COMORBID CONDITIONS AND MANAGEMENT STARTEGIES IN COPD PATIENTS: A RETROSPECTIVE OBSERVATIONAL STUDY

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ABSTRACT

Objective: To evaluate the different comorbid conditions in subjects diagnosed with Chronic Obstructive Pulmonary Disease (COPD) and their treatment approaches. **Methods:** Retrospective observational cohort study was conducted in Inpatient Respiratory department at Bongu Bheem Rao (BBR) super speciality hospital from July 2017 to December 2017 and a total number of 318 case records of subjects diagnosed with COPD, regardless of senility, belonging to both genders were collected from the subjects case sheets. **Results and Discussion:** among the subjects, the number of men and women are 268 and 50 respectively. of which, 108 (33.96%) males and 28 (8.80%) females are affected with a habitat of smoking. Cardiovascular comorbidities (61.3%) is recorded to be more prevalent comorbidity than other comorbid conditions inherited in the study and percentage of drug usage is high in antibiotics (58.2%). **Conclusion:** The highest incidence of comorbidities was recorded in cardiovascular diseases along with COPD. The main cause of COPD observed is due to smoking as half of the subjects are diagnosed with a habitat of smoking. Males are affected with a higher risk than females. High percentage of drug usage is found with the antibiotic class of drugs.

KEYWORDS: Chronic obstructive pulmonary disease, Comorbidities, Smoking, Exacerbations, Mortality.

INTRODUCTION

Chronic Obstructive Pulmonary disease is a chronic respiratory condition which involves an acceleration in inflammatory disease process of the lungs.[1] It is signalized by various conditions namely airflow limitation, inflammation, and tissue remodelling.[2] In COPD, the lungs are damaged due to oxidative stress, increased cytokine release as a result of inflammatory process, increased protease activity and hyperinflation of the lungs.[3] COPD an increasing global health issue due to enhanced rate of smoking habitats, changes in life change modification and is expected to be the fourth leading cause of mortality across the global village by 2030.[4] It accounts for almost 5% of overall deaths worldwide.[5] The estimated prevalence rates on the genders (males and females) ranges from 2-22% in males and 1.2% - 1.9% in females respectively.[6] Progression of COPD increases with aging process, highest prevalence was among the geriatric population (age>60 years) was found that the prevalence rate was higher in men when compared with women.[7] Prevalence, mortality and morbidity among the individuals diagnosed with COPD vary among the different groups of countries. However, in general, the individuals are from the air pollution as a result of devastation of natural green reserves.[8] COPD does not simply contribute to death, it progress to alterations in day to day life, social and disrupt the thinking abilities.[9] The burden of the disease (COPD) is further accelerated with concurrent comorbidities.[10] Individuals with chronic airflow limitation in COPD are at an increased risk factor for cardiovascular comorbidities,[11] besides, it is also a trending factor of mortality and hospitalization in the individuals with mild to moderate disease.[12] Concomitant diseases (comorbidities) in subjects with COPD inherit are cardiovascular diseases, respiratory diseases, Haematology diseases, excretory diseases.[13] Researchers in their studies are in accordance with the assertion that prevalent comorbidities among COPD individuals include namely anxiety/depression, pulmonary artery hypertension, metabolic diseases, gastro oesophageal reflux diseases (GERD) and chronic kidney disease (CKD).[14] Exacerbations of COPD leads to increased death rates accompanied with the disease.[15] Smoking habitat is a vital risk factor for COPD all over the world and cessation of smoking is the non-pharmacological intervention to bring the disease progression to the horizon.[16] Irrational usage of drugs is a major issue to be concerned about, in the present clinical practice, over half of the medications that are

being prescribed, dispensed or sold inappropriately to the patients, where they are lack in knowledge of administration which eventually leads to death.[17] The study may evaluate the clinical impact of comorbidities, prevalence and their association among the COPD subjects in terms of percentage. The aim of the current study is to explore the association of wide range of different comorbid conditions, exacerbation risk, mortality rate, effect on the basis of gender and to assess the treatment approaches among COPD subjects.

METHODS

This 6 months, retrospective, observational cohort study was conducted in Inpatient respiratory department at BBR super speciality hospital, Balanagar, Hyderabad from July 2017 to December 2017.The Local Ethics Committee approved the study protocol(). Cases of COPD subjects with different comorbidities who had attended the study location in the yester years were collected from the medical record department. Subjects with irrespective of senility who were diagnosed with COPD accomplished with the comorbid conditions inherited in the study (Cardiovascular diseases, Respiratory diseases, Haematological diseases and Excretory diseases) were eligible for inclusion. Subjects with none of the comorbidities mentioned in the prior statement, besides, who were primarily diagnosed with COPD were not included in the study. Subjects were also excluded if other comorbidities are diagnosed regardless of the included comorbidities. The data was analysed through SPSS (Statistical Package for the Social Sciences) software.

Clinical impact of comorbidities among COPD patients: **Psychiatric comorbidities:** Comorbidities of mental disorders namely anxiety or depression in subjects diagonised with COPD anticipates have reduced health related quality of life, reduced exercise capacity and higher rate of exacerbations and increased death rates**.**[14]

Cardiovascular comorbidities: Pulmonary artery hypertension (PHT): Hypoxia, a critical condition, which provokes the progression of COPD accompanied with PHT. Hypoxia induces pulmonary vasoconstriction and pulmonary vascular remodelling in the form of intimal thickening and muscularizations of arterioles, thereby increasing pulmonary vascular resistance, pulmonary hyperinflation, endothelial dysfunction, polycythaemia and inflammation in-patients with COPD.[14]

Ischaemic heart disease (IHD): Chronic systemic inflammation escalates series of events namely atherosclerosis, vascular endothelial dysfunction and exacerbation. Vasodilation of endothelium (dependent and independent) was significantly altered in subjects with COPD, further leading to IHD.[14]

Haematological diseases: Owing to the inflammatory response in COPD,which results in increased rates of cytokine production, it results in condition namely anaemia, iron deficiency.[18]

Neurological diseases: Amount of air that is inhaled into the lungs is reduced in case of COPD, consequently it results in neuronal damage due to the reduced oxygen levels in the blood. This phenomenon could increase the risk for memory problems due to the fact that the various body chemicals are being elevated as a response of inflammation in COPD, are linked to thinking and memory problems**.**[19]
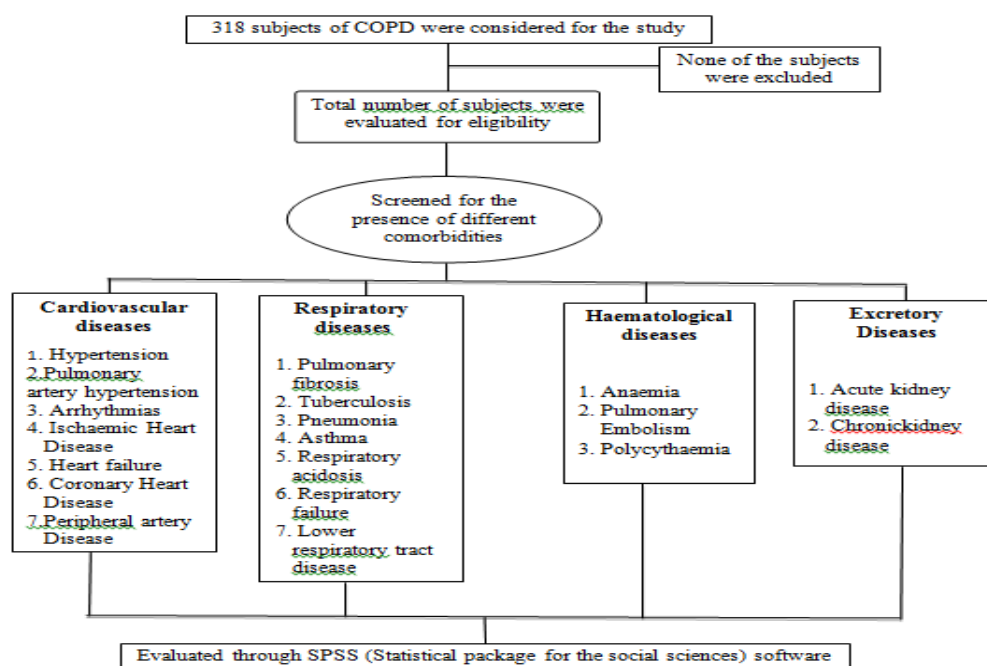

Fig-1: Representation of subjects eligibility, inclusion, exclusion, screening, evaluation.

Metabolic diseases (Diabetes): Biochemical changes in the structure of the lung tissue and airways as a result of impaired lung function, diabetes and involves a chain of mechanisms likely due to systemic inflammation, oxidative stress, hypoxia or direct damage by chronic hypoglycaemia. Increased serum osmolarity (blood sugar contributes to the total serum osmolarity) is associated as a consequence of reduced lung function. Thus COPD is associated with increased risk of glucose intolerance.[20]

Excretory diseases: The proportion of subjects with COPD have a reduced muscle mass, and thus, serum creatinine might be low as a result of decreased creatinine release leading to renal dysfunction, which can be measured by glomerular filtration rate (GFR).

RESULTS
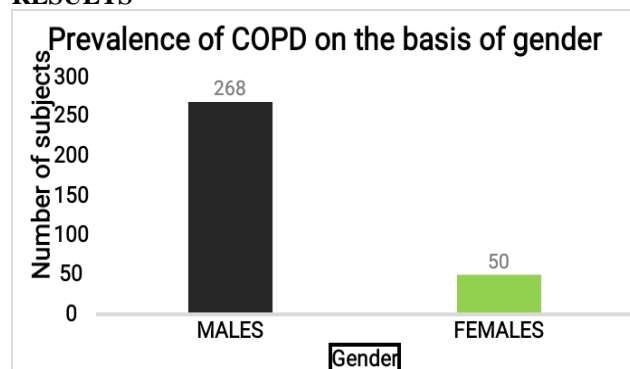
Fig-2: The bar graph illustrates the prevalence of COPD among males 268 (84.27%) and females 50 (15.72%).

Majority of the subjects involved in the study were enrolled with the social habitat of smoking which can be depicted in the **Figure-3**, the majority of subjects involved in the study was determined with exacerbations (**Figure-4**)
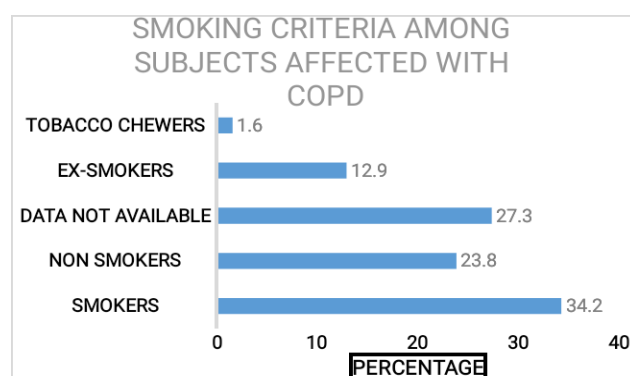
**Fig-3: The bar graph illustrates the percentage of subjects affected with smoking habitat.**
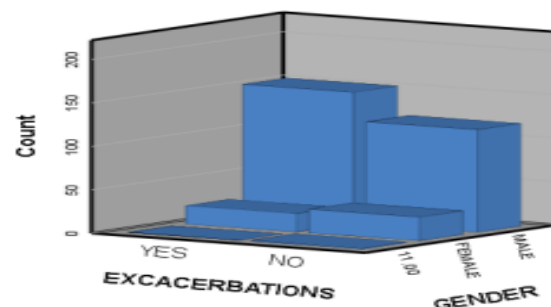
**Fig-4: Bar graph representing the Rate of Exacerbations stratified by Gender among the study population.**

Here, YES= Incidcence of exacerbation in males and females respectively, NO= No incidence of exacerbations in males and females respectively.

48.7% of the individuals with a smoking habitat are prone to COPD Rate of exacerbations in the present study among COPD patients was found to be **53.8%** Mortality rate was observed to be **13.2%.**

Cardiovascular disorders(CVD) with (**61.3%**) is more commonly enrolled comorbidity when compared with respiratory disorders (**39.3%**), Haematology disorders (**4.4%**), Excretory disorders(**13.5%**) are included in the study.(**Figure-5**)
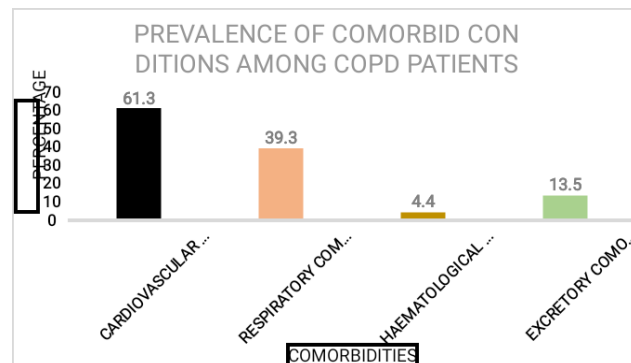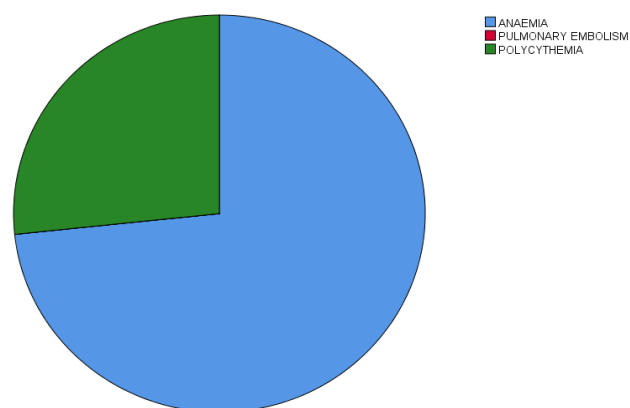

Fig-5: The bar chart describes about the prevalence of different comorbidities involved in the study among COPD patients.
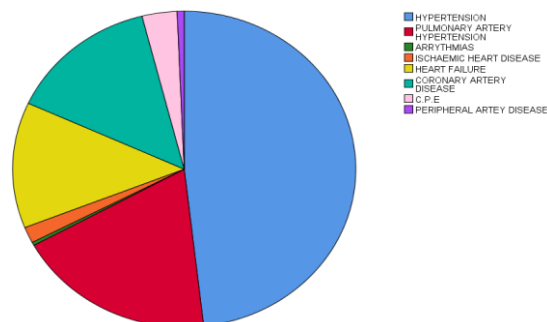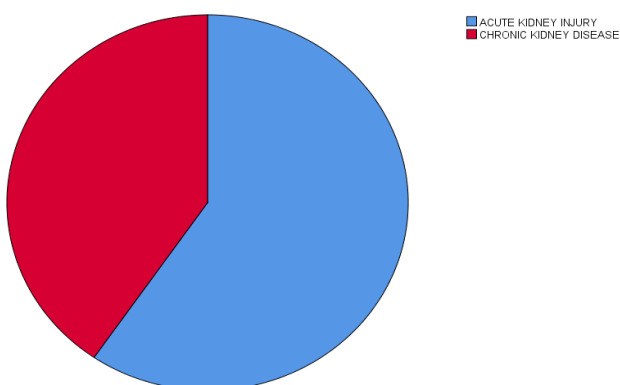

Fig-6: Representation of individual co morbidities of cardiovascular diseases which are depicted in COPD population.
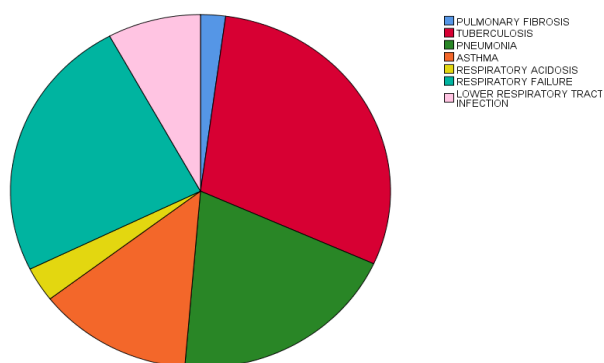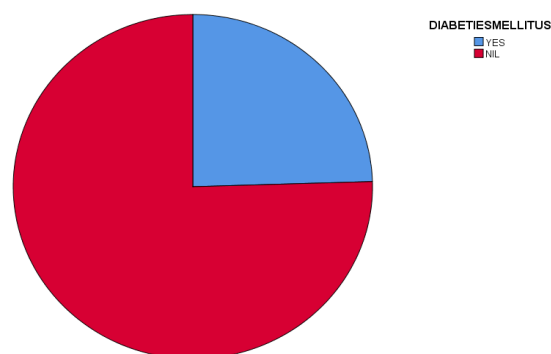
Fig-7: Representation of individual comorbidities (pulmonary fibrosis, tuberculosis, pneumonia, asthma, respiratory acidosis, respiratory failure, LRTI) of Respiratory disorders, that are depicted in COPD patients (N=318).

Fig-10: Pie graph depicting the presence of Diabetes mellitus in Total study population. YES= Subjects with diabetes mellitus, NO= Subjects without incidence of diabetes mellitus.

Fig-8: Representation of individual comorbidities (Anaemia, Pulmonary Embolism, Polycythemia) of Haematological disorders that are depicted in study population.

Fig. 11: Pie graph depicting the presence of anxiety in Total study population. YES= Subjects with anxiety, NO= Subjects without anxiety.

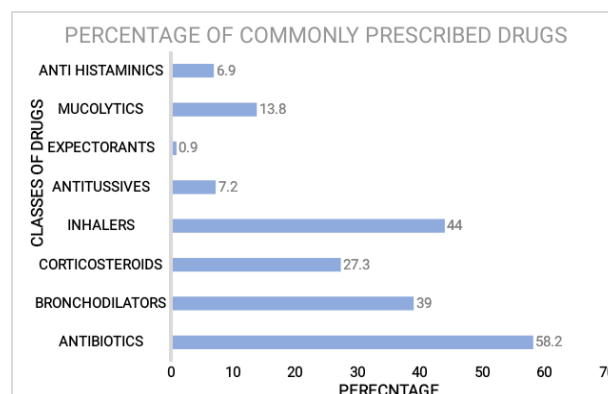**Fig-12: Representation of classes of drugs prescribed among COPD in terms of percentage.**

Fig-9: Representation of Individual comorbidities of Excretory diseases (Acute Kidney Injury, Chronic Kidney Injury) that are depicted in COPD patients (N=318).

Table-2: **Categories of drugs used.**

Class of drugs	Percentage of patients prescribed
Antibiotics	58.2%
Bronchodilators	39%
Corticosteroids	27.3%
Inhalers	44%
Antitussives	7.2%
Expectorants	0.9%
Mucolytics	13.8%
Anti-histamines	6,9%

DISCUSSION

The present data of the study, explores an assertion that, COPD is most commonly affected in males than females, this finding is in accordance with the results of previous study conducted by [Sawant MP et al].[17] Observed more commonly in the age group of 50-80 yrs and the minimum age being 26yrs diagnosed with COPD which was observed in previous studies as 64% were male and the median age was 73yrs [Baty et al][13] **48.7%** of the individuals with a smoking habitat are prone to COPD and our study results are minimal to the findings of [Sawant MP et al].[17] Previous research has shown that cardiovascular, metabolic and psychiatric comorbidities are highly prevalent in COPD patients [Westerik et al][21] and our results tally with the first two findings, but are in contrast with the 3rd finding. CVD was found to be the strongest associated comorbidity in terms of statistical significance and lowest risk was associated with Anxiety. Previous research has shown that **60.4%** of the study population have been evaluated with hypertension[Schnell et al][22] which complies with our study where we observed , among all the cardiovascular comorbidities that we have considered in our study, Hypertension was most frequently observed comorbidity(**Figure-6**). As per our study data, an average number of drugs prescribed were 10 drugs per patient which is lower than the results of previous study by [Bahmed F et al], but it is higher than WHO norms and previous similar study by [Shinde et al], states that average number of drugs per prescription should be 2 to 3 drugs [Sawant MP et al].[17] Antibiotics are most commonly prescribed drugs, **58.2%** of study group patients were prescribed with antibiotics and is lower than the results of the previous studies. Inhalers was prescribed to be **44%** which are lower than results obtained by [Sawant MP et al][17]

Strengths and Limitations

The strengths of the present study include the large cohorts of subjects, a sensible length of follow-up and well evaluated outcomes. However, the study subjects were not chosen to reflect the population of a country, so this study emphasis on a local populace in one particular area. Nevertheless, even though this is a study involving large number of subjects, subgroups of interest is divided into 4 categories (each category involving subjects with COPD accompanied with particular comorbidity). In addition, the restricted category (exclusion criteria) was included based on the subjects with none of the comorbidities with COPD.

CONCLUSION

The present study discussed the prevalence of various comorbidities and drug use pattern in COPD patients. Comorbidities that are commonly associated with COPD in the study are cardiovascular disorders, haematological disorders, respiratory disorders and excretory disorders and the classes of drugs that are commonly used are antibiotics, bronchodilators, corticosteroids, inhalers, mucolytics, antitussives, antihistamines and expectorants. Finally on the basis of the above results the study concluded that Cardio vascular disorders (CVD) was the most prevalent comorbidity in COPD patients followed by Respiratory, Haematological and Excretory disorders. Effect of smoking in COPD is found to be more in men when compared with females and also half of the individuals included in the study are affected with COPD due to smoking. The incidence of the disease was to be higher in males when compared with females. The most commonly prescribed medications are antibiotics with highest percentage of drug usage followed with Inhalers, bronchodilators, corticosteroids, mucolytics, antitussives, antihistamines and expectorants.

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