PREVALENCE OF ANXIETY AND DEPRESSION IN PATIENT WITH CHRONIC OBSTRUCTIVE PULMONARY DISEASE

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ABSTRACT

Anxiety and depression are very common comorbidities in patients with chronic obstructive pulmonary disease (COPD). This study was aimed at documenting the prevalence anxiety and depression in COPD patient attending tertiary level hospital. A quantitative cross sectional analytical study was carried out in 221 patients with previously diagnosed COPD. Participants were recruited from respiratory OPD at Tribhuvan University Teaching Hospital, Nepal. Anxiety and depression were screened using previously validated Nepalese version of Hospital Anxiety and Depression Scale (HADS) and dyspnea was assessed using the modified Medical Research Council Dyspnea Scale (mMRC). COPD Assessment Test (CAT) was used to measure the impact of COPD on daily life. Data was analyzed using SPSS version 16. Out of 221, 140 patients (63.3%) had anxiety and 153 patients (69.2%) had depression and 133 (60.2%) had both psychiatric symptoms. Factors associated with anxiety and depression in COPD patients were age, ethnicity, educational status, marital status, current working status, duration of illness, history of previous hospitalization, number of hospitalization in previous year, domiciliary oxygen therapy comorbidities along with dyspnea, CAT score. In conclusion, the study findings suggest that anxiety and depression are highly prevalent in COPD patients.

KEYWORDS

Anxiety, COPD, Depression, dyspnea scale, HADS, mMRC

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INTRODUCTION

Chronic obstructive pulmonary disease (COPD) is defined as a disease state characterized by the presence of airflow obstruction due to chronic bronchitis or emphysema; the airflow obstruction is generally progressive, may be accompanied by airway hyperactivity, and may be partially reversible.[1] Globally around 65 million people are reported to suffer from moderate to severe COPD. Furthermore, COPD is currently fifth leading cause of death word wide and expected to rise to third by 2020.[2] Therefore, it is evident that increasing number of people is suffering from this disease and psychosocial consequences.[3]

Persons with COPD have a high prevalence of psychological disorders and may function at a reduced level of efficiency due to neuropsychological impairments. Psychological status is independently related to all dimensions of health-related quality of life. Anxiety and depression are very common comorbidities in COPD and have significant impact on patients, their families, society, and the course of the disease.[4-6] Estimates of prevalence of anxiety and depression in COPD are generally higher than those reported in some other advanced chronic diseases. Screening for depression and anxiety may help to identify patients with poor quality of life and an urgent need for intervention in order to improve their health status.[7]

Untreated and undetected anxiety and depressive symptoms may increase physical disability, morbidity, and health-care utilization.[8] While few published studies demonstrate that these disorders associated with COPD respond well to appropriate pharmacologic and non-pharmacologic therapy, only a small proportion of COPD patients with these disorders receive effective treatment.[7,9] Anxiety and depression are challenging to identify and treat because their symptoms often overlap with those of COPD. The causes of depression and anxiety symptoms are multifactorial and include behavioral, social and biological factors.[10]

It has been argued that family may play a significantly important role in COPD given the higher prevalence of depression and anxiety in these patient populations and their association with important clinical features such as dyspnea. It has also been documented that unsupportive family relationships were associated with psychological distress.[11]

A cross-sectional population-based postal survey of COPD patients revealed association of depression and anxiety with demographic, health-related quality of life and clinical characteristics of COPD patients seen in UK primary care.[12] Depression is also associated with lower patient-reported generic health status. The data suggest that assessment and treatment for depression and anxiety should be considered for all COPD patients, not just those with more severe clinical levels of disease.[13]

Though anxiety and depression are significant co-morbid conditions in chronic illnesses, little is known about the prevalence or risk factors for anxiety or depressive symptoms in patient with COPD. Thus it is important to identify those who have clinically significant anxiety or depressive symptoms and its associated factors.

MATERIALS AND METHODS

This was a cross-sectional analytical study conducted on 221 patients diagnosed with at the Outpatient department of Tribhuvan University Teaching Hospital (TUTH), Kathmandu, Nepal. Data was collected following an ethical approval from the Research Committee Maharajgunj Nursing Campus and Institutional Review Board of Tribhuvan University; Institute of Medicine. The sample size for this study was calculated based on similar study by our group.[14] After obtaining the formal permission from the hospital, purpose of the study was explained to the patient and they were explained about the study. Following this, an informed consent was obtained from each participant who met the inclusion criteria. Participant's confidentiality was maintained by using coding their personal identity information in all forms, and the information obtained was solely used for research purpose. The average time required to complete the interview was about 15-20 minutes following the familiarization. A structured interview based questionnaire was use to collect the information regarding the socio-demographic and disease and treatment related variables of the patient such as age, sex, address, ethnicity, religion, educational status, marital status, type of family, working status, smoking status, type of fuel used for cooking, and history of COPD in family, duration of illness, history of previous hospitalization, status of hospitalization in last year, currently used medicine, domiciliary oxygen therapy and other comorbidities. Anxiety and depression were screened using hospital anxiety depression rating scale. Dyspnea level was measured using modified Medical Research Council Dyspnea Scale. Impact of COPD on activities of daily living was assessed using COPD assessment Test (CAT).

Data Analysis Procedure

The collected data were checked daily and organized for completeness and accuracy. The collected data were then edited, coded, classified and then entered into Excel spreadsheet, which was later transferred to SPSS (Statistical Package for Social Science) version 16. Descriptive statistics such as frequency and percentages were used for categorical variables and mean and standard deviation was used for continuous variables. The relationship of various factors with anxiety and depression was analysed using chi-square test. Logistic regression was done to find out the most significant associated factor to anxiety and depression. The significance level (alpha) was set at 0.05 and a p value <0.05 was considered to be statistically significant.

RESULTS

221 patients diagnosed with COPD were included in the study. The mean age of patients was 68.16±10.16 years and their age ranged from 44 to 90 years. Less than half of the patients (46.2%) were male. Regarding the ethnic group more than half (54.7%) of patient were from upper caste. Similarly, majority of patients 143 (64.7%) COPD were illiterate and most of the COPD patients (67.4%) were married. Regarding occupation, only 51 (23.1%) was involved in occupation currently. Likewise, 15.4% COPD patients were current smokers, less than half (42.5%) COPD patients had history of exposure to passive smoking. The mean duration of illness was 6.99±6.34 Years, 57% had previously hospitalized and 27.8 % had no any history of hospitalization in last year. Among COPD patients majority of patients 79.2% weren't dependent on domiciliary oxygen and only 53 patients had other comorbidities.

95.2% patients presented with complaints of Dyspnea. Dyspnea was measured using modified medical research council grading (mMRC). 16 patients (7.2%) were in mMRC grade 0, 46 patients (20.8%) were in mMRC grade 1, 41 patients (18.6%) in mMRC grade 2, 72 patients (32.6%) in mMRC grade 3 and 46 patients (20.8%) in mMRC grade 4.

Out of 221 patients, 140 patients (63.3%) had anxiety and 152 patients (69.2%) had depression. These patients had a HADS score of 8 or more than 8. 133 patients (60.2%) had both anxiety and depression using HADS scale (Table 1).

Table 1: Prevalence of Anxiety and Depression in COPD Patient (n=221)

Variables	n	%
Anxiety		
Present	140	63.3
Absent	81	36.7
Level of Anxiety		
Normal condition (Score 0-7)	81	36.7
Border line disorder (Score 8-10)	19	8.6
Abnormal case (Score 11-21)	121	54.7
Mean of Total Score: 11.37±6.89		
Depression		
Present	153	69.2
Absent	68	30.8
Level of Depression		
Normal condition (Score 0-7)	69	31.2
Border line disorder (Score 8-10)	38	17.2
Abnormal case (Score 11-21)	114	51.6
Mean of Total Score: 11.18±6.01		
Both anxiety and depression		
Present	133	60.2
Absent	88	39.8

Factors which were significantly associated (*p value*<0.05) with anxiety in COPD patients were patient's age (p=0.003), ethnicity (p=0.002), educational status (p=0.014), marital status (p=0.002), current working status (p=0.015) , duration of illness (p<0.001), history of previous hospitalization (p=0.010), number of hospitalizations in the previous year (p=0.020), domiciliary oxygen therapy (p<0.001), presence of other comorbodities (p=0.034), mMRC grade (p<0.001) and CAT score (*p*<0.001), (Table 2).

Table 2: Association between Socio-Demographic and Clinical Variable of Respondents and Anxiety (n=129)

Variables	Anxiety		Chi-square *p* value
	Present No (n=140)	Absent No. (n=81)	
Age Groups (in years)			
Less than 60	36	26	0.003
60-69	31	31	
70 and more	73	24	
Sex			
Male	60	42	0.196
Female	80	39	
Ethnicity			
Upper caste	73	48	0.002
Other	67	33	
Education status			
Literate	41	37	0.014
Illiterate	99	44	
Marital status			
Married	84	65	0.002
Widow/Widower	56	16	
Occupation			
Currently working	25	26	0.015
Currently not working	115	55	
Smoking Status			
Current smoker	19	15	0.577
Ex-smoker	91	48	
Non-smoker	30	18	
Duration of Illness			
Less than 10 Years	97	75	<0.001
More than 10 years	43	6	

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History of previous hospitalization			
Yes	89	37	0.010
No	51	44	
No. of hospitalization in previous year (n=126)			
Less than 2 times	63	33	0.020
2 and more times	26	4	
Domiciliary Oxygen therapy			
Yes	41	5	<0.001
No	99	76	
Other co-morbidities			
Present	40	13	0.036
Absent	100	68	
MRC Dyspnea Score			
0	1	15	<0.001
1	9	37	
2	26	15	
3	61	11	
4	43	3	
Impact of COPD on daily activities (CAT)			
No impact	0	1	<0.001
Low impact	1	12	
Medium Impact	23	46	
High impact	70	17	
Very high impact	46	5	

Further analysis using binary logistic regression showed that age, current working stats and dyspnea score were independently associated with anxiety. Age was associated with an OR of 1.26 (p = 0.014, 95% CI = 1.04-1.53). Currently working patients were 7.67 times (p= 0.029, 95% CI 0.71 to 82.12) more likely to have anxiety symptoms than patients with no current occupation. Similarly dyspnea score was also associated with an odds of 0.23 (p=0.004, 95% CI 0.08-0.63) (Table 3).

Similarly, factors associated (p $value$<0.05) with depression in COPD patients were patient's age (p=0.001), marital status (p=0.001), current working status (p=0.015), smoking status (p=0.034), duration of illness (p=0.001), history of previous hospitalization (p=0.002), number of hospitalizations in the previous year (p=0.040), domiciliary oxygen therapy (p<0.001), presence of other comorbodities (p=0.008), mMRC grade (p<0.001) and CAT score (p<0.001), (Table 4).

Table 4: Association between Socio-Demographic and clinical variables of Respondents and Depression (n=129)

Variables	Depression		
	Present No. (n=153)	Absent No. (n=68)	Chi-square p value
Age Groups (in years)			
Less than 60	40	22	0.001
60-69	33	29	
More than 70	80	17	
Sex			
Male	69	33	0.637
Female	84	35	
Ethnicity			
Upper caste	82	38	0.753
Other	71	30	
Education status			
Literate	49	29	0.127
Illiterate	104	39	
Marital status			
Married	92	57	0.001
Widow/Widower	61	11	
Occupation			
Currently working	28	23	0.015
Currently not working	125	45	
Smoking Status			
Current Smoker	18	16	0.034
Ex-smoker	104	35	
Non-smoker	31	17	
Duration of Illness			
Less than 10 Years	110	62	0.001
10 and more	43	6	
History of previous hospitalization			
Yes	98	28	0.002
No	55	40	
No. of hospitalization in previous year			
Less than 2 times	71	25	0.040
2 and more times	27	3	
Domiciliary Oxygen therapy			
Yes	41	5	<0.001
No	112	63	
Other co-morbidities			
Present	44	9	0.008
Absent	109	59	

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MRC Dyspnea Score			
0	1	15	<0.001
1	13	33	
2	27	14	
3	68	4	
4	44	2	
Impact of COPD on daily activities (CAT)			
No impact	0	1	<0.001
Low impact	3	10	
Medium impact	26	43	
High impact	76	11	
Very high impact	48	3	

Likewise, further analysis using binary logistic regression showed that age, current working status, use of domiciliary oxygen therapy and dyspnea score were independently associated with depression. Age

was associated with an OR of 1.34 (p = 0.026, 95% CI = 0.98-1.83). Currently working patients were 36.35 (p= 0.043, 95% CI 0.71 to 82.12) times more likely to have depressive symptoms than patient with no current occupation. Patients with domiciliary oxygen therapy were 32.41 (p= 0.020, 95% CI 1.71 to 612.71) times likely to have symptoms of depression. Similarly dyspnea score was also associated with an odd of 0.082 (p=0.004, 95% CI 0.01-0.45) (Table 5).

DISCUSSION

The study aimed to describe prevalence of anxiety and depression among COPD patients. The study demonstrated out of 221 patients, 140 patients (63.3%) had anxiety and 152 patients (69.2%) had depression. The mean HADS (±SD) anxiety score was 11.37 (± 6.894) and mean HADS (±SD) depression score was 11.18 (± 6.013). This finding is nearly consistent with the findings of the study including 60 COPD patients which show the mean scores for anxiety and depression were 8.2 ± 4.6 and 7.9 ± 4.3 respectively. Likewise in their study, 41.7% patients

Table 3: Most Significant associated factor for anxiety among COPD patient by logistic regressions (n=221)

Variables	B	S.E.	Adjusted odds Ratio (β)	95% CI Lower	95% CI Upper	*p* value
Age	0.236	0.097	1.266	1.048	1.530	0.014
Sex						
Male	-0.379	0.847	0.685	0.130	3.604	0.655
Female	Ref	Ref	Ref	Ref	Ref	
Ethnicity						
Upper caste	0.482	0.651	1.620	0.452	5.808	0.459
Other	Ref	Ref	Ref	Ref	Ref	
Education status						
Literate	0.098	0.915	1.103	0.184	6.625	0.915
Illiterate	Ref	Ref	Ref	Ref	Ref	
Marital status						
Married	-0.099	0.793	0.905	0.191	4.283	0.900
Widow/Widower	Ref	Ref	Ref	Ref	Ref	
Occupation						
Currently working	2.038	1.209	7.676	0.717	82.122	0.029
Currently not working	Ref	Ref	Ref	Ref	Ref	
Duration of Illness	-0.072	0.101	0.930	0.763	1.134	0.473
Domiciliary Oxygen therapy						
Yes	0.801	0.875	2.229	0.401	12.393	0.360
No	Ref	Ref	Ref	Ref	Ref	
Other co-morbidities						
Present	0.660	0.726	1.935	0.466	8.032	0.363
Absent	Ref	Ref	Ref	Ref	Ref	
mMRC Dyspnea Score	-1.447	0.504	0.235	0.088	0.631	0.004
CAT Score	-0.075	0.073	0.928	0.804	1.072	0.310

Variables	B	S.E.	Adjusted odds Ratio (β)	95% CI		p value
				Lower	Upper	
Age	0.295	0.158	1.343	0.985	1.830	0.026
Sex						
Male	-0.246	1.177	0.782	0.078	7.844	0.834
Female	Ref	Ref	Ref	Ref	Ref	
Ethnicity						
Upper caste	1.121	0.953	3.067	0.474	19.861	0.240
Other	Ref	Ref	Ref	Ref	Ref	
Education status						
Literate	-1.392	1.142	0.249	0.027	2.332	0.223
Illiterate	Ref	Ref	Ref	Ref	Ref	
Marital status						
Married	-0.368	1.062	0.692	0.086	5.545	0.729
Widow/Widower	Ref	Ref	Ref	Ref	Ref	
Occupation						
Currently working	3.593	1.778	36.352	1.114	1.186	0.043
Currently not working	Ref	Ref	Ref	Ref	Ref	
Duration of Illness	-0.243	0.150	0.785	0.585	1.052	0.105
Domiciliary Oxygen therapy						
Yes	3.479	1.500	32.418	1.715	612.715	0.020
No	Ref	Ref	Ref	Ref	Ref	
Other co-morbidities						
Present	-0.616	0.991	0.540	0.077	3.766	0.534
Absent	Ref	Ref	Ref	Ref	Ref	
mMRC Dyspnea Score	-2.497	0.869	0.082	0.015	0.453	0.004
CAT Score	-0.122	0.101	0.885	0.727	1.078	0.226

Table 5: Most Significant associated factor for Depression among COPD Patient by logistic regressions (n=221)

had symptoms suggestive of anxiety and 46.7% had symptoms suggestive of depression.[15] However a study conducted by Puhan *et al*. among 88 COPD patients and Janssen *et al*, among 701 COPD patients show the mean HADS depression score as 7.63±3.9 and 7.2± 0.2, whereas 21.6% and 32.1% patients had scores ≥ 11 for depression respectively.[6, 16] For the HADS anxiety domain, mean score was 7.03 ± 4.0 and 7.6 ± 0.2 and 22.7%, and 27.4% patients had scores ≥ 11 respectively.

A cross-sectional association was observed for anxiety/depression with different socio-demographic and clinical variables. Both anxiety and depression were associated with age (*p=0.003, p=0.001)* and were more prevalent in age group ≤70 years. This finding was supported by the study from Ray et al. VAT is a relatively common problem but in comparison to ventilator-associated pneumonia (VAP where age is associated with anxiety and depression.[17] In contrast, the age of the patient did not appear to be associated with both anxiety

and depression in a study by Jose et al[18] Similarly in another study, compared with the oldest group (≥70 years old), the risk of anxiety and depression was 15% higher for those aged ≤ 50 years of age; those aged 51–70 also had an excess risk of 11%. Furthermore, in the present study higher number females score both in anxiety and depression scale than males, however there was no statistical significant relation between the scores of anxiety/ depression and gender. In a study by Xiao et al, it was reported that after adjustment for covariates, female patients were more likely to suffer from anxiety (aOR = 6.41, 95% CI: 1.73-23.80) than male patients.[19]

Likewise, we found anxiety was associated with ethnicity (p=0.002), educational status (p=0.014), marital status (p=0.002) and occupational status (p=0.015) whereas depression was associated with marital status (p=0.001), working status (p=0.015) and smoking status (p=0.034). Balcells et al, 2010 also found that strong association between the working

status and presence of anxiety.[20] A Korean study on the prevalence of depression and anxiety noted that smoking history were independent risk factors for depression in patients with COPD.[21] Further current smokers had a higher prevalence of both anxiety (54% vs. 37%) and depression (43% vs. 23%) than non-smokers.[22] Some studies also found that living alone and low education levels were related to anxiety and depression in COPD.[23,24] A cross-sectional study from India gave a strong relationship with low level of education, poor socio-economic conditions and advanced age to depression.[25] Likewise Tsai *et al.,* population-based studies on the association between chronic obstructive pulmonary disease (COPDfound in their study that age, gender, monthly income and hospitalization were significantly related to the risk of depression in COPD patients. Compared with the oldest group (≥70 years old), the risk of depression was 15% higher for those aged ≥ 50 years of age; those aged 51–70 also had an excess risk of 11%.[26] In another study, depression was related to the severity of pulmonary obstruction and anxiety was related to marital status and satisfaction with income.[22] Further anxiety was more common in women than in men (47% vs. 34 %) and current smokers had a higher prevalence of both anxiety (54% vs. 37%) and depression (43% vs. 23%) than non-smokers.[22] A cross sectional study among 121 COPD patients in Aligarh, India to assess the presence of anxiety and depression in COPD client attending OPD using Hospital anxiety and depression scale to examine depression and anxiety respectively showed that 69 (57.02%) and 44 (36.37%) patients out of 121 had depression and anxiety respectively. In addition, depression was more common in male gender, and this prevalence was also found to be positively associated with lower education class, social class, single marital status and cases residing urban locality. Likewise, prevalence of anxiety was more in female gender, rural locality, higher education and upper socioeconomic and marital status being single.[27]

The present study showed that the age, current working status, use of domiciliary oxygen and mMRC Dyspnea score were the most significant factors associated with anxiety and depression in COPD. The factors associated with anxiety and depression in COPD patients were found same in the findings reported by Jose *et al.* These include duration of disease, number of hospitalizations in the previous year MMRC grade, oxygen therapy, and presence of other comorbodities.[18] Another study also reported that comorbidity, increased duration of disease diagnosis, increased dyspnea, increases the risk of depression in COPD patients.[23,26]

The major limitations were absence of specialist evaluation for anxiety/depression and it was difficult to assume causality for anxiety and depression as it was a cross-sectional study.

In conclusion, the prevalence of anxiety and depression in chronic obstructive pulmonary disease is very high and a significant number of patients have both the co-morbidities. Age, current working status, use of domiciliary oxygen and dyspnea score were the most significant factor associated with anxiety and depression in COPD. Considering the high prevalence of anxiety and depression among COPD patients, management of the psychiatric symptoms should be incorporated in the treatment of COPD. A routine screening test is recommended to detect the psychiatric morbidities among the COPD patients.

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