



# Unravelling the Impact: Undiagnosed Chronic Obstructive Pulmonary Disease and its Influence on Cardiovascular Diseases - A Review

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## KEYWORDS

Childhood Hansen's disease, Leprosy in children and Paediatric.

## Abstract

Background

Chronic obstructive pulmonary disease manifests as a gradually advancing and incapacitating respiratory ailment marked by the constriction of airflow. The undiagnosed population with COPD presents a major threat to both individual health outcomes and healthcare systems, resulting in heightened healthcare expenses and a decreased quality of life for those affected. Investigating the potential implications of undetected COPD on cardiovascular health provides a comprehensive analysis of the current knowledge and key findings in this intricate interplay.

Objective:

This review examines the literature on undiagnosed COPD, exploring its association with cardiovascular diseases. It explores the intricate relationship between undetected COPD and cardiovascular health, offering key insights into this complex interplay. Focusing on epidemiology, risk factors, clinical presentation, and barriers to diagnosis, the objective is to provide an understanding of the challenges associated with undetected COPD.

Methods:

A thorough and systematic search was executed on PubMed between 2019 and July' 2023

Results:

A global examination of studies highlights diverse prevalence rates of undiagnosed COPD. Notably, the highest rate reaches 91.5%, with British Columbia, Canada, following closely at 72.1%. COPD patients show elevated rates of heart failure and varying incidences of ischemic heart disease compared to those without COPD.

Conclusions:

Undiagnosed COPD poses concealed challenges with profound impacts on individuals and healthcare systems, often hindered by delayed recognition due to the disease's insidious nature. A multifaceted strategy, improved awareness, and enhanced diagnostic tools are crucial to address barriers and reduce the profound consequences of delayed diagnosis.

**Abbreviations:** COPD: Chronic obstructive pulmonary disease, CRP: C-reactive protein, CVD: Cardiovascular diseases, FEV1: Forced expiratory volume in 1 second, FVC: Forced vital capacity, GOLD: Global initiative

## 1. INTRODUCTION

COPD poses a global public health challenge, giving rise to significant financial, societal, and healthcare

for chronic obstructive lung disease, ICS: Inhaled corticosteroid, LABA: Long-acting beta agonist, LAMA: Long-acting muscarinic antagonist, PFT: Pulmonary function test, VEGF: Vascular endothelial growth factor, encumbrances due to its widespread prevalence and the associated impact on disability and mortality [1,12]. Cardiovascular disease, cancer, and COPD are the leading global causes of death. The frequent



coexistence of CVD and COPD in populations contributes to a worse prognosis for myocardial infarction in COPD patients [40]. COPD and CVD are intricate conditions shaped by environmental and genetic factors, with complex and not fully elucidated interconnecting mechanisms [32]. Approximately 70% to 80% of adults with COPD are estimated to remain undiagnosed [16]. Multiple factors contribute to the undiagnosed of COPD. Smoking, a key risk factor, is frequently underreported, and exposure to environmental pollutants may not be readily recognized [2,6,9,10,36]. The World Health Organization has stated that the current daily worldwide smoking prevalence surpasses 1.1 billion individuals, and it is expected to rise to 1.3 billion by the year 2025 [25]. Moreover, healthcare systems face challenges in implementing widespread screening and diagnostic measures, further complicating early identification. In elderly individuals experiencing dyspnea, distinguishing between heart failure and chronic obstructive pulmonary disease is crucial. Heart failure is identified by insufficient blood circulation caused by diminished contractility [31]. COPD treatment should address not only respiratory complications but also actively focus on preventing and treating the prevalent cardiovascular diseases in affected patients [30].

In the population aged 65 and above, COPD ranks as the third most common cause of mortality, leading to almost 1 million hospitalizations annually in the United States. This respiratory condition extends its global impact, being implicated in approximately 3 million deaths worldwide each year [24, 35]. Impacting around 384 million individuals worldwide, COPD is a progressive respiratory condition that led to 3.2 million deaths in the year 2015 alone [8].

This in-depth research review aims to fill the knowledge gap concerning undiagnosed COPD and its impact on cardiovascular diseases, striving to unravel the complexities surrounding this silent epidemic. Despite the availability of diagnostic tools and guidelines, there exists a substantial population with unrecognized COPD, leading to missed opportunities for timely interventions, disease management, and improved quality of life.

## 2. METHODS

This comprehensive review seeks to explore the multifaceted dimensions of undiagnosed COPD and its effect on cardiovascular diseases, offering a synthesis of current literature to unravel the complexities surrounding its prevalence, risk factors, clinical presentation, and barriers to early diagnosis. By examining the nuances of undiagnosed COPD, we aim to bridge existing knowledge gaps and provide a thorough understanding of the challenges faced by both individuals and healthcare systems.

### 2.1 SEARCH STRATEGY AND SELECTION CRITERIA

The authors conducted a review to assess and compare the patient characteristics, risk elements, symptoms, and screening techniques among individuals with confirmed diagnoses and those without diagnosed conditions.

The search strategy for this review involves a comprehensive exploration of major databases, of PubMed published between 2019 to July' 2023. A combination of keywords and medical subject headings terms are employed to capture relevant literature on undiagnosed COPD and cardiovascular system. The search will encompass variations of terms such as undiagnosed COPD, missed diagnosis of COPD, cardiovascular system, heart failure along with terms related to risk factors, symptoms, and diagnostic challenges. The search is restricted to peer-reviewed articles published in English, emphasizing observational studies, interventional studies, and systematic reviews. The publication date range will be set to capture the latest evidence, with a secondary exploration of seminal works if deemed relevant. Studies exclusively addressing diagnosed COPD cases are excluded. The inclusion criteria involve the studies featuring populations with undiagnosed COPD as well as its relation with cardiovascular diseases, providing data on prevalence, risk factors, clinical presentation, or barriers to diagnosis. Table 1 represents the detailed classification of articles as a part of comprehensive study. A quality assessment will be conducted to evaluate study design, sample size, and methodological rigor, ensuring that the selected studies contribute robust and reliable information to the synthesis of evidence.



The focus of the review articles is exclusively on COPD, with a deliberate exclusion of diseases such as cardiovascular conditions, physical activity, lung cancer, cardiac comorbidities, obstructive sleep apnea, tuberculosis and heart diseases from their scope [18,19,20,23]. By narrowing their focus to COPD and its association with cardiovascular system alone, these articles aim to provide a specialized and in-depth analysis of the respiratory condition along with heart without delving into the broader context of other associated diseases. This deliberate limitation allows for a more targeted exploration of COPD and cardiovascular related aspects, emphasizing a specific and detailed examination of the pulmonary disorder and

cardiac abnormality without incorporating additional health dimensions.

The age group of population for this review is adults having greater than 18 years as well as majority of articles having age group greater than 40 years. GOLD standards and FEV1/FVC ratio below 0.70 is encompassed in the definition of COPD [26,31]. The screening method for the undiagnosed condition has been determined through the spirometry test. This structured search strategy and selection criteria aim to capture a diverse range of studies while maintaining methodological rigor in identifying and assessing the literature relevant to undiagnosed COPD.

**Table 1: Characteristics and classification of articles for study**

Author	Study type	Identification on definition for COPD	Screening method for undiagnosed COPD	Sample size	Prevalence of undiagnosed COPD (%)	Risk factor	Age group	Conclusion	Country
Jefferson Daniel et al. (2023) [5]	Cross-sectional observational study	GOLD defined COPD	PFT, chest x-ray, 6-minute walk test, serum immunoglobulin E and % blood eosinophils	N=877	9	Tobacco smoke, Biomass fuel	40 years and above	This study exposed significant misclassification by physicians.	India
Buyu Zhang et al. (2023) [1]	Cross-sectional diagnostic study	FEV1/FVC ratio less than 0.70 with FEV1 <60%	Spirometry	N=22943	23.7	Passive smoking, occupational exposure, air pollution	30 to 79 years	The prediction model can function as an initial screening tool for identifying undiagnosed COPD patients in primary care environments.	China
Fernando J. Martinez et al. (2023)	Cross-sectional study	5 questions and peak expiratory flow rate	Spirometry	N=4325	2.5	Smoke cigarette, prior diagnosis of	45 to 80 years	This tool exhibited a diminished sensitivity but elevated	US



[9]						asthma		specificity in detecting clinically significant COPD.	
Thuong hien V Tran et al. (2023) [13]	COP DGen e study	smoking history of 10 or more pack-years	Chronic cough, respiratory exacerbations, spirometry	N=2800	19	Earlier diagnosis and treatment	45 to 80 years	There are multiple factors associated with undiagnosed COPD.	US
S. M. Martins et al. (2022) [10]	Cross sectional study	GOLD guideline FEV1/FVC < 0.7	Six different screening tests four screening questionnaires, spirometer and peak flow measurement	N=1162	5.16	Cigarette smoking, cooking fumes, biomass fuel, dust	40 years and above	The test's performance, cost, and ease of use resulted in the detection of 26.7 cases per 1,000 patients.	Brazil
Nina Faksvåg Caspersen et al. (2022) [6]	Cross sectional Study	FEV1/FVC < 0.7 or below the lower limit of normal	Health examination survey, spirometry, medical history and clinical examination	N=3667	5.09	Smoking, tobacco consumption	62 to 65 years	It identified a COPD prevalence of 7.1%, with 72.2% of cases being undiagnosed.	Norway
Emma Ray et al. (2021) [2]	Interventional study	GOLD guideline FEV1/FVC < 0.7	Clinical history, administered questionnaires and performed quality-assured spirometry	N=288	26.38	smoking status, dyspnoea consultations	40 to 79 years	The diagnostic rate for new COPD cases in the participating practices was slightly elevated compared to that in control	UK



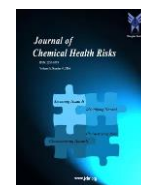
Zihan Pan et al. (2021) [21]	Cross sectional screening test accuracy study	GOLD stage FEV1/FVC < LLN	Chinese symptom based questionnaire, micro spirometry, peak flow measurement	N=2445	8.91	Dust, biomass fumes, passive smoking and active smoking	40 years and above	In Chinese primary care, the most effective screening strategy involves using both the C-SBQ and micro spirometry.	China
Kate Petrie et al. (2021) [7]	Cross sectional study	FEV1/FVC < 0.7	BOLD core questionnaire spirometry, self-reported diagnosis	N=3355	6.9	Smoking, occupational exposures	40 years and above	This analysis proposes criteria for identifying undiagnosed COPD in primary care through targeted case identification and evaluation.	Australia
Juan-Antoni Riesco-Miranda et al. (2021) [22]	Multi-center cross-sectional cohort observation	GOLD standard	Lung function test, 6-item fagerstrom test, breath test, and carboxyhaemoglobin level	N=252	28.9	Smoking	35 years above	The study reveals a common profile for recently identified cases, mostly men in their early sixties, showing mild symptoms, and with a significant and extended smoking history.	Spain
Marie-	CON	FEV1/FV	Questionnaire	N=193	3.94	Smoke	18 to	Encouragi	France



Christine Delmas et al. (2021) [11]	STANCOH study	C < lower limit of normal and FEV1 < 80% predicted	and health examination	98		rs with a tobacco consumption	69 years	ng spirometry use and implementing systematic symptom screening through structured questionnaires among primary care professionals should enhance the diagnosis of obstructive lung disease	
Matthew Preteroti et al. (2020) [4]	Population based case finding study	FEV1/FVC < lower limit of normal	Questionnaire, spirometry	N=910	12.19	Exposure to cigarette smoke	18 years and above	It establishes that 20% of randomly chosen individuals with reported respiratory symptoms have undiagnosed airflow obstruction caused by COPD.	Canada
Kate M Johnson et al. (2020) [8]	Registry based longitudinal cohort study	GOLD guideline FEV1/FVC < 0.7	Spirometry	N=112635	72.1	Environmental exposures, asthma	40 years above	COPD patients had higher pre-diagnosis outpatient service utilization than non-	Canada



								COPD subjects.	
Mamta Ruparel et.al (2020) [3]	Cross sectional study	GOLD standard	Spirometry, low dose computed tomography	N=560	67	Smoking	60 to 75 years	High rates of undiagnosed COPD and emphysema exist in lung cancer screening participants.	UK
Stine Hangard et. al (2019) [12]	Demographic study	FEV1/FVC < 0.7 GOLD standards	Spirometry	N=1098	91.5	Cigarette smoke, environmental pollutants	40 years above	Subjects with undiagnosed COPD were characterized by a better health status than subjects with diagnosed COPD.	US
Kang-Cheng Su et. al (2019) [14]	Cross sectional case finding study	GOLD guideline	COPD assessment test, PEFr, spirometry	N=301	48.8	Respiratory symptoms, smoking history	40 years and above	The model swiftly and precisely assesses the prevalence of COPD in undiagnosed patients, assisting in pinpointing individuals in need of further diagnostic evaluation and timely intervention.	Taiwan



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### 3. ASSOCIATION BETWEEN UNDIAGNOSED COPD SEVERITY AND CARDIOVASCULAR RISK

COPD has a substantial impact on cardiovascular well-being, elevating the susceptibility to conditions like heart failure, coronary artery disease, and stroke. Closely monitor COPD patients for acute cardiovascular events post-exacerbations, emphasizing preventive measures as a central aspect of patient management [39]. Table 2 represents the impact of COPD on cardiovascular disease. The systemic inflammation associated with COPD contributes to the development and progression of cardiovascular diseases. Additionally, chronic hypoxia in COPD may lead to pulmonary hypertension, further straining the cardiovascular system. The intricate interplay between COPD and cardiovascular diseases underscores the importance of comprehensive care strategies for individuals with these comorbidities.

For the management of chronic obstructive pulmonary disease, it is advisable to employ inhaled long-acting muscarinic antagonists. Using the National Health Insurance cohort, the study found that among COPD patients aged 55 and above without a history of coronary heart disease but using inhalers, tiotropium usage was associated with a heightened risk of coronary heart disease [27]. COPD patients have a 2 to 5 times greater risk of developing cardiovascular diseases, including coronary artery disease, cardiac dysrhythmia, heart failure, and pulmonary and peripheral vascular disease, in comparison to the general population [29]. Significantly, this heightened

prevalence persists even after accounting for age, smoking patterns, and other risk factors. Vascular endothelial growth factor is a crucial prognostic biomarker in cardiovascular disease, influencing angiogenesis, endothelial cell function, vascular permeability, and thrombogenicity; elevated VEGF levels are observed in COPD exacerbations [35]. Detecting COPD in heart failure necessitates continuous lung function testing, including body plethysmography, and evaluating individual risk elements such as smoking history. A single cut-off for FEV1/FVC and other parameters may not be adequate [31]. Combining LAMA and LABA for dual bronchodilation therapy does not appear to elevate cardiovascular adverse events in COPD patients [40]. In this economic analysis of a multicounty clinical trial, the 1-year costs for combined acute COPD exacerbation and revascularization or cardiovascular composite events were notably lower in all active treatment arms compared to placebo. Effective COPD management in patients with cardiovascular risk could potentially reduce the overall cost of COPD care for clinicians and payers [38]. Studies on the cardiovascular safety of the oral phosphodiesterase inhibitor roflumilast revealed a 35% decrease in cardiovascular events [42]. Premature initiation and the pace of lung function deterioration contribute to an extra rise in cardiovascular disease risk. In contrast to individuals with typical spirometry results, a constrained spirometry pattern demonstrated the most robust link with cardiovascular disease at the outset [33].

**Table 2: Impact of COPD on cardiovascular diseases**

Author	Objective of research	Main findings
Jiyoung Shin et al. (2022) [27]	This study explored whether the administration of tiotropium, the initial commercially accessible LAMA, increases the likelihood of coronary heart disease in COPD patients via a nationwide cohort investigation.	<ul style="list-style-type: none"> <li>Among 5787 COPD patients, 1074 (18.6%) were diagnosed with coronary heart disease, with a mean participant age of 61.4 years.</li> <li>It examined the impact of LAMA medication before the initiation of LAMA or LABA prescriptions.</li> </ul>
Anastasia Papaporfyriou et al. (2023)	This review underscores the frequency of cardiovascular coexisting conditions in individuals with COPD.	<ul style="list-style-type: none"> <li>Heart failure prevalence in COPD ranges from 7% to 42%, markedly exceeding rates in the non-COPD population.</li> <li>The incidence of ischemic heart disease in stable COPD patients fluctuates from 7.1% to 33%.</li> </ul>





[29]		
S. Andre et al. (2019) [35]	This paper focuses on addressing the treatment of COPD patients with concurrent ischemic heart disease, heart failure, and dysrhythmia.	<ul style="list-style-type: none"> <li>– Beta-blockers are employed for cardiovascular diseases, while beta 2-agonists are used for respiratory conditions.</li> <li>– CRP in COPD serves as a biomarker for both systemic inflammation and atherosclerosis; reduced lung function is associated with elevated CRP, indicating an augmented risk of ischemic heart disease, especially in patients with moderate to severe obstruction and heightened CRP levels.</li> </ul>
G. Güder et al. (2019) [31]	This clinical review outlines common challenges in diagnosing COPD, heart failure, and concurrent conditions. It provides strategies to prevent misdiagnosis and ensure effective treatment.	<ul style="list-style-type: none"> <li>– Establishing the severity of COPD in heart failure patients is challenging due to overlapping symptoms. Further randomized controlled trials are essential to assess the effectiveness and side effects of medical therapy in individuals with both heart failure and COPD.</li> <li>– Beta-blockers could reduce the occurrence of pulmonary exacerbations and overall mortality in COPD, even without cardiovascular disease.</li> </ul>
Paola Rogliani et al. (2019) [40]	This paper seeks to systematically assess the influence of inhaled therapies on cardiovascular adverse events in individuals with COPD.	<ul style="list-style-type: none"> <li>– Administering monotherapy with long-acting bronchodilators, such as LAMA and LABA, has exhibited a positive safety profile in individuals with COPD.</li> <li>– ICS and ICS/LABA combinations do not exhibit an elevated cardiovascular risk, although certain ICSs may be linked to an increased risk of pneumonia.</li> </ul>
Frederik Trinkmann et al. (2019) [42]	It outlines the uses and possible drawbacks of frequently prescribed drugs in individuals with both COPD and cardiovascular disease.	<ul style="list-style-type: none"> <li>– Antimuscarinic drugs need to be assessed considering the inherently elevated cardiovascular risk in COPD.</li> <li>– Commencing oral steroids or using elevated doses was linked to a 3.4-fold rise in the risk of newly developing atrial fibrillation.</li> </ul>
Sergio H.R. Ramalho et al. (2020) [33]	This review delves into present understanding and debates regarding the interrelations between lung function and cardiovascular disease.	<ul style="list-style-type: none"> <li>– Prior to clinically diagnosed lung disease, subclinically measured deterioration in lung function using FEV1, FVC, and FEV1/FVC ratio is linked to elevated risks of overall and cardiovascular mortality.</li> <li>– The decline in the FEV1/FVC ratio (average 0.30/year in men and 0.37/year in women) was associated with a smaller left atrial internal dimension and reduced cardiac output.</li> </ul>

## 4. RESULTS

### 4.1 PREVALENCE OF UNDIAGNOSED COPD

Reviewing studies represents the prevalence of undiagnosed COPD across different studies, regions, and populations. Figure 1 illustrates the percentage prevalence of undiagnosed chronic obstructive pulmonary diseases based on the data presented in Table 1. The lower end of the Table 1 having color wise numbers reflects the quantity of patients. The

United States has the highest undiagnosed COPD occurrence, reaching 91.5% [12]. In the British Columbia, Canada the rate of undiagnosed COPD is 72.1% [8].

### 4.2 RISK FACTORS

Authors systematically examine the multifaceted risk factors contributing to COPD. Risk factors reveal a prominent association with cigarette smoking,



emphasizing the dose-response relationship between smoking intensity and COPD development [3,4,11,22]. The study highlights the impact of secondhand smoke exposure for a long span on COPD [1,21]. Occupational exposures to dust, chemicals, and fumes, specifically in high-risk industries, contribute significantly [5,7]. Genetic factors, notably alpha-1

antitrypsin deficiency, play a role, with recent research exploring broader genetic predispositions [15]. Identification of specific risk factors associated with undiagnosed COPD, such as smoking history, tobacco consumption, occupational exposures, biomass fuels, air pollution, family history and cooking fumes among them 88% articles consider the one of the risk factors is smoking.

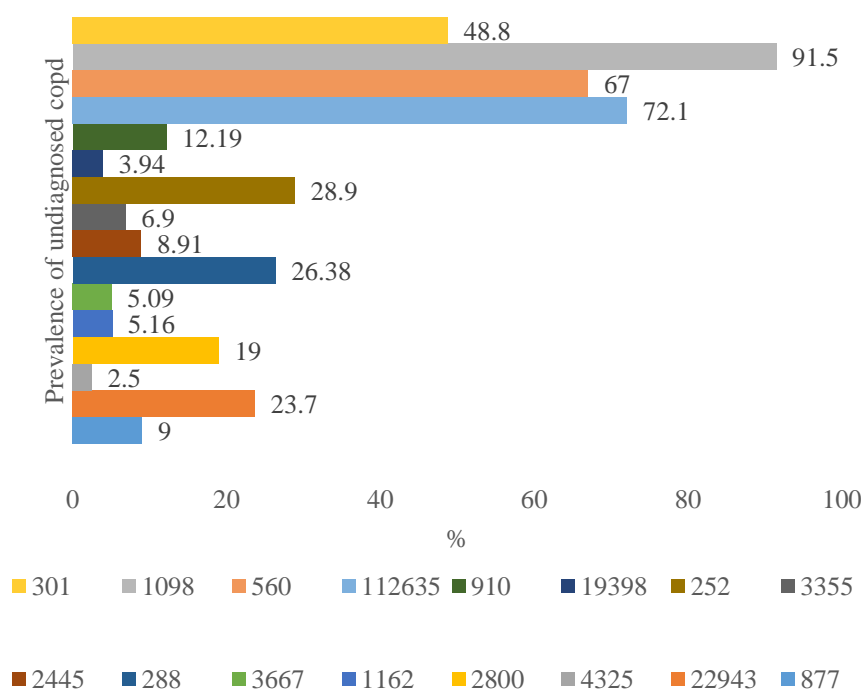


Fig 1 Percentage prevalence of undiagnosed COPD

### 4.3 BARRIERS TO DIAGNOSIS

Exploration of barriers hindering the timely diagnosis of COPD, including patient-related factors, healthcare system challenges, and the impact of stigma on seeking medical attention.

Younger working patients might face obstacles in attending, thus being underrepresented in potentially extended appointments [2]. Limited access to a spirometer, the time-intensive process of pre and post bronchodilator spirometry within brief consultation sessions, and a lack of expertise and unfamiliarity with conducting the pulmonary function test [10].

### 4.4 DIAGNOSTIC TOOLS AND STRATEGIES

Evaluation of the effectiveness of current diagnostic tools and strategies, as well as potential improvements or innovations for early detection.

Spirometry stands out as the primary and widely utilized tool for COPD detection. Its prevalence in clinical settings highlights its effectiveness in assessing lung function and identifying obstructive patterns. As an essential diagnostic tool, spirometry plays a pivotal role in the timely identification and control of COPD. Several diagnostic methods aid in detecting COPD, including the 6-minute walk test, serum immunoglobulin E levels, blood eosinophil percentages, and chest X-rays [5]. These diverse tools provide a comprehensive approach, assessing functional capacity, immunological markers, and



radiographic findings for a more nuanced understanding of COPD. The Fagerström test, questionnaires, and health examination survey tools are employed for detecting undiagnosed COPD [22]. These instruments collectively assess smoking dependence, symptomatology, and overall respiratory health, contributing to a comprehensive diagnostic approach.

#### 4.5 EFFECT OF COPD ON CARDIOVASCULAR DISEASES

Individuals with COPD confront an increased susceptibility to developing cardiovascular diseases in comparison to the general population. Conditions such as coronary artery disease, heart failure, and pulmonary vascular disease are more widespread among COPD patients. Beta-blockers, prescribed for cardiovascular diseases, demonstrate potential in reducing pulmonary exacerbations and overall mortality in COPD, independent of cardiovascular disease presence [31,35]. Administering long-acting bronchodilators LAMA and LABA as monotherapy, including an examination of the impact of LAMA medication before initiating LAMA or LABA prescriptions, has shown a favorable safety profile in COPD patients [27,40]. COPD patients face an elevated risk of acute myocardial infarction through diverse pathophysiological pathways [34]. Subclinical decline in lung function, before clinically diagnosed pulmonary disease, is linked to elevated risks of general and cardiovascular mortality. Reduction in FEV1/FVC ratio correlates with a smaller left atrial dimension and decreased cardiac output [33]. Individuals with COPD-OSA overlap syndrome show a substantial occurrence of cardiovascular conditions, notably ischemic heart disease (36%) and hypertension (58%) [41]. More than half of patients (53.3%) encountered a cardiovascular incident within 30 days following a moderate or severe COPD exacerbation, while almost two-thirds (59.3%) suffered a cardiovascular event within 30 days after a severe exacerbation [36]. Cardiovascular comorbidities did not exhibit a greater prevalence in COPD patients in comparison to those without airflow limitation. Tobacco smoking was correlated with an increased risk, whereas exposure to organic dusts was linked to a reduced risk of significant cardiovascular comorbidities [37].

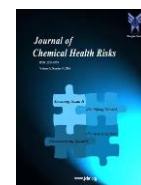
#### 4.6 PUBLIC HEALTH IMPLICATIONS

Discussion of the broader public health implications of undiagnosed COPD and its associated cardiovascular abnormalities considering its economic burden, impact on healthcare systems, and potential strategies for prevention.

The prevalence of obesity is similar among diagnosed and undiagnosed COPD patients, and observing obesity may have limited clinical significance for case-finding strategies in COPD [6]. The combination of questionnaire and peak flow testing may result in some individuals with a COPD diagnosis being overlooked. This proportion of individuals who could benefit from treatment may have ramifications for delayed intervention and subsequent economic impacts [10]. People might avoid acknowledging their respiratory health concerns due to potential stigma related to chronic lung diseases associated with tobacco dependence. Concerns about elevated expenses, encompassing life and travel insurance, as well as prescription costs, could contribute to their hesitancy in addressing the issue [2]. Cardiovascular events are a leading reason for hospitalization in COPD patients, substantially adding to the economic impact of the disease [28]. The present findings indicate that individuals without a COPD diagnosis sought healthcare for respiratory symptoms, with a significant majority having a key risk factor—smoking. The alarming aspect is the lack of COPD diagnosis despite this prevalent risk factor, suggesting inadequate adherence to guidelines. This non-diagnosis situation results in unequal care, denying these individuals access to essential treatment and self-management support, potentially impeding disease prevention and adversely affecting their quality of life [17].

#### 4.7 INTERVENTIONS AND RECOMMENDATIONS

Identification of interventions and recommendations for improving early diagnosis, including public health campaigns, healthcare provider education, and policy initiatives. Primary care provides an optimal environment for implementing initiatives aimed at early COPD identification and its effect on heart related diseases. This environment provides a convenient and uncomplicated identification of symptomatic patients with clinically meaningful conditions, enabling prompt intervention with currently available therapeutic measures [10]. The study revealed various health



interventions that proved potentially beneficial for participants in the program, extending beyond the new COPD diagnoses. These interventions encompassed health promotion activities like smoking cessation, dietary adjustments, and pulmonary rehabilitation, along with recommendations for additional assessments in cases of diagnostic uncertainty [2].

## 5. CONCLUSION

This review underscores the concealed challenges of undiagnosed COPD and its associated cardiovascular conditions, emphasizing its significant impact on individuals and healthcare systems. The insidious nature of the disease, coupled with barriers to timely diagnosis, contributes to the under recognition of its prevalence. Addressing undiagnosed COPD necessitates a multifaceted strategy, encompassing improved awareness, enhanced diagnostic tools, and targeted interventions. The consequences of delayed diagnosis are profound, urging a reevaluation of current healthcare practices. Undiagnosed COPD patients face barriers such as poor access to spirometry and time constraints during consultations. The condition significantly elevates cardiovascular disease risk, including heart failure and coronary artery disease. Beta-blockers show promise in reducing mortality in COPD, irrespective of cardiovascular disease presence. In the patient data reviewed from various papers, the average prevalence of undiagnosed COPD is approximately 27%. Subsequent research should prioritize enhancing diagnostic methods, comprehending distinct challenges among different populations, and evaluating the prolonged effects of early interventions. Unveiling the hidden burden of undiagnosed COPD is crucial for proactive respiratory health management. This review serves as a call to action for collaborative efforts among healthcare professionals, policymakers, and the public. By doing so, we can unmask undiagnosed COPD, empower individuals with early interventions, and ultimately enhance the landscape of respiratory care.

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