Association between depression and chronic obstructive pulmonary disease among hospital patients. A cross sectional study

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ABSTRACT

introduction. Co-morbid diseases are commonly associated with chronic obstructive pulmonary disease such as depression, anxiety, etc. The objective of study was to determine the prevalence of depression and its factors associated with chronic obstructive pulmonary disease among hospital patients.

Methods. It's a cross sectional study and total 54 patients were selected through simple random sampling from chest ward of tertiary care hospital. Validated patient health questionnaire (PHQ-9) questionnaire was used to determine the depression among COPD patients. Binary logistic regression model was used to determine the association between depression with COPD with adjustment of duration of disease, gender and age. Cronbach alpha was calculated to assess internal consistency of PHQ-9.

Results. Approximately 35.2%, 27.8% and 37% of COPD patients were suffered moderate, moderate severe and severe depression respectively. After adjustment of covariates in logistic regression analysis the common factors were females [OR 1.20 (CI 1.11-4.56)], smoker [OR 1.55 (CI 1.13-2.22)], and more than 10-year of duration of COPD [OR 1.01(CI 1.00-1.14)] statistically significant predictors of depression in COPD patients.

Conclusions. COPD patients had high prevalence of depression. Females gender, smoking and duration of disease were common factors associated with depression among these patients. There is need for developing health promotion programs such as counseling of patients with psychiatrist to reduce the burden of depression among COPD patients.

Keywords: COPD, depression, hospital, smoking, duration

INTRODUCTION

Chronic obstructive pulmonary disease (COPD) defined as is a lung disease characterized by chronic obstruction of lung airflow that interferes with normal breathing and is not fully reversible (1). Chronic obstructive pulmonary disease (COPD) is a disease with multiple effects on the different organ of the body (1). COPD is the common cause of death in both developed and developing countries with very high disability adjusted life years (DALYs) (2).

Chronic obstructive disease (COPD) has impact on the daily activities of patients such as anxiety and depression due to restricted common daily activities, leading to frustration and depression (3). Patients environment and social conditions had affected the disease severity and it led to development of psychological disorders among patients of COPD. Example as common psychiatric disease such as depression and anxiety (4) are associated with COPD (5).

The previous study results showed that patients suffering from COPD exhibited the symptoms of anxiety (34%) and depression (16%) (6). Another study found that 50% anxiety and 28% depression symptoms among COPD patients (7). Another study found that prevalence of depression among

COPD patients ranged from 6% to 42% (8). In a case control study, results showed that prevalence was higher in the cases compared to control and difference was statistically significant (9). Prevalence of depression was found 96% in the study conducted in India (10).

Patients of COPD with depression may not comply with their treatment which leads to difficulty in pulmonary rehabilitation. It also increased the cost of treatment and economic burden to health system of the country (11).

In Pakistan prevalence of chronic obstructive pulmonary disease (COPD) ranges from 14% to 20% (11). Females commonly suffer from COPD because women commonly used biomass fuel for cooking especially in rural areas (11). In a survey which was conducted in rural papulation, results was found that prevalence of depression was high among females (11). Giving the important public health problem of depression among COPD patients, very few studies are available and there is need for more studies to find out the factors for depression among COPD patients. The results of the study will be helpful for the pulmonologist to manage the COPD patients with early detection of psychiatric disorder specifically depression. The objective of study to determine the prevalence of depression among COPD patients and its associated factors.

MATERIALS AND METHODS

Operational definition

COPD patients were diagnosed with spirometry with indicator of force vital capacity and force expiratory volume in one second (FEV1). All the participants had FEV1/FVC ratio of <70% of the predicted value with positive risk factors being smoking, air pollution, occupational exposure, age and genetics.

Stages of COPD

Global Initiative for Chronic Obstructive Lung Disease (GOLD) recommendations: stage I (> 80), stage II (50-79), stage III (30-49) and stage IV (< 30).

Study Setting, study design, sample technique

The study was conducted in outpatient clinic at the Department of Chest Medicine in the public sector tertiary care hospital. It was cross sectional study and the patients were selected through simple random sampling.

Sample size, inclusion and exclusion criteria and study variables

Sample size was calculated through world health organization (WHO) health studies calculator, with 5% significance level, 5% margin of error, prevalence of depression from previous studies was 10% (12) The overall sample was 54 patients.

Inclusion criteria – The participants included were patients already diagnosed as a case of chronic obstructive pulmonary disease, age above 35 years and less than 80years, patients who gave consent to participation in the study.

Exclusion criteria – patients exhibiting any other breathing illnesses (i.e. asthma), any psychiatric disorders, patients exhibiting other comorbidities (i.e. diabetes, hypertension). Patients with current or previous history of substance abuse, patients who did not give consent. Study variables. independent – age, sex, education, occupation, socio-economic status and residence, smoking, duration of illness, cough, etc. were taken as independent variables. Dependent – depression was taken as dependent variable.

Study tools

Patient Health Questionnaire 9 (PHQ-9) was used to assess the depression among COPD patients. It is a validated, reliable and disease-specific instruments for determine the depression.. It consists of 9 items. Scoring is done from a range of 0-27, scoring classified as no depression 0-4, mild depression 5-9, moderate 10-14, moderate sever 15-19, and severe depression form 20-27.

Data collection

After taking permission of hospital management, questionnaires were distributed among study participants. Each participant was explained individually the contents of the questionnaire and the importance of this study regarding their health conditions.

Statistical analysis

Data was entered in Epi data software and analyzed in SPSS software version 24. Frequency and

proportion were calculated for descriptive analysis. Binary logistic regression model was used to determine the factors associated with depression among COPD patients. P value 0.05 considered significant.

Ethical consideration

The study has been approved by the hospital ethical committee. The approval code is IRB-2019-203. Confidentiality of study participation data were maintained. Consent was obtained before conducting the interview of the study participants.

RESULTS

Most of study participants were 46-80 years of age and mean age was 49.8±11.98 SD. Majority were male (53.7%), 48.7% were having primary level of education. Most of them smoker (63%) with positive family history (40.7%) (table 1).

TABLE 1. Socio-demographic characteristic of study participants

S.no	Characteristics	Frequency	Proportion (%)
1	Age (Mean±SD)	49.8±11.98	
	35-45	20	37
	46-80	34	63
2	Gender		
	Male	29	53.7
	Female	25	46.3
3	Education level		
	Primary	26	48.1
	Secondary	16	29.6
	Higher	12	22.2
4	Ethnicity		
	Sindhi	11	20.4
	Punjabi	14	25.9
	Urdu	21	38.9
	Others*	7	14.9
5	Residence		
	Rural	3	5.6
	Urban	51	94.4
6	Smoker		
	Eever	34	63
	Never	20	37
7	Family history of COPD		
	Yes	22	40.7
	NO	32	59.6

*Other regional language

Most (72.2%) of study participant duration of illness less than 10 years. 38.9% were using inhaler more than two times daily, Majority (68.5%) of patients were in stage III of COPD (table 2).

TABLE 2. Current status of patient disease

S.no	Variables	Frequency	Proportion (%)
1	Duration of COPD		
	1-10 Years	39	72.2
	> 10 years	15	27.8
2	History of allergy		
	Yes	18	33.3
	No	36	66.7
3	Frequency of inhaler / day		
	Once	14	25.9
	Twice	19	35.2
	More than twice	21	39.9
4	Stage of COPD		
	Stage I	0	0
	Stage II	3	5.6
	Stage III	37	68.5
	Stage IV	14	25.9

Most (37%) of the study participants had severe depression, 35.2% were moderate and 27.8% were severe moderate depression. No patients were found in minimal or mild depression category (table 3).

TABLE 3. Prevalence of depression among study participants (n = 54)

S.no	Classification of depression*	Frequency (n)	Proportion (%)
1	Normal	0	0
2	Mild depression	0	0
3	Moderate depression	19	35.2
4	Moderate sever depression	15	27.8
5	Severe depression	20	37

*PHQ-9 classification

All factors of socio-demographic characteristics and clinical factors were associated with depression in COPD patients. After adjustment of covariates in regression analysis, smoking, duration of COPD and stages of COPD were significantly associated with depression (tables 4 and 5).

TABLE 4. Association of socio-demographic characteristics with depression among study participants (univariate analysis)

S.no	Characteristics	Moderate depression OR (95% CI)	Severe depression OR (95% CI)
1	**Age (years)**		
	30-45	1	1
	46-80	1.16(0.99-4.83)	1.87(0.67-3.18)
2	**Gender**		
	Male	1	1
	Female	1.02(0.26-3.99)	1.10(0.31-3.87)
5	**Residence**		
	Urban	1	1
	Rural	1.18(1.01-4.38)	0.50(0.04-6.01)
6	**Smoker**		
	Never	1	1
	Eever	0.51(0.12-2.02)	1.75(0.44-6.92)
7	**Family history of COPD**		
	NO	1	1
	YES	1.16(0.28-4.83)	0.58(0.16-2.09)
8	**Duration of COPD**		
	1-10 years	1	1
	>10 Years	3.79(0.65-21.96)	1.36(0.35-5.17)
9	**Stages of COPD***		
	Stage I	1	1
	Stage II	0.29(0.06-10.20)	0.87(0.06-27.10)
	Stage III	0.60(0.02-13.52)	1.20(0.05-24.47)
	Stage IV	0.84 (0.04-15.16)	1.00(0.05-17.75)

*FEV1 values- Stage I (>80), Stage II (50-79), Stage III (30-49) and Stage IV (< 30)

TABLE 5. Association of socio-demographic characteristics with depression among study participants (multivariate analysis)

S.no	Characteristics	Moderate depression AOR (95% CI)	Severe depression AOR (95% CI)
1	**Age (years)**		
	30-45	1	1
	46-80	1.16(0.25-5.40)	1.78(0.19-3.11)
2	**Gender**		
	Male	1	1
	Female	1.01(1.23-4.34)	1.20(1.11-4.56)
3	**Residence**		
	Urban	1	1
	Rural	1.18(1.01-4.38)	0.50(0.04-6.01)
4	**Smoker**		
	Never	1	1
	Ever	1.87(1.46-7.67)	1.55(1.13-2.22)
5	**Family history of COPD**		
	NO	1	1
	YES	1.23(0.48-3.83)	1.88(0.66-2.09)
6	**Duration of COPD**		
	1-10 years	1	1
	>10 Years	0128(1.16-5.18)	1.01(1.00-1.14)
9	**Stages of COPD***		
	Stage I	1	1
	Stage II	0.26(0.04-1.51)	1.15(0.19-3.37)
	Stage III	0.51(0.16-16.39)	1.29(1.01-25.15)
	Stage IV	0.75(0.03-18.29)	1.10(1.01-18.12)

*FEV1 values- Stage I (>80), Stage II (50-79), Stage III (30-49) and Stage IV (< 30)

DISCUSSION

Study found that majority of the patients of COPD were suffering from moderate to severe depression. The important factors which has associated with depression are smoking, duration of illness, advance stages of COPD and family history.

The prevalence of depression in this study is very high. The mean score of PHQ-9 in all stages of COPD suggested that all patients were suffering from depression. This result is consistent with the other study which showed that prevalence of depression range from 37% to 72% among COPD patients (13). Another study has found that 72% prevalence of depression among COPD patients (14). Other studies in different countries reported found that the prevalence of depression among COPD patients ranged from 6% to 56%.(15-17). This variation may be due to intervention of reducing the depression in society.(18-19).

In this study age and gender not significantly associated with depression. This result is consistent with other study results in which age and gender factors not statistically significant among COPD patients (20) and another previous study result showed that gender is also not associated with depression among COPD patients (21). In Pakistan, female are more likely suffered for COPD compare to males (22), because in rural side biomass fuel is used for cooking, this result is consistent with the study which was conducted in USA (23). Education level determinants also associated with depression in COPD patients because educated patients has awareness of treatment and prevention and result of this study has found that illiterate patients were more suffered for depression as compared to educated people, this result is consistent with other study result (24).

Smoking is one of the important predictors for depression in COPD patients and result was found that it is statistically significant association with de-

pression among COPD patients. In different studies it is found that smoking was the important factor of depression among COPD patients (25-31). A another study showed that strong association between smoking and depression (32). Smoking and depression are strongly associated due to dependency on nicotine (33,34).

Result found that severity of COPD disease is the important predictor of depression, this result is consistent of other study results which showed that as FEV1 has negative relationship with depression, its mean that when FEV1 has decreased the probability of depression were increased due to impact of daily activities of patients (35). COPD severity and daily activities were strongly correlated with depression. In different studies result which showed that psychiatric problems associated with respiratory problems.(33-35).

There are several limitations of current study. First it is a cross sectional study which did not determine the temporality. Second the sample was taken from single center not from different center. Third it is a clinical study which needs to conduct in large population which effectively generalizes the results.

It is recommended to conduct future studies in population based with large sample size and with more variation of demography.

CONCLUSION

Majority of COPD patients were depressed, and important factors are severity of COPD, family history, duration of illness, education level and smoking. Clinical specialist should identify the depression at early stage and start treatment with COPD and it should increase the awareness level of COPD patient for early management of depression.

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