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Research Article

Chronic Obstructive Pulmonary Disease and Quality of Life: A Comprehensive Analysis of Determinants, Challenges, and Gender-Based Management Approaches

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Abstract

Background: *Chronic Obstructive Pulmonary Disease (COPD) is a prolonged lung disease that causes breathing barriers and severely impacts the quality of life of patients.*

Objective: This study aims to identify the causes, challenges, disease severity, and the role of gender and treatment and master plans on the quality of life in COPD patients.

Method: *Descriptive, observational, and cross-sectional design was adopted for this research.*

Methodology: *A total of 200 patients were included using a non-probability consecutive sampling technique. Data collection involved patient interviews, medical records, and clinical evaluations.*

Results: *Key causes identified were genetics, respiratory infections, smoking, and occupational exposure. Low sociocultural status and comorbidities were widespread risk factors. Most patients were in very severe or severe disease stages. Oxygen therapy, medication, smoking suspensions, and rehabilitation were found to be most effective in improving quality of life.*

Conclusion: *COPD requires early detection, personalized treatment plans, and public health interventions to mitigate long-term effects, especially in socioeconomically disadvantaged populations.*

1.1 Introduction

Chronic Obstructive Pulmonary Disease (COPD) is a progressive lung disease that significantly impairs respiratory function, leading to a decrease in quality of life. It primarily includes chronic bronchitis and emphysema. Common causes include smoking, environmental pollutants, and genetic factors. This study explores the impact of COPD on individuals' lives, examining causative factors, risk contributors, and the gender-based prevalence and management approaches[1]. Chronic Obstructive Pulmonary Disease (COPD) is a chronic lung disease that is hard for the patients to breathe. It comprises two conditions: chronic bronchitis, which results in continuous coughing and mucus, and choking, which destroys the air sacs of the lungs. Both of these conditions cause obstructed or narrowed airways, and breathing in and out of the lungs becomes worse[2].

The leading cause of COPD is smoking, though other contributing factors include exposure to air pollution, dust, harmful chemicals, and even genetic conditions. The development of COPD does not happen in one night but occurs gradually with the time passes. It develops slowly in most people over many years and might not even present with overt symptoms at an early stage but can become quite severe with time passes. With time, even performing simple daily activities like walking, going up and down stairs, or even speech becomes challenging with shortness of breath. Those with COPD tend to tire easily, suffer from recurrent infections in the lungs, and end up going to the hospital more often[3].

Towards the later stages, patients become dependent on oxygen therapy and receive constant care. The condition further impacts mental status, causing depression and anxiety as the individual depends more on others[4]. No treatment available for COPD, but early diagnosis and suitable treatment can control the symptoms and prevent the disease from being spread. Treatment involves medication such as inhalers, breathing exercises, smoking cessation, and staying away from polluted areas. A healthy life with a well-balanced diet and adequate exercise5.

COPD is a chronic respiratory disease that strikes millions of individuals globally. COPD is primarily triggered by smoking, prolonged exposure to air pollution, and the inhalation of toxic dust or chemicals[6]. COPD destroys the airways, which makes it hard for an individual to breathe. The symptoms gradually increase with time, impairing daily activities and general health. Individuals with COPD commonly suffer from persistent cough, wheezing, chest tightness, and shortness of breath[7]. As the condition advances, it becomes increasingly difficult for patients to perform simple activities, which results in frustration and fatigue. In more advanced cases, oxygen therapy and 24-hour medical attention may be implemented. Patients with COPD may suffer from anxiety or depression, which affects not only their physical fitness but also their mental and emotional health. The most measure issue is the cost of treatment. Medication, pulmonary rehabilitation, breathing techniques, and a healthy lifestyle helps for treating COPD patients, even if it cannot be completely cured. The quality of life can be improved and early diagnosis leads to proper and accurate treatment. The effects of COPD can be reduced in part by prevention, education, and better healthcare services. To improve patient care and overall health, this study clarifies the causes, severity, challenges, and treatment of COPD[8]

1.2. COPD in India- Current trends; burden and public health implications

COPD is a significant health issue in India, with millions of individuals, particularly those who are exposed to excessive air pollution, smoking, and indoor smoke from wood, coal, or cow dung fires used for cooking. Most individuals in rural settings, especially women, develop COPD as a result of long-term exposure to smoke in poorly ventilated kitchens. In urban settings, traffic and industrial pollution are

the main effect of damaging respiratory conditions. Although a chronic disease, awareness of COPD is low, resulting in late diagnosis and treatment. In India, most patients approach doctors when the disease has progressed to a severe stage. The lack of easy examine to healthcare in rural India makes much more difficult to get diagnosis in early stage[9]. COPD results in shortness of breath, tiredness, and lung infections, decreasing the capacity for work and the economic stability of families. The expensive treatment, such as drugs and hospitalization cannot be affordable by an individual staying in rural areas. In order to address COPD in India, better awareness, better healthcare facilities, and control policies for air pollution are necessary. Avoid smoking, cleaner use of cooking fuel, and health check-ups every now and then can help limit the effects of COPD. This study has attempted to throw light on challenges and solutions in effectively managing COPD in India[10].

1.3. Future Scopes

This research explores the global and regional burden of Chronic Obstructive Pulmonary Disease (COPD), focusing on its etiology, risk factors, public health implications, and future weakening strategies. It specifically addresses how COPD develops as a chronic inflammatory disease affecting the airways and lungs, primarily affected by long-term exposure to harmful particles and gases. These include cigarette smoke, biomass fuel used for cooking and heating, air pollution, and occupational dust—all of which contribute to structural and functional decline of the lungs. The study also investigates genetic liking such as alpha-1 antitrypsin deficiency that can increase individual susceptibility. The paper further explores why COPD continues to be a major cause of morbidity and mortality worldwide, particularly in low- and middle-income countries. Despite its high prevalence, COPD is frequently underdiagnosed or misdiagnosed due to limited access to spirometry and low awareness among healthcare providers and the general public. Lack of early diagnosis and proper management strategies results in disease progression, frequent hospitalizations, and reduced quality of life for patients. In terms of what the study covers, it examines the pathophysiology of COPD, including chronic bronchitis and emphysema, as well as common clinical symptoms like breathlessness, chronic cough, and sputum production. It also highlights multiple chronic conditions such as cardiovascular disease, diabetes, and depression, which complicate patient outcomes and increase healthcare costs. Geographically, the research focuses on where COPD has the most significant impact, with particular emphasis on developing regions in South Asia, sub-Saharan Africa, and parts of Latin America. The facing challenges such as poor air quality, high rates of smoking, insufficient healthcare systems, and limited health care managements. The study's future scope highlights the critical need for cost-effective treatment, awareness efforts, and early screening initiatives. It promotes international cooperation in public health policy and research to enhance COPD data collecting and observations. Medicine, bronchodilators, inhaled steroids, oxygen therapy, some surgeries and community-based steps-in could greatly improve patient management and monitoring in low cost. Through sustainable healthcare models, the research lays the groundwork for long-term solutions that will improve patient outcomes, lower the implication of COPD worldwide, and promote lung health.

2. Literature Survey

Agustí, A., Hogg, J. C., et al [11]: - Chronic Obstructive Pulmonary Disease, or COPD, is a chronic lung disease that is primarily brought about by smoking and exposure to harmful pollutants. Typical symptoms are shortness of breath, cough, and tightness in the chest. It is typically diagnosed through a lung function test known as spirometry. COPD cannot be cured, but it can be treated with drugs, oxygen therapy, and pulmonary rehabilitation. Current research is concentrated on individualized treatment regimens, the determination of particular markers of disease (biomarkers), and applying

artificial intelligence for enhanced early diagnosis and treatment. All these initiatives are aimed at enhancing the quality of life for individuals suffering from COPD.

Sharma, R., & Rani, S. [12]: - In this paper, it discloses how artificial intelligence (AI), particularly deep learning, is useful in COPD diagnosis. It describes different AI models, methods, and datasets employed to analyze medical images such as X-rays and CT scans. The research indicates that AI enhances early detection, accuracy, and decision-making for COPD diagnosis. It also addresses existing research gaps, issues, and future prospects of AI in assisting physicians and improving patient care in respiratory medicine for the better treatment.

Rani, S., & Sharma, R. [13]: - This study says the role of computer-aided diagnosis in detecting Chronic Obstructive Pulmonary Disease (COPD) using CT scans. Various image processing techniques, including lung segmentation, feature extraction, and classification methods, are there. The paper highlights how machine learning models, especially deep learning, enhance accurate in COPD diagnosis. It also compares past research, showing improvements in automation and speed. Overall, the literature emphasizes the growing importance of AI in improving early detection and treatment of COPD.

Aqsa Dogar1, Tahira Batool., et al [14]: - This study looked at how diabetes and chronic obstructive pulmonary disease (COPD) are linked. Researchers studied 250 diabetic patients and found that many had poor lung function, with varying levels of airflow blockage. Poor blood sugar control was connected to worse lung performance. The study highlights that diabetes can negatively affect breathing through inflammation and poor metabolism. It recommends early diagnosis and combined treatment of both diseases to help manage symptoms and slow disease progression for better patient outcomes.

S. Kalpana., et al [15]: - This study how well patients with Chronic Obstructive Pulmonary Disease (COPD) control their own care. Among 106 patients, half showed poor habits, and almost all used their inhalers inappropriately. Factors like marital status, poor diet, and depression affected. The findings show a clear need for programs to give the knowledge to the patient's proper self-care and correct method to use inhaler. Better education can help improve their daily management and reduce hospital visits and complications from COPD.

Wang-Chun Kwok., [16]: - This highlights that respiratory infections are cause flare-ups in COPD, with viruses and bacteria being major triggers. Vaccination is important to protect COPD patients from serious infections. The GOLD guidelines approve to vaccines for influenza, COVID-19, pneumonia, RSV, pertussis, and shingles. These vaccines decrease illness and hospital stays. The review also discusses the strength of research behind each vaccine and possible side effects. Overall, vaccination plays a key role in managing and protecting the health of people with COPD.

Buğra Kerget., et al [17]: - This study compared three types of nebulizer treatments in COPD patients with acute flare-ups. Sixty patients were divided into groups receiving jet, dry air, or classic nebulizer therapy. All groups showed improved lung function, but the jet nebulizer group had the most accurate in improvement in breathing capacity. Although jet nebulizers were more effective, dry air nebulizers were noted as easier to use and sterilize. The study suggests jet nebulizers is a better treatment for the patient.

A. Zeeshan, A. Muhammad [18]: - This study investigated how common pulmonary hypertension (PH) is in people with chronic obstructive pulmonary disease (COPD). Among 200 patients aged 40–70, over half (52.5%) had PH. The condition was more frequent in those with severe COPD. The results showed PH is significantly linked with disease severity. Most patients were older males, and echocardiography was used to confirm PH. The study

concludes that PH is common in COPD patients, especially in those with more advanced stages of the disease.

İmren Mutlu Hayat, Halil Ferat Öncel [19]: - This study explored hormone levels in male COPD patients based on how severe their disease was. Sixty-four men with COPD were tested for hormones like testosterone, LH, FSH, and TSH. Results reveals that lower hormone levels, especially testosterone, in patients with more severe COPD. These changes were linked to low oxygen levels in the blood, suggesting damage to the body's hormone-regulating system. The study demand for more research on whether hormone therapy, like testosterone, could help in COPD treatment.

Oscar Peñuelas., et al [20]: - This global research outcomes of COPD patients admitted to ICUs with acute exacerbations who received either non-invasive or invasive ventilation. Data from 1998 to 2016 showed that mortality rates decreased in time worldwide, regardless of income level or region. Non-invasive ventilation was more common, replacing invasive methods. However, survival rates still varied greatly by location and income level. The study suggests that better selection of patients for the right ventilation method could improve results, and further research is needed to explore this.

Joan B. Soriano, Bernd Lamprecht [21]: - As of 2012, around 210 million people worldwide are estimated to have COPD, a condition increasingly linked to aging and smoking. Despite earlier vague estimates, new data highlights its growing impact. Global studies and health organizations like GOLD and GARD are working to better understand and track COPD's burden. This research is crucial, as limited resources must be wisely used to manage the disease. COPD is now more recognized in global health, alongside asthma and other chronic respiratory diseases, making accurate data even more essential.

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Muhammad Muneeb Hassan., et al [23]: - This study says how COVID-19 vaccination affects people with both COPD and heart disease (CVD). Researchers studied 838 patients in Pakistan and found that unvaccinated people had a much higher risk of death than the vaccinated one. Vaccinated patients had mild symptoms and for better survival. The study highlights how important COVID-19 vaccination is for people with chronic illnesses like COPD and CVD, as it greatly improves to reduces the risk of serious illness or death.

Chen, X., et al [24]: - The purpose of this research was to assess the effectiveness of standardized treatment for COPD patients using a big data center based on IoT technology. This research was implemented at Xiamen Medical College Affiliated Haiyang Hospital from October 2019 through October 2020 and had participants aged 40 and over. The results were such that the patients treated via the IoT-based system saw a dramatic decline in acute exacerbations and better quality of life when compared to standard care recipients. The study deduced that IoT technology actually helps facilitate self-management and the continuity of care in COPD patients.

3. Objective

The primary aim of this study is to know how Chronic Obstructive Pulmonary Disease (COPD) influences the life of individuals with the disease. COPD is a chronic lung disease that complicates breathing and weakens an individual's capacity to do daily

activities. The purpose of this research is to determine the primary causes, difficulties, severity, and potential means of coping with the disease to enhance patients' quality of life. One key objective of this study is to determine the general causes and risk factors of COPD, e.g., smoking, air pollution, and contact with harmful chemicals. It will also look at the challenges associated with COPD patients, which include difficulty breathing, fatigue, and mobility decline. The study will be analyzing how far the disease can progress and how it differentiates from person to person. Yet another aim is to examine different treatment techniques such as drugs, exercise, and lifestyle modification to determine how these benefit patients. The study will also examine if men and women are influenced differently by COPD. Finally, this research will make valuable suggestions for analyzing the impact of COPD on quality of life:

A. To identify the major causes and risk factors associated with COPD.
B. To explore the challenges faced by individuals living with COPD.
C. To examine the severity of the COPD patients.
D. To examine the conditions of the patient (Acute/ Chronic condition).
E. To identify the gender based affected of COPD.
F. To examine the effectiveness of various management strategies.

4. Methodology

This study utilized a descriptive, observational, and cross-sectional research design to explore the determinants and challenges linked to Chronic Obstructive Pulmonary Disease (COPD) in a sample of 200 patients. Participants were selected using a non-probability consecutive sampling method. Data collection associated to direct patient interviews, detailed clinical histories, and relevant diagnostic evaluations. Key variables examined included the fundamental causes, disease severity, risk factors, therapeutic interventions, and gender-specific impacts. The study focused to provide comprehensive insights into COPD patterns and management, thereby contributing to improved patient care and targeted treatment strategies.

5. Data Analysis and Descriptions:

5.A. To identify the major causes and risk factors associated with COPD.

1) On the basis of causes.

The graph illustrates how the causes of ailments are distributed amongst 200 patients. The predominant causes identified are genetic factors, which alone account for nearly a quarter of all cases. It can be concluded that the health complications troubling these patients are likely to be inherited or at least strongly influenced by their family ancestry. This also accounts for why patients are afflicted with these disorders. Respiratory infections are also put into consideration, and are the second most prevalent cause alongside accounting for a large proportion of infections. Bronchitis and pneumonia often infect the lung and bronchial system and patients suffer greatly on account of bronchitis or pneumonia. Ranging right alongside these causes is another major factor: smoking, and here, France is leading. With very little actually being done to curb smoking, it remains a leading cause of so many Czech diseases. A lot of attention is directed towards lung cancer and other respiratory failures. Occupational exposure is also an important cause, and a considerable number of patients suffer on account of the work environment drowning them in harmful surroundings. They are likely to suffer from dangerous pollution that can affect the lungs and various other health problems. Other disturbing factors unexplained before such as air pollution, toxic chemicals, and other contaminate collectively form environmental pollutants attributing to the remaining part of the chart. These highlight that people residing in or working in polluted areas tend to possess an alarming adverse effect on health. To recapitulate, the chart tries to make it clear that

respiratory infection and genetics give rise to disorder alongside former chronic issues such as smoking, occupational exposure, and pollution.

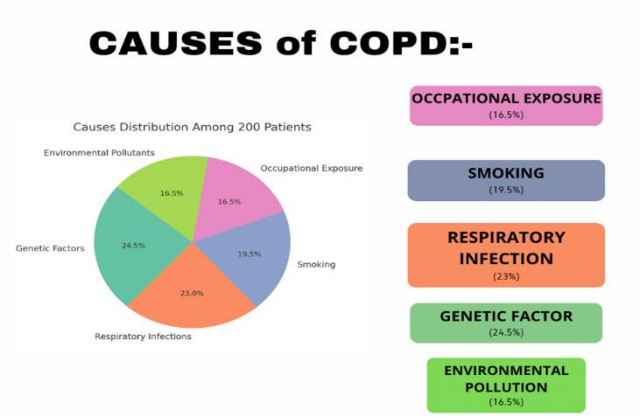

Figure 1

2) On the Basis of risk factors: -

The risk factor distribution for 200 patients is displayed in the pie chart. Low socioeconomic status is the most common risk factor, accounting for 30% of occurrences. This suggests that a large number of patients are impoverished, have limited access to healthcare, or live in substandard housing, all of which may worsen their health. Comorbidities are the second most common risk factor, accounting for 24.1% of cases. Comorbidities, which occur when a patient has more than one ailment, suggest that the majority of study participants had complex medical disorders that make recovery and treatment difficult. Age over 60 is the second most prevalent risk factor, accounting for 17.7% of occurrences. The second most common risk factor is age greater than 60, occurring in 17.7% of the cases. This implies that older people are more at risk for health issues, which could be because of compromised immunity and body changes with age. Occupational exposure subsequently accounts for 15% of the cases. This means most patients are subjected to harmful environments or substances within the workplace, including chemicals, dust, or pollutants, heightening their potential for developing certain health problems. Lastly, family history for 13.2% of the cases proposes that there may be a genetic component involved with some patients. These risk factors need to be addressed in order to enhance patient outcomes and direct preventive interventions.

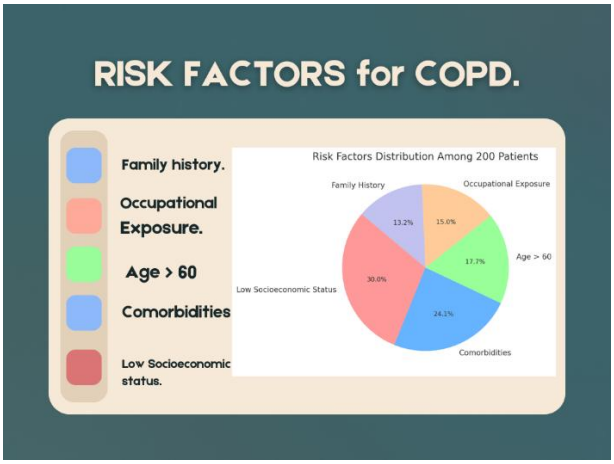

Figure 2

3. To explore the challenges faced by individuals living with COPD.

The pie chart says the primary challenges by 200 patients. The largest problem is Physical boundaries, which is experienced by 45.5% of them. This indicates nearly half of the patients are having difficulty with physical activities such as walking, lifting, or mobility, which can impair their quality of life. The second most frequent challenge is Frequent Hospitalization, occurring in 28.0% of the patients. This indicates that most of them frequently have to be hospitalized, probably due to the fact that their conditions are severe or constantly worsening. The third issue is Breathlessness, occurring in 13.0% of the population. This indicates some patients consistently have difficulty with breathing issues, which can make everyday activities extremely difficult. Psychosocial Burden is seen in 9.0% of instances. This is emotional and social distress such as stress, anxiety, depression, or loneliness because of their condition. Finally, Medication is responsible for 4.5%, indicating a few patients find it difficult to take

their medicines correctly, which can impact their recovery.

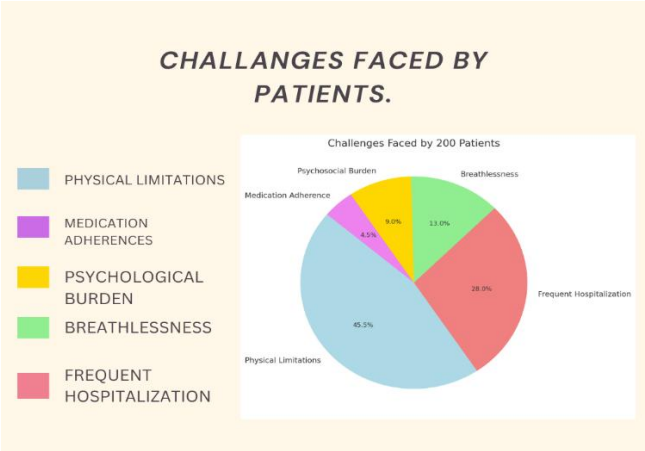

Figure 3

5.C. To examine the severity of the COPD patients.

The explain of health problems among 200 patients. The majority of the patients belongs to the Very Severe category as most of the patients are suffering from very severe health issues. The problems in question usually need extensive medical attention, careful monitoring, and emergency. This results the seriousness of their condition and the necessary for medical support. The second largest category is the Severe group. These individuals also suffer from serious illnesses, but not quite as severe as those in the group that is very severe. They still require frequent medical care, check-ups, and possibly specialist attention to handle their condition and keep it from deteriorating. The Moderate category is smaller compared to the others. Patients under this category have discernible symptoms that can interfere with their daily lives, but they are more manageable. They do not necessarily require emergency care but need frequent follow-up and treatment. The Mild segment is the least portion of the chart, i.e., there are only a few patients who have mild symptoms. These patients typically require very little medical attention and can take care of their health independently.

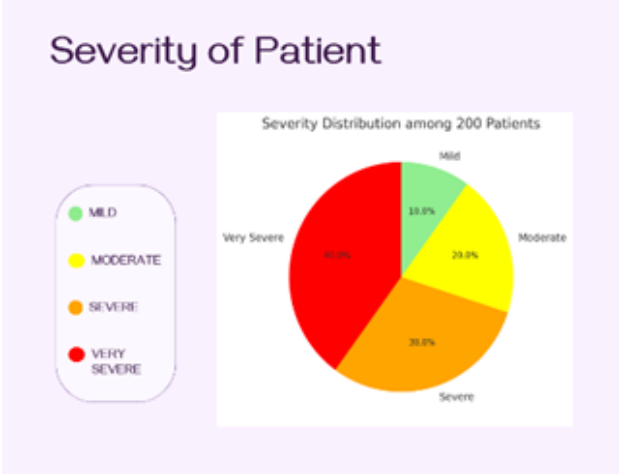

Figure 4.

4. To examine the conditions of the patient (Acute/ Chronic condition).

The number of patients with acute and chronic conditions out of 200 patients. Out of them, 134 patients (67%) have chronic conditions, and 66 patients (33%) have acute conditions. This precisely indicates that chronic conditions are far more prevalent in this group of patients. Chronic illnesses are long-term and typically require ongoing treatment and ongoing medical attention. Some examples are diabetes, heart disease, and asthma. These diseases don't resolve quickly and may impact an individual's way of life for years to come. Patients with chronic illnesses may require constant support, medications, and frequent visits to the doctor. Conversely, acute conditions are transient and typically onset abruptly. They tend to be cured speedily. Some examples are infections, trauma, or an acute illness such as the flu.

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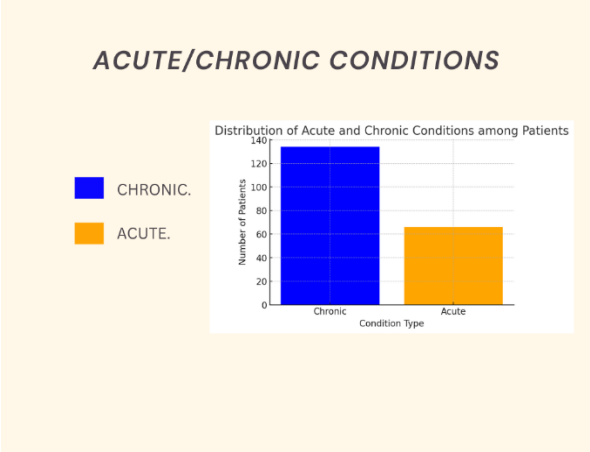

Figure 5

To identify the gender based affected of COPD.

The gender breakdown of 200 patients. There are two categories: Male and Female. The number of patients in each category is indicated on the y-axis, ranging from 0 to 120. The blue bar indicates male patients, and the orange bar indicates female patients. There are 99 male patients and 101 female patients, showing that the numbers of males and females are very close. In fact, there are just 2 more females. This near-equal distribution between male and female patients is such that the dataset is well-balanced by gender. It matters when analyzing medical data because it minimizes gender bias. If there was a much larger proportion of one gender, then it would potentially influence the accuracy and fairness of the results. Since both genders are represented approximately equally, the results from this group of 200 patients are more reliable and equitable to both men and women. It is easier to analyze when comparing how various conditions or treatments impact each gender.

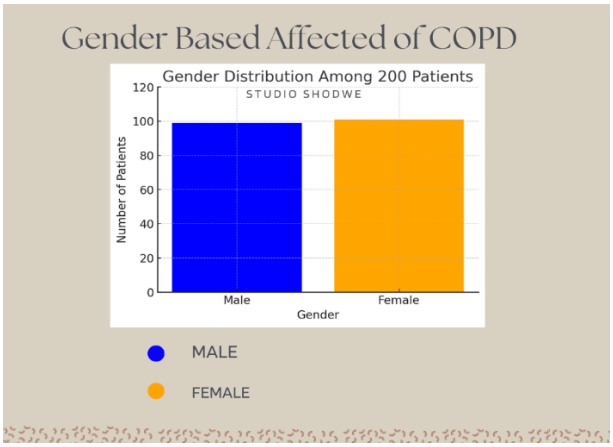

Figure 6

To examine the effectiveness of various management strategies.

The methods by which 200 patients are treated. The most common treatment is Oxygen Therapy, given to 45 patients, for better breathe. Close to this is Smoking, given to 44 patients, with the aim of avoiding smoking for healthier lungs. 43 patients are given medication to cure diseases. Pulmonary Rehabilitation is prescribed to 39 patients to improve lung function. Lastly, Lifestyle Changes are prescribed to 29 patients in order to healthier lifestyles. This integration of techniques illustrates a balanced approach towards managing chronic illnesses.

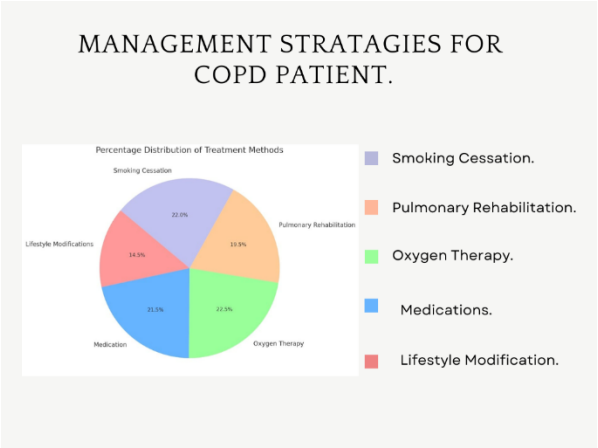

Figure 7

6. Results

1. To identify the major causes and risk factors associated with COPD.

The cause and risk factor analysis of 200 patients reveals definite patterns. As per the pie chart of causes, the most frequent one is genetic factors with 25% of cases. It implies that inherited characteristics are a key reason for health issues in most patients. Respiratory infections follow, also making an important portion of the total, indicating that conditions such as pneumonia, bronchitis are common. Smoking is also an important cause, emphasizing the ill effects of tobacco. Occupational exposure is also an important aspect, as most patients have exposure to noxious substances. The rest caused by pollutions and chemicals affect health. Risk factors-wise, the largest one is low economic status, which is present in 30% of the patients. This shows how poor access to healthcare, poor living conditions, and poverty damage health. Comorbidities (more than one health problem) are present in 24.1%, complicating treatment. Age greater than 60 years is present in 17.7%, illustrating older individuals are more susceptible. Occupational exposure is once again observed in 15%, and family history in 13.2%, illustrating a genetic component. In general, treatment of these causes and risk factors is responsible for improved prevention and management.

2. To explore the challenges faced by individuals living with COPD.

The pie chart says the primary challenges by 200 patients. The largest problem is Physical boundaries, which is experienced by 45.5% of them. This indicates nearly half of the patients are having difficulty with physical activities such as walking, lifting, or mobility, which can impair their quality of life. The second most frequent challenge is Frequent Hospitalization, occurring in 28.0% of the patients. This indicates that most of them frequently have to be hospitalized, probably due to the fact that their conditions are severe or constantly worsening. The third issue is Breathlessness, occurring in 13.0% of the population. This indicates some patients consistently have difficulty with breathing issues, which can make everyday activities extremely difficult. Psychosocial Burden is seen in 9.0% of instances. This is emotional and social distress such as stress, anxiety, depression, or loneliness because of their condition. Finally, Medication is responsible for 4.5%, indicating a few patients find it difficult to take their medicines correctly, which can impact their recovery.

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6. To examine the effectiveness of various management strategies in enhancing the quality of life of COPD patients.

The methods by which 200 patients are treated. The most common treatment is Oxygen Therapy, given to 45 patients, for better breathe. Close to this is Smoking, given to 44 patients, with the aim of avoiding smoking for healthier lungs. 43 patients are given medication to cure diseases. Pulmonary Rehabilitation is prescribed to 39 patients to improve lung function. Lastly, Lifestyle Changes are prescribed to 29 patients in order to healthier lifestyles. This integration of techniques illustrates a balanced approach towards managing chronic illnesses.

7. Conclusion

COPD is a multifactorial disease with a significant burden on patients' physical, mental, and economic well-being. Early diagnosis, public awareness, and proper treatment—including rehabilitation and lifestyle modification—are crucial to improving the quality of life. Gender-based treatment plans and targeted prevention strategies are recommended. This research work gives a lucid idea about Chronic Obstructive Pulmonary Disease (COPD), its causes, impacts, issues, and treatments among 200 patients. The results point out that COPD is a chronic and severe lung disease that affects the physical, emotional, and social health of patients. It progresses with time, generally becoming severe before symptoms are seen. The primary Causes of COPD are genetic predisposition, respiratory infections, smoking, occupational exposures, and environmental factors. The most accurate risk factor is low socioeconomic status, followed by comorbidity, advanced age, and family history. The study also identifies the major patient challenges. The most commonly reported problem is physical disability, followed by hospitalizations and breathlessness, all of which decrease the quality of life. Social challenges like stress, anxiety, and depression are also an important, as well as challenges in adhering to medications. The severity analysis indicates that most of the patients belong to the very severe and severe categories, requiring medical support and care at all times.

Author Contributions

Durga Prasad & Pallavi Acharya Rath is the primary author of this work, responsible for

conceptualization, literature review, data analysis, and manuscript writing. manuscript.

Ethical Approval

NA

Informed Consent

Not Applicable.

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Conflict of Interest

There are no apparent conflicts of interest between the authors' personal relationships or financial interests that may have affected the results of this study, the authors state. There is no conflict of interest, according to the writers. All ideas and opinions expressed in this article are those of the authors.

Financial Interests

The authors declare they have no financial interests.

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