# STUDY OF PREVALENCE OF OBSTRUCTIVE LUNG DISEASE

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**ABSTRACT**

**BACKGROUND**

The aim of the study is to study the prevalence of obstructive lung diseases like COPD, Bronchitis and Bronchial Asthma in Community Health Center, Haliyal.

**MATERIALS AND METHODS**

This study was undertaken in Community Health Center, Haliyal. This was a prospective study. Duration of study was nearly one year from December 2015 to March 2017. All patients with symptoms of obstructive lung disease were involved in the study. Patients with COPD with history of pulmonary tuberculosis were also involved in the study.

**RESULTS**

During study period of nearly one year, 508 cases of obstructive lung disease were detected; out of which 312 were male while 196 were female patients. When compared to total patients examined during this period, the prevalence of COLD was 3.4%. Out of 508 cases, 406 cases were of chronic bronchitis, 95 patients of COPD and 7 patients had history of bronchial asthma. In our study, out of 508 patients 375 (74%) had history of smoking bidis and cigarette. Out of 406 chronic bronchitis patients, 5 had history of pulmonary tuberculosis, while out of 95 COPD patients, 7 had history of pulmonary tuberculosis i.e. out of 508 patients total 12 patients (1.4%) had history of tuberculosis.

**CONCLUSION**

Prevalence of COLD in our study was 3.4%. In our study, smoking was main risk factor, 74% of patients had history of smoking, while direct and indirect exposure to industrial products in sugarcane industry in Haliyal was second important risk factor in 375 patients. 12 patients who had previous history of tuberculosis progressed to development of COLD. Yet interstitial lung disease secondary to exposure to industrial (sugarcane) risk factors remains unconfirmed due to lack of facility and economical constraint as CT could not be done.

**KEYWORDS**

COLD: Chronic Obstructive Lung Disease, Bronchitis, Bronchial Asthma, Pulmonary Tuberculosis. Interstitial Lung Disease.

**HOW TO CITE THIS ARTICLE**: Hakki SA. Study of prevalence of obstructive lung disease. J. Evid. Based Med. Healthc. 2018; 5(35), 2580-2584. DOI: 10.18410/jebmh/2018/531

## BACKGROUND

Chronic obstructive pulmonary/lung disease (COPD/COLD) is a common community problem and considered an essential cause of morbidity and mortality in both developed and developing countries. Estimation of COPD prevalence in some regions may vary due to underutilization of spirometry and inadequate diagnosis. The diagnosis of COPD is based on symptoms, the presence of risk factors and spirometry. Chronic obstructive pulmonary disease (COPD) is diagnosed on the basis of a forced expiratory volume in 1 second of <0.07 (FEV1/FVC <0.07) in the pulmonary function test (PFT). (COLD) is one of the major preventable chronic respiratory diseases (CRD). The Global Initiative for Obstructive Lung Disease (GOLD) describes COLD as a common preventable and treatable disease, characterized by persistent airflow limitation that is usually progressive and associated with an enhanced chronic inflammatory response in the airways and the lung to noxious particles or gases.

COLD is characterized by dyspnea due to limited airflow. Advanced COLD is associated with severe dyspnea accompanied by coughing, sputum, and fatigue, as well as cardiovascular complications such as cardiac insufficiency, which require constant oxygen supply and limit daily activities, ultimately resulting in depression or decreased quality of life. The main risk factor for COLD is smoking, followed by environmental and seasonal factors. Long smoking period ultimately leads to a proportionately high prevalence. Smoking is an important cause for the development of COLD. The prevalence of chronic bronchitis in smokers is five times the prevalence in non-smokers.[1] Same was the outcome in our study with 74% of COLD patients having history of smoking.

Even prevalence of COLD is high in nonsmokers. The occurrence of COLD has recently increased among nonsmokers who have never smoked in their lives. Passive exposure to smoke and industrial smoke are other contributing factors of COLD in nonsmokers. Exposure to

*Financial or Other, Competing Interest: None.*
*Submission 06-08-2018, Peer Review 12-08-2018,*
*Acceptance 22-08-2018, Published 25-08-2018.*
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*DOI: 10.18410/jebmh/2018/531*

industrial products or biomass fuel and gas are other important risk factors in nonsmoker and female population.[1] In our study 375 patients had history of direct (employers) or indirect (nearby residentials) exposure to sugarcane industry and its industrial products.

Previous history of pulmonary tuberculosis can reduce the lung compliance and make patient vulnerable to obstructive lung disease and vice versa. 12 patients in our study had history of pulmonary tuberculosis.

Even though there are many COLD patients among nonsmokers, the main cause of the disease has not been yet defined. Some of the pathophysiologic changes, personal, and environmental/seasonal risk factors relate and contribute to air flow restriction. Exposure to cigarette smoke from second hand smoking can affect the bronchus and limit airflow. The risks of respiratory infection also depend on the level of occupational exposure to hazardous substances. And previous history of tuberculosis remains contributory factor for development of COLD.[2]

Although COLD is a chronic disease, the acute exacerbations occur secondary to any cause either infective or allergic factors. The rate at which they occur determine the progression of the disease. Early diagnosis and control of progression of exacerbating factor plays important role. There is under diagnosis of COLD which can result in under treatment. There is widespread under recognition and under diagnosis of COLD. Those with early Stage with mild COLD may have no symptoms, or mild symptoms. Such patients may be under treated and not perceived by individuals or their health care providers as abnormal and possibly indicative of early COLD.[3] Early diagnosis of COLD even as early as stage first is very important to stop progression and take preventive measures by counseling. Confirmation of limitation of lung capacity by spirometry tests helps in further management of COLD cases. Prevention of infection and early treatment in cases of infections in a diagnosed case of COLD remain important in preventing complications and progression of the disease. Because COPD exacerbations have been associated with impaired quality of life, accelerated deterioration of lung function, increased risk of hospital admission and increase in mortality, they have an important impact on the healthcare-related costs.[4] So exacerbations should be tackled carefully.

A decreased level of immunity or pulmonary compliance due to increased age may also lead to increased risk of respiratory infections or deterioration of respiratory function. Educational and financial status affect acquisition of health-related knowledge and information, as well as access to health services and nutritional intake; hence, these factors may also affect the occurrence of pulmonary infection for those living in an environment exposed to exhaust gas, Dust, coal, and heavy metals such as cadmium, aluminium, mercury, and lead which may cause airflow restriction. Already due to excessive respiratory efforts patients are in protein deficiency, Poor nutritional intake and stress further affect energy balance and deteriorate immunity, thereby reducing muscle strength and causing dyspnea,

Differences in physical activities lead to changes in respiratory muscle strength, intramuscular protein, and weight, and may cause dyspnea in daily life. As well Anaemia increases muscle fatigue due to oxygen deficiency in the blood and causes difficulties in physical activities and dyspnea. A medical history of lung disease or pulmonary tuberculosis may impact airflow and cause airway inflammation or pulmonary fibrosis, thus resulting in airway changes.

Despite the severity of air pollution or the increase in the number of non-smoking COPD patients, not many studies have been conducted to investigate factors that play a major role in the occurrence of the disease among nonsmokers. A few previous studies identified the factors associated with COPD among non-smoking adults as sex, age, socioeconomic status and educational background, occupational exposure to dust, body mass index (BMI), and history of pulmonary tuberculosis or asthma.[2]

COPD is recognized as the fourth major killer disease in the developed countries, and a leading cause of mortality and morbidity all over the world. Obstructive sleep apnoea (OSA) is a disorder is one of the important risk factors in development of complication of chronic cor-pulmonale. A high prevalence is seen characterized by instability of the upper airways during sleep, which results in markedly reduced (hypopnea) or absent (apnoea) airflow at the nose/mouth.[5]

## MATERIALS AND METHODS

The study was carried out in Community Health Center Haliyal, with attached Directly Observed Treatment, Short course (DOTS) center. This was a prospective study. Duration of study was from December 2015 to March 2017. All patients with symptoms of obstructive lung disease were involved in the study. Planned data was collected and recorded. Patients of COLD with history of pulmonary tuberculosis were also involved in the study.

### Aims and Objectives

1. To assess the prevalence of asthma, chronic bronchitis and emphysema symptoms in adults.
2. To search for underlying causative factors that may influence the development of obstructive lung diseases.
3. To study and prevent exacerbating factors.
4. To educate patients and prevent exacerbations and complications in the COPD cases.
5. To study correlation with Smoking habit
6. To study correlation with Occupation and socio-economic status.[6]
7. To study influence of sugarcane industry on prevalence of COLD.

### The Following Details were Recorded

**1. Personal Data:**

Age, sex, occupation, was noted down. A detailed occupational history was taken, inquiring about the age at start of the occupation, exact nature of work, hours of work, nature of any protective devices used etc.

**2. Symptoms**

Chief complaints were noted and a detailed account of each was obtained. The complaints specifically sought for included: fever, cough, expectoration, haemoptysis, chest pain, breathlessness (sudden/gradual), loss of weight, loss of appetite etc.

**3. Past History**

Any significant past medical history was noted. Patients with past history of tuberculosis were categorized differently for analysis.

**4. Personal History**

Smoking history and details in the form of duration and amount of smoking bidis, cigarettes or any other forms of tobacco smoke were recorded. The number smoked per day, any other addiction. In case of non-smokers, any history of smoking among other family members or friends was noted (passive smoking)

**5. Physical Examination**

A complete clinical examination was performed in all cases including general examination, examination of respiratory system in details and other systems wherever needed.

**6. Investigations**

Relevant investigations were done to arrive at a diagnosis and detect any associated condition or co morbidities. These included routine blood examination Haemoglobin (Hb), Total counts (TC), Differential counts (DC), Erythrocyte sedimentation rate (ESR), Fasting blood sugar. Chest x ray and sputum AFB was done in all suspected cases of associated pulmonary tuberculosis.

**RESULTS**

During study period total 508 cases of obstructive lung disease were detected. When compared to total patients examined during same period prevalence of obstructive lung disease was 3.4%.

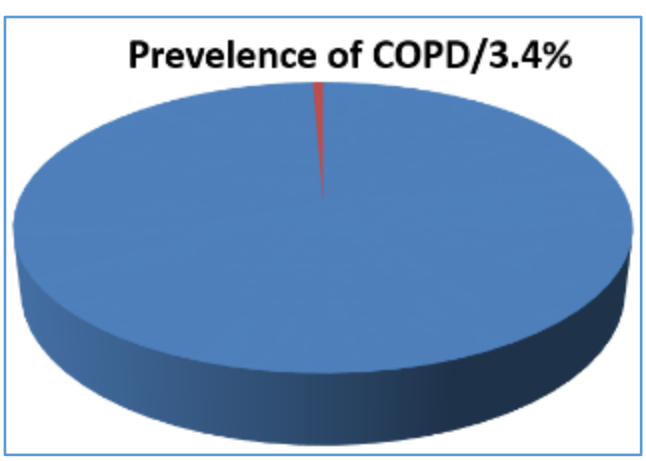


***Figure 1***

Out of 508 cases 312 (61. 5%) were male while 196 (38.5%) were female patients.

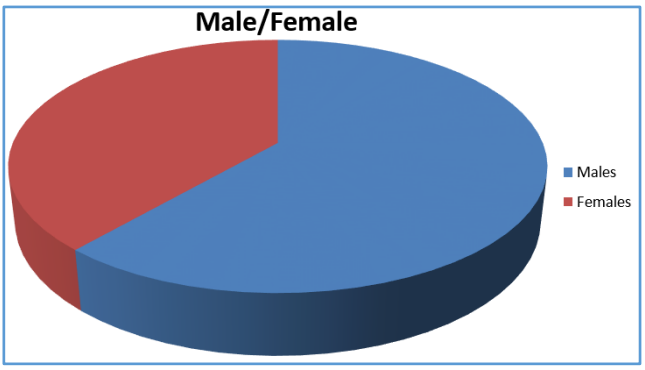


***Figure 2***

Out of 508 cases 406 (80%) cases were of chronic bronchitis, 95(19%) patients of COPD and 7(0.8%) patients had bronchial asthma. Out of 406 chronic bronchitis patients 5 had history of pulmonary tuberculosis, while out of 95 COPD patients 7 had history of pulmonary tuberculosis i.e. out of 508 patients total 12 patients (1.4%) had tuberculosis.

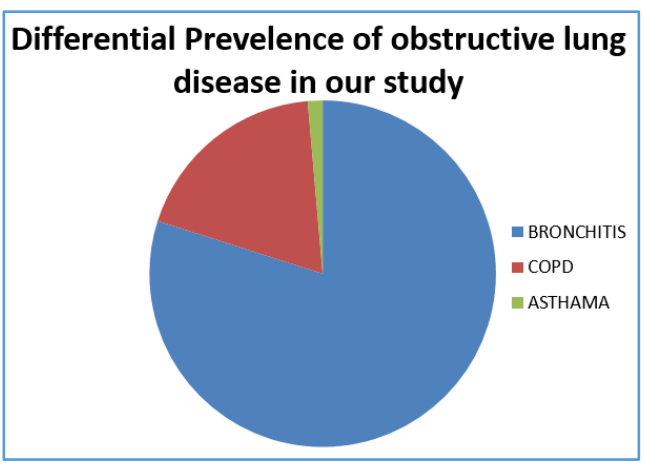


***Figure 3***

The prevalence of chronic bronchitis in smokers is five times the prevalence in non-smokers[1] and is similar to the values reported for light smokers in other surveys. In our study out of 508 patients 375(74%) had history of smoking bidis and cigarette. These observations suggest that cigarette smoking is associated with the development of chronic bronchitis.

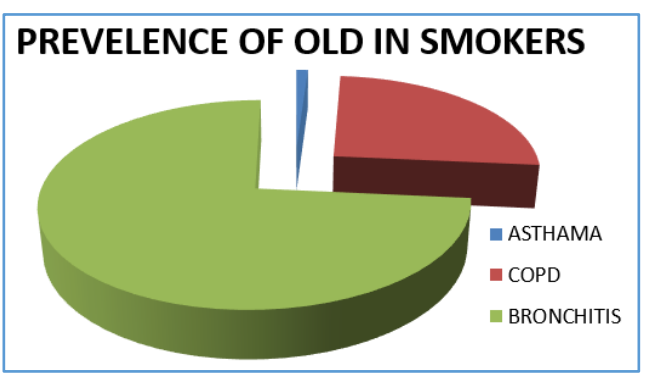


***Figure 4***

Air pollution has also major effect on exacerbation and progression of disease. Out of 508 patients 173 patients had history of working in industry or leaving near sugar cane industry. But these patients could not be confirmed with diagnosis of Interstitial Lung Disease as some were not affording for CT while others not willing and few referred had no follow up.

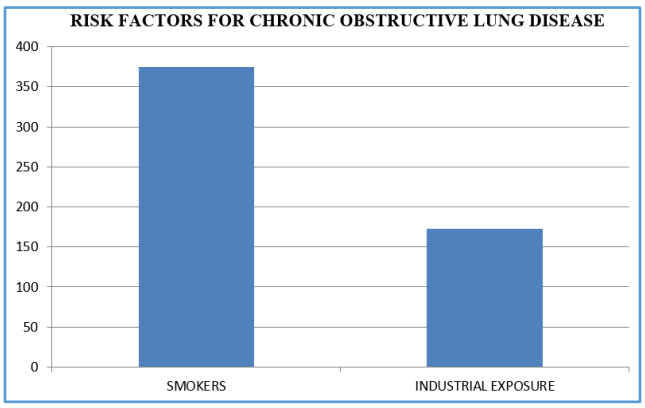


***Figure 5***

## DISCUSSION

COPD is a common health problem with increasing prevalence all over the world. It is important to know and evaluate the burden of this disease in our community. Although there is a considerable healthcare demand, COPD is still under diagnosed, inadequately evaluated and inadequately treated. Progressive, incompletely reversible airflow limitation is the main characteristic of chronic obstructive lung /pulmonary disease (COPD/COLD).

Clinical presentation, response to therapy and disease progression are heterogeneous among patients with COPD. Presentation differs from patient to patient. Patients with COPD suffer to varying degrees from chronic cough, expectoration of phlegm, dyspnoea and a variety of extrapulmonary symptoms. Several COPD phenotypes have been proposed, but only a few have been validated. One of these COPD phenotypes is the chronic bronchitis (CB) phenotype, which is generally defined as patients with COPD who experience chronic cough and sputum production for more than 3 months per year for two consecutive years. Other one is Emphysema where breathlessness is more prevalent than sputum production.

Although COPD is a chronic disease, acute exacerbations and the rate at which they occur determine the progression of the disease. Because COPD exacerbations have been associated with impaired quality of life, accelerated deterioration of lung function, increased risk of hospital admission and increase in mortality, they have an important impact on the healthcare-related costs.[4]

The Burden of Obstructive Lung Disease (BOLD) group recently reported an average global COPD prevalence of 10. 1% with wide variations across the participating countries.[7]

Acute exacerbations are also responsible for acute respiratory failure posing life-threatening emergency situations. They are also responsible for an enormous increase in economic burden of COPD.

Several comorbidities have been recognized in the recent past in association with COPD[8] There is a co-existence of other important conditions like tuberculosis (TB) as sequelae with COPD. This is considered to be important predisposing condition for the development of COPD and can seriously influence the course of the disease. Hyperviscosity and hyperuricaemia due to chronic hypoxia and secondary polycythaemia lead to secondary complications. Osteopenia, weight loss, hypoproteinaemia are other associations with COPD. The development of chronic cor pulmonale is most common complication, with associated pulmonary hypertension and right ventricular enlargement secondary to a chronic pulmonary disease. The increased cardiovascular mortality in COPD has added more burden due Systemic thromboembolic phenomena which can end in a medical emergency of pulmonary thrombo-embolism. Thus, COPD is also an important but relatively unrecognized cause of pulmonary thromboembolism. Bullae formation and pneumothoraxes are other important COPD related morbidities responsible for worsening of a stable condition.

## CONCLUSION

Mortality rates are substantially higher in patients with COPD than in the general population, which emphasizes the need for better primary and secondary prevention in patients with COPD.[7] The important objective in prevention should be to identify the risk factors for COPD and important comorbid conditions such as asthma and post-tuberculosis sequelae.[9]

In conclusion, from this study, there is a considerable rate of COPD occurrence in smokers and even among nonsmokers. The risk factors for COPD among non-smoking adults were:

1. Old men with low education.
2. Patients for whom a long time had elapsed following the first diagnosis of pulmonary tuberculosis; and
3. Patients who had been highly exposed to environmental risk factors. In our setup, industrial exposure was the risk factor. Therefore, the findings of this study support the following proposal with respect to prevention of COPD in future.

### Preventive Measures

Mortality rates are substantially higher in patients with COPD than in the general population, which emphasizes the need for better primary and secondary prevention in patients with COPD.[10]

First, it is necessary to inform the smokers about the risk factors associated with COPD occurrence, and to emphasize the need for preventing respiratory infections and counselling methods to quit smoking.

Second, individuals with a medical history of tuberculosis should be required to regularly undergo regular PFT to prevent deterioration of pulmonary functions and to thoroughly track and observe their conditions.

Third, the labourers in the construction or mining industry should be aware of the fact that they may be diagnosed with COPD even if they do not smoke, and also that they must wear protective gear to block out dust; they

must also be informed about the characteristics and risks associated with their work environment.

Fourth, people living nearby industries and factories must be encouraged to wear a mask when outdoors to protect themselves against risk factors. Old cooking utensils must also be replaced to prevent accumulation of lead in the lungs.

Fifth, a follow-on replication study is suggested on nonsmokers diagnosed in PFT after using a bronchodilator as in clinical setting.

Finally, future research should include PFT on the elderly (aged >60 years)[2]. Proportion of subjects reporting chronic bronchitis symptoms increased with age, worse lung function and exposure to potential risk factors.[11]

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