

Prevalence of Anxiety and Depression in Patients of Chronic Obstructive Pulmonary Disease with Respiratory Failure

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Abstract

Introduction: COPD, a global health concern, and a major cause of chronic morbidity and mortality worldwide, extends beyond the lung and many patients have several systemic manifestations that can further impair functional capacity and health-related quality of life. The present study was conducted to study anxiety and depression in patients of chronic obstructive pulmonary disease with respiratory failure.

Material & Methods: The present study was conducted on patients of COPD, attending Department of Tuberculosis and Respiratory diseases, Dr. Murali Lal Chest Hospital, G.S.V.M. Medical College, Kanpur. COPD patients with and without respiratory failure served as cases and controls respectively. Psychiatric evaluation of patients for anxiety and depression was done by Hamilton's Anxiety scale and Hamilton's Depression scale. The data obtained was analysed using Microsoft excel version 2010. For further statistical analysis SPSS version 22.0 was used.

Results: Of the 50 cases of COPD patients with respiratory failure and 52 controls with COPD alone, 90%

of the cases and 65.38% of the controls were found to have some form of psychiatric illness. **Conclusion:** Psychiatric morbidity was positively associated with respiratory failure in COPD patients and a higher prevalence was seen with increasing age, severity and longer duration of disease.

Keywords: COPD, Respiratory failure, Anxiety, Depression

COPD is a global health concern and a major cause of chronic morbidity and mortality worldwide. The Global Burden of Diseases Study reported a prevalence of 174.5 million cases of COPD globally in 2015 ^[1]. The number of cases of COPD in India increased from 28.1 million in 1990 to 55.3 million in 2016 ^[2]. Around, 3.17 million deaths were caused by the disease in 2015 i.e. 5% of all deaths globally in that year. More than 90% of these deaths occurred in low- and middle-income countries. The World health organization (WHO) predicts that COPD will become the third leading cause of death worldwide by 2030 ^[3].

It is increasingly recognized that COPD extends beyond the lung and that many patients have several systemic

manifestations that can further impair functional capacity and health-related quality of life^[4]. A complex interplay is in place between psychiatric issues and pulmonary diseases, with the co-morbidity often found to have a bidirectional association or even stemming from a separate common pathway^[5]. COPD patients with high level of anxiety and depression have also been seen to have poor health related quality of life and higher level of dyspnoea^[6]. Although, there have been challenges involved with identifying specific etiologies, diagnosing patients, and estimating prevalence, studies generally have agreed that psychiatric issues continue to be important factors in the management of COPD^[7-11] with increased risk of rehospitalization^[13].

The present study was an attempt to assess the prevalence of anxiety and depression in patients of chronic obstructive pulmonary disease with respiratory failure and other factors associated with it.

Material and Methods

The present study was conducted on patients of COPD, attending Department of Tuberculosis and Respiratory diseases, Dr. Murali Lal Chest Hospital, G.S.V.M. Medical College, Kanpur. The subjects, either admitted in indoor wards or attending outpatient department were included if they fulfilled the criteria for inclusion. Informed consent was taken from all the subjects. COPD was diagnosed according to criteria adopted and recommended by GOLD. COPD patients without respiratory failure served as control.

Criteria for respiratory failure was:

1. Respiratory rate >25/min
2. Signs of increased work of breathing
3. ABG
 - a. pH <7.35, or
 - b. PaCO₂ >45mmHg, or

PaO₂ <60mmHg

Patients were subjected to complete clinical history and examination, spirometric evaluation, six-minute walk test and necessary radiological examination. Following blood tests were done- Complete blood count (CBC), SGPT, SGOT, Serum creatinine, serum electrolyte, serum bilirubin, ABG and blood sugar.

Psychiatric evaluation of patients for anxiety and depression was done by Hamilton's Anxiety scale^[14] and Hamilton's Depression scale^[15].

Patients were evaluated through detailed history and through multisystem clinical examination for making the diagnosis and to rule out various exclusion criteria.

Sample Size: Taking the prevalence of psychiatric morbidity as 50% in COPD patients and absolute precision as 10% we got a sample size of 96. We added an extra 10% to this sample size for any loss to follow-up. The final sample size we obtained was 106.

Statistical Analysis: The data obtained was analysed using Micro soft excel version 2010. For further statistical analysis SPSS version 22.0 was used.

Inclusion Criteria

- COPD patients of either sex aged between 40 to 80 years, who were on treatment or newly diagnosed cases.
- COPD patients presenting with/without depression with respiratory failure

Exclusion Criteria

- Patients who refused to give consent
- Patients with co-existing active pulmonary illness
- Critically ill patients
- Patients having gross impairment in comprehension and expression of speech
- Uncooperative patients

Results & Discussion

The present study comprised of 50 cases of COPD patients with respiratory failure and 52 controls with COPD alone. 3 cases and 1 control were either lost to follow up or refused to participate in the study.

In the present study majority of the cases were males (86%) and belonged to the age group of 51-60 years (50%). Males formed the major chunk (53.5%) of 51-60 years age group, while majority of the females (42.8%) were of 40-50 years of age. Similarly, in controls too majority of the subjects were males (78.85%) and were 51-60 years old (46.15%).

In the present study total psychiatric morbidity was significantly more in patients with respiratory failure (90%) in comparison to patient with no respiratory failure (65.39%) (p 0.003). The odds ratio also came out to be more than 1 (OR 1.588) signifying that the odds of psychiatric morbidity being present was more in COPD patients with respiratory failure than in COPD patients without respiratory failure.

Table 1: Comparison of Psychiatric Illness in Cases (COPD patients with respiratory failure) and Controls (COPD patients without respiratory failure)

	Anxiety Only	Anxiety with Depression	Total Psychiatric Illness	No Psychiatric
Cases (n=50)	9 (18%)	36 (72%)	45 (90%)	5 (10%)
Controls (n=52)	12 (23.07%)	22 (42.31%)	34 (65.38%)	18 (34.62%)
	Chi Sq. 2.321, d.f. 1, p=0.128		Chi Sq. 8.844, d.f. 1, p=0.003 Odds Ratio 1.588	

Prevalence of anxiety with depression was found to be more in females (85.7%) in comparison to males (69.8%), although this difference was not found to be statistically significant (p 0.684) (Table 2). These results were in accordance with several past studies [5, 9-11] which found no correlation between presence of depression or anxiety

We did not come across any study in which psychiatric morbidity was assessed in COPD patients with respiratory failure. Lacasse et al [7], studied prevalence of depression in patients with severe oxygen-dependent COPD. Most of their patients (105 out of 109) were on long term oxygen therapy (LTOT). This study was closely similar to our study as LTOT patients are considered to be the patients of respiratory failure. More than half of their study patients (57%) demonstrated significant depressive symptoms. There was strong evidence that depression was under-treated in this group of patients. Van Manen et al [8] also investigated whether depression occurred more often in patients with COPD than in controls. They too found that proportion of depression was more in COPD patients than in controls. The risk of depression was 2.5 times more for patients with severe COPD than for controls. Chaudhary et al [5] and Marco et al [6] too found that the prevalence of anxiety and depression was high in COPD patients (28.4% & 28.2% respectively) than in the control group (2.7% & 18.8% respectively).

symptoms in COPD patients and their sex. Conversely, Laurin et al [12] concluded that psychiatric disorders were nearly two times higher in women. Marco et al [6] too, found that the females had higher levels of anxiety and depression and worse symptom related quality of life. The proportion of psychiatric illness was seen to significantly

increase with increasing age as all the patients in 60-80 years age group were found to be suffering from anxiety and depression ($p=0.01$) (Table 2). These observations mirrored the findings of Cleland et al [4], who too found that depression and anxious symptoms in COPD patients were related with increasing age. Although, various other studies [9-11] found no correlation between presence of depression or anxiety symptoms in COPD patients and their age. Majority of the cases in the present study had Type II respiratory failure (78%), the rest 22% of the cases had Type I respiratory failure. The type of respiratory failure present in the cases too had an effect on the proportion of anxiety and depression present in them. Cases with type II respiratory failure had significantly high percentage (79.5%) of anxiety and depression when compared with Type I (45.5%) (Table 2) or even with controls with no respiratory failure (43.31%) (Table 1). The severity of anxiety ranged from mild to severe in the case subjects. Very severe anxiety was not seen in the cases. More than half of the patients (51.10%) had moderate form of anxiety followed by milder (44.40%) and severe (4.40%) form of anxiety. Similarly, the severity of depression ranged from mild to severe in the cases under study. Very severe depression was not observed in the cases. Mild depression was more common (52.80%) followed by moderate (38.80%) and severe depression (8.3%). The severity of anxiety in the cases was seen to be affected by the type of respiratory failure present in the cases. Mild anxiety was significantly more common in type I respiratory failure (77.8% vs. 36.10%) ($p 0.024$) while moderate anxiety was quite significantly more prevalent in Type II respiratory failure subjects (61.10% vs. 11.1%) ($p 0.007$). In contrast to the anxiety score, the depression score was not affected by the type of respiratory failure present in the cases. Most of the cases in both type I & type II respiratory failure had milder form

of depression (60% & 51.6%) followed by moderate depression (40% & 38.7%). In the current study 78% of the patients with COPD and respiratory failure were found to be tobacco smokers. 94.9% of these patients had psychiatric illness (anxiety alone as well as anxiety and depression) in comparison to 72.7% of the patients with no smoking history ($p 0.03$). Our findings are comparable with the study done by Gudmundsson et al [13] and Khan et al [11] also found smokers to have a higher prevalence of psychiatric co-morbidities. In the present study majority (68%) of the study subjects had been suffering from the disease for more than 5 years. Duration of symptoms was found to have a significant impact on presence of psychiatric morbidity. All the patients with symptoms duration of more than 5 years had some kind of psychiatric illness ($p 0.006$) and also majority (88.24%) of them suffered from anxiety as well as depression ($p 0.015$). Our findings go hand in hand with studies of Chaudhary et al [5] and Khan et al [11]. In contrast, Ellassal G. et al [9] found no correlation between presence of depression or anxiety symptoms in COPD patients and the duration of illness. The stage of COPD according to GOLD criteria was also found to have a significant effect on the presence of psychiatric morbidity in the cases. It was seen that proportion of patients with psychiatric morbidity increased with the increase in the severity of the stage of COPD ($p 0.0004$). Van Manen et al [8] too found that prevalence of depression was more in patients with severe COPD (25%) in comparison to mild to moderate COPD (19.6%). Similarly, several other studies [5, 9-11] have also concluded that frequency of anxiety and depression are correlated with the severity of COPD. In conclusion, the prevalence of psychiatric co-morbidities is quite high in patients of COPD with respiratory failure. The frequency of psychiatric illness increased with increasing age, smoking, duration and severity of illness.

Gender and presence of co-morbidities were not found to have any effect on its frequency. Further studies are needed to be done in COPD patients with respiratory

failure to know more about the severity and risk factors involved with psychiatric co-morbidities in such patients.

Table 2: Factors Associated with the Presence of Psychiatric Illness in COPD patients with Respiratory Failure

Gender	Anxiety Only	Anxiety with Depression	Total Psychiatric Illness	No Psychiatric Illness
Male (n=43)	9 (20.9%)	30 (69.80%)	39 (90.70%)	4 (9.30%)
Female (n=7)	0 (0%)	6 (85.7%)	6 (85.70%)	1 (14.30%)
	Chi Sq. 1.731, d.f. 1, p=0.188		Chi Sq. 0.166, d.f. 1, p=0.684	
Age Group (in years)				
40 to 60 (n=34)	9 (26.50%)	20 (58.80%)	29 (85.30%)	5 (14.70%)
61 to 80 (n=16)	0 (0%)	16 (100%)	16 (100%)	0 (0%)
	Chi Sq. 6.207, d.f. 1, p=0.01		Chi Sq. 2.614, d.f. 1, p=0.106	
Type of Respiratory Failure				
Type I (n=11)	4 (36.30%)	5 (45.50%)	9 (81.8%)	2 (18.20%)
Type II (n=39)	5 (12.80%)	31 (79.50%)	36 (92.30%)	3 (7.70%)
	Chi Sq. 4.201, d.f. 1, p=0.04		Chi Sq. 1.049, d.f. 1, p=0.306	
Duration of Symptoms				
<5 years (n=16)	5 (31.25%)	6 (37.50%)	11 (68.75%)	5 (31.25%)
≥5 years (n=34)	4 (11.76%)	30 (88.24%)	34 (100%)	0 (0%)
	Chi Sq. 5.896, d.f. 1, p=0.015		Chi Sq. 11.806, d.f. 1, p=0.0006	
Smoking				
Present (n=39)	8 (20.50%)	29 (74.40%)	37 (94.90%)	2 (5.10%)
Absent (n=11)	1 (9.10%)	7 (63.60%)	8 (72.70%)	3 (27.30%)
	Chi Sq. 0.342, d.f. 1, p=0.559		Chi Sq. 4.675, d.f. 1, p=0.03	
Co-morbidity				
Present (n=13)	1 (7.69%)	12 (92.31%)	13 (100%)	0 (0%)
Absent (n=37)	8 (21.62%)	24 (64.86%)	32 (86.48%)	5 (13.52%)
	Chi Sq. 1.731, d.f. 1, p=0.188		Chi Sq. 1.952, d.f. 1, p=0.162	
Stage of COPD (GOLD 2012)				
I (Mild) (n=0)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
II (Moderate) (n=13)	4 (30.80%)	4 (30.80%)	8 (61.60%)	5 (38.40%)
III (Severe) (n=27)	5 (18.50%)	22(81.50%)	27 (100%)	0 (0%)
IV (Very Severe) (n=10)	0 (0%)	10 (100%)	10 (100%)	0 (0%)
	Chi Sq. 7.037, d.f. 2, p=0.03		Chi Sq. 15.812, d.f. 2, p=0.0004	

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