



**ORIGINAL RESEARCH PAPER**

**Respiratory Medicine**

**STUDY OF SOCIO-DEMOGRAPHIC PROFILE AND BMI CHARACTERISTICS OF PATIENTS WITH COPD**

**KEY WORDS:** COPD, socio economic status, demographic factors

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**ABSTRACT**

**Background:** Chronic obstructive pulmonary disease (COPD) is characterized by persistent airflow limitation, which usually progresses and is associated with an increased chronic inflammatory response [1,2]. Socio-economic, cultural, and environmental factors are becoming increasingly important determinants of chronic obstructive pulmonary disease [26]. An increased burden of COPD is expected due to the aging of the population and continued exposure to COPD risk factors [27,28]. This study aimed at investigating the socio economic, clinical, and demographic factors associated with COPD and highlighting their prevalence in the disease. **Methodology:** The present study included COPD patients presenting to the Department of Respiratory Medicine, M.M.I.M.S.R., Mullana. Proforma included all the detailed information about age, gender, occupation, address, height, weight, dwellings, economic status, religion, nutrition, literacy status, smoke exposure, smoking habit, about any type of addiction, kuppuswamy scale BMI scale (if any), comorbidities details. The subjects were requested to undergo spirometry according to the American Thoracic Society guidelines. Data was analysed using SPSS V24.0. **Results:** The current investigation discovered a male predominance in COPD patients, with most individuals falling within the 51–60 age range. While only 12.67% of the subjects in the current study had exposure to biomass, other participants in the study were still active smokers. In the present study, 23.33% of the patients had a BMI more than 29.9. Most COPD patients were urban dwellers, proving that biomass fuel exposure is not a common cause of COPD in the current study. The most prevalent category was GOLD B (38.67%). There was at least one comorbid condition in 44.66% of patients. Hypertension (19.33%), diabetes mellitus (14%) and gastritis, ulcers, and GERD (5.33%) were the three concomitant conditions that were most common. The most frequent presenting symptom was breathlessness (49.33%); mixed symptoms were observed in 20.67% of the individuals. Spirometry revealed that the average FEV1 (L) value was 1.33±0.68, the FEV1 (%N) value was 48.4±12.43, and the ratio of FEV1 to FVC (L) value was 0.61±0.14. Obesity and smoking history (current or former) were statistically significant risk factors for the severity of COPD. The subject's gender does not significantly increase the chance of the disease progressing. **Conclusion:** The current findings demonstrated that age >60 years, current/ex-smokers, exposure to biomass fuel, and obesity (i.e., BMI ≥25) are statistically significant risk factors for disease progression in patients with COPD in developing nations like India. A higher quality of life, a lighter financial burden on the subject's family, and improved management are expected to result from the assessment and identification of specific sociodemographic and clinical characteristics in COPD patients. These factors will also likely improve patient outcomes.

**INTRODUCTION**

Chronic obstructive pulmonary disease (COPD) is characterized by persistent airflow limitation, which usually progresses and is associated with an increased chronic inflammatory response [1,2]. The severity of the disease in individual patients is influenced by exacerbations, hospitalizations, and coexisting diseases [3]. Poor airflow is connected with the presence of emphysema and inflammation progressing in bronchioles [4].

Rapid lung function decline is associated with a number of factors including continued smoking, emphysema severity, and the frequency of acute exacerbations; identification and modification of such risk factors is a goal of COPD management [5]. Nutritional and metabolic abnormalities are core features of COPD as a systemic disease [6,7]. The most common conditions of COPD are emphysema chronic bronchitis and Emphysema.

**Emphysema**

Emphysema is a type of COPD that shares the clinical symptoms of shortness of breath and airway obstruction. Commonly seen in people with a long-term history of smoking, it is noted uniquely in the clinical presentation as a “pink puffer.” The term comes from the clinical appearance of patients with emphysema, who, with the increased work of breathing, have a flushed appearance from lack of oxygen and poor cardiac output. The damage is deep within the lungs, arising from overinflated alveoli where air has become trapped because of the inability to exhale the carbon dioxide.

Chronic smoking damages the flexibility of the alveoli, making them stiff and ineffective. Often because the work of breathing takes all their energy, people with COPD become exhausted while eating, so they experience weight loss as well as muscle wasting due to the lack of oxygen. Emphysema has also been called “COPD Type A.”

**Chronic Bronchitis**

Chronic bronchitis is a type of COPD characterized by inflammation, airway irritation, and mucus buildup in the main bronchus. The clinical diagnosis is defined as “persistent cough that produces phlegm and mucus, for at least 2 months per year, in 2 consecutive years”. Symptoms include chronic cough that attempts to rid the airway of thick mucus and phlegm. Chronic bronchitis is also characterized by cough caused by smoking or other environmental pollutants such as dust, air pollution, or unsafe work environments where coal, asbestos, or other irritants inflame delicate respiratory tissues.

According to the Global Obstructive Lung Disease (GOLD), COPD is one of the leading causes of morbidity and the fourth leading cause of mortality worldwide [8,9]. COPD affects 210 million people around the world [10], and the current prognoses indicate that by 2030 it will be the third leading cause of death in the world [11]. Epidemiological studies show that in most countries, the prevalence of COPD in adults aged ≥40 years is between 6% and 10%. Estimates show that by 2020 COPD will become the seventh cause of disability [11,12].

Patient related factors such as age and gender associated with prognosis in the disease. The true impact of COPD in women has been understudied but there is evidence that reveals substantial gender differences in the susceptibility to, severity of, and response to management of COPD [13,14]. The life of people with a chronic disease changes dramatically and leads to significant deterioration in its quality [15]. Comparing the needs with existing reality, especially in chronic diseases, occurs on many levels of quality of life (QOL) [16].

The criteria applied to define socioeconomic differences include education, income, and occupation [17,18]. The influence of socioeconomic factors on QOL has been demonstrated in worldwide studies in patients with bronchial asthma [19], cerebral stroke [20], prostate cancer [21], and chronic renal failure [22].

Socio-economic, cultural and environmental factors are becoming increasingly important determinants of chronic obstructive pulmonary disease (COPD) [23]. Previous studies have demonstrated that fragility is associated with COPD stage and that comorbidities and the low body mass index are predictors of mortality or hospitalization. [24,25] In COPD, existence of both common and modifiable risk factors, including unhealthy diet, tobacco use, alcohol abuse, and lack of physical activity and also non-modifiable risk factors such as age and genetic predisposition exist.

An increased burden of COPD is expected due to aging of the population and continued exposure to COPD risk factors [27,28,29]. Cardiovascular disease and diabetes are significant causes of morbidity and mortality for patients with COPD, and their prevalence is significantly higher than in matched controls [36]

Numerous observational studies have demonstrated that low BMI is an independent predictor of mortality in COPD [37,38,39,40]. Overweight and obesity, on the other hand, appear to have a protective effect on mortality, with the greatest effect in those with severe COPD [14,27]. This is in contrast to the general population, where obesity is associated with decreased life expectancy [41]. Such observations form part of the so-called "obesity paradox" [42], but how this applies to other COPD outcomes is unclear. This study aimed at investigating the socio-economic, clinical and demographic factors associated with COPD and highlighting their prevalence in the disease. This would highlight the commonly associated variables and determine the association with disease severity and prognosis.

**METHODOLOGY**

**Study Period:** 12 months  
**Sample Size:** 150 subjects.

**Inclusion Criteria:** Patients diagnosed with COPD were included in study.

**Exclusion Criteria:** Any patient of COPD that warrants admission to Intensive Care Unit or patient/attendants not ready to participate in study or who were not willing to give written informant consent.

**Case selection:** The patients were interviewed with a questionnaire regarding the demographic data, socioeconomic status, medical history and previous history of taking any medications. Proforma included all the detail information, economic status, religion, nutrition, literacy status, smoke exposure, smoking habit, about any type of addiction, kuppaswamy scale BMI scale (if any), comorbidities details. The study protocol for all procedures was approved by the Institutional Review Board for Ethical Clearance

**Study Sequence:** Thorough detailed history and physical examination was done of all the patients and recorded on a proforma. Symptoms of the patients were recorded. For grading of dyspnea, GOLD classification was used. A body mass index score was assigned, and severity of COPD analysed.

**Spirometry:** The subjects were requested to undergo a spirometry according to the American Thoracic Society guidelines, with the same type of portable spirometer (DATOSPIR-200.Sibel S.A.Barcelona)

**Statistical Analysis:** Data was analyzed using SPSS V24.0 (Statistical Package for Social Sciences, Version 15.0) package. Univariate analysis was established between the severity of the disease and BMI / sociodemographic status of patients.

**RESULTS**

Out of the total 150 patients included, 127 (84.67%) were males, and the remaining 23 (15.33%) were females. Female to male ratio was 15.33/84.67%. Out of 150 subjects, 13 (8.67%) subjects were in age range 31-50 years, 79 (52.67%) were in age range 51-60 years and 58 (38.67%) were of >60 age.

In present study 97 (64.67%) subjects live in urban areas and 53 (35.33%) subjects belong to rural area. In present study, BMI in range of 18.5-24.9 kg/m<sup>2</sup> was in 67 (44.67%) subjects, in range of 25-29.9 kg/m<sup>2</sup> was in 48 (32%) patients and >29.9 kg/m<sup>2</sup> in 35 (23.33%) patients.

In present study, of the total 150 subjects included, 78 (52%) were current smokers and 46 (30.67%) subjects were ex-smokers.

Biomass exposure was present in only 19 (12.67%) subjects whereas the remaining 131 (87.33%) subjects said no.

According to GOLD 2011 criteria 36 (24%) subjects were in Gold A category, 58 (38.67%) subjects were in Gold B category, 47 (31.33%) subjects were in Gold C category and 9 (6%) subjects were in Gold D category. (Table 6)

**Table 6: COPD among the study subjects according to GOLD criteria**

GOLD Criteria	N	%
Gold A	36	24.00
Gold B	58	38.67
Gold C	47	31.33
Gold D	9	6.00

Co-morbidities among the patients involved in study were recorded. 29 (19.33%) patients complained of Hypertension. 21 (14%) patients had complained of Diabetes Mellitus. 8 (5.33%) suffered from Gastritis, Ulcer, GERD. 6 (4%) had complain of Coronary Artery Disease and 3 (2%) had complain of Post Tuberculosis, as shown in Table 7.

Symptoms among COPD subjects were recorded. 27 (18%) subjects had symptoms of cough, 72 (49.33%) subjects had symptoms of breathlessness, 19 (14%) subjects had symptoms of pedal edema, 16 (11.33%) subjects had symptoms of fever, 11 (7.33%) subjects had symptoms of chest tightness and 31 (20.67%) subjects had combined symptoms. (Table 8)

**Table 8: Symptoms among the study subjects**

Symptoms	N	%
Cough	27	18
Breathlessness	72	49.33
Pedal edema	19	14.00
Fever	16	11.33

Chest tightness	11	7.33
Combined Symptoms	31	20.67

Clinical characteristics of COPD patient according to spirometry was recorded. The mean level of FEV1 (L) was 1.33±0.68, FEV1 (%N) was 48.4±12.43 and Ratio of FEV1 to FVC (L) was 0.61±0.14. (Table 9)

**Table 9: Spirometry among the study subjects**

Spirometry	Mean	SD
FEV1 (L)	1.33	0.68
FEV1 (%N)	48.4	12.43
Ratio of FEV1 to FVC (L)	0.61	0.14

Univariate analysis of various parameters according to COPD severity was done and it found that age >60 years, current/ex-smokers, exposure to biomass fuel, and obesity (i.e., BMI ≥25) were statistically significant risk factors. Gender of the subject is not a significant risk factor.

**Table 10: Univariate analysis of various parameters according to COPD severity**

Parameters	OR	p value
<b>GENDER</b>		
Female	1 (reference)	
Male	1.07	0.46
<b>AGE GROUP (IN YEARS)</b>		
31-50	1 (reference)	
51-60	1.24	0.37
>60	2.87	0.041*
<b>SMOKING STATUS</b>		
No	1 (reference)	
Current/Ex	4.96	<0.01*
<b>BIOMASS EXPOSURE</b>		
No	1 (reference)	
Yes	2.89	0.038*
<b>BMI (KG/M2)</b>		
18.5-24.9	1 (reference)	
25-29.9	3.57	0.006*
>29.9	4.13	0.002*

\*:statistically significant

**DISCUSSION**

**GENDER DISTRIBUTION**

Out of the total 150 patients included, 127 (84.67%) were males and remaining 23 (15.33%) were females, showing male predominance in patients suffering with COPD. Female to male ratio was 15.33/84.67%.

**AGE DISTRIBUTION**

Out of 150 subjects, maximum subjects were of age range 51-60 years i.e., 79 (52.67%); followed by 58 (38.67%) were of >60 age and least were in age range 31-50 years i.e., only 13 (8.67%) subjects. The age range of subject was 35-79 years.

**SMOKING STATUS AND BIOMASS EXPOSURE**

In present study, more subjects were in current smokers group (n=78, 52%) and 46 (30.67%) subjects were ex-smokers. Biomass fuel exposure was present in only 19 (12.67%) subjects.

**BMI**

In present study, BMI in range of 18.5-24.9 kg/m2 was in 67 (44.67%) subjects, in range of 25-29.9 kg/m2 was in 48 (32%) patients and >29.9 kg/m2 in 35 (23.33%) patients. In current study 23.33% of the patients were obese (BMI>29.9).

**LOCATION OF SUBJECTS**

In present study maximum subjects belong to urban area (n=97, 64.67%) and 53 (35.33%) subjects belong to rural area. Our findings are in line with previous literature's results showing that smoking, aging and gender are well established risk factors for COPD development [164].

**DISEASE SEVERITY**

Disease severity assessed during the initial visit using the combined GOLD 2011 criteria revealed the rates from A to D categories 24%, 38.67%, 31.33% and 6%, respectively. More subjects fall into categories B, C, and D, which may be attributed to late symptom presentation, misinformation on the part of the subject as they may assume it to be normal, direct or indirect cigarette exposure, exposure to biomass fuel, or all of the above.

**CO-MORBIDITIES**

44.66% patients had at least one comorbid condition. The most common risk factor for co-morbidities is smoking, whether it be direct or indirect. Smoking is thought to be a contributing factor in the development of hypertension, GERD gastritis, coronary artery disease, and post-tuberculosis. Given that the majority of the respondents in the current study came from urban areas, lifestyle may also be a factor. The most frequent comorbidities were hypertension (19.33%), diabetes mellitus (14%), Gastritis, Ulcer, GERD (5.33%). And 6 (4%) subjects had complained of coronary artery disease and 3 (2%) patients had complained of Post Tuberculosis. It may be expected that these patients may be treated as a potentially high-risk group for cardiovascular events in the future perspective and that the preliminary prevention procedures should be implemented immediately.

**CLINICAL SYMPTOMS**

Breathlessness (49.33%) was the most common presenting symptom, followed by chronic cough (18%). 14% subjects had symptoms of pedal edema, 11.33% subjects had symptoms of fever and 7.33% subjects had symptoms of chest tightness. And combined symptoms were present in 20.67% subjects.

**SPIROMETRY FINDINGS**

According to spirometry the mean level of FEV1 (L) was 1.33±0.68, FEV1 (%N) was 48.4±12.43 and Ratio of FEV1 to FVC (L) was 0.61±0.14.

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