

A SYSTEMATIC REVIEW ON GLOBAL AND REGIONAL PREVALENCE AND MANAGEMENT OF CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD)

Author's Name: Yahya Chhadat¹, Arpita Pancholi²

Affiliation:

1. Clinical instructor, Parul Institute of Nursing, Vadodara, India.
2. Associate Professor & HOD of Mental Health Nursing Department, Parul Institute of Nursing, Vadodara, India.

Corresponding Author Name & Email Id: Arpita Pancholi, arpita061987@gmail.com

ABSTRACT

Chronic Obstructive Pulmonary Disease (COPD) is a major contributor to global morbidity and mortality and is projected to become the third leading cause of death worldwide. Characterized by persistent respiratory symptoms and irreversible airflow obstruction, COPD often goes underdiagnosed, especially in low- and middle-income nations. Despite advancements in medical therapies, diagnosis and comprehensive treatment strategies remain insufficient in many settings. This systematic review synthesizes global data from 1990 to 2021 to assess COPD prevalence, analyze major risk factors, and evaluate diagnosis and management trends. The review identifies substantial variation in prevalence—from 1.5% in asymptomatic smokers to over 20% in high-risk populations—and underscores common risk factors such as tobacco use, environmental pollutants, occupational exposure, and aging. Furthermore, the review emphasizes gaps in early diagnosis and the widespread underuse of pulmonary rehabilitation programs. These insights call for proactive healthcare initiatives, widespread screening protocols, and robust public health campaigns to mitigate the burden of COPD worldwide.

Keywords: COPD

INTRODUCTION

Chronic Obstructive Pulmonary Disease (COPD) encompasses a range of progressive respiratory disorders, notably emphysema and chronic bronchitis, which lead to persistent airflow limitation and breathing difficulties. Although it is both preventable and manageable, timely diagnosis and effective treatment are essential to enhance patient outcomes and quality of life. According to the World Health Organization (WHO), COPD causes over 3 million deaths annually, with the majority occurring in low- and middle-income countries where healthcare systems often lack adequate resources.

COPD arises from a combination of modifiable and non-modifiable risk factors. These include smoking, exposure to indoor and outdoor air pollutants, occupational inhalation of hazardous substances, and inherited conditions such as alpha-1 antitrypsin deficiency. Additionally, demographic shifts such as an aging population and urbanization contribute to increasing global prevalence. Early stages of COPD often go unnoticed due to a lack of symptoms, and the limited availability of diagnostic tools like spirometry further hampers detection in many areas.

This review compiles evidence from diverse population studies and meta-analyses to provide a global overview of COPD prevalence, risk factors, diagnostic patterns, and management approaches. It highlights data from both symptomatic and asymptomatic groups and underscores the urgent need for early detection strategies and consistent international healthcare policies

METHODOLOGY This systematic review was conducted according to the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines.

Data Sources and Search Strategy: A comprehensive search was conducted in PubMed, EMBASE, Medline, and Global Health databases for articles published from January 1990 to December 2021. The search terms included “COPD prevalence,” “chronic obstructive pulmonary disease,” “risk factors,” “pulmonary rehabilitation,” and “spirometry-based diagnosis.”

Inclusion and Exclusion Criteria:

- Inclusion: Population-based studies; spirometry-confirmed COPD diagnosis; peer-reviewed original research; studies with clearly defined sample populations.
- Exclusion: Studies with incomplete data, case reports, letters to the editor, non-English articles.

Data Extraction and Quality Assessment: Two authors independently screened the titles and abstracts. Full texts of selected studies were assessed for eligibility. Disagreements were resolved through consensus or a third reviewer. Data extracted included authors, year, country/region, study design, sample size, prevalence rates, risk factors, and management strategies. Study quality was

assessed using the Joanna Briggs Institute (JBI) critical appraisal checklist for prevalence studies.

Data Synthesis: A narrative synthesis of the findings was undertaken and prevalence data were tabulated and compared across different regions and population groups. Where applicable, pooled prevalence rates were presented.

RESULTS

Author(s)	Year	Region	Sample Size	Prevalence (%)	Key Findings
Carette H et al.	2019	France	120	53 (breathlessness)	Underuse of pulmonary rehabilitation and symptom management.
Shital Patil et al.	2021	India	8973 reviewed	7	Major risk factors: smoking, biomass fuel, environmental smoke, pollution.
Terzikhan N et al.	2016	Netherlands	14,619	13.6	High incidence in males and smokers; substantial prevalence among female non-smokers.
Hill K et al.	2010	Canada	1459	20.7	67% of COPD cases previously undiagnosed.
Adeloye D et al.	2015	Global	Meta-analysis	11.7	Highest in Americas, lowest in SE Asia. Large regional disparity.
Ghani MV et al.	2019	Global	127,598	12.16	Male prevalence 5% higher than female; stage I most common.
Sansores RH et al.	2015	Mexico	2,961	1.5 (WOS)	Asymptomatic smokers often missed in early diagnosis.
Yoo KH et al.	2011	Korea	10,523	12.9	96.5% mild/moderate, <3% diagnosed/treated.
Landis SH et al.	2014	12 countries	Survey	7–12	Burden high; greater in men, increases with age.

DISCUSSION

This systematic review highlights significant disparities in the global and regional prevalence of COPD, influenced by diverse factors such as smoking habits, environmental exposure, healthcare accessibility, and socioeconomic conditions. The findings reaffirm that tobacco smoking remains the leading risk factor for COPD, but emerging data also emphasize the role of biomass fuel exposure, air pollution, and occupational hazards, particularly in low- and middle-income countries.

The variation in prevalence rates—from 1.5% among asymptomatic smokers to over 20% in high-risk populations—suggests an urgent need for region-specific public health strategies. The underdiagnosis and lack of treatment in a majority of patients, as observed in several studies, underscore a critical gap in healthcare delivery and patient education. Moreover, the limited use of spirometry in primary care settings contributes to missed diagnoses, especially in early stages where interventions could be most beneficial.

Gender differences were also noted, with higher prevalence among men, although an increasing trend among women, particularly non-smokers, indicates a shift in disease epidemiology possibly linked to environmental or household exposures.

Furthermore, pulmonary rehabilitation—a proven intervention—remains grossly underutilized. Only 40% of patients in some settings received rehabilitation, and psychological symptoms associated with COPD, such as anxiety and depression, were often neglected.

Conclusion The global burden of COPD is significant and growing, with pronounced disparities in prevalence and care. This review underscores the importance of early detection through widespread access to spirometry, better awareness of risk factors, and greater utilization of preventive and rehabilitative services. Policymakers must prioritize COPD in public health agendas by implementing robust screening programs, strengthening primary care infrastructure, and educating both healthcare providers and the public. Future research should focus on tailored interventions addressing the unique demographic, occupational, and environmental contexts of different regions to reduce the morbidity and mortality associated with this chronic disease.

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