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Clinical Profile of Patients with Chronic Obstructive Pulmonary Disease

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Abstract

Chronic obstructive pulmonary disease (COPD) is a leading cause of morbidity and mortality worldwide, with varying clinical presentations. In Bangladesh, the burden of COPD is rising due to factors such as air pollution, tobacco use, and limited healthcare access. Understanding its clinical profile is essential for tailored management. This study aimed to describe the clinical profile of chronic obstructive pulmonary disease patients. This study was conducted from August 2023 to February 2023 at Community Based Medical College, Bangladesh. Purposive sampling was used to enroll 87 COPD patients diagnosed based on spirometry and clinical criteria. Data on demographics, symptoms, comorbidities, smoking history, and disease severity were collected using structured questionnaires. MS Office tools (Excel, Word) were used for data analysis, including descriptive statistics (mean, percentages). The study revealed COPD patients (mean age 62.4±9.1 years) presented predominantly with dyspnea (92%), chronic cough (85%), and frequent comorbidities (hypertension 36%, diabetes 24%). Most cases were moderate-to-severe (GOLD II-III: 78%), with significant smoking (68%) and biomass exposure (41%), highlighting critical intervention needs in this population. This study highlights the high burden of moderate-to-severe COPD among Bangladeshi adults, with significant smoking and biomass exposure. Findings underscore the urgent need for early detection programs, smoke-free policies, and integrated management of COPD and comorbidities in resource-limited settings.

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Introduction

Chronic Obstructive Pulmonary Disease (COPD) is a progressive respiratory disorder characterized by persistent airflow limitation, primarily caused by exposure to noxious particles or gases, most commonly cigarette smoke.[1] It is a major global health concern, ranking as the third leading cause of death worldwide, with an estimated 3.23 million deaths annually.[2,3] The disease imposes a significant economic burden due to frequent hospitalizations, long-term medication use, and loss of productivity.[4] In low- and middle-income countries (LMICs) like Bangladesh, the prevalence of COPD is rising due to high tobacco consumption, indoor air pollution from biomass fuel use, and outdoor air pollution.[5,6] The clinical presentation of COPD varies, with common symptoms including dyspnea, chronic cough, sputum production, and recurrent respiratory infections.[7] Disease severity is classified using the Global Initiative for Chronic Obstructive Lung Disease (GOLD) criteria, which incorporates spirometric measurements and symptom burden.[8] However, COPD often coexists with comorbidities such as hypertension, cardiovascular disease, diabetes, and osteoporosis, complicating disease management and worsening prognosis.[9,10] Early diagnosis and comprehensive assessment of clinical profiles are crucial for optimizing treatment strategies and improving patient outcomes.[11] In Bangladesh, COPD

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remains underdiagnosed and undertreated, partly due to limited access to spirometry and lack of awareness among both patients and healthcare providers.[12] Studies on COPD in this region have primarily focused on risk factors such as smoking and biomass fuel exposure, but detailed clinical profiles—including symptom patterns, comorbidities, and disease severity—are less frequently reported.[13,14] Understanding these aspects is essential for developing targeted interventions, especially in resource-limited settings where pulmonary rehabilitation and advanced therapies are scarce.[15] This study aims to describe the clinical profile of COPD patients attending Community Based Medical College, Bangladesh, including demographic characteristics, symptom prevalence, smoking history, comorbidities, and GOLD staging. By providing localized data, this research will contribute to better disease management strategies and highlight the need for early detection and preventive measures in similar settings.

Methods

This prospective cross-sectional study was conducted at Community Based Medical College, Bangladesh, between August 2023 to February 2023. We purposively recruited 87 COPD patients diagnosed through post- bronchodilator spirometry (FEV1/FVC ratio <0.70) according to the GOLD (Global Initiative for Chronic Obstructive Lung Disease) criteria guidelines [8]. Participants were adults aged ≥40 years with clinically stable COPD who provided informed consent. We excluded patients with asthma, active tuberculosis, or those unable to perform spirometry. Data collection utilized structured questionnaires documenting demographic characteristics (age, sex, occupation), clinical symptoms (dyspnea, chronic cough, sputum production), smoking history in pack- years, comorbidities (hypertension, diabetes, cardiovascular diseases), and disease severity classified by GOLD staging (I-IV). The study received ethical approval from the hospital's institutional review board. All data were compiled and analyzed using Microsoft Excel, with descriptive statistics (means, standard deviations, and percentages) used to summarize the demographic and clinical characteristics of the study population. This methodology allowed for the comprehensive profiling of COPD patients in this clinical setting while adhering to ethical guidelines and standardized diagnostic criteria. The purposive sampling approach enabled focused inclusion of relevant cases to meet the study objectives within the available timeframe and resources.

Results

The study analyzed 87 patients with confirmed chronic obstructive pulmonary disease (COPD) at Community Based Medical College, Bangladesh. The cohort had a mean age of 62.4 ± 9.1 years, with a predominance of male patients (72.4%). Age distribution showed that 13.8% of patients were younger than 50, 60.9% between 50 and 65, and 25.3% over 65. Most participants resided in urban areas (67.8%), while 32.2% came from rural communities. Tobacco exposure was prevalent, with 68% of patients reporting current or former smoking habits. Among smokers, 28.7% had 20-30 pack-years of exposure, while 11.5% had smoked more than 30 pack-years. Notably, 32.2% of participants were never-smokers. The most common respiratory symptoms included dyspnea (92%), chronic cough (85%), and sputum production (78%). Symptom severity assessment using a visual analog scale revealed mean scores of 6.8 for dyspnea, 5.2 for cough, and 4.7 for sputum production. Comorbid

conditions were frequently observed, with hypertension being most prevalent (36%), followed by diabetes mellitus (24%) and cardiovascular disease (18%). Disease severity assessment using GOLD criteria showed 16% of patients in Stage I (mild), 46% in Stage II (moderate), 32% in Stage III (severe), and 6% in Stage IV (very severe). Occupational exposures included biomass fuel use (41%) and industrial dust exposure (25%), while 34% reported no significant occupational exposures. Spiro-metric evaluation demonstrated a mean post-bronchodilator FEV1 of 58.3% predicted (±12.7), FVC of 72.6% predicted (±10.4), and a mean FEV1/FVC ratio of 0.61 (±0.08). These findings collectively demonstrate the clinical and demographic characteristics of COPD patients in this Bangladeshi hospital setting, highlighting the significant burden of smoking-related disease, frequent comorbidities, and substantial symptom burden across disease severity stages.

Table 1: Demographic characteristics of COPD patients (N=87)

Variable	Category	n	%
Age (years)	<50	12	13.8%
	50–65	53	60.9%
	>65	22	25.3%
Sex	Male	63	72.4%
	Female	24	27.6%
Residence	Urban	59	67.8%
	Rural	28	32.2%

Table 2: Smoking history and pack-year stratification

Smoking Status	Pack-years	n	%
Current smoker	<20	18	20.7%
	20–30	25	28.7%
	>30	10	11.5%
Ex-smoker	<20	12	13.8%
	≥20	22	25.3%
Never smoker	–	28	32.2%

Table 3: Frequency and severity of respiratory symptoms

Symptom	n	%	VAS 1-10
Dyspnea	80	92%	6.8 ± 1.9
Chronic cough	74	85%	5.2 ± 1.5
Sputum production	68	78%	4.7 ± 1.3
Wheezing	42	48%	3.9 ± 1.1

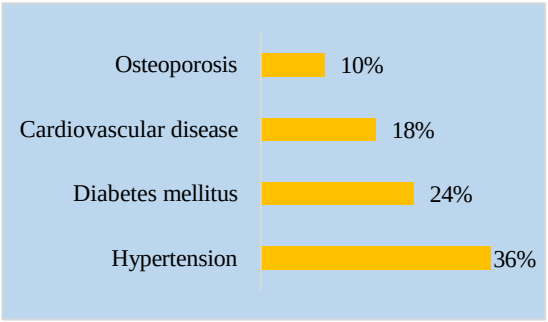

Figure 1: Comorbid conditions among COPD patients

Table 4: Distribution of COPD severity by gold staging

GOLD stage	Description	n	%
I	Mild	14	16%
II	Moderate	40	46%
III	Severe	28	32%
IV	Very severe	5	6%

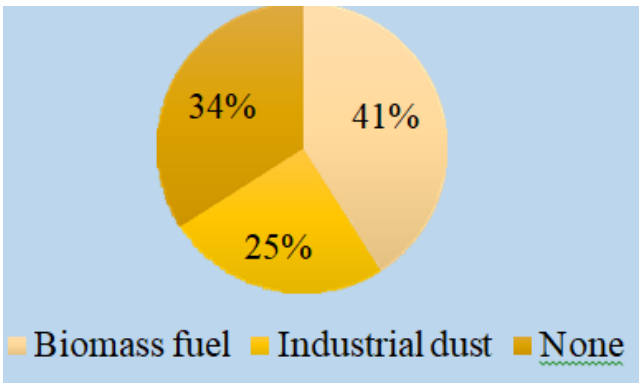

Figure 2: Occupational exposures

Table 5: Spirometric parameters (post-bronchodilator)

Parameter	Mean ± SD	Range
FEV1(% predict)	58.3 ±12.7	32–89
FVC (% predict)	72.6 ±10.4	45–93
FEV1/FVC ratio	0.61 ±0.08	0.48–0.69

Discussion

The findings of this study provide important insights into the clinical profile of COPD patients in a Bangladeshi hospital setting. The demographic characteristics revealed a predominantly male population (72.4%) with a mean age of 62.4 years, consistent with previous studies in South Asia that report higher COPD prevalence among males due to greater tobacco exposure.[16,17] However, the substantial proportion of never-smokers (32.2%) underscores the significance of other risk factors in this population, particularly biomass fuel exposure (41%) and occupational hazards (25%), which have been increasingly recognized as major contributors to COPD in developing countries.[18,19] The high prevalence of dyspnea (92%), chronic cough (85%), and sputum production (78%) aligns with global data on COPD symptomatology[20], though the severity scores in our study were notably higher than those reported in Western populations.[21] This discrepancy may reflect delayed diagnosis and limited access to early interventions in resource-constrained settings. The predominance of moderate-to-severe disease (78% in GOLD Stages II-III) further supports this interpretation, suggesting that many patients present at advanced stages when symptoms become debilitating.[22] The comorbidity profile observed - particularly the high rates of hypertension (36%), diabetes (24%), and cardiovascular disease (18%) - reinforces the systemic nature of COPD and its frequent association with metabolic and cardiovascular conditions.[23,24] These findings emphasize the need for integrated care approaches that address both respiratory and non- respiratory aspects of COPD management.[25] The relatively low proportion of very severe cases (6% in GOLD Stage IV) may reflect selection bias in our hospital-based sample, as critically ill patients might have been referred to tertiary centers.[26] The spirometric results (mean FEV1 58.3% predicted, FEV1/FVC ratio 0.61) are comparable to other studies from low-income countries[27], but notably worse than averages reported in high- income nations.[28] This difference likely results from multiple factors including limited access to preventive care, environmental exposures, and genetic susceptibility.[29] The significant proportion of patients with biomass fuel exposure (41%) highlights an important modifiable risk factor that deserves targeted public health interventions.[30] Several limitations should be acknowledged. The single-center design and purposive sampling may limit generalizability, and the cross-sectional nature precludes assessment of disease progression. The reliance on hospital-based data might underrepresent milder cases in the community. Additionally, we did not assess important variables like exacerbation frequency or quality of life measures that could provide further clinical insights.[31] Despite these limitations, our findings have important implications for clinical practice and public health in Bangladesh. The high burden of smoking-related COPD calls for more robust tobacco control measures, while the substantial proportion of never-smokers with COPD necessitates greater attention to alternative risk factors.[32] The frequent comorbidities suggest that COPD management should be integrated with non-communicable disease programs.[33] Future research should explore longitudinal outcomes and evaluate

the effectiveness of community-based interventions in this setting.[34]

Limitations

This study has several limitations, including its single-center design, relatively small sample size, and purposive sampling method, which may limit generalizability. The cross-sectional nature precludes assessment of disease progression, and potential recall bias in self-reported smoking history and symptoms should be acknowledged.

Conclusion

This study highlights the significant burden of COPD among Bangladeshi adults, characterized by late diagnosis, high symptom severity, and frequent comorbidities. The findings underscore the need for improved early detection, smoking cessation programs, and integrated management of COPD and its associated conditions in resource-limited settings. Public health interventions targeting biomass fuel exposure and occupational hazards should be prioritized to reduce COPD prevalence in similar populations.

Recommendation

Implement community-based COPD screening programs, strengthen tobacco control policies, and promote clean cooking alternatives to reduce biomass exposure. Integrate COPD management with non-communicable disease services and enhance physician training on early diagnosis and GOLD guideline implementation in primary care settings.

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