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ASSESSMENT OF LUNG FUNCTIONS IN 18 - 60 YEARS OLD DEPRESSION AND ANXIETY PATIENTS ATTENDING A TERTIARY CARE CENTER OF NORTH INDIA: A HOSPITAL BASED CROSS SECTIONAL STUDY.

Physiology

Yadav Nidhi* (MD) Associate Professor, Department Of Physiology, SNMC Agra, UP *Corresponding Author

Srivastava Richa (MD) Professor, Department Of Physiology, SNMC Agra, UP

Sinha Vishal (MD) Professor, Department Of Psychiatry, SNMC Agra, UP

Gupta Kumar Pankaj (MD) Junior Resident, Department Of Physiology, SNMC Agra, UP

ABSTRACT

Lung health is increasingly recognized as an essential factor in mental health. Anxiety can affect pulmonary function by triggering the "fight or flight" response, leading to rapid breathing, hyperventilation, and potentially worsening existing lung conditions or causing panic attacks. Depression has been found to affect the rate of respiration and the performance of respiratory muscles. It has been found that there was a clear longitudinal association between chronic depression and faster pulmonary function decline among women. Among Chronic obstructive pulmonary disease (COPD), the frequency of depression varies greatly from 10% to 57%, while the prevalence of anxiety varies widely, between 7% and 50%. COPD patients with persistent hypercarbia are at an increased risk of such dyspneic spells and become more susceptible to anxiety attacks. This was a hospital based cross sectional study done between January 2025 to February 2025.There were 40 patients of depression and 58 patient of anxiety of age between 18-60 years of either sex were recruited. The diagnosis of depression and anxiety were made by Hamilton Depression Rating Scale(HDRS Score) and Hamilton Anxiety Rating Scale (HAM-A) respectively. All the patients were subjected to pulmonary function test (Spirometry) by Spiromax for assessment of lung function. The recorded variables included forced vital capacity (FVC), forced expiratory volume in 1st second (FEV1), FEV1/FVC ratio.Mean age of study participants was (SD) 40.89 ±13 years. There were 58 (59.18%) male and 40 (40.81%) were females. Mean FEV1 among depression was 2.52±0.65 litre and among anxiety group was 3.11±0.83 litre. Among patients with depression, 15% had an obstructive lung pattern, 40% had a restrictive pattern, and 45% had normal lung function. In the anxiety group, 17.24% had an obstructive pattern, 62.06% had a restrictive pattern, and 20.68% had normal lung function. Coexistent of psychiatry illness in chronic respiratory disease make it difficult its management or vice versa. Therefore assessment of lung function should be done as screening among depression and anxiety patients for early diagnosis and timely intervention for better management.

KEYWORDS

Hamilton Depression Rating Scale, Hamilton Anxiety Rating Scale, Pulmonary function, Depression, Anxiety

INTRODUCTION

Lung health is increasingly recognized as an essential factor in mental health. As respiration is also under voluntary control, different emotions, such as sadness and excitement, affect the rate and depth of respiration.Anxiety can affect pulmonary function by triggering the "fight or flight" response, leading to rapid breathing, hyperventilation, and potentially worsening existing lung conditions or causing panic attacks.[1,2] Depression has been found to affect the rate of respiration and the performance of respiratory muscles. It has been found that there was a clear longitudinal association between chronic depression and faster pulmonary function decline among women.[3,4]Depression has been linked to increased respiration pattern variability (RPV), indicating irregularities in breathing rhythms. Studies have shown that there is connectivitychanges in the brain's default mode network (DMN). These findings suggest that altered respiratory patterns may persist even after depressive symptoms subside and could influence the clinical course of depression.[5] Chronic respiratory diseases group like Chronic obstructive pulmonary disease (COPD), asthma, Interstitial lung disease constitute a major burden of disease. Among Chronic obstructive pulmonary disease (COPD), the frequency of depression varies greatly from 10% to 57%, while the prevalence of anxiety varies widely, between 7% and 50%. [6]COPD patients with persistent hypercarbia are at an increased risk of such dyspneic spells and become more susceptible to anxiety attacks.[6] A recent study has noted depression to be an independent factor for acute exacerbation of COPD, with a higher risk of readmission and severe exacerbations in the previous year.[7]

Coexistent of psychiatry illness in chronic respiratory disease make it difficult its management or vice versa. Therefore assessment of lung function should be done as screening among depression and anxiety patients for early diagnosis and timely intervention for better management.

MATERIAL &METHODS-

This was a hospital based cross sectional study done between January2025 to February 2025.All the Depression and anxiety patients who attended the Outpatient department (OPD) of psychiatric department and fulfilled the inclusion and exclusion criteria during study period were the study subjects.

Inclusion Criteria –

1. All the depression and anxiety patients, screened by Hamilton Depression Rating Scale(HDRS Score) and Hamilton Anxiety Rating Scale (HAM-A) respectively , of age 18-60 years of both sexes were recruited attending psychiatry OPD.

Exclusion Criteria

1. Patients with known pulmonary disease like Chronic Obstructive Pulmonary disease (COPD), asthma, Bronchiectasis, Interstitial Lung disease (ILD) and lung cancer, other causes of pulmonary fibrosis, history of thoracotomy or chest surgery .
2. Patients with known respiratory impairment like neuromuscular diseases.
3. Pregnant females
4. Individuals who did not give consent for study
5. Hemodynamically unstable patients and patients who do not fit for perform pulmonary function tests.

Study Subjects:

- Total 98 patients were recruited from Outpatient department (OPD) of psychiatry,. Ethical clearance taken from institutional committee and The procedure was explained to the patients in their mother tongue and informed consent was taken.Detailed information of these patients were collected in predesigned working proforma which included socio-demographic, clinical profile and investigations.Lung function were assessed by spirometry (Spiromax) Pulmonary Function Test machine)
- Spirometric indices including force expiratory volume in first second (FEV_1), forced vital capacity (FVC), and FEV1/FVC were tested. At least three forced expiratory manoeuvres that satisfied American thoracic society / European Respiratory Society criteria were done for each patient of which the test with highest values were accepted.Obstructive disease was defined as FEV1/FVC ratio <0.8 with a FVC ≥ 80% of the predicted value. Restrictive disease was diagnosed as FEV1/FVC ratio >0.8 and FVC was FVC<80% of the Predicted. Combined disease was defined as an FEV1/FVC ratio <0.8 and FVC <80% of the

Predicted.[8]

- The collected Data was encoded in Microsoft excel Worksheet and analysed using SPSS Statistical software version 24 (IBM). Proportion, Mean Standard deviation, Chi- Square test, t-test was used for statistical analysis and presentation of data.

RESULT-

There were 40 patients of depression and 58 of anxiety were recruited in the study. Mean age of study participants was (SD) 40.89 ±13 years. There were 58 (59.18%) male and 40 (40.81%) were females. There were 32.65% ex smoker,28.57 % tobacco user and 27.55 % alcoholic.There were 18.36% diabetics,12.24% hypertension and 6.12% diabetes & hypertension both. (Table 1,2) Mean FEV1 among depression was 2.52±0.65 litre and among anxiety group was 3.11±0.83 litre.The mean FVC was 3.30±0.70 liters in the depression group and 3.73±0.96 liters in the anxiety group. A statistically significant difference in FEV1 was found between patients with depression and anxiety (P = 0.002). (Table 3) Among patients with depression, 15% had an obstructive lung pattern, 40% had a restrictive pattern, and 45% had normal lung function. In the anxiety group, 17.24% had an obstructive pattern, 62.06% had a restrictive pattern, and 20.68% had normal lung function. Association of pattern of lung function with socio- demographic factors among depression was evaluated and found a statistically significant association (p< 0.005) between co-morbidity and lung function patterns in individuals with depression.(Table - 4)Association of pattern of lung function with socio- demographic factors among anxiety was evaluated and found a statistically significant association (p< 0.005) between alcohol addiction and lung function patterns in individuals with anxiety.(Table 5)

DISCUSSION–

In this study we found that patients with depression had lower FEV1 (2.52±0.65 L) and FVC (3.30±0.70 L) compared to those with anxiety (FEV1 = 3.11±0.83 L, FVC = 3.73±0.96 L). Atlantis et al. (2013)also found that depression is associated with reduced lung function, particularly lower FEV1 and FVC levels. [9]Van Manen et al. (2002)showed that anxiety and depression were common in patients with chronic obstructive pulmonary disease (COPD) and were linked to poor pulmonary function. In this study we observed a higher prevalence of restrictive lung patterns in patients with anxiety (62.06%) and depression (40%). [10] Similarly Shah et al.(2017)also found that patients with mood disorder had restrictive lung impairment due to increased airway resistance and altered breathing pattern.[11]

Maurer et al. (2008) also found that depression and anxiety are linked to worsening lung function, possibly due to increased systemic inflammation and stress-related physiological changes. There was a statistically significant association (p < 0.005) between comorbidities (diabetes, hypertension) and lung function patterns in depression.[12]

Yohannes et al. (2010) had also reported that diabetes and hypertension exacerbate pulmonary dysfunction in depressed patients by increasing systemic inflammation and oxidative stress.[13] Milaneschi et al. (2013)also concluded in their study that metabolic disorders, including diabetes, are more prevalent in patients with depression and anxiety, contributing to worsened lung function.[14]

CONCLUSION

Regular lung function assessments in patients with depression and anxiety are vital for early diagnosis and timely intervention, potentially mitigating the compounded health risks associated with these coexisting conditions. Our study findings further reinforcing the critical need for integrated mental and physical health care strategies.

Limitation Of The Study - As this study is a single centre hospital based observational cross sectional study therefore results of the study cannot be generalized, further large multicentric follow up study should be done.

Table 1. Sociodemographic Characteristics of Study Participants (n=98)

Variables	Frequency	Percentage (%)
Age Group		
20-40 years	41	41.83
40-60 years	54	55.10
>60 years	03	3.06
Gender		
Male	58	59.18
Female	40	40.81
Residence		
Rural	40	40.18
Urban	58	59.18
Occupation		
Farmer	11	11.22
Student	15	15.30
Labour	20	20.04
Service	22	22.44
Housewife	30	30.61
Body Mass Index (BMI kg/m2)		
<18.5	20	20.40
18.5-24.59	44	44.89
>25	34	34.69
Socioeconomic Status		
Upper class	6	6.12
Upper Middle Class	10	10.20
Middle class	31	31.62
Lower middle class	33	33.67
Lower class	18	18.36
Addiction History		
Ex smoker	32	32.65
Non smoker	73	67.34
Alcoholic	27	27.55
Tobacco user	28	28.57

Table 2. Clinical Characteristics Of Study Participants (n=98)

Variables	Frequency	Percentage (%)
Clinical Presentation		
Breathlessness	21	21.42
Cough	32	32.65
Depression		
No	58	61.90
Mild	25	23.80
Moderate	14	13.34
Severe	01	0.90
Anxiety		
No	42	40.0
Mild	30	33.34
Moderate	28	26.67
Severe	0	0
Comorbidity		
Diabetes	18	18.36
Hypertension	12	12.24
Diabetes & Hypertension Both	06	6.12
Hypothyroidsm	04	4.08

Table 3: Comparison Of Mean Spirometry Parameters Among Patients With Depression And Anxiety

Parameters (Mean ± SD)	Depression (n=40)	Anxiety (n=58)	Statistical Interpretation
Force Expiratory Volume In First Second (FEV1) (Litres)	2.67±0.80	3.04±0.82	P=0.002*
FEV1 (pred)%	68.35±15.94	68.10±13.45	P=0.93
Force Vital Capacity (FVC) (in Litres)	3.30±0.95	3.66±0.93	P<0.07
FVC (pred)%	72.10±17.02	68.66±12.85	P=0.25
FEV1/FVC(%)	76.36 ±10.83	83.37±0.89	P=0.009

*Statistically Significant

Table 4 Association Of Pattern Of Lung Function With Socio-Demographic Factors Among Depression

Variables		Depression N=40				
		Normal Lung Function (18)	Obstructive Group (6)	Restrictive Group (16)	P value	Chi-square value
Age(years)	<40	6	1	9	0.17	3.45
	>40	12	5	7		
Gender	Male	11	1	9	0.156	3.71
	Female	7	5	7		

Alcohol Addiction	Present	9	5	4	0.042	6.33
	Absent	9	6	12		
Ex Smoker	Yes	4	1	5	0.31	2.29
	No	14	5	11		
Tobacco use	Yes	8	2	5	0.71	0.68
	No	10	4	11		
Co morbidity	Yes	02	05	10	**0.001**	**13.97**
	No	16	1	06		

Table 5. Association Of Pattern Of Lung Function With Socio-Demographic Factors Among Anxiety

Variables		**Anxiety N=58**				
		Normal Lung Function (12)	**Obstructive Group (10)**	**Restrictive Group (36)**	**P value**	**Chi-square value**
Age(years)	<40	9	6	16	0.166	3.59
	>40	3	4	20		
Gender	Male	9	6	21	0.582	1.08
	Female	3	4	15		
Alcohol Addiction	Present	4	1	4	**0.001**	17.04
	Absent	8	9	32		
Ex Smoker	Yes	6	4	12	0.455	1.57
	No	6	6	24		
Tobacco use	Yes	5	1	7	0.16	3.63
	No	7	9	29		
Co-morbidity	Yes	04	05	14	0.66	0.720
	No	8	5	22		

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