

**ORIGINAL RESEARCH**

# Assessment of epidemiological and clinico-radiological profile of COPD patients

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**ABSTRACT**

**Background:** COPD is primarily caused by long-term exposure to irritants, usually cigarette smoke, but can also be triggered by exposure to other harmful particles or gases in the environment. The present study was conducted to assess epidemiological and clinico-radiological profile of COPD patients. **Materials & Methods:** 80 COPD patients of both genders were selected. Parameters such as history of presenting symptoms, radiological presentation was recorded. Severity of symptoms as perceived by the patient was measured using Modified Medical Research Council grades (mMRC) and COPD Assessment Test (CAT). The modified medical research council scale of dyspnea to assess the severity of dyspnea was recorded. **Results** Mean age of the patients of the present study was  $57.66 \pm 13.57$  years. 86.3 percent of the patients were males while the remaining 13.8 percent were females. Breathlessness was found to be present in all patients (100%). Cough and chest tightness was found to be present in 95 percent and 30 percent of the patients respectively. Clubbing was found to be present in 46.25 percent of the patients. The maximum patients were in 2nd grade of clubbing i.e. 22.5%. Grade 1 and grade 3 was present in 15% and 8.8% of patients respectively. Cyanosis and Pedal edema was found to be present in 5 percent and 31.3 percent of the patients respectively. Emphysematous changes were seen in all the patients (100%). Cardiomegaly was seen in 28.7%, Tubular heart seen in 37.5%, Hilar prominence in 22.5%, Pruning of blood vessels at periphery in 22.5% and bullae seen in 10% of the patients. 67.5% of patients belong to COPD-C with history of smoking. 20% of patients belongs to COPD-I with history of occupational exposure and in 32.5% of patients belongs to COPD-I with history of occupational exposure. **Conclusion:** Our research contributes to raising awareness of the value of quitting smoking, the necessity of early COPD diagnosis, and the requirement for ongoing care.

**Key words:** Cardiomegaly, COPD, Smoking

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**INTRODUCTION**

Chronic Obstructive Pulmonary Disease (COPD) is a heterogeneous lung condition characterised by chronic respiratory symptoms (dyspnea, cough, sputum production and/or exacerbations) due to abnormalities of the airways (bronchitis, bronchiolitis) and/or alveoli (emphysema) that cause persistent, often progressive, airflow obstruction.<sup>1</sup>

COPD results from gene(G)-environment(E) interactions occurring over the lifetime(T) of the individual (GETomics) that can damage the lungs and/or alter their normal development/aging processes.<sup>2</sup> The main environmental exposures leading to COPD are tobacco smoking and the inhalation of toxic particles and gases from house hold and outdoor air pollution, but other

environmental<sup>3,4</sup> and host factors (including abnormal lung development and accelerated lung aging) can also contribute.<sup>2</sup> The most relevant (albeit epidemiologically rare) genetic risk factor for COPD identified to date are mutations in the SERPINA1 gene, leading to  $\alpha$ 1-antitrypsin deficiency, but other genetic variants, with a low individual effect size, are associated with reduced lung function and risk of COPD too.<sup>5</sup>

According to the survey published in lancet the total number of cases of COPD in India increased from 28.1 million in 1990 to 55.3 million in 2016. The crude prevalence was highest in the north Indian states of Jammu and Kashmir, Himachal Pradesh, Uttarakhand, and Haryana followed by Rajasthan, Uttar Pradesh, Punjab and Mizoram.

The main reason of the disability-adjusted life-years (DALYs) caused due to COPD in India in 2016, were attributed to air pollution (53.7%), tobacco use (25.4%), and occupational risks (16.5%), making these the leading risk factors for COPD.<sup>6</sup> [8]

Globally, In 2005 COPD is the eighth leading cause in terms of years of life lost due to disability (DALYs) but by 2013 COPD was ranked as the fifth leading cause of DALYs lost. In India, it account for 3% of DALYs [9]and total deaths in India estimated to be around 500,000 deaths per year.<sup>7</sup>

COPD usually presents as dyspnoea, cough and sputum production. Less common but troublesome symptoms include wheezing, chest tightness and chest congestion. These symptoms play a major role in diagnosing the disease. Spirometry is required to make the diagnosis; the presence of a post-bronchodilator FEV1/FVC < 0.70 confirms the presence of persistent airflow limitation. The goals of COPD assessment are to determine the level of airflow limitation, the impact of disease on the patient's health status and the risk of future events (such as exacerbations, hospital admissions or death) in order to guide therapy.<sup>8</sup>

## MATERIALS & METHODS

The present study consisted of 80 COPD patients of both genders. The study was carried out in the Department of Pulmonary Medicine, Department of medicine and Department of cardiology, Guru Gobind Singh Medical College & Hospital, Faridkot, Punjab on outdoor as well as indoor patients.

All gave their written consent to participate in the study. Data such as name, age, gender, BMI etc. was recorded. Parameters such as history of presenting symptoms, severity of symptoms, socioeconomic status, risk factor assessment, nutritional status, presence and severity of depression, degree of airflow obstruction and reversibility and radiological presentation was recorded. Severity of symptoms as perceived by the patient was measured using Modified Medical Research Council grades (mMRC) and COPD Assessment Test (CAT). The modified medical research council scale of dyspnea to assess the severity of dyspnea was recorded. Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

## RESULTS

**Table I AGE-WISE DISTRIBUTION IN COPD PATIENTS**

Age group (years)	Number of patients	%
20 to 30	2	2.5
31 to 40	7	8.8
41 to 50	22	27.5
51 to 60	19	23.8
>60	30	37.5
Total	80	100.0
Mean $\pm$ SD	57.66 $\pm$ 13.57	

A total of 80 patients of COPD were analyzed. Mean age of the patients of the present study was 57.66  $\pm$  13.57 years. 37.5 percent of the patients belonged to the age group of > 60 years, while 27.5 percent of patients belonged to age group of 41-50 years and 23.8 percent belonged to age group of 51-60 years.

**Table II GENDER-WISE DISTRIBUTION IN COPD PATIENTS**

Gender	Number of patients	Percentage of patients
Males	69	86.3
Females	11	13.8
Total	80	100.0

86.3 percent of the patients were males while the remaining 13.8 percent were females.<sup>6</sup>

**TABLE 3: DISTRIBUTION OF BODY MASS INDEX (BMI) IN COPD PATIENTS**

BMI	TOTAL NO. OF PATIENTS	PERCENT
Severely Underweight	10	12.5
Underweight	7	8.8
Normal Weight	52	65.0
Overweight	11	13.8
OBESITY GRADE I	0	0
OBESITY GRADE II	0	0
OBESITY GRADE III	0	0
Total	80	100.0
MEAN $\pm$ SD	21.21 $\pm$ 3.654	

Above table shows distribution of BMI in study population. Maximum patients had normal weight i.e. 65%. 13.8% of patients were overweight, 8.8 % of patients were underweight and 12.5% were severely underweight.

The mean BMI of patient was  $21.21 \pm 3.654$ .

**Table III DISTRIBUTION OF CHIEF COMPLAINTS IN COPD PATIENTS**

Chief complaint	Number of patients	Percentage
Breathlessness	80	100.0
Cough	76	95.0
Chest tightness	24	30.0

Breathlessness was found to be present in all patients (100%). Cough and chest tightness was found to be present in 95 percent and 30 percent of the patients respectively.

**Table IV DISTRIBUTION OF CLINICAL SIGNS IN COPD PATIENTS**

Clinical signs	Number of patients			Percentage of Patients		
	G1	G2	G3	G1	G2	G3
Clubbing	37			46.3		
	12	18	7	15	22.5	8.8
Cyanosis	4			5.0		
pedal edema	25			31.3		

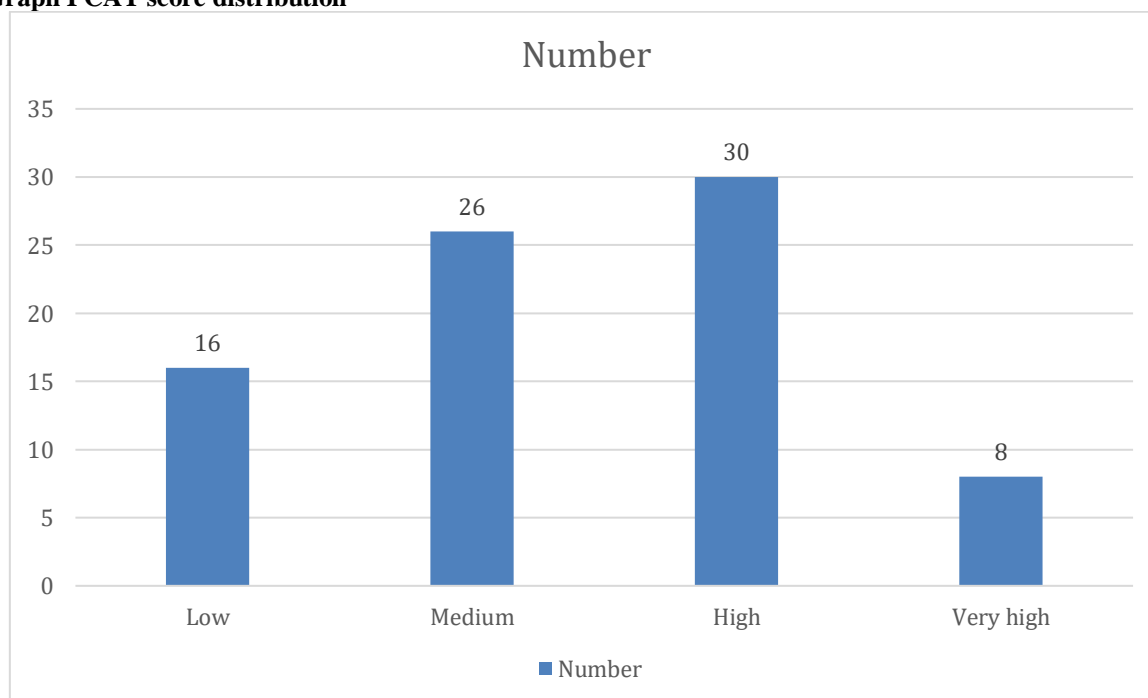
Clubbing was found to be present in 46.25 percent of the patients. The maximum patients were in 2nd grade of clubbing i.e. 22.5%. Grade 1 and grade 3 was present in 15% and 8.8% of patients respectively. Cyanosis and Pedal edema was found to be present in 5 percent and 31.3 percent of the patients respectively.

**Table V CHEST X-RAY CHANGES IN COPD PATIENTS**

Chest-X-ray Findings	Number of patients	Percentage of Patients
Emphysematous changes	80	100.0
Cardiomegaly	23	28.7
Tubular heart	30	37.5
Hilar pominnce	18	22.5
Pruning of blood vessels at periphery	18	22.5
Bullae	8	10

On chest x-ray Emphysematous changes were seen in all the patients (100 %). Cardiomegaly was seen in 28.7%, Tubular heart seen in 37.5%, Hilar prominence in 22.5%, Pruning of blood vessels at periphery in 22.5% and bullae seen in 10% of the patients.

**Graph I CAT score distribution**



Graph I shows that CAT score was low in 16, medium in 26, high in 30 and very high on 8 patients.

**Table VI DISTRIBUTION OF RISK ETIOTYPES OF COPD PATIENTS**

ETIOTYPES	Number	Percentage
COPD-C	54	67.5
COPD-P	16	20.0
COPD-I	26	32.5

67.5% of patients belong to COPD-C with history of smoking. 20 % of patients belongs to COPD-P with history of occupational exposure and in 32.5 % of patients belongs to COPD-I with history of occupational exposure.

**TABLE 8: SHOWING GOLD STAGING ACCORDING TO FEV1 IN COPD PATIENTS**

Gold staging according to FEV1	Percentage of predicted FEV1 value	Number of patients	Percentage of patients
S1 (Mild)	≥80	0	0
S2 (Moderate)	50%–79%	39	48.8
S3 (Severe)	30%–49%	26	32.5
S4 (Very Severe)	Less than 30%	15	18.8

Maximum number of patients was present in stage 2 with 48.8% of followed by stage 3 and stage 4 with 32.5 and 18.8 % of patients respectively. None of the patients had stage 1 COPD

**TABLE 9: SHOWING CORRELATION OF mMRC WITH GOLD STAGE**

mMRC	GOLD STAGE				TOTAL	P VALUE
	S1	S2	S3	S4		
G1	0	1	0	0	1	.0001
G2	0	33	1	0	34	
G3	0	4	22	0	26	
G4	0	1	3	15	19	
Total	0	39	26	15	80	

Above table shows the correlation of mMRC with that of gold stage. The severity of mMRC increase with that of increasing gold stage, as we could observe that G2 stage has maximum 33 cases is maximum S2 and G4 has maximum cases in S4. The correlation was statistically significant

## DISCUSSION

COPD is currently the third leading cause of death in the world; and has led to around 3 million deaths annually and is projected to reach 5.4 million yearly by 2060. The Burden of Obstructive Lung Diseases (BOLD) surveyed total of 29 countries and reported worse lung function than earlier studies with a worldwide prevalence of 10.1%.<sup>6</sup> Overall, 11.8% (SE 7.9) for men, and 8.5% (SE 5.8) for women and a substantial prevalence of COPD of 3-11% among never-smokers. COPD afflicts many people in low-income, middle-income, and wealthy countries, and years of life lost prematurely increased 13.2%. Although COPD has traditionally been considered a disease that affects men, however in some countries, the prevalence and associated mortality is higher among women than among men.<sup>7</sup> The present study was conducted to assess epidemiological and clinico-radiological profile of COPD patients.<sup>1</sup> In the present study, a total of 80 patients of COPD were analyzed. Mean age of the patients of the present study was 57.66 ± 13.57 years. The results of our study were similar to the study by holms KE et in which mean age of the patients was 59.9 years [46]. Andersen et al in their study found that the mean age at evaluation was 54.7 years for COPD patients. We found that 86.3 percent of the patients were males while the remaining 13.8 percent were females. Katiyar et al in their study found 86.5% patients to be male.<sup>9</sup> The

present study 65% of patients had normal BMI. 18.8% of patients were overweight and 30.3 % of patients were underweight.

The mean BMI of patient was 21.21± 3.654. Wu et al in their study found 7.8% of patients to be underweight, 45.97% to be normal weight, 27.96% overweight and 18.28% of patients to be obese.<sup>10</sup> Breathlessness was found to be present in all patients (100%). Cough and chest tightness was found to be present in 95 percent and 30 percent of the patients respectively. Mahesh et al 90.1% of patients had breathlessness and all the patients had cough compared to 100% and 95% in the current study.<sup>11</sup> We found that clubbing was found to be present in 46.25 percent of the patients. The maximum patients were in 2nd grade of clubbing i.e. 22.5%. Grade 1 and grade 3 was present in 15% and 8.8% of patients respectively. Cyanosis and Pedal edema was found to be present in 5 percent and 31.3 percent of the patients respectively. Emphysematous changes were seen in all the patients (100 %). Cardiomegaly was seen in 28.7%, Tubular heart seen in 37.5%, Hilar prominence in 22.5%, Pruning of blood vessels at periphery in 22.5% and bullae seen in 10% of the patients. In a study by Reddy et al, chest X-ray findings were emphysema, cardiomegaly and prominent pulmonary conus present in 39.34%, 18.03% and 9.89% respectively. These finding were discordant to our study.<sup>12</sup> In the present study

maximum number of patients were present in stage 2 (moderate) with 48.8% of patients followed by stage 3 (severe) and stage 4 (very severe) with 32.5 and 18.8% of patients respectively. Purohit et al showed 16%, 48% 25% and 10% patients to be in stage 1, 2, 3, and 4 of gold staging.<sup>13</sup>

67.5% of patients belong to COPD-C with history of smoking. 20% of patients belongs to COPD-P with history of occupational exposure and in 32.5% of patients belongs to COPD-I with history of occupational exposure. In a study by Mahishale et al 70% of the patients were smokers which were almost similar to our results.<sup>14</sup> In the article by Aggarwal et al. published in this issue of Lung India, 32.4% of COPD patients had a history of PTB.<sup>15</sup> In the PLATINO conducted by Menezes AM et al which compared COPD patients with and without TB history, it was found that airway obstruction was observed in 30.7% of patients with a positive history of TB while Jain et al in their study found 28.8% of COPD patient with positive TB history.<sup>16</sup>

## CONCLUSION

Our research contributes to raising awareness of the value of quitting smoking, the necessity of early COPD diagnosis and the requirement for ongoing care to decrease the burden globally.

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