Original Research Article

A cross-sectional study to investigate the association of depression among COPD patients at a secondary care hospital in Nilgiris

ABSTRACT

Aim: Depression is highly affected comorbid condition with Chronic Obstructive Pulmonary Disease (COPD) patients remaining unrecognized and under-diagnosed. Co-morbid depression affects the prognosis of the disease leading to an increase in the mortality rate. **Objective**: The main objective of the study was to assess and evaluate the association of depression among COPD patients by using the Hamilton Depression Scale (HAM-D). **Study design, place and duration**: A cross-sectional study conducted at Government headquarters hospital, Ooty, consisting of 82 COPD patients, who were assessed for depression. **Results**: Among 82 COPD patients, 17% (n=14) of the patients found without depression, 17% (n=14) of the patients suffered from mild depression, followed by 35.3% (n=29) of the patients from moderate depression, 25.6% (n=21) of the patients suffered from severe depression and 4.8% (n=4) patients diagnosed with very severe depression. Thus, the prevalence of depression in our study population was 82.9%. Depression was found to be significantly associated with age (p =0.000), alcoholism (p =0.012) and duration of disease (p= 0.000). A positive correlation was obtained between depression and age, duration of disease. **Conclusion**: The study revealed that the severity of depression is strongly associated with age, consumption of alcohol, and duration of COPD.

Keywords: COPD, Depression, HAM-D scale, Comorbidity

INTRODUCTION

Chronic obstructive pulmonary disease (COPD) which includes chronic bronchitis and emphysema is a group of lung diseases, which is characterized by the bronchial obstruction, recurrent productive cough and dyspnea, impaired ventilator function and easy fatigability [1]. It mainly affects the bronchus and alveoli due to excessive smoking. The epithelial cells are irreversibly damaged due to nicotine dependence. It is one of the most common respiratory disorders affecting the elderly and a major cause of morbidity, disability and mortality in old age [2]. There is increasing evidence that COPD and depression coexist together and may have a bidirectional cause and effect relationship [2]. The chronic disease initially affects the lungs and gradually spreads to extrapulmonary if treatment is not adequate [2]. Symptoms of COPD are both distressing and disabling, resulting in limited exercise tolerance, interfering with the basic daily activities of life, which ultimately leads to impaired quality of life [3, 4]. The quality of life of chronically ill patients is further complicated by a concurrent depressive disorder Comorbid depression may worsen the COPD prognosis. Depressed mood often leads to poor medication adherence, decreased exercise capacity, loss of productivity, functional disability, and increased use of health resources, which may increase the risk of exacerbation and mortality [4, 5]. Furthermore, there is a complex association between nicotine dependence, smoking cessation and depression [5].In addition to that, frequent use of steroid medications in the management of COPD can worsen depression. Depressive symptoms are often undiagnosed and untreated, as they are mislabeled as the side effects of COPD. There are various scales used to diagnose depression, such as Hamilton Depression Scale (HAM-D), GDS scale, Body Index etc. The exact mechanism of depression among COPD patients is not known. However, theories focus on genetic predisposition, the impact of chronic illness, lack of social support and nicotine dependence [6]. Thus it is important to identify COPD patients with depression and provide appropriate management. However, treating depression will not cure COPD, but it will help to prevent the worsening of COPD. This study aims to assess and evaluate the association of depression among COPD patients using the Hamilton Depression Scale (HAM-D).

MATERIALS AND METHODS

Study design and Setting:

The single centred, cross-sectional study was conducted at a secondary care Government Medical College & Hospital, Ooty (Udhagamandalam), for a period of 6 months. The study

was carried out on COPD patients. After the confirmed diagnosis of COPD by the doctors, a total of 82 COPD patients were enrolled to participate in the study.

Data was collected using a specially designed data collection form from the medical records of the participant, while depression was assessed using the validated Tamil version of the Hamilton Depression Scale (HAM-D). HAM-D scale is a 21-item questionnaire, where scoring is based on the first 17 questions. Based on the score, the patients were classified as Normal (score 0-7), Mild (Score 8-13), Moderate (Score 14-18), Severe (Score 19-22), and Very Severe (Score >23) depression.

Inclusion and Exclusion criteria:

Patients diagnosed with COPD, for a minimum of 6 months, aged between 20-60 years, were recruited in the study. All the inpatients from (Intensive Care Unit (ICU), Male Medical Ward, Female Medical Ward) and the outpatients visiting the secondary care hospital were included. Patients who smoke and consume alcohol and patients of all gender, communities and races were also recruited. Pregnant and lactating mothers, self-medicated patients, were excluded from the study. Subjects who had a history of psychiatric illness or those on anti-depressant medication were eliminated from the study. Participants who had, other co-morbid conditions and those who refused to provide informed consent were also excluded.

Method of data collection:

A team of research staff visited the hospital daily to screen the potential subjects. Primary screening was done based on the conformation diagnosis of COPD and other eligibility criteria.

The objectives, procedures, and the need of the study were explained to the participants and their caretakers, and upon agreement, the informed consent was collected in their native or preferred language (Tamil or English). The consent form was also countersigned by the study investigator and dated. The study inclusion and exclusion criteria were checked after obtaining the consent. After which the recruited patients were screened for depression using the HAM-D depression scale administered by a researcher who was trained by a psychiatrist of the same hospital.

The study was approved by the Institutional Ethics Committee (IEC) JSS college of pharmacy, Ooty.

Data Analysis:

The collected data were categorized, entered into the computer, edited, cleaned and analysed. Descriptive analysis was performed for demographic characteristics. Categorical variables were expressed as percentages and continuous variables as unadjusted means and standard deviations. All the variables were compared to two groups i.e. with depression and without depression. Chi-Square test for categorical variables and independent t-test for continuous variables were used. A Pearson's correlation analysis was performed to check the association of HAM-D scores with the patient's demographic characteristics and other clinically significant variables ($p<0.05$). All analysis was conducted using the IBM SPSS statistical software (V.21.0: SPSS Inc, Chicago Illinois, US)

RESULTS

Participant recruitment status

A total of 82 COPD patients were recruited through purposive sampling, after the assessment for eligibility. Patients were grouped into two groups, as with depression and without depression based on the HAM-D scores.

Demographic Characteristics:

The demographic characteristics of the study participants are listed in **(Table 1).**

Variables	**COPD patients with depression(N=68) n (%)**	**COPD patients without depression (N=14) n (%)**	***p*-value**
Age in years			
20-30	2(2.4)	0	*p* =0.000*
31-40	1(1.2)	7(8.5)	

41-50	23(28)	7(8.5)	
51-60	42(51.2)	0	
Gender			
Male	57(69.5)	13(15.8)	*p* =0.384
Female	11(13.4)	1(1.2)	
Smoking Status			
Smoker	46(54.8)	13(17)	*p* =0.056
Non-smoker	23(28)	0	
Type of Smoking			
Beedi	32(39)	4(4.87)	*p* =0.068
Cigarette	22(26.8)	1(1.2)	
Living Status			
Alone	12(14.6)	2(2.4)	*p* =0.761
With family	56(68.2)	12(14.6)	
Marital Status			
Married	60(19.5)	11(13.4)	*p* =0.334
Unmarried	8(9.7)	3(3.6)	
Adherence Level			
Regular	29(35.3)	11(13.4)	*p* =0.328
Irregular	39(47.5)	3(3.6)	
Alcohol Consumption			
Alcohol	47(57.3)	2(2.43)	*p* =0.012

Non-alcohol	21(25.6)	12(14.6)	
Educational Status			
Illiterate	30(36.5)	6(7.3)	*p*=0.841
Primary	32(39)	7(8.5)	
Secondary	6(7.3)	1(1.2)	
Food Habit			
Vegetarian	5(6)	2(2.4)	*p*=0.058
Non-vegetarian	63(76.8)	12(14.6)	
Duration of Disease (yrs.) (mean±SD)	3.41± 2	1.35±0.00	**p*= 0.000
HAM-D Mean Score(mean±SD)	16.88±2.5	4±3	*p*= 0.02

Table 1: Demographic profile of COPD patients with and without depression

Variables such as gender, smoking status, type of smoking, living status, marital status, adherence level, educational status and food habits were equally distributed between the groups. However, some factors like age, alcohol consumption and duration of disease showed significant differences among the COPD patients with and without depression.

Out of 82 subjects, 68 COPD patients were found to have depression, while 14 subjects did not have depression. Among the COPD patients with depression, 57 (69.5%) patients were males, while 11(13.4%) patients were female. This was because, in the Nilgiris district, a greater number of males were found to be affected with COPD owing to smoking and occupation.

46 patients (54.8%) with depression were smokers. The most common pattern of smoking was beedi at 39% followed by a cigarette at 26.8% in the depression group. 4(4.87%) patients who were smoking beedi were in the non-depression group.

Among the study population, married patients were more than unmarried. No scale was used to confirm adherence. However, both groups were found to have an equal level of adherence. Based on the data collected, maximum COPD patients were on alcohol and fell under different stages of depression – mild/moderate/severe (p= 0.012), which states that there can be an association between alcohol consumption and prevalence of depression among COPD patients. However, the results are inconclusive, as alcohol consumption is a confounding factor.

Distribution of depression among the population

As per our study population, 17% were Normal, 17% of patients suffered from Mild depression, followed by 35.3% of Moderate depression, 25.6% of the patients suffering from severe depression, and 4.8% of patients fell under Very Severe depression**(Figure 1).**

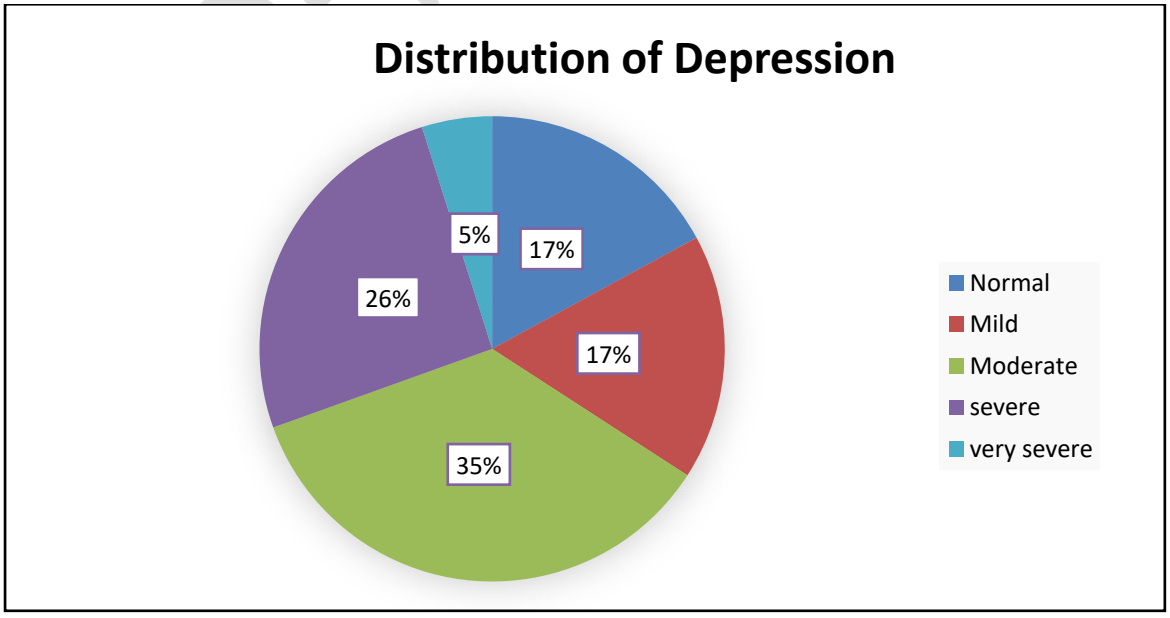

Figure 1: Distribution of depression type

Association of age and HAM-D scores:

Pearson's correlation was performed between the age of the subjects and HAM-D scores, and the results are presented in **(Table 2).** The strength of association was found to be moderately positive. Hence, the HAM-D scores increased with the increase in age. A positive correlation was observed between the two variables and was represented by a scatter plot **(Figure 2).**

Figure 2: Positive correlation between Age of subjects and HAM-D score

Variable	**Correlation Co-efficient**	***p*-value**

Duration of disease	0.519	*p**= 0.000
Age	0.432	*p**=0.000

Table 2: Correlation Co-efficient and corresponding *p*-value.

*p**< 0.001 at 99% Confidence Interval

Association of the duration of disease and HAM-D scores:

Pearson's correlation analysis was carried out between the duration of illness and the individual HAM-D scores, which is represented in **(Table 2).** A strong positive correlation was found between the duration of disease and the depressive scores, indicating that an increase in the duration of the disease can increase the depressive scores. The scatter plot between the duration of disease and HAM-D scores shows a positive correlation **(Figure 3).**

DISCUSSION

COPD is the leading respiratory disease affecting the life span and quality of living around the globe [7]. Advanced COPD condition is observed typically in the elderly and often related to significant co-morbid illness. A higher prevalence of co-morbid depression is in individuals with COPD than either the general population or with other chronic illness patients [8]. Emotional disturbance because of embarrassing and major physical impairments such as dyspnoea and productive coughing can lead to depression among patients with COPD [9]. Depression has a remarkable impact on COPD patients, such as increased mortality, worsened exacerbations, and reduced quality of life. Therefore, to overcome the deterioration of COPD symptoms, questionnaires are being used which are cost-effective, faster, and easier to administer [10]. HAM-D scale is one of the most widely used and accepted questionnaires to identify and assess the severity of depression [11].

In this cross-sectional study of depression in COPD patients, we found a high prevalence of depression (82.9%) when compared with other studies. Depression is a common comorbid condition in COPD patients and its prevalence in various studies has been ranging from 7-80% [12-16]. Many factors can contribute to a varying percentage of depression prevalence among populations such as different ethnicity, different cultural background, demographic heterogeneity of study populations, and the administration of various screening tools [17]. One of the main factors influencing this study vs others is the location. Exposure to high altitude (7,350 ft from sea level) for a long period results in hypoxia that induces considerable alteration in psychological parameters such as euphoria followed by depression [18]. In this study, depression was observed in all age groups. However, about half of the cases (51.2%) were from the age group 51-60 followed by 41-50 (28%), 31-40 (1.2%), and 20-30 (2.4%). The severity of depression was found to be increased with increasing age [19-21]. This is because as the patient with COPD gets older, reduced energy level, restriction in performing daily activities, incapability to participate in social gatherings lead to unhappiness further inflating depression [22].

In this study, significance was observed between alcohol intake and depression (p=0.012). Although there is a significant association between depression and alcohol consumption, the results are inconclusive as alcohol consumption is a confounding factor for depression. Heavy alcohol use damages lung function. Metabolites of alcohol and non-alcohol congeners generate immunosuppressive effects and compromise mucociliary clearance. Perhaps alcohol dependence is associated with risk for COPD but not alcohol abuse [23]. Whereas, chronic illness can lead to depression further increasing illness. Comorbid depression and chronic illness could lead to alcohol consumption [24] but in this study, the amount of consumption was not obtained from the patients to observe the correlation between these two variables. Besides, we also found a significant difference in the duration of disease and severity of depression (p=0.000). The mean duration in our study population was 3.41±2 years. Therefore, our study showed that depression severity increased with increasing COPD duration [25, 26]. Depression and chronic illness have a bidirectional relationship. In general, individuals with chronic medical conditions are more prone to develop depressive symptoms. Besides, depression is dominant among cancer, heart disease, stroke, respiratory problems, and diabetes patients worldwide than in general populations. However, poor health outcomes among COPD patients are because of decreased QOL, increased mortality, functional disability, reduced adherence to the treatment, and exacerbation of the condition is imperative

in the initiation of depressive condition. In further, low-grade chronic inflammation, disturbed neurotransmitter system, the diminished cellular system could further reduce the prognosis of the disease [27, 28]. Hence, as this disease condition worsens with the increasing duration of illness, depression has also been found to deteriorate.

The majority of our study population was found to have moderate depression (35%). Despite the prevalence and detrimental effect of comorbid depression with COPD, it is important to manage depression to improve the prognosis of the disease. According to the available evidence, less than one-third of the comorbid patients are receiving treatment for depression. There are several barriers reported for the limitation in the depression treatment. These include, 1) patient-directed barrier, for instance, the patient is hesitant to disclose the symptoms and also lack of knowledge; 2) physician-directed barrier, lack of knowledge and confidence on the diagnostic approach for assessing depression and short consultation time; 3) system – based barriers, for example, lack of inter-professional communication between primary health and the mental healthcare system. An integrated treatment approach is required from healthcare professionals, patients, and caregivers to overcome these barriers [29].

One of the major limitations of our study was Forced Expiratory Volume in the first second (FEV1) values are not assessed in the study population because of the unavailability of the spirometer. Hence the association of severity of depression with the stages of COPD (GLOBAL initiative for chronic Obstructive Lung Disease (GOLD) staging) could not be performed.

CONCLUSION

Depression was a significant co-morbid condition among COPD patients and was found to be associated with age, alcoholism, duration of disease. This proves that depression was prevalent among the COPD populations of the Nilgiris and requires immediate medical attention.

COMPETING INTERESTS DISCLAIMER:

Authors have declared that no competing interests exist. The products used for this research are commonly and predominantly use products in our area of research and country. There is absolutely no conflict of interest between the authors and producers of the products because we do not intend to use these products as an avenue for any litigation but for the

advancement of knowledge. Also, the research was not funded by the producing company rather it was funded by personal efforts of the authors.

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