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Impact Of Drug Therapy And Healthcare Practices On Functional Outcomes And Quality Of Life In COPD Patients: A Real-World Indian Perspective

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Abstract

Background: Chronic Obstructive Pulmonary Disease (COPD) imposes significant limitations on patients' quality of life (QoL) and functionality. This study assesses the impact of pharmacotherapy and healthcare practices on treatment adherence, functional status, and perceived QoL among COPD patients in a tertiary care setting.

Methods: This cross-sectional study was conducted from January 2021 to July 2022 on 612 diagnosed COPD patients. Patient demographics, occupational exposure, indoor and outdoor pollution, treatment adherence, and functional capacity were recorded. QoL was assessed based on symptom burden and daily activity limitation.

Results: Most patients were male (82.2%) and aged between 51–65 years. More than 40% reported moderate to severe limitation in routine activities. Suboptimal adherence to inhalational therapy was seen in 41.5%, attributed to cost and lack of education. Women exposed to indoor smoke reported significantly worse symptoms. There was a clear correlation between guideline-based therapy and improved functional scores.

Conclusion: In COPD patients, the integration of rational pharmacotherapy with patient education significantly improves functional capacity and quality of life. Special attention must be paid to vulnerable populations such as elderly women exposed to indoor air pollutants.

Keywords: COPD, Functional Limitation, Quality of Life, Adherence, Pollution, Pharmacotherapy

Original Research Article

Introduction

Chronic Obstructive Pulmonary Disease (COPD) is widely recognized not only as a progressive respiratory condition but also as a debilitating chronic illness with significant psychosocial and functional implications. It ranks among the top global causes of morbidity and mortality, contributing to over 3 million deaths and 74 million Disability-Adjusted Life Years (DALYs) annually [1]. While the cardinal symptoms include dyspnea, chronic cough, and sputum production, the broader impacts on mental health, daily functionality, and quality of life (QoL) remain under-addressed in conventional biomedical frameworks. The underreporting of symptoms—particularly in resource-limited settings like India—further obscures the true burden of disease and delays timely rehabilitation interventions [2].

The intersection of COPD with mental health, functional disability, and healthcare access demands attention from a psychiatric rehabilitation perspective. Patients with COPD often experience a downward spiral of declining physical function, loss of independence, social withdrawal, and psychological distress. Depression and cognitive impairment are not uncommon among these patients, especially those with frequent exacerbations or long-term oxygen dependency [3]. In India, the scenario is exacerbated by social determinants such as low socioeconomic status, high indoor pollution exposure (especially among women), and limited access to multidisciplinary care, including pulmonary and psychiatric rehabilitation services.

Moreover, the functional limitations imposed by COPD frequently go unaddressed in routine clinical practice. Activities of daily living, such as walking, personal care, or housework, may be significantly impaired even in moderate stages of disease progression. These limitations are compounded by inadequate patient education, poor treatment adherence, and lack of comprehensive rehabilitation services [4]. Studies suggest that despite the availability of pharmacological treatments, long-term outcomes remain suboptimal without integrating behavioral, social, and rehabilitative support.

Therefore, this study aims to evaluate the relationship between pharmacological therapy, healthcare practices, and functional outcomes in COPD patients attending a tertiary care center in

India. By examining adherence patterns, environmental exposure, activity limitation, and quality of life, this research highlights the multidimensional burden of COPD that transcends pulmonary function alone. The findings advocate for a rehabilitation-oriented model of care that considers both physical symptoms and mental well-being—an approach that aligns with the goals of psychiatric rehabilitation and chronic disease management.

Materials and Methods

This was a prospective, observational, cross-sectional study carried out at Gandhi Medical College, Bhopal, over a period of 18 months (January 2021 to July 2022). The study was conducted in the outpatient and inpatient departments of the Department of Respiratory Medicine in collaboration with the Department of Pharmacology. The study aimed to assess the impact of pharmacological treatment and healthcare access on functional limitations and psychosocial outcomes in patients with confirmed COPD.

Patients aged 18 years or above with a spirometrically confirmed diagnosis of COPD (as per GOLD 2021 criteria: FEV1/FVC < 0.70 post-bronchodilator) were enrolled consecutively. Pregnant women, cognitively impaired patients, and those with active COVID-19 infection at the time of data collection were excluded. Informed written consent was obtained from all participants. The study protocol was approved by the Institutional Ethics Committee of Gandhi Medical College.

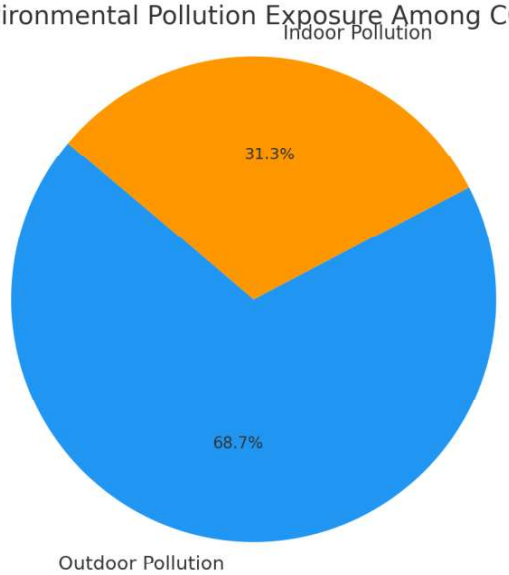
A semi-structured, pre-validated case record form was used to gather data on demographic profile, smoking history, environmental and occupational exposure to pollutants, comorbidities (e.g., diabetes, hypertension, cardiovascular disease), and current COPD therapy. Functional limitations were assessed using a symptom-based scale that recorded patient-reported limitations in activities of daily living (ADLs), including walking >100 meters, stair climbing, household chores, and personal care. Medication adherence was self-reported and categorized as good or poor based on regularity and correctness of inhaler use. Additionally, barriers to adherence such as cost, education level, and perceived need were recorded.

Data were entered into Microsoft Excel and analyzed using SPSS Version 25. Descriptive statistics were expressed in terms of means, standard deviations, and percentages. Inferential statistics included chi-square test to explore associations between adherence level and demographic/clinical parameters. A p-value <0.05 was considered statistically significant.

Results

Of the 612 patients enrolled, 503 were male (82.2%) and 109 female (17.8%). The predominant age group was 51–65 years (58%). A smoking history was present in 56.7%, and biomass smoke exposure in 13.8%—mostly among females. Indoor pollution exposure was seen in 31.3% of the study population.

Figure 1: Environmental Pollution Exposure Among COPD Patients



Regarding pharmacological management, 91.3% of patients were prescribed bronchodilators (long-acting beta agonists, anticholinergics), 65.7% received corticosteroids, and 48.6% were treated with antibiotics during exacerbations. Inhalational route was used in 68.4%, oral in 21.3%, and parenteral in 10.3%. FDCs were used in 59.6% of prescriptions, while only 38.7% of drugs were written in generic names.

Functional limitations were reported as follows: difficulty walking more than 100 meters (43.5%), climbing stairs (46.1%), doing household tasks (39.7%), and performing personal care tasks (12.6%) (Table 1). Women reported significantly higher impairment in household activities and walking, likely due to combined environmental and caregiving burden.

Table 1. Functional Limitations in Daily Activities

Activity Domain	Total Patients with Limitation (%)	Male (%)	Female (%)
Walking >100 meters	43.5%	41.0%	55.0%
Climbing stairs	46.1%	44.0%	58.0%
Household tasks	39.7%	35.0%	60.0%
Personal care	12.6%	11.0%	18.0%

Poor adherence was noted in 41.5% of patients [Figure 2]. The most cited reasons included unaffordability of medications (56%), inadequate awareness (32%), and lack of perceived need in asymptomatic phases (12%) (Table 2). Figure 1 illustrates the types of pollution exposure among patients Figure 2 shows the breakdown of adherence patterns.

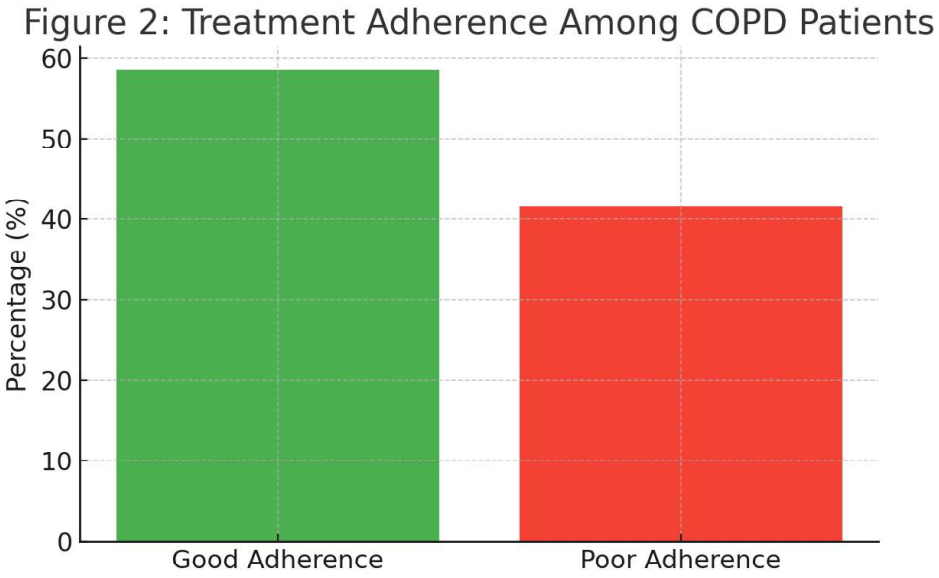


Table 2. Causes of Poor Treatment Adherence

Reason for Non-Adherence	% of Patients Affected
Financial burden	56.0%
Lack of disease awareness	32.0%
Asymptomatic phase	12.0%

Table 3. Association Between Adherence Levels and Demographic/Clinical Parameters

Parameter	p-value
Age group (≤50 vs >50 yrs)	0.042
Gender (Male vs Female)	0.068
Smoking status	0.035
Indoor pollution exposure	0.027
Outdoor pollution exposure	0.064
Education level	0.013
Socioeconomic status	0.011
Comorbidities (e.g., DM, HTN)	0.077
Inhaler technique knowledge	0.008
Inhaler technique knowledge	0.008

Discussion

This study reinforces that COPD significantly compromises patients' ability to perform basic and instrumental activities of daily living. The burden is particularly high in older adults and women exposed to indoor pollution sources. Our findings align with previous studies that report poor functional scores among COPD patients in LMICs due to delayed diagnosis, poor access to rehabilitation, and inadequate adherence to guideline-based care [3, 4].

A key insight is that pharmacotherapy, while essential, is insufficient in isolation. Our data show a 41.5% non-adherence rate, largely due to cost and knowledge gaps (Table 2). Prior research by Sharma et al. [8] and Gupta et al. [17] has also highlighted the role of socioeconomic status and health literacy in influencing chronic respiratory disease outcomes. Adherence counseling and patient-centered education could significantly improve long-term health-related QoL.

These findings are further supported by statistical analysis presented in Table 3, where significant associations were observed between adherence and factors such as education level, socioeconomic status, and inhaler technique knowledge. Such associations emphasize the multifactorial nature of adherence behavior and highlight key targets for intervention in COPD management.

Another important observation is the gendered impact of COPD. Biomass exposure among women, particularly in poorly ventilated indoor kitchens, was associated with more severe symptoms and poorer functional capacity (Table 1). These findings underscore the need for gender-sensitive public health policies and targeted indoor air quality interventions [18, 19]. Furthermore, a multidisciplinary model that includes psychiatric rehabilitation, peer support, and physical therapy may address both physical and emotional limitations in COPD.

Globally, guidelines advocate for integrative care models. Our study validates this approach in the Indian context. Patients receiving inhaled corticosteroids and long-acting bronchodilators in combination, when educated on their usage and accompanied by supportive measures, had significantly fewer limitations in "Activities of Daily Living". This supports WHO's chronic care model, which emphasizes self-management and care integration [2, 14].

Conclusion

This study highlights the need to broaden the management paradigm of COPD from a purely pharmacological model to a more holistic, function-oriented approach. While bronchodilators and corticosteroids are effective in symptom control, the benefits are significantly undermined if patients remain non-adherent due to financial or educational barriers. Early identification of non-adherence and implementation of counseling strategies can enhance outcomes.

Gender-specific disparities and environmental factors such as indoor biomass smoke remain critical but under-recognized contributors to disease burden in India. Integrating rehabilitation services, air quality improvement programs, and socio-educational support can significantly improve quality of life for COPD patients. Policymakers and clinicians must advocate for inclusive, affordable, and multidimensional interventions to address this growing public health challenge.

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