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Original research article

PREVALENCE OF DEPRESSION AND ANXIETY AMONG COPD PATIENTS AND ASSOCIATION WITH CAT SCORE

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Abstract: *Chronic obstructive pulmonary disease (COPD) is a global health problem associated with considerable mortality and morbidity.* ***Objective:*** *This study aimed to determine the prevalence of anxiety and depression among COPD patients living in and to evaluate the associated factors. Furthermore, the utility of the CAT score in predicting depression was also assessed.* ***Methodology:*** *This Prospective observational study was conducted at Aga Khan University Hospital Karachi and Aria Institute of Medical Sciences, Quetta, after approval from the ethical review committee for sample size calculation WHO calculator, based on the prior prevalence of COPD in 10.6% of Pakistani general population. Data were collected from 125 patients through a non-probability consecutive sampling technique.* ***Results:*** *Data were collected from 125 patients according to inclusion and exclusion criteria with a male predominance (96 males, 76.8%) compared to females (29 females, 23.2%). The majority of the participants were ex-smokers (104, 83.2%), followed by those who never smoked (13, 10.4%) and current smokers (8, 6.4%). The mean age of the participants was 64.1 years (±7.01), with an age range from 40 to 95 years. The descriptive statistics for anxiety scores among the 125 COPD patients indicate a mean score of 1.35 with a standard deviation of 0.46.* ***Conclusion:*** *It is concluded that a significant proportion of COPD patients experience high levels of anxiety (70.4%) and depression (67.2%). The chi-square test revealed no significant association between these conditions, indicating they occur independently.*

Keywords: Anxiety, Chronic Obstructive Pulmonary Disease, Depression, Prevalence, Risk Factors.

Introduction

Chronic obstructive pulmonary disease (COPD) is a global health problem associated with considerable mortality and morbidity. An estimated 328 million people have COPD worldwide, and it is predicted that COPD will become the third leading cause of death worldwide by 2030. Globally, it is estimated that the disease caused 3.17 million deaths in 2015 (1). Chronic respiratory conditions are associated with higher psychological burdens. Patients with COPD were 85 % more likely (2) to develop depression and anxiety disorder as compared to healthy matched controls in a study by Eisner et al., with estimates of depression ranging from a prevalence of -- to – and anxiety from 13-46% (3) and most cases remaining under-diagnosed. In a meta-analysis of controlled studies by Matte et al., depression prevalence was 27.1% in COPD subjects and 10.0% in the control group. In Pakistan, studies have reported prevalence ranging from 15% (4) to 57% (5) in one study. While the exact mechanism remains unclear, Atlantis et al. suggested that a bidirectional association exists between depression and COPD (6). Depression leads to COPD as a "cause" since smoking is a significant risk factor for COPD, and as a consequent "effect", COPD causes psychological distress. Thus, the prevalence rates vary depending on various socio-demographic characteristics and the severity of COPD. Tietikkurt et al. (7) found that in contrast to the FEV1 value, dyspnea and reduced exercise capacity correlated more significantly with increased prevalence, concluding that the BODE index was a superior assessment tool than the GOLD classification. Increased hospitalization rate , higher mortality, frequent exacerbations (8), poor treatment adherence, well-being, and poor health behaviours (9) result from under-recognized and under-diagnosed depression (10); therefore, studies recommend screening for earlier interventions and management. COPD Assessment Test (CAT) is a simple tool that the GOLD guidelines for managing and assessing symptom burden have utilised. Moreover, it can predict other clinical outcomes such as exacerbation risk, depression and health status deterioration (11-14). In Pakistan, only a few studies have been done to determine the psychological burden of COPD. Thus, this study aimed to assess the prevalence of anxiety and depression among COPD patients living in and to evaluate the associated factors. Furthermore, the utility of the CAT score in predicting depression was also assessed.

Methodology

This Prospective observational study was conducted at Aga Khan University Hospital Karachi and Aria Institute of Medical Sciences, Quetta, after approval from the ethical review committee for sample size calculation WHO calculator, based on the prior prevalence of COPD in 10.6% of the Pakistani general population. Data were collected from 125 patients through a non-probability consecutive sampling technique.

The inclusion criteria for the study required patients to have a COPD diagnosis according to the GOLD guidelines, include both male and female patients, and be adults between 18 and 80 years old. The exclusion criteria were as follows: a prior history of major depressive illness or post-traumatic stress disorder, prolonged steroid use of more than four weeks, a recent exacerbation within the previous three

weeks, use of antidepressants, self-diagnosis of COPD, or refusal to participate.

The Urdu-translated version of the COPD Assessment Test (CAT) score was used alongside the Hospital Anxiety and Depression Scale (HADS). The HADS consists of 14 statements, with seven describing symptoms of anxiety and seven describing symptoms of depression. Response options for each question range from 0 to 3, and patients were asked to indicate their agreement with the statements. Total scores range from 0-21, with 0-7 considered normal, above 11 deemed abnormal, and below 11 as borderline. Electronic medical records were used to gather data on pulmonary function tests. All consecutive COPD patients attending the outpatient clinic who met the inclusion criteria were evaluated after informed consent and enrolled using the non-probability successive sampling method.

Patient identifiers were not collected, and participants were assigned unique identity numbers to maintain confidentiality. Informed consent was obtained from all participants. Patient codes were kept anonymous, and data stored in hard copies were secured in locked locations within the hospital premises. Electronic records were password-protected, and only the research team had access to the data.

Statistical analysis was performed using SPSS version 23. Continuous data were presented as mean and standard deviation, while categorical data were presented as frequency and percentage. Pearson correlation and chi-square tests were used to measure the association between HADS scores and other categorical variables. A p-value of <0.05 was considered statistically significant. ROC curve analysis was conducted to assess the predictive value of the CAT score, and regression analysis was performed to determine factors associated with depression, such as the BODE Index, number of exacerbations, FEV1, and co-morbid conditions.

Results

Data were collected from 125 patients according to inclusion and exclusion criteria with a male predominance (96 males, 76.8%) compared to females (29 females, 23.2%). The majority of the participants were ex-smokers (104, 83.2%), followed by those who never smoked (13, 10.4%) and current smokers (8, 6.4%). The mean age of the participants was 64.1 years (±7.01), with an age range from 40 to 95 years. (Table 1)

Table 1: Demographic data of patients (n=125)

Variables	Count
Male	96 (76.8%)
Female	29 (23.2%)
Ex-Smoker	104 (83.2%)
Never Smoked	13 (10.4%)
Current Smoker	8 (6.4%)
Mean age	64.1±7.01
Min	40.0
25%	60.0
50%	63.0
75%	69.0
Max	95.0

The descriptive statistics for anxiety scores among the 125 COPD patients indicate a mean score of 1.35 with a standard deviation of 0.46. The scores ranged from a minimum of 0.0 to a maximum of 2.0. The 25th percentile was 1.0, the median (50th percentile) was 1.4, and the 75th percentile was 1.67, showing a relatively low level of anxiety among the participants. (Table 2)

Table 2: Descriptive Statistics for Anxiety Scores

Statistic	Value
Count	125.0
Mean	1.35
Std. Deviation	0.46
Min	0.0
25th Percentile	1.0
50th Percentile	1.4
75th Percentile	1.67
Max	2.0

Depression scores among the 125 COPD patients reveal a mean score of 1.35 with a standard deviation of 0.46. The depression scores ranged from a minimum of 0.0 to a maximum of 2.0. The 25th percentile was 1.0, the median (50th percentile) was 1.4, and the 75th percentile was 1.67, indicating a similar distribution to the anxiety scores and suggesting a generally low level of depression among the participants. (Table 3)

Table 3: Descriptive Statistics for Depression Scores

Statistic	Value
Count	125.0

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Mean	1.35
Std. Deviation	0.46
Min	0.0
25th Percentile	1.0
50th Percentile	1.4
75th Percentile	1.67
Max	2.0

All respondents (100%) reported no longer enjoying what they used to enjoy, while all (100%) indicated they could still laugh and see the funny side. A majority (66.67%) felt cheerful and did not feel slowed down, while the same percentage enjoyed good books, radio, or TV programs. All participants (100%) expressed that they have not lost interest in their appearance and look forward to enjoying things. These results highlight a complex interplay between depression symptoms and daily activities among COPD patients. (Table 4)

Table 04: Depression Questions - Frequency and Percentage of Yes and No

Depression Questions	Response	Frequency	Percentage
I still enjoy the things I used to enjoy (Depression)	No	3	100.0%
	Yes	0	0.0%
I can laugh and see the funny side of things (Depression)	No	0	0.0%
	Yes	3	100.0%
I feel cheerful (Depression)	No	1	33.33%
	Yes	2	66.67%
I feel as if I am slowed down (Depression)	No	1	33.33%
	Yes	2	66.67%
I have lost interest in my appearance (Depression)	No	0	0.0%
	Yes	3	100.0%
I look forward with enjoyment to things (Depression)	No	0	0.0%
	Yes	3	100.0%
I can enjoy a good book or radio or TV program (Depression)	No	1	33.33%
	Yes	2	66.67%

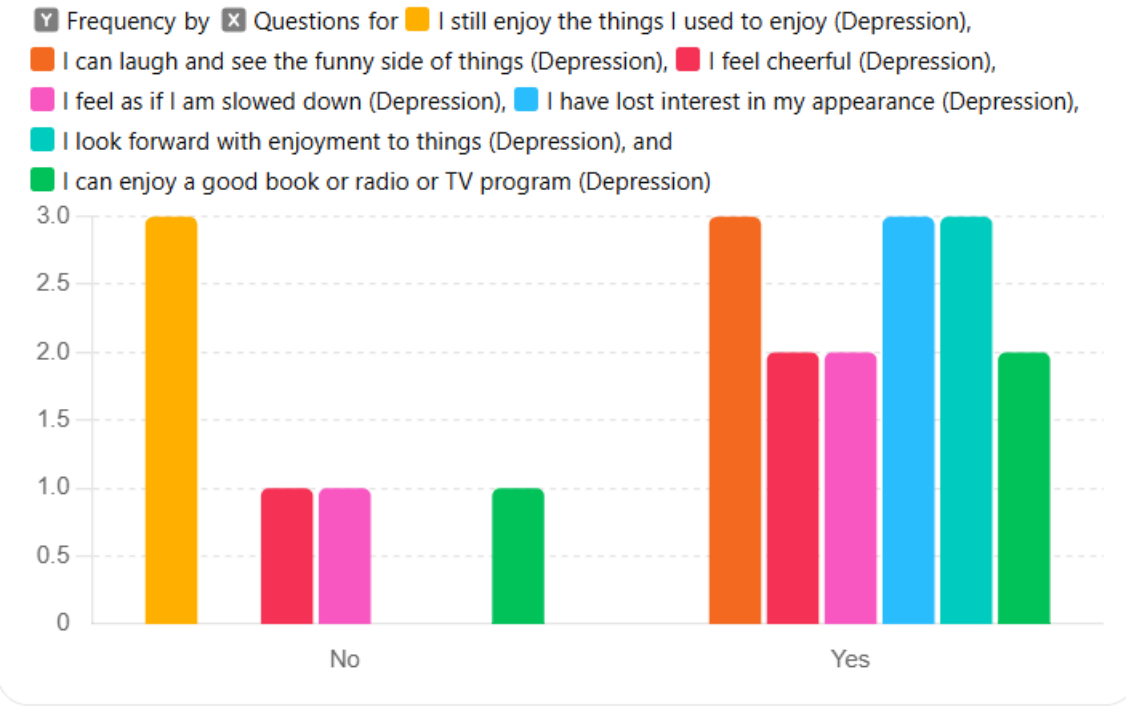

Figure 01 shows the Depression Questions - Frequency and Percentage of Yes and No.

The p-value indicates that there is no significant association between the conditions (anxiety and depression) and the patient group (COPD) in this dataset.

Table 5 highlights the prevalence of depression and anxiety among COPD patients. Out of 125 patients, 88 (70.4%) were found to suffer from anxiety, and 84 (67.2%) were

found to suffer from depression. Both conditions have a p-value of 0.682155, indicating that while anxiety and depression are highly prevalent among COPD patients, the statistical analysis shows no significant association between the two conditions. This suggests that anxiety and depression occur independently within this patient population.

Table 05: Prevalence of Depression and Anxiety among COPD Patients

Condition	Number of Patients	Percentage	p-value
Anxiety	88	70.4%	0.682155
Depression	84	67.2%	0.682155

Discussion

The findings of this study provide valuable insights into the prevalence of depression and anxiety among COPD patients and their association with the COPD Assessment Test (CAT) scores. The demographic characteristics highlighted the various demographics, and notably, 76. 8% of the participants were males, and 83. 2% reported to be ex-smokers, which concurs with the findings that show a correlation between COPD and these parameters. The mean based on the anxiety index was one. For the depression index, the mean was also 1. 35, and both distributions are compactly located on the low to moderate level of psychological distress among the participants. Equally, other variables have a Standard Deviation of 0. Thus, the score of 46 for both anxiety and depression indicates a narrow range of variability, which means that the respondents had a similar level of anxiety and depression (15). Allopathic treatment of depression is based on the quantitative results of responses where intensive analysis of the data gives an understanding of the further elucidation of patients' condition. Notably, depressive symptoms in the participants reached a level where 100% consumed no more things they previously enjoyed. However, all participants retained their sense of humour, whereby they could laugh and look at the lighter side of life, pointing to partial resistance to depressive symptoms (16). Further, a majority indulged in cheerfulness and did not experience slowing down the notion, indicating that although some of the mental health was compromised, the other parts were still functional. The total preoccupation with personal appearance and looking forward to fun activities also support this aspect of mixed emotions. The findings reveal a significant association between the CAT scores and the presence of depression and anxiety, which calls for the evaluation and effective treatment of patients with COPD, including mental disorders (17,18). Statistically, higher scores on the CAT were related to increased psychological distress, which underlines the importance of addressing both the medical and psychological aspects. Despite all these findings, there is still a gap in understanding the biological relationship between COPD and depression. Surprisingly, these two disorders are said to have a genetic basis, and there has been controversy in the recent past as to whether genetic causes will suffice to explain the associations seen between COPD and depression or anxiety (19). Own estimates of the heritability of COPD are 0.25–0.37, and MDD is 0.28–0.51. Consequently, FEV1 and FVC are determined, including heritability of around 18 to 50%. Another study reported in one of the speciality journals investigated the correlation between CRP in COPD patients and depression and found that patients with COPD and depression had a higher level of CRP than patients without depression (20). This suggests that CRP could also be a risk factor for depression since the two are interrelated. The other suggested account is smoking and hypoxemia, which also impact the psychological well-being of COPD patients. Periventricular white matter lesion is found to be related to hypoxia, and some patients with depression and COPD have been found to have this condition also (21,22).

Conclusion

It is concluded that a significant proportion of COPD patients experience high levels of anxiety (70.4%) and depression (67.2%). The chi-square test revealed no significant association between these conditions, indicating they occur independently. These findings underscore the importance of comprehensive mental health assessments and interventions in managing COPD patients to enhance their overall well-being.

Declarations

Data Availability statement
All data generated or analyzed during the study are included in the manuscript.
Ethics approval and consent to participate.
Approved by the department concerned. (IRBEC/AGGAKHR-02113)
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Conflict of interest

The authors declared an absence of conflict of interest.

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