

Sociodemographic and Clinical Characteristics of COPD Patients

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Abstract

Objective: The aim of the present study was to assess the sociodemographic and clinical characteristics of COPD patients. **Methods:** A cross sectional study was conducted at the National Institute of Diseases of Chest and Hospital (NIDCH), Mohakhali, Dhaka from September 2022 to August 2023. During the study period 46 samples were collected. Acute exacerbation of COPD patients admitted to NIDCH with met the selection criteria was the study population. Purposive sampling was done according to availability of patients. Data were collected after approval of protocol by ethical review committee. The collected data were entered into the computer and analyzed by using SPSS (version 26.0) **Results:** Among the 46 patients with COPD, the majority (19, 41.3%) were aged >64 years, with a mean age of 58.2 ± 9.2 years. Male patients predominated (93.5%), with a male-to-female ratio of 14.3:1. Most patients (67.4%) were from rural areas, and 65.2% belonged to low socioeconomic backgrounds. Regarding smoking status, 33 (71.7%) patients were current smokers, 10 (21.7%) were ex-smokers, and 3 (6.5%) were non-smokers. Diabetes mellitus was the most frequent comorbidity, present in 15 (32.6%) patients, followed by hypertension in 14 (30.4%); 17 (37.0%) patients had no documented comorbidity. A D-dimer level of $<0.5 \mu\text{g/dL}$ was observed in 13 (28.3%) patients, whereas 33 (71.7%) had levels $\geq 0.5 \mu\text{g/dL}$. On electrocardiography, sinus tachycardia was the most common abnormality, observed in 31 (67.4%) patients. T-wave inversion in leads VI–V4 was present in 4 (8.7%) patients, while ST-segment elevation in lead aVR was observed in 2 (4.3%) patients. Based on CTPA findings, isolated COPD was present in 36 (78.3%) patients, whereas 10 (21.7%) had COPD with concomitant pulmonary embolism (PE). Thus, the prevalence of PE among the study population was 21.7% (10/46).

Conclusion: Pulmonary embolism was detected in approximately one-fifth (21.7%) of patients with COPD in this study.

Keywords: D-dimer level, CTPA, pulmonary embolism, COPD, Sociodemographic characteristics

I. Introduction

Chronic obstructive pulmonary disease is a widespread cause of mortality, morbidity and economic burden worldwide, as well as a public health challenge ¹. About 12.5% of Bangladeshi adults are COPD patients ². COPD is considered a significant public health challenge since it is regarded as a preventable and treatable disease. According to estimates, the disease affects more than 210 million individuals globally and would be the third most common cause of death in the world by 2030 ³. A common presentation of the disease is an acute exacerbation of COPD (ECOPD) which manifests as rapid-onset dyspnea, often accompanied by productive cough, bronchospasm, deterioration of respiratory function ^{4,5}. Bronchial infection and air pollution are recognized as the major cause of ECOPD; however, in about 30% of cases, no clear etiology is identified ⁶. The signs and symptoms of ECOPD can overlap several other clinical conditions like heart failure, asthma, pneumonia, and pulmonary embolism (PE) making overt clinical diagnosis difficult ⁷. COPD patients are at particular risk of venous thromboembolism (VTE) due to factors like immobility, advanced age, smoking, infection, heart failure, and venous stasis ⁸. Pulmonary embolism (PE) is characterized by an embolus, mainly by thrombus known as pulmonary thromboembolism (PTE), running to the pulmonary artery with blood flow and causing embolism, leading to a progressive increase of the pulmonary artery pressure, right heart failure, and eventually death ⁹. In a systematic review and meta-analysis published in 2017 reported the prevalence of

PE in ECOPD to be 16.1%.¹⁰ The standard diagnostic strategy, based on clinical probability assessment, D-dimer testing, and computed tomographic pulmonary angiogram (CTPA), is proven to have a very low rate of diagnostic failure¹¹. However, there has been a large increase in CTPA for suspected PE^{12,13}. The exact reasons are likely multifactorial. The signs and symptoms of PE are very common and unspecific. As such, clinicians fear they might be missing a life-threatening condition. Due to the lack of specificity of D-dimer testing, a large proportion of patients have a false-positive result and require imaging to rule out PE. Finally, CTPA is a fast, minimally invasive, and more sensitive than ventilation/perfusion (V/Q) scans. A slight increase in PE diagnosis has been observed as a result but with no clear benefits in terms of outcome, especially PE-related mortality^{14,15}.

II. Methods

A hospital-based cross-sectional observational study was conducted at the National Institute of Diseases of the Chest and Hospital (NIDCH), Mohakhali, Dhaka, from September 2022 to August 2023. A total of 46 previously diagnosed COPD patients admitted with acute exacerbation of COPD were recruited by purposive sampling according to predefined inclusion and exclusion criteria. Patients with other chronic respiratory diseases, active tuberculosis, pneumonia, nephropathy, coronary heart disease, pregnancy or lactation, and those receiving antiplatelet therapy were excluded. After obtaining written informed consent, sociodemographic characteristics, smoking status, comorbidities, clinical features, vital signs, ECG findings, D-dimer levels, and other relevant investigations were recorded using a structured data collection form. Pulmonary embolism was assessed by computed tomography pulmonary angiography (CTPA), which was used to determine the presence or absence of PE. Data were analyzed using SPSS version 26.0 and presented as mean $\pm$ standard deviation for quantitative variables and frequency and percentage for categorical variables. Ethical approval was obtained from the Ethical Review Committee of NIDCH, and confidentiality of participants' information was maintained throughout the study.

III. Results

According to table 1, majority 19(41.3%) patients belonged to age group >64 years with the mean age was 58.2 $\pm$ 9.2 years. Male patients were predominant (93.5%) with male to female ratio was 14.3:1. Majority 31(67.4%) came from rural area. Almost two third (65.2%) came from low socioeconomic family.

Table I: Distribution of the study populations by socio-demographic variables (N=46)

Socio-demographic variables	Number of participants	Percentage
Age (years)		
<50	12	26.1
50-64	15	32.6
>64	19	41.3
Mean $\pm$ SD	58.2 $\pm$ 9.2	
Range (min-max)	40.0-73.0	
Gender		
Male	43	93.5
Female	3	6.5
Residence		
Rural	31	67.4
Urban	15	32.6
Socioeconomic status		
Low	30	65.2
Middle	16	34.8

Figure 1 shows that current smoker was found in 33(71.75%), ex-smoker was 10 (21.75%) and non-smoker was 3(6.5%) patients.

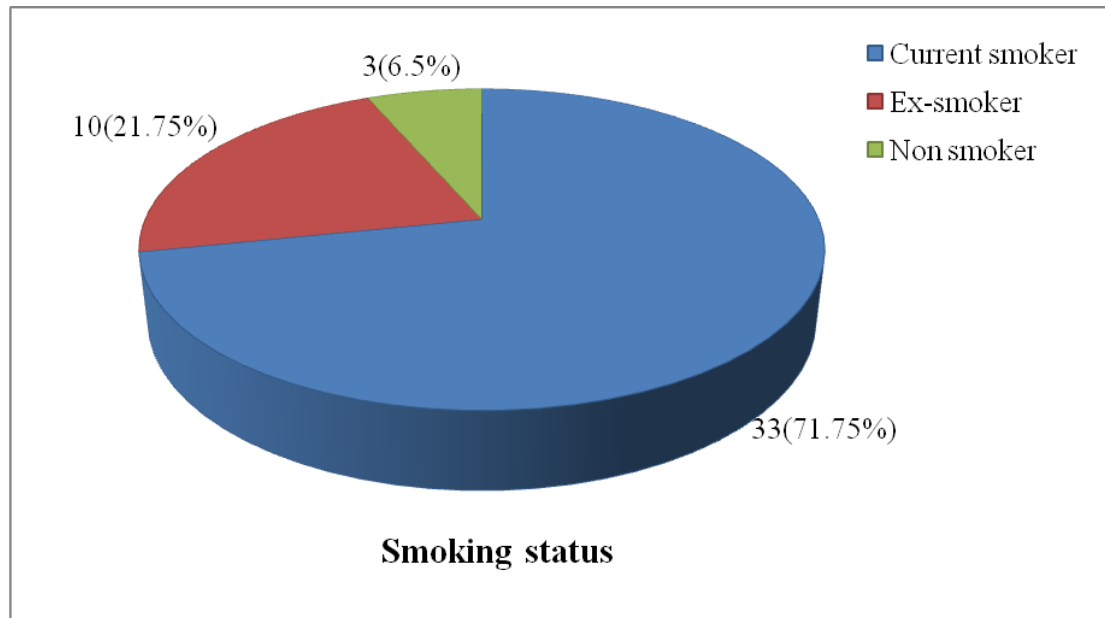


Figure 1: Pie chart shows distribution of the study populations according to smoking status (N=46)

Regarding co-morbidity, 15(32.6%) patients had DM, 14(30.4%) had hypertension and 17(37.0%) were no co-morbidities.

Table II: Distribution of the study populations according to co-morbidity (N=46)

Co-morbidity	Number of participants	Percentage
DM	15	32.6
HTN	14	30.4
Absent	17	37.0

Table III shows that d-dimer <0.05 $\mu\text{g/dl}$ was found in 13 patients (28.3%) and ≥ 0.5 was in 33 patients (71.7%).

Table III: Distribution of the study populations according to D-dimer level (N=46)

D-dimer ($\mu\text{g/dl}$)	Number of participants	Percentage
<0.5	13	28.3
≥ 0.5	33	71.7

Regarding ECG, sinus tachycardia was found in 31(67.4%), T-wave inversion in lead V1-V4 was 4(8.7%) and ST elevation in lead aVR was 2(4.3%) patients.

Table IV: Distribution of the study populations according to ECG (N=46)

ECG	Number of participants	Percentage
Sinus tachycardia	31	67.4
T-wave inversion in lead V1-V4	4	8.7
ST elevation in lead aVR	2	4.3
Normal	9	19.6

Table VI showed that only COPD was found in 36(78.3%) and COPD with pulmonary embolism was 10 (21.7%) patients.

Table VI: Distribution of the study populations according to chest x-ray (N=46)

Chest x-ray	Number of participants	Percentage
COPD	36	78.3
COPD with pulmonary embolism	10	21.7

Regarding computed tomographic pulmonary angiogram (CTPA), the prevalence of pulmonary embolism (PE) was found in 10 (21.7%) patients.

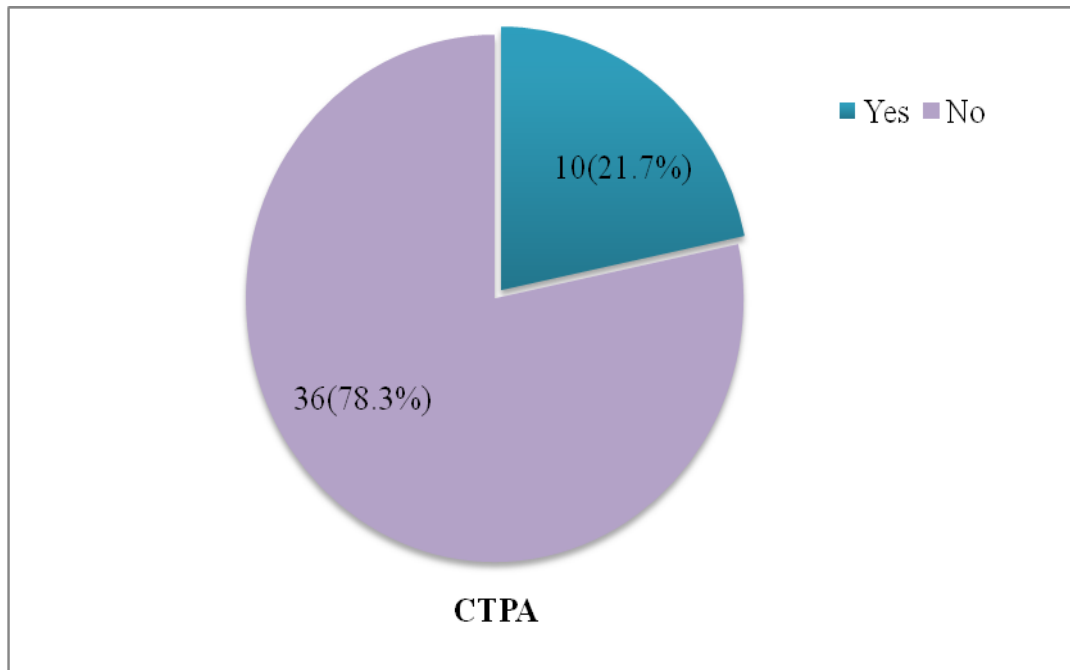


Figure 3: Pie chart shows distribution of the study populations according to CTPA (N=46)

IV. Discussion

In this present study observed that majority 19(41.3%) patients belonged to age group >64 years with the mean age was 58.2 ± 9.2 years. In a study conducted by Chiang et al. (2024) reported that the mean age was 60 ± 19 years.¹⁶ This study observed that male patients were predominant (93.5%) with male to female ratio was 14.3:1. Chiang et al. (2024) demonstrated that 40% were males and 60% were females in COPD patients.¹⁶ Hassen et al. (2019) had observed that male was 79.0% and Akpinar et al. (2014) also found 142 patients (82.6%) were male, and 30 patients (17.4%) were female. Their study findings were consistent with my study.^{17,18} In this current study observed that current smoker was found in 33(71.75%), ex-smoker was 10(21.75%) and non-smoker was 3(6.5%). Gomes et al. (2023) reported that current smoker was 20.2%, former smoker 58.0% and never smoker 21.8%. Stone et al. (2022) also showed that current smoker was 34.7%, ex-smoker 55.18% and never smoker 3.46%. The above mentioned studies finding were almost similar in this study.¹⁹ Regarding co-morbidity, 15(32.6%) patients had DM, 14(30.4%) had hypertension and 17(37.0%) were no co-morbidities. Hassen et al. (2019) demonstrated that hypertension was 37.0% and diabetes mellitus was 16.0%.¹⁷ Akpinar et al. (2014) also found that hypertension was 20.3%, diabetes mellitus 15.1% that was support with my study.¹⁸ In this current study observed that d-dimer $<0.05 \mu\text{g/dl}$ was found in 13(28.3%) and ≥ 0.5 was 33(71.7%). In a study conducted by Stals et al. (2023) revealed that D-dimer level between $0 \mu\text{g/L}$ to age-adjusted value was 43.0%, -D-dimer level between age-adjusted value to $1000 \mu\text{g/L}$ was 20.0% and -D-dimer level $\geq 1000 \mu\text{g/L}$ was 36.0%.²⁰ Kearon et al. (2006) reported that 373 (56%) had negative D-dimer test results and 297 (44%) had positive D-dimer test results. The above mentioned studies finding were almost similar in this study.²¹ Regarding ECG, sinus tachycardia was found in 31(67.4%), T-wave inversion in lead V1-V4 was 4(8.7%) and ST elevation in lead aVR was 2(4.3%). In a study done by Sullivan et al. (2023) described that T-wave inversions in V1–V4 ($n = 66$, 9.8%) and ST-segment elevation in aVR ($n = 35$, 5.2%). T wave inversion in the anterior leads has been reported in many studies as the most common ECG finding among patients with PE (68.0% and 44.4%) particularly massive PE (Ferrari et al., 1997; Rodger et al., 2000)^{22,23}. Whereas, sinus tachycardia was reported in many studies that was 26.0% (Ferrari et al., 1997) and 42.2% (Rodger et al., 2000), that was support with my study. Regarding computed tomography pulmonary angiography (CTPA), the prevalence of pulmonary embolism (PE) was found in 10(21.7%).^{22,23} Wang and Ding (2021) reported that pooled data of 5035 patients indicated the prevalence of PE in AE-COPD to be 12.9%.²⁴

V. Conclusion

The study population was predominantly older, male, rural, from a low socioeconomic background, and comprised mainly current smokers. Elevated D-dimer levels and sinus tachycardia were common findings

among the patients. These findings suggest that PE may be an important comorbidity in patients with COPD, particularly when clinical features are suggestive of thromboembolic disease. A high index of suspicion and appropriate use of CTPA may facilitate early identification of PE in patients with COPD.

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Conflict of Interest

Authors declare no conflict of Interest.

Reference

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