Original Research Article

Profile of COPD Patients in Rural Population Attending Rural Tertiary Health Care Centre of Central India

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ABSTRACT

Background: *Chronic obstructive pulmonary disease (COPD) is a major worldwide health problem that has an increasing prevalence and mortality. Exacerbations and co-morbidities contribute to the overall severity in individual patients. Although COPD is a lung disease, it is associated with systemic manifest-ations and co-morbid conditions. So assessment of various co-morbidities and early intervention can cause decrease in hospital stay, improvement in quality of life and decrease mortality, in COPD patients.*

Aim: *To study the prevalence of various co-morbidities in patients of COPD in rural population.*

Methods: *A cross sectional study was conducted on 48 patients in UPUMS Saifai attending department of medicine between October 2016 to March 2017.Various co-morbidities were assessed by clinical, haematological, biochemical and radiologically*

Results: *In our study we found that all the patients included had at least one co-morbid condition. 30% patients were having 3 co-morbid condition and 16% patients were suffering from 4 co-morbid conditions.*

Conclusion: *Patients with higher GOLD groups had more number of co-morbid conditions. Early detection and treatment of various co-morbid conditions is required so that there will be decrease mortality and hospital stay as well as improve quality of life.*

Introduction

Chronic obstructive pulmonary disease (COPD) is a major worldwide health problem that has an increasing prevalence and mortality. The Global Initiative for Chronic Obstructive Lung Disease (GOLD) and the World Health Organization (WHO) defines COPD as follow.-"Chronic obstructive pulmonary disease (COPD), a common preventable

and treatable disease, is characterized by 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. Exacerbations and comorbidities contribute to the overall severity in individual patients."

It is now agreed that an estimated 210 million people have COPD worldwide[1].The highly cited, influential Global Burden of Disease (GBD) studies estimated that COPD causes the death of at least 2.9 million people annually. The GBD highlights that COPD was the sixth leading cause of death in 1990, has been the fourth since 2000, and is projected to be the third by 2020[2]. By 2030 COPD will be the direct underlying cause of 7.8% of all deaths and will represent 27% of deaths related with smoking, only surpassed by 33% for cancer and 29% for cardiovascular disease[3].

There are comprehensive lists of risk factors associated with the development and triggering of COPD exacerbations[4]. Although COPD is a lung disease, it is associated with systemic manifestations and co-morbid conditions[5]. The most common comorbidities are ischaemic heart disease, diabetes, skeletal muscle wasting, cachexia, osteoporosis, depression, and lung cancer[6]. These comorbidities affect health outcomes, increase the risks of admission to hospital and death, and account for more than 50% of use of health-care resources for COPD[7]. They also explain why clinical features in patients with COPD do not correlate well with FEV_1[8]. One common denominator across comorbidities is systemic inflammation. Increased concentrations of circulating cytokines (tumour necrosis factor α and interleukins 6 and 8), adipokines (leptin, ghrelin), and acute-phase proteins (C-reactive protein, fibrinogen) are seen in most of the diseases. Furthermore, all described risk factors have been directly linked to the presence of systemic inflammation[5]. There is no doubt that comorbidities increase the risk of hospitalisation and mortality in COPD patients, especially as the airway obstruction becomes more severe[9]. So assessment of various comorbidities and early intervention can cause decrease in hospital stay,

improvement in quality of life and decrease mortality, in COPD patients.

Materials and Methods

This was a cross sectional study conducted in UPUMS Saifai between October 2016 to March 2017.

Inclusion criteria

- Diagnosed case of COPD having X-Ray and Spirometric evidence.

Exclusion criteria

- Patients who presented with exacerbation not due to COPD but because of other disease like bronchial asthma, bronchiectasis interstitial lung diseases etc.
- Patients with multiple organ failure
- Haemodynamic instability
- Pregnant women
- Those patients who refused consent

Study Size: Those patients who satisfied inclusion criteria were included in this study.

All selected patients underwent following investigations

Complete blood count, renal and liver function tests, random blood sugar, HbA1C, Lipid Profile, C - reactive protein titre, X-ray chest PA view, ECG, Echocardiography with 2D colour Doppler of heart, ABG analysis, MMRC grading, Body mass index

Statistical Analysis: Statistical analysis was done using SPSS 22.0.

Results

Total 48 patients were included in our study. We had 35 males patients and 13 females patients. COPD is rare before the age of 40.


Sex Distribution in Study
Female ■ Male
27%
73%
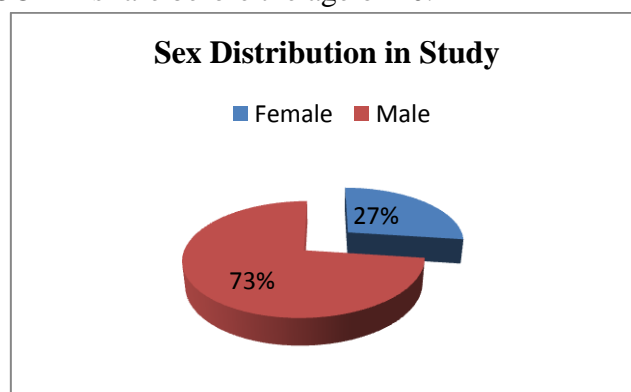
Youngest of our patient is 47 year of age and oldest is 80 year with mean age 62.79 years.
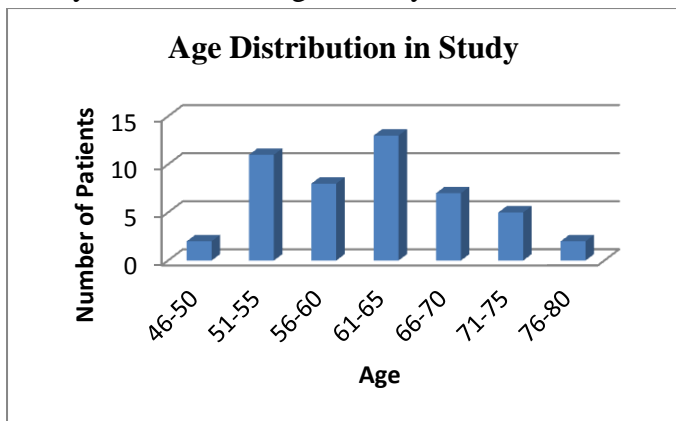
Age Distribution in Study

Smoking is the most important risk factor as 71% of our patients were smoker, 12% patients had risk factors other than smoking like exposure to biomass fuel which is more important in rural India, especially in females and occupational exposure. In our study we had 17% patients which had no identified risk factors.

Risk Factor: Smoking
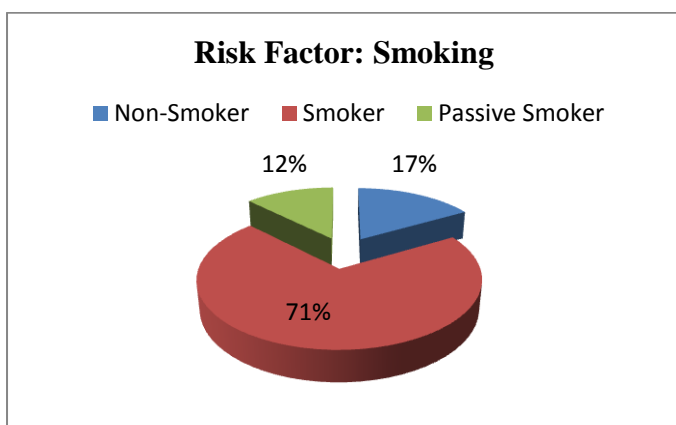
Serum C - reactive protein (CRP) levels are markers of systemic inflammation. As COPD is associated with chronic systemic inflammatory response so CRP can be used as a biomarker in patients with COPD. In our study we found that 52% patients with COPD had raise CRP titre. Raised CRP titres are indication of systemic inflammation which is responsible for various comorbid conditions.
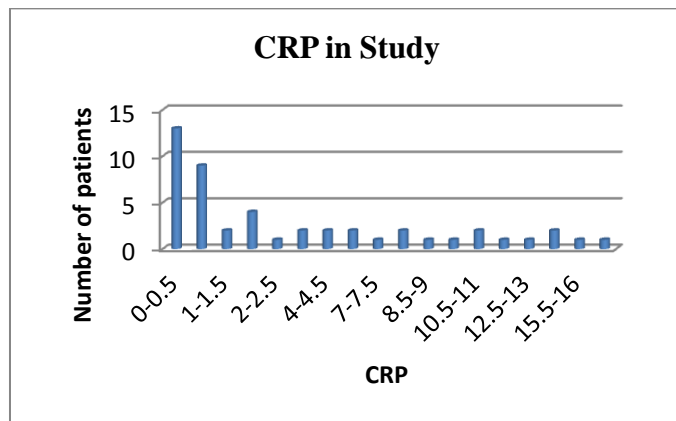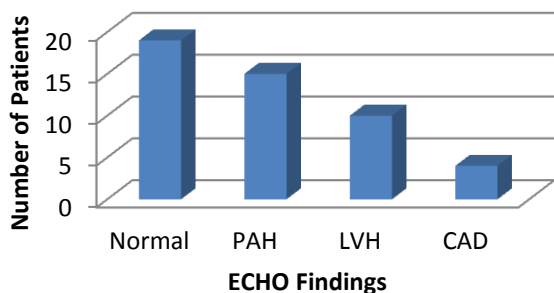
CRP in Study

In our study we found that all the patients included had at least one comorbid condition. 30% patients were having 3 comorbid condition and 16% patients were suffering from 4 comorbid conditions. This shows presence of high prevalence of comorbidities among COPD patients.

37.5% patients with COPD had BMI less than 21 kg/m2. COPD patients had low BMI due to loss of fat free body mass.
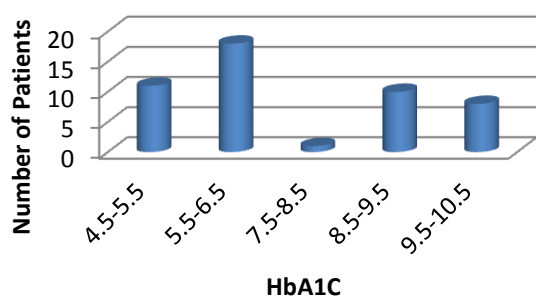
BMI in Study
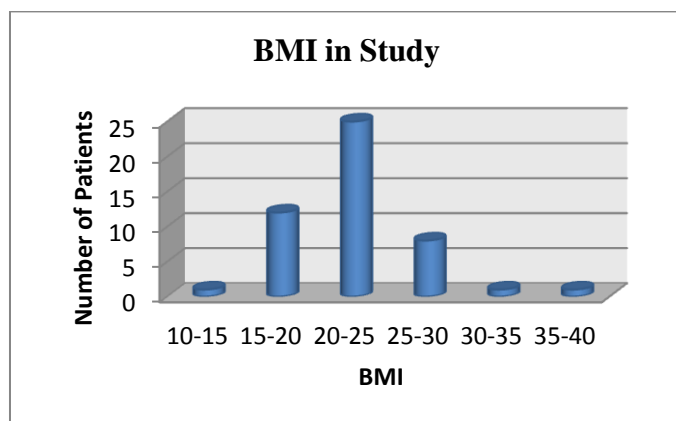
Cardiac co-morbidities: In our study we found 60% of COPD patients had significant findings in 2D-ECHO. Pulmonary artery hypertension (PAH) was found in 31.25%. LVH was found in 20.83%. In our study we found that 48% of patients had either increase blood pressure or had controlled blood pressure with the help of some anti-hypertensive.

2D-ECHO Findings in Study

calculate glomerular filtration rate (GFR). 25% of patients had increase serum creatinine levels (>1.4mg/dl). 39.58% of patients have significant increase in blood urea levels (>44mg/dl). 8.33% of patients had severely reduced GFR (<30ml/min/1.73m2), while 56.25% of patients had moderate reduction in GFR.
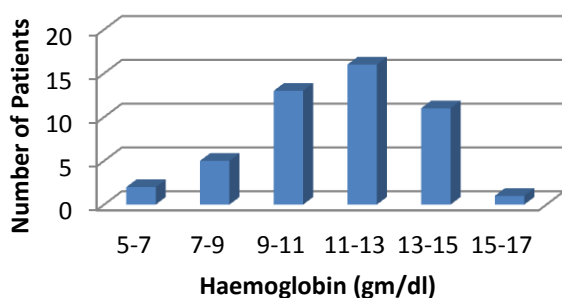
Diabetes: In our study we find there is increase prevalence of diabetes in patients with COPD. We looked for Hba1c level to look for long term glycaemic control and random blood sugar. 39.58 % of patients have raised HbA1c levels. Although only 18.75% of patients have raised random blood sugar level.

GFR in Study

HbA1C in Study

Dyslipidaemia: 29.17% of patients had increase serum cholesterol levels. 37.5% of our patients had decrease serum HDL levels (<40mg/dl). 25% of patient had increased serum triglyceride levels.14% of patients had increased serum LDL levels.

Anaemia: COPD patients have anaemia of chronic diseases. Although COPD patients had raised haematocrit but due to persistent systemic inflammation COPD patient showed increase prevalence of anaemia. 41.67% patients have hemogloblin less than or equal to 11g/dl.
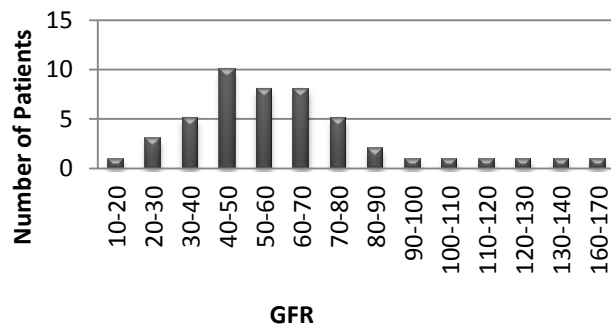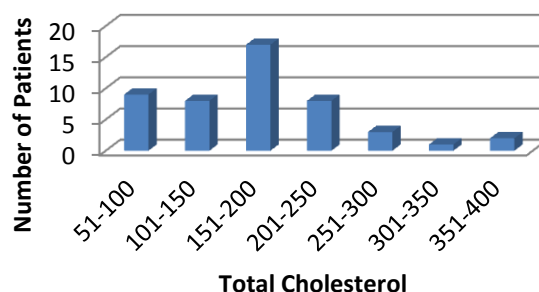
Total Cholesterol in Study

79.17% of our patients had hypercarbia, while 14.58% patients had hypoxemia and 22.92% patients had uncompensated respiratory acidosis.

Haemoglobin Concentration in Study

pCO2 in Study

Renal impairment: To find renal impairment we saw serum creatinine and urea levels. Then we
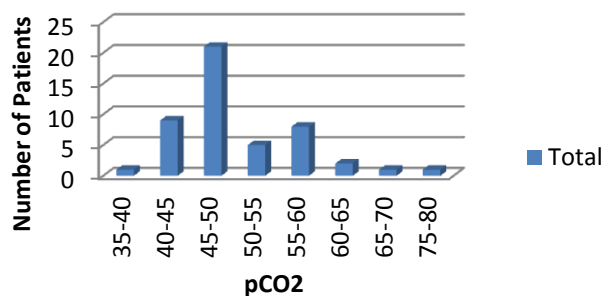
Most of the patients (72.91%) included in study belong to GOLD Spirometeric Class 2 and 3.
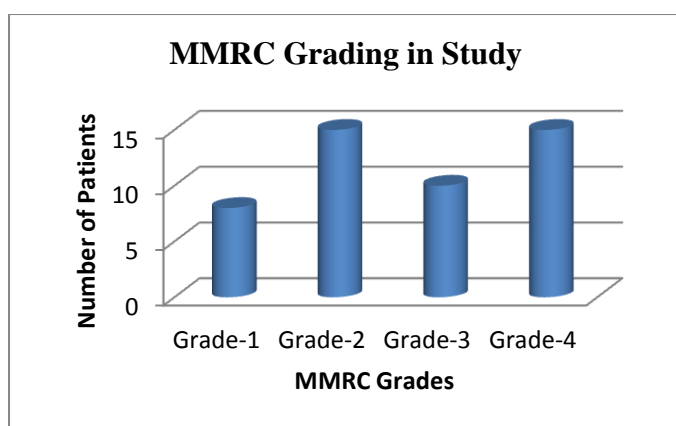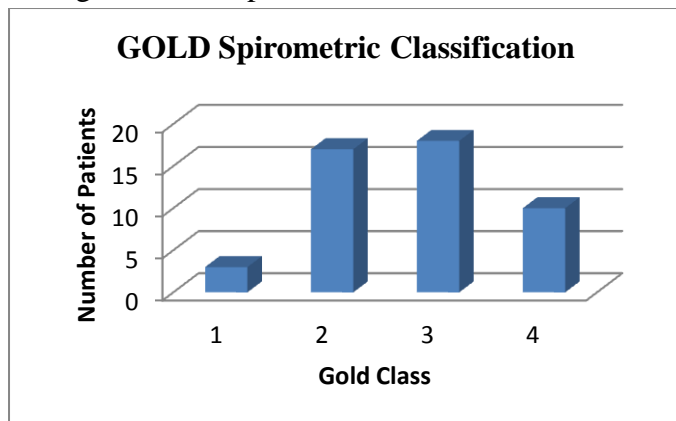
GOLD Spirometric Classification

MMRC Grading in Study

Discussion

Chronic Obstructed Airways Disease (COPD) is fourth leading cause of death and it is estimated that it is going to be third by the year 2020. Now it is well known that COPD is not only an airway disease. Its systemic manifestation is documented by various studies[10]. In our study we found many systemic manifestations like anaemia, diabetes, cardiovascular diseases, renal impairment, dyslipidaemia, muscle wasting etc. All these listed in historical document "Systemic manifestations and co-morbidities of COPD"[10].

Smoking is the most important risk factor as 71% of our patients were smoker, 12% patients had risk factors other than smoking like exposure to biomass fuel which is more important in rural India and especially in females. When a person who has no history of smoking get exposed to other risk factors like Post TB Bronchiectasis, Biomass Fuel Exposure, Occupational exposure etc, will have 10.5 times more chance of developing COPD. This observation is also supported by study that the use of biomass fuels (e.g. use of wood for cooking and heating) increases the risk of COPD by three to four times, contributing significantly to COPD prevalence, especially in rural regions[11]. In our study we had 17% patients which had no identified risk factors so there is requirement of more research to identify factors leading to COPD in such patients. Joint exposure to smoking and occupational factors has been shown to multiply the risk of COPD[12].

COPD is associated with chronic inflammatory state of the body. Various inflammatory biomarkers had been studied in various studies. Serum C - reactive protein (CRP) levels are important marker of systemic inflammation. In our study we found 52% patients had raised CRP titre. Our findings are supported by study conducted by Pinto-Plata VM.et all[3]. Conclusion of their study was CRP levels are raised in COPD patients without clinically relevant ischemic heart disease and independent of smoking, and reduced in patients using inhaled corticosteroids (ICS). CRP may be systemic marker of inflammatory process that occurs in patients with COPD.

Our all patients had at least one co-morbidity which is supported by previous study by Kerry Schnell; Carlos O Weiss et al.[14] They found 96% of their patients had at least one comorbid condition. Our 82% patients included in the study had two, 16% had 4 co-morbid conditions. This shows high prevalence of comorbidities in COPD patients.

31.25% patients participated in our study had Pulmonary Artery Hypertension (PAH). Similar type of results was shown in study done by Elwing J, Panos RJ et al[15] in which they approximate the prevalence of PAH in COPD about 10-30%. Vascular remodelling is mainly responsible for PAH. Systemic vasodilators have not been found to be effective therapy.

In our study there is increase prevalence of left ventricular hypertrophy (LVH) and coronary artery disease (CAD). We found 20.83% of patients having LVH and 8.33% patients were suffering from CAD. Study conducted by Lange Peteret al[16] found prevalence rate 17.7% for LVH in patients of COPD. Increase prevalence for CAD may be related

to common risk factor (smoking) for both COPD and CAD.

There is increase prevalence of hypertension has been seen among COPD patients. In our study we found 48% of patients either had increase systolic blood pressure or blood pressure controlled with some anti-hypertensive drugs[17].

Conclusion

Chronic obstructive pulmonary disease (COPD) is a complex disease involving more than airflow obstruction. Smoking is the most important risk factor. Environmental and genetic factors both play a role in pathogenesis. The ''spill-over'' of Inflammatory mediators into the circulation may result in important systemic manifestations of the disease. Systemic inflammation may lead to various comorbid conditions, such as ischaemic heart disease, heart failure, pulmonary artery hypertension, anaemia, diabetes, renal impairment and dyslipidaemia.

Serum C - reactive protein (CRP) levels are important marker of systemic inflammation. Cardiac co-morbid condition such as PAH, LVH, CAD had high prevalence among COPD patients. Diabetes, hypertension are more prevalent in COPD patients. Cardiac co-morbidities are always highlighted but there is significant amount of renal impairment in patients with COPD. Renal impairment is a neglected co-morbid condition in patients with COPD. COPD patients have low BMI.

The MMRC dyspnoea scale is a simple and valid method of categorizing patients with COPD in terms of their disability that could be used to complement FEV1 in the classification of COPD severity. With the decrease in serum cholesterol level, MMRC grading and left ventricular ejection fraction increases.

Patients with higher rank in GOLD spirometeric classification had more number of co-morbidities. Patients with higher group in GOLD groups had more number of comorbid conditions.

Early detection and treatment of various comorbid conditions is required so that there will be decrease in mortality and hospitals stay as well as improve quality of life. Due to small data and demographic variation among rural and urban population, this study demands for larger scale rural population based studies in future.

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