 years, including 62 males (56.4%) and 48 females (43.6%). The average COPD duration was 8.3 ± 3.1 years. The majority were aged 60 years and older (65.5%) and married (70.9%). Employment status varied, with 31.8% unemployed and 40.9% employed. Depression, assessed using the Hamilton Depression Rating Scale (HAM-D), was prevalent in 54% of participants, with

34.5% having no depression, 38.2% mild, 20% moderate, and 7.3% severe depression. Depression rates were higher among older patients, females, single individuals, and the unemployed, indicating significant mental health concerns among COPD patients.

Conclusion: The study findings highlight the significant burden of depression among COPD patients in Pakistan, influenced by demographic factors, disease severity, and cultural contexts. Addressing these factors through targeted interventions is crucial for improving mental health outcomes and overall quality of life in this vulnerable patient population.

Keywords: Depression, Chronic Obstructive Pulmonary Disease (COPD), Hamilton Depression Scale (HAM-D), FEV1, FEV1/FVC.

Introduction

Exposure to dangerous environmental chemicals, such as pollution and tobacco smoke, is the primary cause of Chronic Obstructive Pulmonary Disease (COPD), a lung condition that is increasingly devastating and common.[1] It causes long-lasting symptoms like coughing, dyspnea, and mucus production, which eventually impede airflow. A forced expiratory volume in one second (FEV1) that is less than 70% of the predicted value and a FEV1/forced vital capacity (FVC) ratio that is also less than 70% are clinical indicators of COPD.[2-3]

Beyond its physical manifestations, COPD is increasingly recognized for its significant impact on mental health, particularly in relation to depression.[4] Depression is characterized by persistent low mood, diminished interest in activities, and affects emotional, cognitive, and physical well-being.[5] The co-occurrence of COPD and depression exacerbates both conditions, leading to poorer health outcomes, increased hospitalizations, and higher healthcare costs. Studies indicate varying prevalence rates of depression among COPD patients, ranging from 19.6% in mild cases to as high as 42% in moderate to severe cases, with higher rates observed among female patients.[6-7]

Globally, COPD ranks among the leading causes of death and disability, and its prevalence continues to rise.[8] The psychological burden of COPD, coupled with its physical symptoms, underscores the need for a deeper understanding of depression within this population. Despite its impact, depression in COPD patients often goes unrecognized and untreated in clinical settings, highlighting the importance of addressing this dual burden through comprehensive healthcare strategies.[9-10]

This study aims to fill a critical gap in current research by investigating the frequency of depression specifically among COPD patients in our local context. By identifying demographic characteristics associated with depression in this population, we aim to inform targeted interventions that improve patient outcomes and enhance overall quality of life.

Objective

To determine the frequency of depression among COPD patients, and to explore the demographic characteristics associated with depression in these patients.

Methodology

Study Design and Setting

This descriptive cross-sectional study was conducted at Jinnah Post Graduate Medical Center Karachi, Pakistan from May 2022 to May 2024.

Participant Selection

An overall 110 patients included in the study were those diagnosed with moderate to severe COPD based on spirometry, in accordance with the GOLD criteria.[11] Inclusion criteria were as follows:

i. Patients aged 18 years or above, of both genders.
ii. Diagnosed with COPD for not less than 5 years.

Patients were excluded if they had depression secondary to other chronic diseases or had known psychiatric problems.

Ethical Considerations
Ethics approval was obtained from the Institute's ethical review committee. Informed consent was obtained from all participants, and information pamphlets in the local language (Urdu) were provided.

Data Collection
Data was collected using the standard Hamilton Depression Rating Scale (HAM-D), consisting of 21 questions.[12] The HAM-D score was used to determine the level of depression, with a score of 7 or above indicating depression. Scores were categorized as follows:

- <7: No depression
- 7-17: Mild depression
- 18-24: Moderate depression
- Above 24: Severe depression

A structured questionnaire was used to collect demographic information, including age, sex, marital status, and occupation.

Assessment of COPD
COPD was diagnosed and its severity was assessed using spirometry, with the following criteria:

- FEV1 <70% of the predicted value
- FEV1/FVC ratio <70%

Statistical Analysis
SPSS version 20 was used for data entry and analysis. For numerical factors such age, COPD duration, FEV1 status, and HAM-D score, descriptive statistics were computed, including mean and standard deviation (SD). The presentation of categorical information, such as gender, marital status, and occupation, was done using frequencies and percentages. The relationship between depression grades and characteristics such age, gender, length of COPD, and FEV1 percent predicted grades of COPD was calculated.

Primary and Secondary Outcomes
The primary outcome of the study was to determine the frequency of depression among COPD patients. The secondary outcome was to explore the demographic characteristics associated with depression in these patients.

Results
A total of 110 patients diagnosed with moderate to very severe COPD were included in the study. The mean age of the participants was 60.5 ± 10.2 years. Among them, 62 (56.4%) were male and 48 (43.6%) were female. The average duration of COPD among participants was 8.3 ± 3.1 years. Table-1 provides the demographic overview categorized by age group, gender, marital status, and employment status. The majority of patients were aged 60 years and older (65.5%), with a fairly even split between males (56.4%) and females (43.6%). Most patients were married (70.9%), a smaller proportion were single (20%) or widowed (9.1%). Owing to the employment status, 31.8% were unemployed, whereas 40.9% were employed.

Table-1: Demographic Characteristics

Demographic Variable	Sub-groups	Frequency (n=110)	Percentage (%)
Age Group (years)	18-49	8	7.3
	50-59	30	27.3
	60+	72	65.5
Gender	Male	62	56.4
	Female	48	43.6
Marital Status	Married	78	70.9
	Single	22	20
	Widowed	10	9.1
Employment	Employed	45	40.9
	Retired	30	27.3
	Unemployed	35	31.8

Patients were grouped into four categories based on their FEV1 % predicted and FEV1/FVC ratio, depicted in table-2. Those with mild COPD, were not included in this study. The moderate COPD group consisted of 55 patients (50%) while in the severe COPD category, there were 45 patients (40.9.%), and the very severe COPD group included 10 patients (9.1%). The distribution of COPD based on severity is also depicted in Figure-1 below.

Table-2: Severity of COPD Based on FEV1/FVC Ratio

COPD Severity	FEV1 % Predicted	FEV1/FVC Ratio	Frequency (n=110)	Percentage (%)
Mild COPD	FEV1 ≥ 80%	< 70%	Not included	Not included
Moderate COPD	50% ≤ FEV1 < 80%	< 70%	55	50
Severe COPD	30% ≤ FEV1 < 50%	< 70%	45	40.9
Very Severe COPD	FEV1 < 30% or FEV1 < 50% with chronic respiratory failure	< 70%	10	9.1

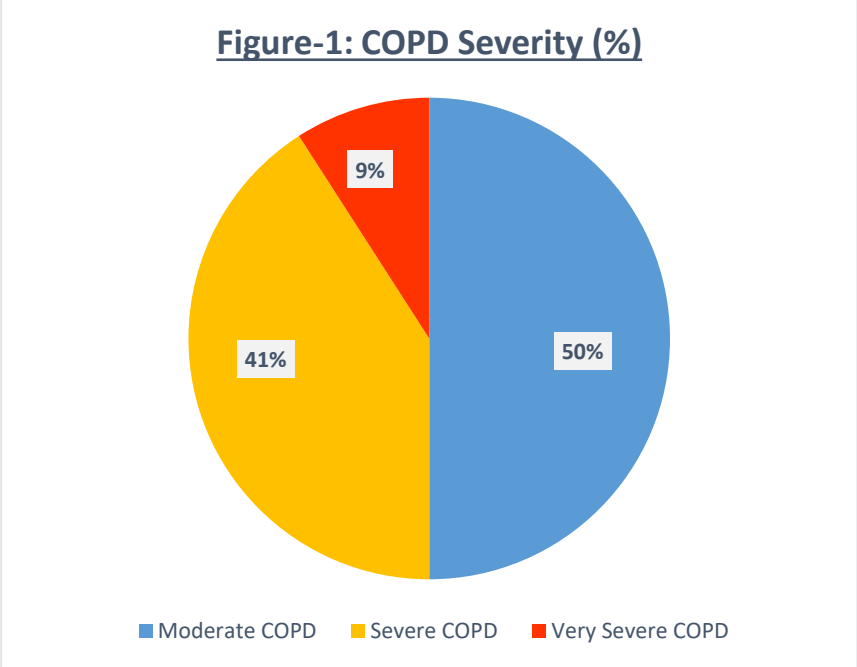

Table-3 summarizes the levels of depression among COPD patients, categorized by their Hamilton Depression Rating Scale (HAM-D) scores. Among the participants, 38 (34.5%) had no depression, while 42 (38.2%) experienced mild depression. A smaller proportion, 22 patients (20%), exhibited moderate depression. The least common was severe depression, observed in only 8 patients (7.3%), illustrated in figure-2 below.

Table-3: Depression Severity and its Distribution in Study Participants

Depression Level	HAM-D Score	Frequency (n=110)	Percentage (%)
No Depression	< 7	38	34.5
Mild Depression	7-17	42	38.2
Moderate Depression	18-24	22	20
Severe Depression	> 24	8	7.3

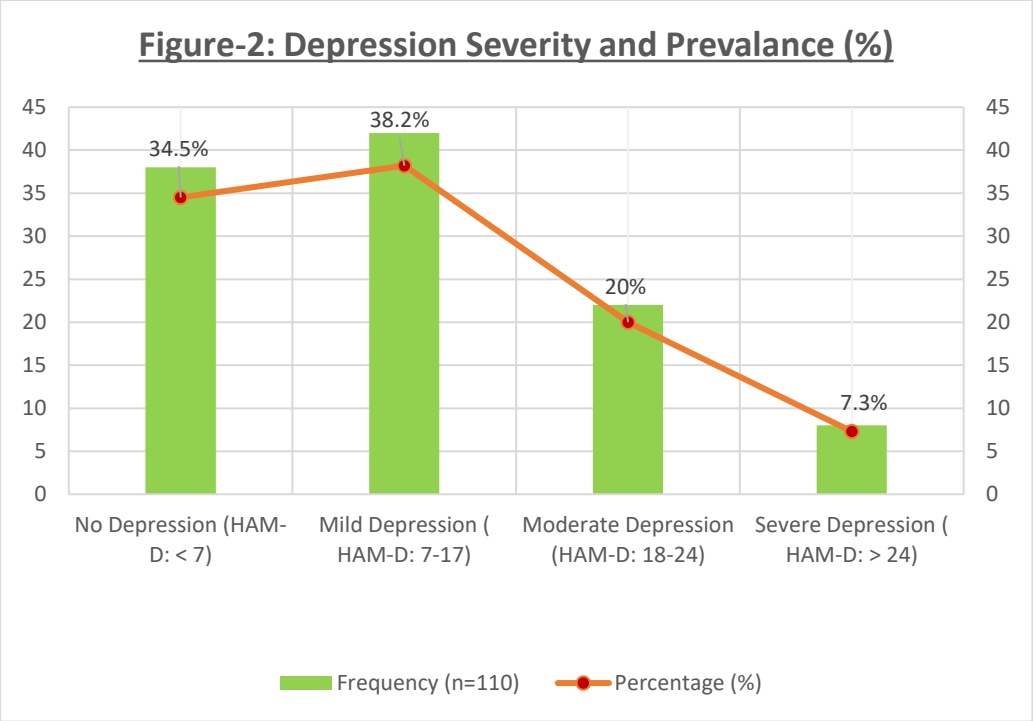

Table-4 presents the distribution of depression levels among patients with varying severity of COPD. Among the 55 patients with moderate COPD (50%), 34.5% had no depression, 36.4% had mild depression, 21.8% had moderate depression, and 7.3% had severe depression. In the severe COPD group (40.9%, n=45), 34.5% had no depression, 37.8% had mild depression, 20% had moderate depression, and 8.9% had severe depression. Among the 10 patients with very severe COPD (9.1%), 40% had no depression, 50% had mild depression, 10% had moderate depression, and none had severe depression.

Table-4: Correlation of COPD Severity and Depression Levels

COPD Severity	Depression Level	HAM-D Score	Frequency (n=110)	Percentage (%)
Moderate COPD (n=55, 50%)	No	< 7	19	34.5
	Mild	7-17	20	36.4
	Moderate	18-24	12	21.8
	Severe	> 24	4	7.3
Severe COPD (n=45, 40.9%)	No	< 7	15	34.5
	Mild	7-17	17	37.8
	Moderate	18-24	9	20
	Severe	> 24	4	8.9
Very Severe COPD (n=10, 9.1%)	No	< 7	4	40
	Mild	7-17	5	50
	Moderate	18-24	1	10
	Severe	> 24	0	0

Table-5 provides demographic insights into COPD patients, detailing their characteristics and the prevalence of depression within each subgroup. Among different age groups, depression rates were notably higher among older patients, with 62.5% of those aged 18-49, 60% of those aged 50-59, and 68.1% of those aged 60 and older experiencing depression. Gender-wise, 64.5% of males and 66.7% of females had depression. Marital status also showed variations, with higher rates among single individuals (77.3%) compared to married (64.1%) and widowed (50%) patients. Employment status revealed higher depression rates among unemployed individuals (74.3%) compared to employed (55.6%) and retired (70%) patients.

Table-5: Prevalence of Depression Within Each Subgroup (Secondary Outcome)

Characteristic	Sub-groups	Frequency (n=110)	With Depression (n)	Percentage with Depression (%)
Age Group (years)	18-49	8	5	62.5
	50-59	30	18	60
	60+	72	49	68.1
Gender	Male	62	40	64.5
	Female	48	32	66.7
Marital Status	Married	78	50	64.1
	Single	22	17	77.3
	Widowed	10	5	50
Employment	Employed	45	25	55.6
	Retired	30	21	70
	Unemployed	35	26	74.3

Discussion

Chronic Obstructive Pulmonary Disease (COPD) poses a substantial public health challenge globally, ranking as the third leading cause of mortality by 2020.[13] COPD not only significantly impacts physical health but also exacerbates psychological disorders such as depression and anxiety, thereby impairing patient quality of life and functional abilities.[14] In Pakistan, where depression is prevalent due to factors like unemployment, gender inequality, and socioeconomic disparities exacerbated by recent natural disasters, understanding the intersection of COPD and depression becomes crucial.[15]

Our study identified a prevalence of depression among COPD patients at 54%, slightly lower than the 57% reported in a study conducted by Hussain et al.[16] This finding highlights the consistent burden of depression in COPD patients across different regions of Pakistan, underscoring the need for targeted interventions to address mental health alongside COPD management.

Interestingly, we observed a higher prevalence of depression in moderate and severe form of COPD, suggesting a direct relationship between disease severity and psychological distress. This aligns with previous research by Rahi et al. indicating that more severe COPD stages, characterized by reduced lung function, are associated with heightened depression rates.[4]

In our study, females exhibited a higher prevalence of depression (66.7%) compared to males (64.5%), similar to the findings of an international study done in Spain reporting 3.54-fold increased rates of depression among women with COPD.[17] This disparity underscores the influence of societal and cultural factors on gender-specific psychological health outcomes in COPD patients in our part of the world.

Age also emerged as a significant factor influencing depression, with older patients (50-70 years) showing a higher risk. This finding resonates with existing literature suggesting that advanced age and prolonged disease duration contribute to increased psychological impairments and depression severity in COPD patients.[18]

Our study reported a lower prevalence of depression as we strictly controlled for confounding variables and excluded patients with comorbid conditions known to contribute to depression. This methodological rigor aimed to provide a clearer estimate of depression directly attributable to COPD in our study cohort, enhancing internal validity. In contrast, studies by Tsai et al. and negi et al. reported higher depression prevalence rates among COPD patients, ranging from 25% to over 50%. These variations could be attributed to different study methodologies, healthcare systems, and cultural contexts influencing mental health outcomes.[19-20]

Despite its strengths, our study had limitations. Conducted in tertiary care settings, it may not fully represent less severe cases in the general population. The cross-sectional design limited our ability to establish causal relationships between COPD and depression. Future research should employ longitudinal designs and include community-based samples to explore these relationships further.

Conclusion

The study findings highlight the significant burden of depression among COPD patients in Pakistan, influenced by demographic factors, disease severity, and cultural contexts. Addressing these factors through targeted interventions is crucial for improving mental health outcomes and overall quality of life in this vulnerable patient population.

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