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Depression and Anxietyin patients with chronic pulmonary diseases

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Abstract—
Context: Anxietyand depression and in patients with chronic lung diseases complicates the disease effects.The prevalence of depression in COPD patients ranged from 37% to 71%. Exacerbation and death rate of depressed patients with chronic lung disease are increased.
This study aims to study the frequency of depression and anxiety and to detect their impact on quality of life in patients with chronic pulmonary diseases.
Settings and Design: This is a cross sectional observational study on patients taken from chest and cardiothoracic hospital of Minia university, Egypt in the period from Septemper,2017 to Septemper,2018
Methods and Material: full history ,examination , mMRC , chest X ray ,HRCT was done whenever needed), The Hamilton Anxiety Rating Scale (HAMA). Beck
Depression Inventory (BDI-II)'' questionnaire and SGRQ were done
Statistical analysis: Statistical analysis was performed using SPSS software ($\chi 2$ test and independent sample t-test).
Results: The frequency of depression and anxiety in all patient groups was 78.7% and 16.4% respectively.Both depression and anxiety scores were positively correlated with age , dyspnea scale,FVC and HRQL score(P 0.001).
Conclusion:IPF and bronchiectasis had the higher frequency of depression among chronic pulmonary diseases ,depression and anxiety scores were positively correlated with age , functional state and HRQL scores .

Keywords— Depression, Anxiety, Chronic pulmonary diseases, HRQL

Introduction:

Chronic pulmonary diseases are common group of diseases that occur in 10% ofadults [1].
They affects patientswork, social performance. some associated psychiatric disorders complicates the disease effects.[2] Anxiety and depression arecommon in chronic lung diseases .[3]Prevalence of depression among COPD patients has a range of37% to 71%.[4]

It is well known that depression and anxiety can affect patients health andseverity of his disease.[5]
Untreated depression has major impact on patient compliance with treatment, increased chance of hospital admissions and poor life quality.[6] Depression isn't recognized in all patients of chronic pulmonary disorders.[7] Death rate and exacerbations are higher in depressed patients with chronic lung disease.[8]
Although the prevalence of psychiatric co morbidities in chronic respiratory diseases is much more higher than the general population, it seems difficult to the recognition these conditions. Routinescreening for psychiatric co morbidities in patients diagnosed with obstructive ling diseases should be considered.[9]
The Saint George's Respiratory Questionnaire (SGRQ) was used to assess the life quality in both obstructive and restrictive pulmonary diseases as COPD and bronchiactasis and interstitial lung diseases.[10]
We aimed to study the frequency of depression and anxiety and to detect their impact on quality of life in patients with chronic pulmonary diseases.

Patients and methods

This is a cross sectional observational study on patients who sought medical advice in the outpatient clinics of Chest department of Minia Cardio-Thoracic University Hospital in the period from Septemper,2017 to Septemper,2018 . The study was approved by Minia University Ethics Committee and a written consent was taken from all patients .

The study included 225 patients with chronic pulmonary disease. There were 100 patients with (COPD), 50 patient with bronchial asthma (BA) , 50 patients with idiopathic pulmonary fibrosis (IPF) and 25 patients with bronchiectasis. Patients who had malignancy or primary psychiatric disorder were not included. All patients were subjected to full history, clinical examination,chest X ray andhigh resolution chest computed tomography (HRCT) was done whenever needed. Dyspnea was assessed using the modified Medical Research Council (mMRC) dyspnea scale according to the AmericanThoracic Society and European Respiratory Society guidelines' standards.[11]

Spirometry was performed usingspirometer (ZAN 300, Germany).
Forced vitalcapacity (FVC), forced expiratory volume in the first second(FEV1) and(FEV1/FVC) were measured. Finally, arterial oxygen tension (PaO2) was measured using arterial blood gases(ABGs) analysis.
Psychiatric assessment was done by expert psychiatrist, the severity of a patient's anxiety was measured by Hamilton Anxiety Rating Scale (HAMA).[12]

It consists of 14 questions. Each is given a severity rating, a score from 8 to 14 is considered mild , 15–23 moderate and 24 or more indicates severe anxiety.[13] Depression is assessed using ''BeckDepression Inventory (BDI-II)'' questionnaire[14], which consists of 21-question, each answer being scored on a scale value of 0–3.

Total score Level of depression
1–10 are considered normal
11–16 Mild mood disturbance
17–20 Borderline clinical depression
21–30 Moderate depression
31–40 Severe depression
>40 Extreme depression
life quality was then evaluated using theSGRQ[15], measuring symptoms score, activity score, social andemotional disease impact. The score of zero indicates no impairment to while the score of 100 indicates maximum impairment.

Statistical Analysis:

Statistical analysis was performed using the Statistical package for social science SPSS software, (version 20 ; SPSS Inc , Chicago , III) on a personal computer. A Statistical analysis was performed using $\chi 2$ test and independent sample t-test to assess differences between proportion.

Results

Among 225 patients of chronic lung diseases, the mean age was 47.7±17.7 ,148 (65.7%) were males and (153)68%.were non smokers(table 1)

There was a significant decrease in FEV1 and PaO2 in patients with , IPF and bronchiectasis compared to asthmatic and COPD patients (**P 0.001**) with the least values in bronchiectasis 42.2±14 and 40.5±8.6 respectively (table 2)

The frequency of depression and anxiety in all patient groups was 78.7% and 16.4% respectively.
There was no significant difference between patients groups as regard depression and anxiety scores , however patients with asthma and IPF had more significant decrease in total scores of HRQL (P 0.001) (table 3)

Both depression and anxiety scores were positively correlated with age , dyspnea scale,FVC and HRQL scores and negatively correlated with PaO2 (table 4).
IPF and bronchiectasis groups had the highest frequency of depression (82% , 100% respectively) and anxiety (24% , 20% respectively) compared to COPD and asthmatic groups .(figures 1,3).
Most patients had borderline and mild depression.(figure2).

Discussion:
Depression and anxiety could be associated with chronic lung diseases and could decrease the social functioning and quality of life in those patients.[16]
Mild chronic respiratorydiseases can be associated with psychiatric symptoms due to the change in nor adrenergic and dopaminergic synthesis as a result of hypoxia which occurs in severe chronic obstructive lung diseases.[17]

In the current study , most of COPD patients are males and had older age than other patients groups which is in agreement with Menezes et al.[18]who found a higher prevalence of COPD in elderly patients. Kurmi et al.[19]also found a higher prevalence of COPD in men due to the higher rate of smoking , this also explain that the majority of our patients groups are non smokers except COPD group.
Hamilton Anxiety Scale was used to assess the degree of anxiety in the current study. [20]

The frequency of anxiety in all patient groups was 16.4% , this observation was similar to most previously reported results which ranged widely from as low as 13% to the highest reported prevalence.[21,22]
The frequency of anxiety in COPD patients in this study was (17%)which was lower than that found in IPF(24%) or in bronchiectasis (20%)figure 3. This was the case in some studies on patients with chronic obstructive pulmonary diseaseswhich found decreased frequency of anxiety in COPD patient than in bronchiectasis .[23]

Frequency of depression in the current study was 78.7% in all patients groups (75% , 82% ,72% and 100%) in COPD , IPF, asthma and bronchiectasis respectively .

The wide range in the prevalence of depression among COPD patientsis due to multiple causes such as differences in assessment, different sampling methods, and screening instruments .[24]
In the study of 1334 patients with chronic respiratory disorders, 70% had depression and most of them (80%) had a clinically significant depression .[25]

An increased incidence of depression has been shown in people with bronchiectasis. The frequency of depression in bronchiectasis group in our study was 100% which was much higher than other studies .
A recent study including ninety-three participants with bronchiectasis demonstrated that 20 % had a higher

depression-related scores and 38 % had a higher anxiety-related scores, depression and anxiety increased with age and anxiety was also associated with increased exacerbations rates.[26]

Moreno et al found that excessive productive cough and bacterial colonization were the most common cause of anxiety and depression in bronchiactasis.[27]

In the current study , 16(64%) out of 25 patients of bronchiectasis had other comorbid diseases like hypertension , diabetes and cardiac diseases , this can explain the highly elevated frequency of depression in this patient group, also despite this higher frequency , most of patients had only borderline or mild depression .

Regarding psychiatric variables and their prevalence in patients with IPF,the present study demonstrated that a clinically meaningful depression was prevalent in patients with IPF (82%).
Kuniket al.[28] and Taghreed et al.[29]were consistent with this as they concluded that prevalence of depression in patients with ILD was (65%) and (73.3%), respectively. While Ryerson et al.[30]conducted that its prevalence wasmuch lower (23%) in ILD.

The depression in IPF patient group in our study was also borderline and mild , this is in consistence with the study of Hoda A et al[31]Who found that highest proportion of mild depression among ILD.
As regard COPD and asthmatic patients , the frequency of depression in this study was 75% , 72% as regard depression and 17% , 6% as regard anxietyrespectively.most of COPD patients had moderate and severe depression while most asthmatic patients had mild to moderate depression.

This results were similar to many other studies, literature review on the prevalence of anxiety in COPD patients reported rates of anxiety ranging from 10% to 40%[32].

In another study from south India, 96% of COPD patients, 56% of bronchial
asthma patient scored as having psychopathology on CPRS (Comprehensive Psychopathological Rating Scale) score.[33]

A recent study of the prevalence of anxiety and depression in COPD, 65% of COPD patients had a significant score of anxiety and depression usingscreening by telephone call .[34]

In the present study ,there was a significant decrease in FEV1 and PaO2 in patients with IPF and bronchiectasis compared to asthmatic and COPD patients (P 0.001) with the least values in bronchiectasis , this results could explain increased frequency of depression in those groups.

In favour of that ,Bratek A et al[35] found thatpatients with more severe pulmonary disease, oxygen delivery and non invasive ventilation had a more significant anxiety and depressive symptoms.

In the current study , both depression and anxiety scores were positively correlated with age , dyspnea scale,FVC and HRQL scores and negatively correlated with PaO2 .Tamer et al[36] study found that anxiety score among chronic lung diseases patients is positively correlated with the age.

Many previous studies have also reported correlations between anxiety and dyspnea[37,38],other studies have found that decreasedFVC was associated with more anxiety [39]

We foundthat both Hamilton anxiety rating scale and Becks depression inventory scale had a significant positive correlation with SGRQ score . Moreover both scales were significantly correlated with each component of the SGRQ separately.

Several studies reported a significant correlation between functional status of COPD patients and the presence of anxiety and depression in [40,41] In chronic pulmonary diseases, depression and anxiety had a bad impact onlife quality.[42]

Wilson and colleagues also found that SGRQ total score was increased withincreasing the scores of depression and anxiety ; the correlation with depression was more strong and significantly correlated with all components of the SGRQ.[43]

Conclusion and recommendations :

Depression is more frequent than anxiety in patients with chronic pulmonary diseases .

IPF and bronchiectasis groups had the higher frequency of depression and anxiety compared to COPD and asthmatic groups .

Both depression and anxiety scores were positively correlated with age , functional state and HRQL scores .

Future workup

Increased awareness about this associated entity (depression and anxiety in chronic pulmonary diseases)isessential to diagnose and treat this part of the diseasewhich is still highly under diagnosed.

Studies with larger number of patients were needed for accurate estimation of frequency of these disorders in patients with chronic pulmonary diseases.

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Table (1): Demographic data of the studied groups:

	Total N=225	**COPD N=100**	**IPF N=50**	**Asthma N=50**	**Bronchiactesis N=25**	**P**
Age Mean±sd	47.7±17.7	62.4±9.2	52.7±9.5	32.1±10.8	42.1±18.3	0.01
Sex Male Female	148(65.8%) 77 (34.2%)	77 (77%) 23 (23%)	13 (26%) 37 (74%)	43(86%) 7(14%)	15(60%) 10(40%)	0.001
Smoking Status smoker ex smoker non smoker	57(25.3%) 46(20.4%) 122(54.2%)	38(38%) 36(36%) 26(26%)	2(4%) 4(8%) 44(88%)	17(34%) 6(12%) 27(54%)	0 0 25(100%)	0.001

***SD: standard deviation. †COPD chronic obstructive pulmonary disease.††IPF idiopathic pulmonary fibrosis.**

Table (2): PFT and ABGs of the studied groups:

	Total N=225	**COPD N=100**	**IPF N=50**	**Asthma N=50**	**Bronchiactesis N=25**	**P**
FEV1 Mean±sd	55.01±23.3	38.2±13.6	45±9.02	80.1±9.5	42.2±14.	0.001
FVC Mean±sd	67.8±21.7	54.5±14.2	40.7±10.5	87.6±10.3	56.2±14.6	0.001
PO2 Mean±sd	57.1±16.6	52.8±12.1	49.7±14.5	80.2±6.7	40.5±8.6	0.001

*FEV1(forced expiratory volume in first second), †FVC(forced vital capacity), ††PaO2(partial pressure of oxygen)

Table (3): comorbiditis of the studied groups:

	Total N=225	**COPD N=100**	**IPF N=50**	**Asthma N=50**	**Bronchiactesis N=25**	**P**
Hypertension	50 (22.2%)	39 (39%)	3 (6%)	5 (10%)	3 (12%)	0.001
Diabetes	27 (12%)	12 (12 %)	4 (8%)	4 (8%)	7 (28%)	0.1
Renal	0 (0 %)	(0 %)	(0%)	0(0%)	0 (0%)	-
Cardiac	43 (19.1%)	16 (16%)	16 (32%)	5 (10%)	6 (24%)	0.01
Neurological	2 (0.8%)	0(0%)	1 (2%)	1 (2%)	0 (0)	0.6

*COPD chronic obstructive pulmonary disease.†IPF idiopathic pulmonary fibrosis.

Table (4): scores of the studied groups:

	Total N=225	COPD N=100	IPF N=50	Asthma N=50	Bronchiactesis N=25	P
Hamilton anxiety Rating scale Mean±sd	12.7±4.9	12.6±5.6	15.2±2.6	11.9±2.9	12.9±5.5	0.2
Becks depression inventory Mean±sd	16.3±6.1	16.6±7.3	18.6±3.01	14.5±3.7	18.07±3.1	0.08
Symptoms score Mean±sd	69.4±16.5	75±15.1	52.7±13.1	55.2±9.1	64.9±9.5	0.001
Activity score Mean±sd	65.6±18	68.7±16.9	54.3±18	52.9±9.6	56.9±15.8	0.001
Impacts score Mean±sd	61±19.1	65.7±17.9	50.7±20	47.3±22.5	60.1±17.4	0.006
Total score Mean±sd	61.9±18.1	67.9±15.6	52.9±17.9	51.1±15.1	60.5±13.7	0.001

*COPD chronic obstructive pulmonary disease.†IPF idiopathic pulmonary fibrosis.

Table (5) Correlation of Becks depression inventory scale with different measured parameters:

Parameter	r	P value
Age	0.3	**0.005**
Sex	-0.1	008
Smoking index	0.1	0.06
MMRC	0.3	**0.0001**
Duration of admission	0.15	0.28
Number of exacerbation	0.3	**0.003**
FVC	-0.2	**0.04**
PO2 (mean±SD	-0.2	**01.0**
Symptomsscore	0.3	**0.01**
Activityscore	0.4	**0.001**
Impactscore	0.4	**0.0002**
totalscore	0.4	**0.001**

***mMRC modified medical research council, †FVC(forced vital capacity), ††PaO2(partial pressure of oxygen)**

Table(6) Correlation of Hamilton anxiety rating scale with different measured parameters:

parameter	r	P value
Age	0.2	**0.03**
Smoking index	0.1	0.2
mMRC	0.2	**0.008**
Duration of admission	-0.1	0.4
Number of exacerbation	0.1	0.3
FVC	-0.2	**0.04**
PaO2 (mean±SD	-0.4	**0.0001**
Symptoms score	0.2	**0.04**
Activity score	0.4	**0.002**
Impact score	0.3	**0.02**
total score	0.3	**0.006**

*mMRC modified medical research council, †FVC(forced vital capacity), ††PaO2(partial pressure of oxygen)

Figure (1) Frequency of depression in the studied groups:

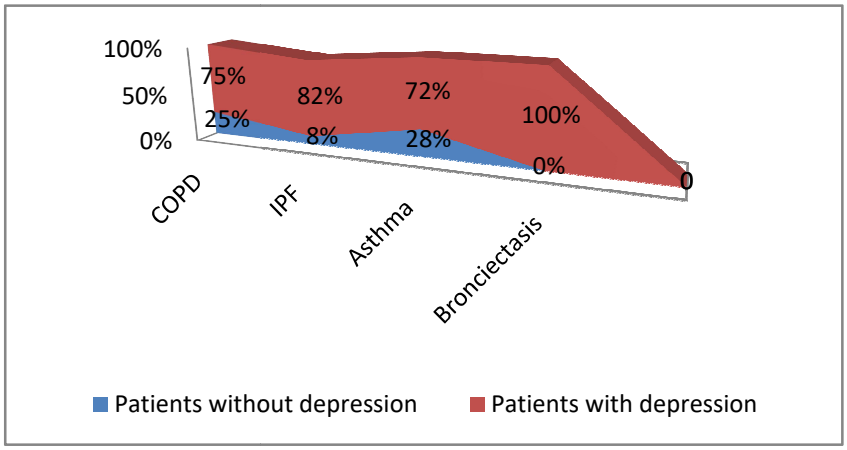

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Figure (2) Severity of depression in the studied groups:

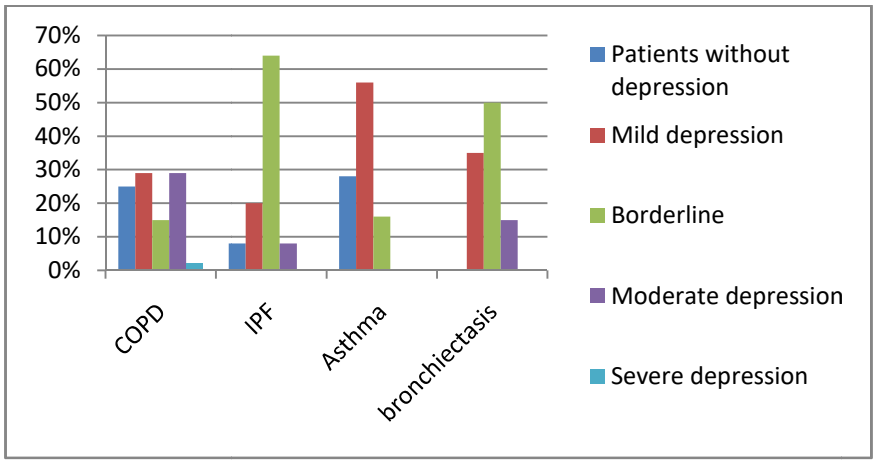

Figure (3) Frequency of anxiety in the studied group: