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Original Research Article

Assessment of Clinical Features on Exposure to Air Pollutants in Elderly Patients with COPD

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Abstract

Introduction: COPD, lung tissue deterioration, is caused by tobacco smoking. It is the third leading cause of death and commonly coincides with heart disease, muscle atrophy, and bone loss. Nutritional deficits, anxiety, and depression in older COPD patients can lower quality of life and medication adherence. COPD sufferers require aid with diet, mental health, and pulmonary rehabilitation, but quitting smoking is most critical.

Aims and objectives: The purpose is to assess the clinical features of tobacco smoking in elderly patients with COPD and identify appropriate treatment interventions.

Methods: Participants were recruited from an academic medical centre's outpatient clinic using predetermined inclusion and exclusion criteria. All participants had a whole battery of tests run on them, including measures of their lung function. Descriptive statistics and tests are used to make sense of the information gathered. Ethical guidelines for medical research involving human individuals, such as informed permission and privacy, were adhered to throughout this investigation.

Results: The peak incidence of COPD occurs between the ages of 70 and 79 for both sexes, with males being more likely to be affected than women. The risk of getting chronic obstructive pulmonary disease (COPD) is significantly increased by Exposure to air pollution and smoking. Table 2 displays COPD cases grouped by air pollution exposure, with the most prevalent symptoms being dyspnea, wheezing, and frequent respiratory infections.

Conclusion: In conclusion, air pollution continues to seriously threaten human health, damaging the respiratory system irreparably and leading to enormous suffering. The severity and consequences of respiratory disorders, especially chronic obstructive pulmonary disease (COPD), have been shown to increase in proportion to the length of time people are exposed to air pollution.

Keywords: Obstructive Pulmonary Disorder, Lung Tissue, Tobacco, Smoking.

Introduction

The prevalence of chronic obstructive pulmonary disease (COPD), which already contributes significantly to global mortality and morbidity, is expected to rise further. Approximately 900 000 COPD has been identified in individuals in the U.K.; in England and Wales, the disease claims the lives of close to 30 000 people yearly [1]. Although estimations from non-UK research and U.K. studies with small

sample sizes indicate that this situation is still primarily undetected, much is known regarding the actual incidence of COPD [2,3]. Smoking is well acknowledged as the leading factor in both the development and death from COPD, raising the risk by a ratio of 13. Unexpectedly little is known about how smoking affects COPD patients generally. Even though smokers, former smokers, and people who have never smoked have higher rates of COPD than extensively reported [4]. This is a crucial issue since it will help assess how serious the smoking problem is among this vulnerable population and how much funding will be required to address it.

Furthermore, given the importance of determining the prevalence of undiagnosed COPD among smokers, many persons with the ailment are unaware of their condition even though quitting smoking would benefit them [5]. The best way to significantly slow down the rate at which a disease advances and to minimize acute exacerbations is to stop smoking, but this must be done before smokers can be assisted in quitting. Lung Health Research showed that smokers with mild, moderate to severe COPD could be assisted in stopping and that doing so positively impacts lung function & mortality [6].

In chronic obstructive pulmonary disease (COPD), lung tissue is destroyed, and lung function gradually deteriorates. A chronic inflammatory response within the lungs, airways, and body characterizes the pulmonary illness known as COPD. It is the third leading cause of death worldwide, with a prevalence of 29% and mainly impacts men, smokers, and persons over 50. The intensity of the symptoms may vary, and they may conceal other pulmonary illnesses, including lung cancer [7]. About 12% of cancer patients have lung disease. Using tobacco, being exposed at work, and having relatives with a past of lung cancer are risk factors. Because of the ongoing local and systemic inflammation and the remodelling of the lung tissue, people with COPD have an elevated risk of developing lung cancer. According to a 5-year U.S. study, patients with COPD had a 16.7/1,000-case annual incidence of lung cancer [8]. The signs and symptoms of COPD can make it difficult to detect lung cancer in its early stages. In addition, many people with COPD & lung cancer may miss out on treatment opportunities due to deteriorating pulmonary function, particularly elderly patients who frequently experience comorbidities. Due to the reduced lung function, the seriousness of COPD may restrict the surgical alternatives. Minimally invasive or nonsurgical procedures may be more advantageous for patients with COPD. The general outlook of people having COPD & the quality of life for patients with lung cancer is lower who do not have COPD, despite the best available treatment [9].

Scientific research has shown that COPD is a systemic disease with a high prevalence for comorbid disorders like cardiovascular disease, muscle atrophy, and osteoporosis. These conditions are most likely connected by a shared systemic inflammation mechanism [10]. Additionally, sadness, anxiety, and hunger are risk factors for elderly COPD patients. These factors affect people's quality of life (QoL) in addition to that but also reduce their adherence to therapy. A poor result and mortality are independently predicted by malnutrition. The GOLD standards, often used to define airflow restriction in adults, may not have the same specificity when applied to elderly individuals, leading to overdiagnosis [11]. The pulmonary function test (PFT)) is crucial for diagnosing COPD. COPD may sometimes go undiagnosed in this population because older people have more difficulty recognizing symptoms. Acute exacerbations aggravate symptoms, frequently necessitate further care and hospitalization, and could hasten the loss of lung health and general well-being. Elderly COPD patients should be managed using a multidisciplinary approach. Patients' dietary status, mental health, lung ventilation performance, and functional

impairment should be assessed. To improve results, major underlying comorbidities must be assessed and addressed [12]. The most significant risk factor for COPD should be eliminated by quitting smoking as the first step in any specific treatment. The fact that smoking cessation rates among older people continue to rise may result from doctors' unwillingness to provide advice and smoking cessation treatments to older people. The most popular COPD medications, bronchodilators and corticosteroids, are mainly used to treat symptoms rather than reduce mortality compared to prolonged oxygen therapy. However, they positively impact exacerbation rates and quality of life. Elderly patients should receive thorough training on how to use an inhaler correctly, & their severity must be regularly tested. The choice of delivery methods for inhaled drugs is crucial in this population. Other essential elements of total therapy include dietary replenishment and pulmonary rehabilitation [13].

Materials and Methods

Research sign: The outpatient clinic located within the PRM medical college hospital served as the source of participants for the Study. Participants were required to be at least 50 years old, healthy, and able to undergo and pass pulmonary function tests. Additionally, they could not have a history of neurological or psychiatric disorders, substance abuse, or severe medical conditions. The exclusion criteria included pregnancy, recent chest surgery or trauma, and significant pulmonary airway disease that prevented the subject from undertaking the tests. The selection of a sample size of one hundred was accomplished by extrapolating the findings of comparable studies. After receiving their informed consent, each participant had a comprehensive medical history and physical examination carried out on them by a qualified medical expert. There was a focus on testing higher-order cognitive ability, language competency, and handedness. A thorough evaluation of the cranial nerves included the use of fundoscopy as one of the diagnostic tools. We analyzed the motor system by looking at size, strength, reflexes, coordination, involuntary movements, and gait. As part of the sensory system examination, evaluations were conducted on the sensations of pain, touch, temperature, cortical sensation, cerebellar and spinal symptoms. Each participant was given a chest x-ray, a urinalysis, an ECG, an echocardiography, a test to determine their level of glucose tolerance, a test to determine their level of renal function, and an electrolyte profile. The investigations were conducted in the hospital's biochemistry, radiology, and cardiology laboratories at the medical college. All participants were given a battery of pulmonary function tests that measured spirometry, lung volume, and diffusion capacity. The physiology department examined the volunteers who were well and sick. During the procedure, there was access to a supply of oxygen, a bronchodilator for the participants, and intravenous fluids.

Additionally, the patient was given a bronchodilator. People who suffered from severe diseases of the pulmonary airways and were unable or unwilling to participate in the Study were excluded. The information collected from the participants was entered into a database and then evaluated using a spreadsheet and a statistical tool. The mean, the standard deviation, the frequency, and the percentage were all calculated for each variable after they were given their own set of descriptive statistics. Using bivariate tests, we investigated the nature of the relationship that exists between the independent and dependent variables—the use of multivariate analyses allowed for the potential confounding factors to be accounted for.

Inclusion and Exclusion criteria

Inclusion criteria: Age above 50 years. Patients are referred to the outpatient department of the PRM medical college hospital. Ability to perform pulmonary function tests. No history of neurological or psychiatric illness. No history of substance abuse. No record of head injury. No major medical condition.

Exclusion criteria: Severe respiratory airway disease prevents the participant from performing the tests: recent chest surgery or trauma and pregnancy.

Ethical Consider: The Study was conducted in accordance with the ethical principles for medical research involving human subjects. Informed consent was obtained from all participants, and confidentiality was maintained throughout the Study. The institutional ethics committee of the medical college hospital approved the study protocol.

Result:

Table 1: Baseline characteristics of the patients considered in this study

Age and Sex distribution of cases with COPD				
Age in year	**Male**	**%**	**Female**	**%**
50-59	17	13.49	15	11.90
60-69	21	16.66	16	12.69
70-79	27	21.46	23	18.25
>80	5	3.96	2	1.58
Total	70	55.55	56	44.45
Age Sex distribution of cases of COPD with Exposure to AIR pollution				
50-59	8	10.96	6	8.22
60-69	12	16.44	10	13.70
70-79	19	26.03	14	19.18
>80	3	4.11	1	1.34
Total	42	57.54	31	32.46
Distribution of COPD cases by smoking				
50-59	21	16.67	11	8.73
60-69	28	22.22	9	7.14
70-79	36	28.57	14	11.11
>80	4	3.17	3	2.38
Total	89	70.64	37	29.36

Table 1 demonstrates how different age groups and sexes are affected differently by the correlation between air pollution and smoking. The percentage of men diagnosed with COPD was much higher than that of women (55.555% versus 44.45%). The age range of 70 to 79 was the one that saw the highest number of occurrences of the condition for people of both sexes combined. The number of men impacted by air pollution was significantly higher than that of women. Similarly, the number of male smokers greatly outnumbered the number of female smokers. According to these findings, the chance of developing COPD may be higher in males than in females, and the condition may be made more likely by Exposure to air pollution and smoking.

Table 2: Presenting clinical features in the cases of COPD.

Clinical Presentation	No cases of Exposure to air pollution	%	No cases without Exposure to air pollution	%
Recurrent respiratory infection	45	35.71	24	19.05
Dyspnea	53	42.06	38	30.16
Weight loss	35	27.78	29	23.04
Wheezing	38	30.16	23	18.25
Dependent ankle oedema	27	21.43	14	11.11
Haemoptysis	9	7.14	4	3.17

Cases of COPD, categorized by their level of Exposure to air pollution, are presented in Table 2. Dyspnea, wheezing, and frequent respiratory infections were the most frequently reported symptoms, and their prevalence increased with increased Exposure to air pollution. Both groups reported symptoms like fatigue, nausea, and headaches, but those exposed to air pollution had a higher incidence of dependent ankle oedema and weight loss. Millions of people worldwide suffer from a chronic respiratory disease known as "chronic obstructive pulmonary disease (COPD)", and these results emphasize the importance of limiting Exposure to air pollution in preventing and treating this condition.

Table 3: Physical findings in patients with and without Exposure to AIR pollution

Physical signs	Patients with Exposure to air pollution	%	Patients without Exposure to air pollution	%
Overinflation	38	30.16	27	21.43
Crepitation	39	30.95	30	23.80
Rhonchi	47	37.30	42	33.33
Central cyanosis	5	3.97	3	2.38
Congestive Heart failure	12	9.52	8	6.38
Clubbing	12	9.52	4	3.17

Patients who were exposed to air pollution and those who were not are compared in Table 3. Crepitation, rhonchi, and over-inflation were both groups' most frequently reported physical symptoms. However, the same symptoms were seen in a somewhat higher proportion of patients exposed to air pollution. Central cyanosis was also seen in several patients. However, it was more common in the exposed group. Although congestive heart failure and clubbing were seldom observed in both groups, they were more common in those exposed to air pollution. These results imply that Exposure to air pollution may influence respiratory and cardiovascular health and contribute to the onset or progression of respiratory disease.

Table 4: Pulmonary function tests in cases with and without Exposure to AIR Pollutants

No of the cases studied	Cases with Exposure to air pollution	Cases without Exposure to air pollution
Tidal volume (Mean±SD) in c.c	200±20	240±20
Vital capacity (Mean±SD) in c.c	1930±110	2220±120
Inspiratory reserve volume (Mean±SD) in c.c	1040±70	1200±60

Expiratory reserve volume (Mean±SD) in c.c	700±50	800±30
FEV1 (%) (Mean±SD) in c.c	34±2	43±3

Tests of lung function before and after potential Exposure to air pollutants are compared in Table 5. The mean and standard deviation for many pulmonary function measures and the total number of cases analyzed are shown in the table. The average tidal volume was lower (200±20 c.c.) in cases where the subjects were exposed to air pollution than in controls (240±20 c.c.). Vital capacity, inspiratory reserve volume, and expiratory reserve volume decreased in subjects with Exposure compared to instances without Exposure. Cases with Exposure had a mean FEV1 (%) of 34±.2, while those without Exposure had a mean FEV1 (%) of 43. ±3. These results indicate that air pollution may impair pulmonary function, resulting in smaller lung volumes and less lung capacity.

Discussion

Like tobacco smokers, women persistently exposed to biomass experience airflow limitation, but nothing is known about their clinical profile or prognosis. To identify chronic bronchitis's clinical characteristics, prognosis, and survival variables linked to cigarette use and biomass exposure. Domestic Exposure to biomass causes chronic obstructive pulmonary disease in women, which has similar clinical features, worse quality of life and a more expensive mortality rate for smokers [14].

In the elderly, chronic obstructive pulmonary disease (COPD) is the leading cause of dying or becoming disabled. Its frequency is sharply increasing, especially among women. However, accurate statistics are lacking since many seniors, particularly those who suffer from impairment and multiple sclerosis, cannot do high-quality spirometry, a necessary diagnostic procedure [15]. Additionally, unusual appearances help to mask COPD. The GOLD suggested staging criteria are debatable even in individuals with a formal diagnosis of COPD due to an imbalance among classificatory and prognostic features [16]. A wide range of symptoms is present in both stable and aggravated COPD. Thus, if a particular pattern of signs has not been identified, it may be challenging to detect a worsening promptly. A genuinely thorough examination is necessary to determine the specific clinical practice for an individual and then customize the multifaceted therapeutic plan. Such a strategy heavily depends on the treating physician's area of expertise. Therefore, initiatives are required to ensure that all specialists caring for older respiratory patients have the cultural and procedural patrimony that enables them to identify and provide the best treatment for these "difficult" patients [17].

Age may be the fundamental cause of chronic obstructive pulmonary disease (COPD). Additionally, smoking, the most prevalent reason for COPD, is to blame for the disease's systemic symptoms and changes in lung function [18]. The investigation sought to look into how ageing affected the incidence of COPD brought on by cigarette smoking. The incidence of COPD was measured using information obtained from the Korea National Health and Nutrition Examination Survey (KNHANES) from 2005 to 2015, and smoking status was assessed using a lifestyle intervention programme. Ageing and smoking strongly impact lung function in people with COPD. Particularly for elderly COPD patients, smoking duration increases when there is advanced age. The findings indicated that age and gender are associated with the degree of COPD in individuals smoking history. Globally, the incidence of COPD kept rising. Quantifying the COPD risk factor and determining how the risk variables interact

could be helpful predictors in preventing COPD [19].

Smokers who suffer from chronic obstructive pulmonary disease (COPD) seem to be a particular group who must quit smoking more quickly but may find it more difficult. The research aimed to identify the smoking-related factors and stopping experiences that smokers with or without COPD often had in common and any specific to smokers having COPD [20]. Researchers performed semi-structured, in-depth interviews with ten smokers with COPD and ten in ten Dutch primary healthcare centres without COPD. The participants' justifications for smoking and stopping were quite similar. The accompanying themes promote a less paternalistic approach to communicating with smokers, emphasizing the motivating stage, consideration of the smokers' viewpoints, and specific information and education. Additionally, discussing social relationships, health views, and moral motivations while communicating with COPD smokers may make smoking cessation treatments more appropriate for them [21].

"Chronic Obstructive Pulmonary Disease (COPD)" is significantly influenced by age, and COPD worsened by chronic respiratory failure may be categorized as a geriatric disease. Due to unique clinical presentation and challenges with current pulmonary function diagnostic standards, most cases go undetected [22]. The condition is hence underdiagnosed and undertreated. Because prompt medication could lessen the distinct and significant consequences of COPD in the health status, this is anticipated to have a noticeable impact on the state of health of undiagnosed COPD patients. Comorbidity has a significant predictive effect and is crucial in shaping the health condition and progress of COPD patients' treatments [23]. Several issues impact the total effectiveness of therapy for elderly patients with COPD, and findings from pharmacological trials and current recommendations only partially apply to this population.

Last but not least, doctors of various disciplines treat elderly COPD patients; the type of therapy depends significantly on the doctor's speciality. In conclusion, COPD, a complex disease in and of itself, becomes challenging to diagnose and treat in the elderly. To provide a comprehensive framework for diagnosing and treating COPD for the working physician, interdisciplinary efforts are preferred [23].

The Study aimed to investigate the impact of Exposure to cigarette smoke and air pollution on respiratory symptoms, respiratory function, and the incidence of COPD in people above 50. Smoking and extended periods (>5 years) of being subjected to air pollution all resulted in a decline in respiratory function, aggravation of respiratory symptoms, and a rise in the prevalence of COPD. For aged patients, routine screening is strongly advised to aid in the early diagnosis of respiratory diseases [23].

Conclusion

In conclusion, air pollution continues to seriously threaten human health, damaging the respiratory system irreparably and leading to enormous suffering. The severity and consequences of respiratory disorders, especially chronic obstructive pulmonary disease (COPD), have been shown to increase in proportion to the length of time people are exposed to air pollution. Air pollution has been found to cause irreparable harm to the respiratory system, with consequences including pulmonary hypertension and cor pulmonale. More and more people are in danger of respiratory ailments due to air pollution due to the increased industrialization of urban and rural areas. The impacts of air pollution are felt most acutely by the older population. Given the limited understanding of the pathophysiologic elements of air pollution-related respiratory illnesses, preventative actions to protect the public from Exposure to air pollution are crucial in dealing with this issue. Especially for at-risk groups like older people, this Study highlights the need to reduce air pollution levels to enhance

public health outcomes. More Study is required to determine the exact nature of the association between air pollution and respiratory disorders and what can be done to prevent and treat them.

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