



THE PREVALENCE OF CHRONIC OBSTRUCTIVE PULMONARY DISEASE IN RAJASTHAN, INDIA – THE BURDEN OF OBSTRUCTIVE LUNG DISEASE (BOLD) STUDY: POPULATION-BASED STUDY

Respiratory Medicine

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ABSTRACT

Introduction The number of COPD cases in India was a staggering 55.3 million in 2016 and is the second common cause of deaths due to NCD¹. Evidence from India suggested the COPD prevalence increases with age and exponentially after 30 years of age. Patients should be assessed for a diagnosis chronic obstructive pulmonary disease if they have a history of exposure to risk factors for the condition, dyspnea, a persistent cough or sputum production, or both. Therefore the objective of this study is to estimate the prevalence of COPD among population of Rajasthan in India. **Method and material** This study was done from January 2021 to June 2022 on 222 Chronic Obstructive Pulmonary Disease (COPD) patients attending the chest department in Department of Respiratory Medicine, National Institute of Medical Science and Research, Jaipur. **Result** We selected 222 patients (200 males and 22 females) based on inclusion and exclusion criteria. 168 patients (75.67%) were in the 55 years or above age group. Cough was the main symptom in our study population and it was found in 126 patients (56.75%). Whereas dyspnoea and expectoration were found in 65 patients (30%) and 30 patients (13.25%). Chest x-ray of study population revealed that 101 (45.49%) patients had normal Chest X-ray whereas 121 patients (54.51%) had hyper-inflated lungs. ECG findings analysis in study population showed low voltage in 86 patients (38.73%), normal in 130 patients (58.55%) and P pulmonale in 6 patients (2.72%). Among the study population 113 patients (50.9 %) were in stage II, 95 patients (42.8%) were in stage III and 14 patients (6.3%) were in stage IV disease. **Conclusion** We conclude that the prevalence of COPD in Rajasthan is at a comparable level with cities in other high-income countries. Apart from known risk factors (age, smoking and lower educational level), a history of tuberculosis may be associated with chronic airflow obstruction even in high-income countries. COPD remains under diagnosed as only 29% of subjects with COPD had a previously diagnosed lung disorder.

KEYWORDS

COPD, Smoking, GOLD criteria, lung

INTRODUCTION

According to the Global Initiative for Chronic Obstructive Lung Disease (GOLD), Chronic Obstructive Pulmonary Disease (COPD) is a treatable and preventable disease that is characterised by a chronically heightened inflammatory response in the airways and lungs to noxious gases or particles. COPD typically progresses and is characterised by a limitation in airflow.¹ Emphysema and small airway disease combine to cause the chronic airflow restriction that is a hallmark of COPD (obstructive bronchiolitis).¹ Long-term inflammation leads to structural changes and the constriction of tiny airways. It is currently a major contributor to mortality and disability.² According to the World Health Organization, it will overtake smoking as the third largest cause of mortality in 2030. (WHO).³ Male sex, tobacco use, age over 45, prior work exposure to inorganic or organic dusts, chemical agents, and biomass fuel fumes are risk factors.

The number of COPD cases in India was a staggering 55.3 million in 2016 and is the second common cause of deaths due to NCD⁴. Evidence from India suggested the COPD prevalence increases with age and exponentially after 30 years of age. The estimated prevalence of COPD ranged from 0.1% to 0.9% between the age group of 5 years to 29 years while the incidence ranged from 1.6% to 28.3% in population above 30 years of age.⁴ The prevalence of COPD varies across different regions and states of India.

Patients should be assessed for a diagnosis chronic obstructive pulmonary disease if they have a history of exposure to risk factors for the condition, dyspnea, a persistent cough or sputum production, or both. Therefore the objective of this study is to estimate the prevalence of COPD among population of Rajasthan in India.

METHOD AND MATERIAL

This study was done from January 2021 to June 2022 on 222 Chronic Obstructive Pulmonary Disease (COPD) patients attending the chest department in Department of Respiratory Medicine, National Institute of Medical Science and Research, Jaipur January 2021–June 2022

Study Design

Observational and cross sectional study.

Study technique

The COPD patients who attended the Respiratory Department at the National Institute of Medical Sciences and Research were chosen randomly for the study as per the inclusion and exclusion criteria mentioned below.

Inclusion Criteria

- 1) Age 18 years and above
- 2) A COPD patient presenting to the respiratory department OPD is diagnosed using clinical and spirometric criteria from the GOLD CRITERIA (post- bronchodilator FEV1/FVC ratio 70% and FEV1 less than 80% of predicted).
- 3) Willing to participate in the study.

Exclusion Criteria

- 1) Hemodynamically unstable patient as per clinical assessment
- 2) Patient with clinical or radiological evidence of pneumonia and pulmonary tuberculosis.

RESULTS

In this study we took all cases of stable COPD, diagnosed on the basis of GOLD criteria attending the department of Chest Medicine during one and half year period between January 2021 to June 2022. We selected 222 patients (200 males and 22 females) based on inclusion and exclusion criteria. 168 patients (75.67%) were in the 55 years or above age group. Cough was the main symptom in our study population and it was found in 126 patients (56.75%). Whereas dyspnoea and expectoration were found in 65 patients (30%) and 30 patients (13.25%). Chest x-ray of study population revealed that 101 (45.49%) patients had normal Chest X-ray whereas 121 patients (54.51%) had hyper-inflated lungs. ECG findings analysis in study population showed low voltage in 86 patients (38.73%), normal in 130 patients (58.55%) and P pulmonale in 6 patients (2.72%). Among the study population 113 patients (50.9 %) were in stage II, 95 patients (42.8%) were in stage III and 14 patients (6.3%) were in stage IV disease.

Table 1 : Age and Sex distribution

Age distribution		Female	Male	Total
Age	40 - 44	0	3	3
	45 - 49	0	3	3
	50 - 54	6	26	32

	55 - 59	16	82	98
	> 60	0	86	86
Total	22	200	222	

Table 2 : Symptoms with Duration

Duration of symptoms	Cough	Expectoration	Shortness of breath	Total
Less than 5 years	3	9	3	15
More than 5 years	123	21	63	207
Total	126	30	65	222

Table 3 : Staging of the Study Population

Severity of symptoms	FEV1%	Number of patients	Percentage (%)
Mild (stage I)	>80%	0	0
Moderate (stage II)	50%-80%	113	50.9
Severe (stage III)	30%-50%	95	42.8
Very Severe (stage IV)	<30%	14	6.3

Table – 3 showing the staging of the study population according to the GOLD criteria.

Table 4 : Correlation of Duration of Symptoms with ECG Findings

Symptoms		ECG finding		
		Normal	Low voltage	P pulmonale
Duration	Less than 5 years	21	0	0
	more than 5 years	109	86	6
Total		130	86	6

Table 5 : Correlation of Duration of Symptoms

Duration of Symptoms	Normal	Hyperinflation
Less than 5 year (n =39)	17	22
More than 5 years (n =183)	84	99
Total	101	121

DISCUSSION

COPD is a leading cause of morbidity and mortality worldwide and has a definite social and economical impact. COPD prevalence, morbidity, and mortality vary across countries and across different groups within countries, and it has a direct relation with the prevalence of tobacco smoking⁵.

In the present study male patients were 200 (90.09%) and females were 22 (9.1%), and that results matched with study done by Izquiero, 2003 to determine the burden of COPD which revealed that the prevalence of COPD was 77.4% in males⁶ and also was matching with the WHO/World Bank Global Burden of Disease which revealed that the prevalence of COPD is higher among men than among women⁷.

In the present study 208 patients (93.69%) were in stage II and stage III of GOLD. In the present study we found that hyper-inflated lungs in chest X-ray were 66 out of 121 patients (54.54%) in more than 5 year duration group. Some authors⁸ reported that hyperinflation, estimated by the IC/TLC ratio, designated the inspiratory index was a predictor of long-term survival in COPD, regardless of FEV1. This finding was confirmed in the long-term cohort study conducted by the National Emphysema Treatment Trial Research Group which determined the risk factors of greater mortality in patients with severe emphysema⁹.

In accordance with results from previous studies^{10,11}, increasing age and cigarette smoking were the most important predisposing factors for developing COPD. A lower educational level was also related to increased risk of COPD. This finding was in accordance with results from other studies^{12,13}, where lower level of education is associated with greater disease severity in COPD and a higher risk of acute exacerbations.

An association between tuberculosis and chronic airflow limitation is described in studies from South America¹⁴, Asia¹⁵, and Africa¹⁶; and it has been advocated this needs to be considered when estimating the prevalence of COPD in tuberculosis endemic areas¹⁷.

CONCLUSION

The strength of the study was its design and structure. Non-responders were more likely to be smokers and older subjects; therefore, the estimated prevalence for COPD is probably underestimated. Other

limitations might include: the sample size being too small to give statistically significant data on rarer risk factors, such as history of tuberculosis;

Not all possible risk factors for COPD were included in our study and some such as passive smoking in early life, poor indoor air quality and poor diet have been associated with low educational level. Our COPD prevalence data should therefore not be interpreted as representing India as a whole.

We conclude that the prevalence of COPD in Rajasthan is at a comparable level with cities in other high-income countries. Apart from known risk factors (age, smoking and lower educational level), a history of tuberculosis may be associated with chronic airflow obstruction even in high-income countries. COPD remains under diagnosed as only 29% of subjects with COPD had a previously diagnosed lung disorder.

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