ORIGINAL RESEARCH PAPER

Respiratory Medicine

CLINICAL PROFILE, SEVERITY ASSESSMENT AND ARTERIAL BLOOD GAS ABNORMALITIES IN PATIENTS HOSPITALISED WITH ACUTE EXACERBATION OF CHRONIC OBSTRUCTIVE PULMONARY DISEASE

KEY WORDS: AECOPD, arterial blood gas, COPD, hypoxaemia, hypercapnia

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ABSTRACT

Background: Acute exacerbations of chronic obstructive pulmonary disease (AECOPD) are a leading cause of hospital admission and mortality. Arterial blood gas (ABG) analysis plays a critical role in evaluating severity and guiding management. **Objectives:** To study the clinical profile, severity classification and arterial blood gas abnormalities in patients admitted with AECOPD at a tertiary care hospital. **Methods:** This cross-sectional observational study was conducted at a tertiary care teaching hospital in South India over a period of 24 months. Eighty patients admitted with AECOPD were included. Demographic characteristics, risk factors, clinical features, comorbidities, spirometry findings and ABG parameters (pH, PaO_2, $PaCO_2$, HCO_3^- and SaO_2) were recorded at admission. Exacerbation severity was classified as mild, moderate or severe based on GOLD 2025 criteria. Data were analysed using descriptive statistics. **Results:** The mean age of patients was 62.5 ± 8.9 years, with a male predominance (73.8%). Majority of patients were from rural areas (80%) with significant exposure to tobacco smoke or biomass fuel. Dyspnoea and cough were present in all patients. Hypoxaemia and hypercapnia were common ABG abnormalities, particularly in severe exacerbations, where respiratory acidosis was observed. ABG derangements correlated well with clinical severity. **Conclusions:** AECOPD predominantly affects elderly rural males with preventable risk exposures. ABG analysis is an essential tool for severity assessment and should be routinely performed in hospitalized patients with AECOPD.

INTRODUCTION

Chronic obstructive pulmonary disease (COPD) is a major cause of chronic morbidity and mortality worldwide. Acute exacerbations of COPD (AECOPD) significantly contribute to disease progression, frequent hospitalizations and increased healthcare costs. These exacerbations are characterized by worsening respiratory symptoms associated with increased airway inflammation, ventilation–perfusion mismatch and impaired gas exchange.

Arterial blood gas (ABG) analysis provides an objective assessment of respiratory failure, helps in determining the severity of exacerbation and guides decisions regarding oxygen therapy, non-invasive ventilation and intensive care unit admission. Despite its clinical importance, there is limited Indian literature correlating ABG abnormalities with severity of AECOPD. This study was undertaken to evaluate the clinical profile, severity grading and ABG abnormalities among hospitalized AECOPD patients.

MATERIAL AND METHODS

This hospital-based cross-sectional observational study was conducted in the Department of Medicine at Sri Siddhartha Medical College and Hospital, Tumakuru, Karnataka, from March 2024 to March 2026. Approval was obtained from the Institutional Ethics Committee, and informed consent was taken from all participants.

Study Population

Patients admitted with a clinical diagnosis of AECOPD as per GOLD 2025 criteria were included. Patients with tuberculosis, bronchial asthma, pneumonia, malignancy, cystic fibrosis or ischemic heart disease were excluded.

Data Collection

Demographic details, occupational and environmental exposure, addiction history, presenting symptoms and comorbidities were recorded using a structured proforma. Clinical assessment included respiratory rate, heart rate, oxygen saturation and dyspnoea severity using a visual analogue scale. Spirometry findings (FEV_1/FVC) were documented when available.

Arterial blood gas analysis was performed at admission and included pH, PaO_2, $PaCO_2$, bicarbonate and oxygen saturation.

Severity Classification

Exacerbations were classified as mild, moderate or severe based on GOLD 2025 criteria incorporating clinical parameters, oxygenation status and ABG findings.

Statistical Analysis

Data were entered in Microsoft Excel and analysed using Epi Info version 3.5.3. Continuous variables were expressed as mean ± standard deviation, and categorical variables as percentages.

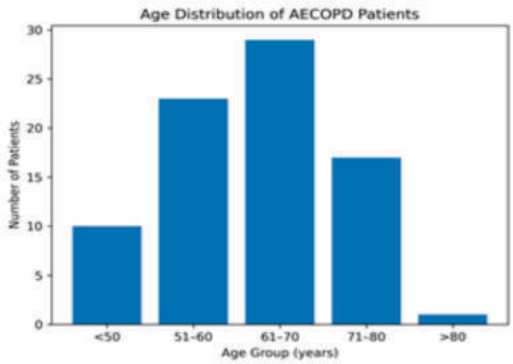
RESULTS

Demographic Characteristics

The age of patients ranged from 44 to 85 years, with a mean age of 62.5 ± 8.9 years. Males constituted 73.8% of the study population, with a male-to-female ratio of 2.8:1. Majority of patients were from rural areas (80%).

Table 1. Demographic Characteristics Of Patients With AECOPD

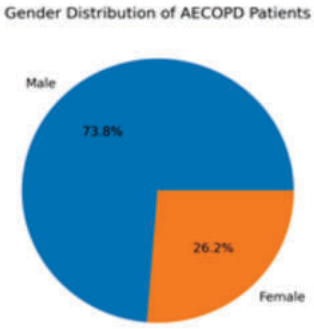
Variable	Value
Mean age (years)	62.5 ± 8.9
Male sex	59 (73.8%)
Rural residence	64 (80%)
Tobacco/biomass exposure	68 (85%)



Clinical Presentation
Dyspnoea and cough were present in all patients. Sputum production was noted in 66.3% and fever in 56.3% of cases.

Table 2. Presenting Symptoms

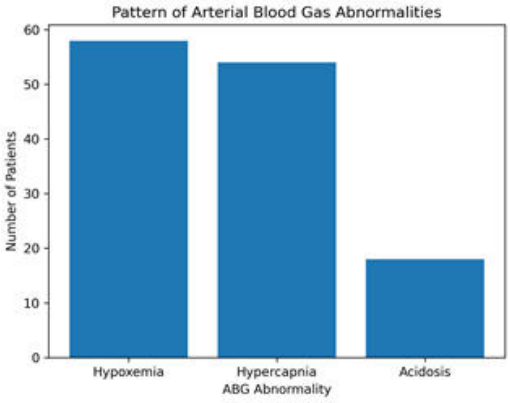
Symptom	n (%)
Dyspnoea	80 (100)
Cough	80 (100)
Expectoration	53 (66.3)
Fever	45 (56.3)



Arterial blood gas abnormalities
Hypoxaemia ($PaO_2 \leq 60$ mmHg) and hypercapnia ($PaCO_2 >$ 45 mmHg) were common findings. Respiratory acidosis (pH < 7.35) was observed predominantly in patients with severe exacerbations.

Table 3. Arterial Blood Gas Abnormalities In AECOPD

Parameter	Abnormal (%)
PaO□ ≤ 60 mmHg	Common
PaCO□ > 45 mmHg	Predominant
pH < 7.35	Severe group



DISCUSSION
This study demonstrates that hospitalized AECOPD patients are predominantly elderly males from rural backgrounds with significant exposure to tobacco and biomass fuels. These findings are consistent with previously reported Indian studies.

ABG abnormalities were strongly associated with clinical severity. Hypoxaemia and hypercapnia were common across all severity groups, while respiratory acidosis was confined to severe exacerbations, emphasizing the importance of ABG analysis in early identification of high-risk patients. Routine ABG assessment enables timely initiation of ventilatory support and appropriate escalation of care.

CONCLUSION
AECOPD remains a significant cause of hospitalization, particularly among elderly rural populations. Arterial blood gas analysis is an indispensable tool for assessing severity and guiding management in hospitalized AECOPD patients and should be routinely employed in tertiary care settings.

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Financial Support And Sponsorship
Nil.

Conflicts Of Interest
None declared.