**Original Research Article**

# Clinico-epidemiological profile and disease severity of chronic obstructive pulmonary disease among patients in a primary care centre at central Kerala

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**ABSTRACT**

**Background:** Chronic obstructive pulmonary disease (COPD) is a chronic disease usually caused by significant exposure to noxious particles and are not fully reversible. COPD represents an important public health challenge that is both preventable and treatable. The aim of this study was to describe the clinico-epidemiological profile of COPD patients and to assess the disease severity using spirometry among respiratory symptomatic in a primary care centre.
**Methods:** A cross sectional study was conducted among the COPD patients attending monthly pulmonology clinic in Urban Health centre, Ettumanoor, Kottayam from June to August 2019. The study comprised of 120 patients with symptoms suggestive of COPD attending the monthly respiratory clinic. Severity of airflow limitation assessed using spirometry results based on GOLD criteria. Clinical and epidemiological data were collected using a semi structured interview schedule.
**Results:** The mean age of the participants were 64±12 and 51.7% were males. The median duration of COPD symptoms for the study participants was 10 (IQR 11) years and 62.5% were having productive cough with dyspnoea as the major symptom. All males except two were smokers and the mean packyears were 42±4 years. As per GOLD guidelines 44 (36.7%) had severe disease, 11 (9.2%) had mild, 39 (32.5%) had moderate and 26 (21.7%) had very severe disease. The average forced expiratory volume in one second (FEV1) in study subjects was 54.8±7.5.
**Conclusions:** In view of the emerging public health risk, COPD need to be diagnosed and managed at the earliest to slow down the progression.

**Keywords:** Airflow limitation, Chronic respiratory disease, COPD, GOLD, Pulmonary function, Spirometry

## INTRODUCTION

Chronic obstructive pulmonary disease (COPD) is a progressive disease characterised by airflow limitation, cough and sputum production with acute exacerbations. Currently it is the growing cause of morbidity and third leading cause of death worldwide.[1] The burden of COPD is on the rise along with demographic transition. Along with considerable socio-economic burden, COPD also causes disability and impairs the quality of life, loss of productivity, increased hospital admissions, and premature mortality.[2]

COPD has been recognised as a heterogenous group of disorders. The most important risk factor is said to be cigarette smoking which remains a widespread habit.[3]

COPD is a preventable and treatable condition. So, in order to modify the outcome or to reverse the condition, early detection needs to play a critical role.

The real burden of COPD is often underestimated as it is not diagnosed by clinical findings alone. The worldwide prevalence of COPD was estimated to be 11.1%.[4] But several studies reveals that the prevalence of physician diagnosed COPD is much lower.[5,6] Thus, only a fraction of those with COPD have been diagnosed

Spirometry-based classification of disease severity according to the Global Initiative for Chronic Obstructive Lung Disease (GOLD) criteria is the mainstay of diagnosing COPD, because it provides objective measurement of lung function.[7] Spirometry is a safe and practical procedure, that can be adopted even at the peripheral levels.

As the disease development is very insidious it is often under diagnosed. It is estimated that 25-50% patients with clinically significant disease being undetected or misdiagnosed.[8] There is potentially wide application for spirometry to improve recognition and diagnosis of COPD, in primary care. In this study we aimed to explore the spirometric pattern of patients having symptoms suggestive of COPD in a primary care centre and to assess the disease severity using GOLD criteria.

## METHODS

A hospital based cross sectional study was conducted during June to August 2019 among patients attending the monthly respiratory outpatient clinic in Kottayam Medical College Urban Health Centre, Ettumanoor. After obtaining informed consent, all patients above 35 years of age with symptoms of Dyspnoea on Exertion (DOE) and /or chronic cough for more than 6 months duration attending the OPD were screened with a semi structured interview schedule. The details on socio demography, symptoms, medications, exposure to various risk factors (Occupational exposure, smoking, indoor air pollution) were collected using the questionnaire. Then pulmonary function testing (PFT) was performed after giving proper guidance and demonstration, using an electronic desktop portable spirometer for all these patients.

### Inclusion and exclusion criteria

A sample of 120 patients with symptoms suggestive of COPD and obstructive pattern in the spirometric curve were included in the study. Their clinico-epidemiological profile was recorded and pre bronchodilator airflow limitation was assessed using GOLD- 2020 criteria[9].

Patients in whom PFT is contra indicated (hemoptysis of unknown origin, pneumothorax, angina, recent myocardial infarction, thoracic aneurism, abdominal aneurism, cerebral aneurism, recent eye surgery (within 2 weeks) recent abdominal /thoracic surgical procedures,

history of syncope associated with forced expiration, patient with active tuberculosis), those with duration of symptoms for less than 6 months, and those < /=35 years of age were excluded from the study. Based on the assumption that tobacco smoking, the major risk factor of COPD, even if started early adolescence, it would take 20-25 years of exposure to tobacco smoke to induce the pathophysiologic changes of COPD in the lungs. Hence generally 35-40 years is considered as the target age group for commencement of COPD symptoms.

### Statistical analysis

Data was coded and entered in Microsoft Excel and analyzed using SPSS version 20. All outcome variables as applicable was expressed in mean or proportions and 95% Confidence interval was calculated. Association between various qualitative variables were assessed using chi square test and quantitative variables were tested using t test/ANOVA test. The level of statistical significance will be fixed at a p value less than 0.05.

## RESULTS

The mean age of the study participants was 64±12 years. Among the subjects, 62 (51.7%) were males. Majority were belonging to the group of 55-74 years of age (Table 1), 22.5% were in the age group 74-95 years and 20.8% were belonging to the age group 35-54 years. Out the 120 patients 9 were already diagnosed to have coronary artery disease and 6 were previously treated for tuberculosis.

**Table 1: Distribution of study subjects based on age and gender.**

| Age group (in years) | Male N (%) | Female N (%) | Total N (%) |
|---|---|---|---|
| 35-54 | 6 (9.7) | 19 (32.8) | 25 (20.8) |
| 55-74 | 35 (56.5) | 33 (56.9) | 68 (56.7) |
| 75-94 | 21(33.9) | 6 (10.3) | 27 (22.5) |
| Total | 62 (100) | 58 (100) | 120 (100) |

### Clinical profile of COPD

The median duration of COPD symptoms for the study participants was 10 (IQR 11) years. The number of exacerbations ranges from 1-6 per year. Among the study participants, 106 (88%) gave history of allergies/atopy. Majority (62.5%) were having productive cough with dyspnoea as the major symptom. Twenty percentage of patients were having chronic productive cough as the only symptom. Dyspnoea was the predominant symptom for rest of the patients.

Out of the 120 study subjects, 102 (85%) were already using some medication for symptom relief. The median duration of medication use among them was found to be 6 (IQR 7) years. Majority (65.8%) are using inhalers only, 6.7% were using only tablets and 12.55% are using both

tablets and inhalers. Eighteen out of 120 patients were not using any type of medications for their symptoms. Among the study subjects, 32 (29.4%) was underweighted and 6 (5%) were obese (Table 2). There was no statistically significant difference in the severity of airflow limitation with body weight. 56% of the females and 61% of the males were having severe to very severe disease (p value 0.581).

**Table 2: Clinical characteristics of study subjects.**

|  | Frequency | (%) |
|---|---|---|
| **H/O allergy/ atopy** | 106 | 88.3 |
| **Symptoms** | | |
| Cough alone | 24 | 20 |
| Dyspnoea alone | 21 | 17.5 |
| Cough and dyspnoea | 72 | 62.5 |
| **Types of medication use** | | |
| Inhalers | 79 | 65.8 |
| Tablets | 8 | 6.7 |
| Inhalers and tablets | 15 | 12.5 |
| None | 18 | 15 |
| **BMI** | | |
| Underweight | 35 | 29.2 |
| Normal | 45 | 37.8 |
| Overweight | 33 | 27.7 |
| Obese | 6 | 5 |

There was no statistically significant association between age groups or gender with disease severity.

***Known risk factors***

All male patients except two were smokers (ever smoker), with an average of 42±4 pack years. Out of them, 28 males are current smokers. None of the females were smokers. Among the study participants, 37.5% gave family history of chronic respiratory diseases, 38 % had history of occupational exposure to dust or fumes. Solid fuels/ biomass is the only source of domestic cooking fuel in 15% houses. In 54% houses solid fuels are used along with LPG.

60% of the smokers and 56% of non-smokers were found to have severe to very severe disease but this difference was not found to be statistically significant (p value 0.760).

***Spirometry pattern and disease severity***

Out of the 120 patients with symptoms suggestive of COPD, Pulmonary function tests results revealed that 44 (36.7%) had severe disease, 11(9.2%) had mild, 39 (32.5%) had moderate and 26 (21.7%) had very severe disease as per GOLD guidelines.[9] The average forced expiratory volume in one second (FEV1) in patients was 54.8 (SD = 7.5) (Table 3).

**Table 3: Spirometry profile of patients.**

| Characteristic | GOLD I | GOLD II | GOLD III | GOLD IV |
|---|---|---|---|---|
| **Number of patients (%)** | 11 (9.2%) | 39 (32.5%) | 44 (36.7%) | 26(21.7%) |
| **FEV1 (%)** | 89.27±5.56 | 61.93±8.48 | 39.77±5.84 | 24.51±3.43 |
| **Age** | 62±11 | 63±15 | 63±12 | 65±7 |
| **Sex** | | | | |
| Male | 8 | 16 | 24 | 13 |
| Female | 3 | 23 | 20 | 12 |
| **Smoking history (males, N=62 pack years** | 39±4 | 42±2 | 49±4 | 48±2 |

**DISCUSSION**

The current study was conducted among patients who have symptoms suggestive of obstructive pulmonary diseases. We found that among the symptomatic, majority had severe airway obstruction as per the GOLD criteria.

In the study majority were having severe or very severe disease as per the GOLD classification. In a study by Bhadnarek et al, majority of patients had mild to moderate disease.[10] Severe COPD was found in 13% of adults surveyed in Spain.[11] Our findings might be an overdiagnosis by using pre-BD FEV1/ FVC to classify airflow limitation which should ideally be done using post BD spirometry values. Majority of the symptomatic patients were above 55 years of age. Some research indicates that irreversible bronchial obstruction and decline of the FEV1 increase with age.[12]

The association between smoking and COPD is well recognized, and men with a history of smoking have are 3.5 times more likely to have COPD.[13] In the present study also the mean pack years were comparatively more for those with more severe airflow limitation, even though the difference was statistically not significant.

There is no well-established evidence on the association between body mass index (BMI) and severity of COPD. But, many studies establishes the association between increased BMI and reduced mortality in COPD.[14-16] Thus, clinicians may be tempted to recommend weight gain to their patient. In the current study there was no statistically significant association between severity of airflow limitation and BMI.

*Limitations*

Our study has certain limitations. We used pre-bronchodilator PFT values for classifying COPD, while post bronchodilator non reversibility is an important criteria for COPD diagnosis based on GOLD guidelines

## CONCLUSION

Early diagnosis and timely management are inevitable to reduce the public health burden of COPD. There is potentially wide application for spirometry to improve recognition and diagnosis of COPD, in primary care.

## ACKNOWLEDGEMENTS

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