PREVELENCE OF CHRONIC OBSTRUCTIVE PULMONARY DISEASE AND ITS COMORBIDITIES – A REVIEW

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ABSTRACT

Chronic obstructive pulmonary disease [COPD] is a common, complex, heterogeneous condition in which it is responsible for growing morbidity and mortality. The study describes about the prevalence of COPD and its comorbidities in two different studies. Study 1, the prevalence of different comorbidities in COPD patients by gender and GOLD stage. This study was a non-interventional, cross-sectional investigation. Study 2, Prevalence of chronic obstructive pulmonary disease and pattern of comorbidities in a general population. This is an epidemiological cross-sectional study. The total number of patients involved in study 1 was 1,216. Males were 880 members and females were 336 members. The comorbidities mentioned were Cardiovascular, respiratory, Metabolic, Oncologic, Neuropsychiatric, Gastroenterology, Osteo – Articular and other diseases. The overall percentage of comorbidities found was 3,198 and the male percentage was 2,182 and the female percentage was 1,016. In study 2, the total population examined in this study was 7,731,628 who are NHS users. Out of which the 3,535,371 were about 45 years old and above. In that 462,894 were using respiratory agents. The number of male patients was 1,603,364 and the percentage is about 45% of ≥45 years of age and the number of patients exposed to ≥ 1 respiratory drug was 205,711 and the percentage was about 44%. The number of female patients was 1,932,007 and the percentage is about 55% of ≥45 years of age and the number of patients exposed to ≥1 respiratory drug was 257,183 and the percentage was about 56%.

KEYWORDS: COPD, patients, prevalence, comorbidities, percentage.

INTRODUCTION

Chronic obstructive pulmonary disease [COPD] is a common, complex, heterogeneous condition in which it is responsible for growing morbidity and mortality.[1] Global obstructive pulmonary disease [GOLD] therapeutic strategies in early versions can be used to assess the disease severity and to follow therapeutic decisions as a function of the degree in airflow limitation. The terms such as "precision", "personalized" and "individualized" are mostly used by the clinicians and investigators. Precision medicine is widely used for assessing genetic, biomarker, phenotypic, psychosocial characters to identify differences between the patients with similar diagnosis by this information it will help the providers to anticipate the disease course and patient response to estimate the efficacy inpatient therapy and finding errors ineffective therapy.[2] In previous years, the GOLD therapy strategy limited the use of spirometry alone to evaluate the severity of the disease and to follow therapy. COPD can significantly affect the other organ's functions such as heart, liver, kidney, vasculature, brain, etc. The limitation of the airflow that indicates COPD is due to the combination of diseases in small airways like obstructive bronchiolitis, parenchymal destruction like

Emphysema. The risk of COPD patients having HIV has been increasing in contemporary.[1] The awareness of the use of antiretroviral drugs in combination helps to improve the condition. One of the primary risk factors of COPD is tobacco consumption. COPD can also cause disturbances in activities of daily living, social, psychological functioning and recreational activities. 7 – 42% of COPD patients with a comorbidity of depression have been found and were four-time more frequent when compared to non - COPD patients. According to the estimation of WHO this condition will be the third most major cause for death by 2020 the followed by coronary and cardiovascular diseases.[2]

MATERIALS AND METHODS

In Study 1, the prevalence of different co-morbidities in COPD patients by gender and GOLD stage. This study was a non-interventional, cross-sectional investigation done on a centralized database of the lung unit and was done a period of about May 2012 – April 2015, the patients were automatically and anonymously selected. The data collected in the subject were as follows: age, gender, BMI (Body Mass Index), Charlson comorbidity Index (CCI), FEV_1 (Forced Expiratory Volume in one

second) value in liters and as percentage in predicted value and the ratio of FEV_1/FVC (Forced Vital Capacity) as % predicted ratio. Comorbidities were grouped into firstly cardiovascular, respiratory, metabolic, oncologic, digestive, neurologic/ psychiatric, osteoarticular disorders. Most frequent disorders were grouped in the second phase. The data was analytically ranked and distributed according to the gender and different GOLD stages were used to rank the comorbidities in the data. The statistics used in this study were descriptive and non – parametric tests.

In Study 2, Prevalence of chronic obstructive pulmonary disease and pattern of comorbidities in a general population. This is an epidemiological cross-sectional study and conducted with the help of administrative health services databases about 22 Italian Local health units (LHU) which are participating in the ARNO project. The populations included were about 7,731,628 and the period was about January 1st – December 31st, 2004. The out-patients prescription database was collected in this study. And has been used for the epidemiological studies and also for drug – exposure, chronic diseases, and population-based study outcomes. Consorzio Interuniversitario CINECA has managed these databases. To examine the epidemiological and therapeutic characteristics of the sample they have used descriptive statistics and the prevalence is calculated according to the number of patients receiving one or more COPD index drugs per 100 individuals in the population. A percentage of the prevalence and rates along with the comorbidities have been done by age and gender of the patients.

RESULTS
The total number of patients involved in study 1 was 1,216. Males were 880 members and females were 336 members. The basic characteristics were recorded and the mean age was 706 ±99 in males and 69.7 ± 10.2. Current smokers were 218 (24.8%) in males, females were 91 (27.1%). Ex-smokers were 516 (58.6%) in male, 192 (57.1%) in females. BMI (Body Mass Index) was 28.6 ± 6.8 in males and 27.6 ± 5.5 in females. FEV1 (Forced Expiratory Volume in one second) in predicted percentage (%) was found to be 61.0 ± 19.8 in males and 63.7 ± 22.9 in females. FEV1 (L) was 1.4 ± 0.4 in males and 1.2 ± 0.7 in females. FEV_1/FVC (Forced Vital Capacity) was found to be 55.2 ± 9.8 in males and 56.3 ± 9.1 in females. CCI (Charlson Comorbidity Index) was 3.5 ± 1.9 in males and 3.4 ± 2.2 in females. The percentage distribution of different groups of comorbidities in the whole sample and by gender also has been mentioned. The comorbidities mentioned were Cardiovascular, respiratory, Metabolic, Oncologic, Neuropsychiatric, Gastroenterology, Osteo – Articular and other diseases. In Cardiovascular disease, the overall percentage was 39.0% in which males were 44.7% and 30.7% in females. In respiratory disease, the overall percentage was 22.4% in which 23.0% in males and 21.1% in females. In metabolic disease, the overall

percentage was 10.4% in which males were 9.2% and 12.4% in females and in Oncologic disease; the overall percentage was 7.6% in which males were 7.0% and 8.5% in females. In Neuropsychiatric disease, the overall percentage was 6.5% in which males were 6.6% and 6.2% in females and in Gastroenterology disease the overall percentage was 8.6% in which 4.8% in males and 14.2% in females. In osteoarticular disease, the overall percentage was 4.9% in which males were 3.8% and 6.0% in females and for other diseases; the overall percentage was 0.6% in which males were 0.9% and 0.9% in females. The overall percentage of comorbidities found was 3,198 and the male percentage was 2,182 and the female percentage was 1,016.

In study 2, the total population examined in this study was 7,731,628 who are NHS users. Out of which the 3,535,371 were about 45 years old and above. In that 462,894 were using respiratory agents. The number of male patients was 1,603,364 and the percentage is about 45% of ≥45 years of age and the number of patients exposed to ≥ 1 respiratory drug was 205,711 and the percentage was about 44%. The number of female patients was 1,932,007 and the percentage is about 55% of ≥45 years of age and the number of patients exposed to ≥1 respiratory drug was 257,183 and the percentage was about 56%. The age groups were also divided to observe the prevalence and age groups were divided as 45 – 64, 65 – 74, 75 – 84 and ≥ 85. 45 – 64 age group of the population were 1,965,547 and the percentage was about 56% and the patients exposed to ≥ 1 respiratory drug were 207,721 and the percentage was about 45%. The age group of 65 – 74 population was 810,721 and the percentage was about 23% and the patients exposed to ≥ 1 respiratory drug were 128,398 and the percentage was about 28%. 75 – 84 age group of the population were 571,129 and the percentage was about 16% and the patient's exposed ≥ 1repiratory drug was 99,179 and the percentage was about 21%. The age group of ≥85 population was 187,974 and the percentage was about 5% and the patients exposed to ≥ 1 respiratory drug were 27,601 and the percentage was about 64%. The total number of population ≥ 45 years was 3,535,371 and the percentage was about 100% and the patients exposed to ≥ 1 respiratory drug were 462,894 and the percentage was about 100%. Another characteristic was also reported in this study and it was the main characteristic of COPD patients which includes the pharmacological treatment as well as general clinical profile. The panel patients were 7,731,628. The patient's ≥ 45 years of age were 3,535,371 and the percentage was about 46.0% and the patients who are treated with at least one drug were 2,910,173 and the percentage was about 82.3%. Patients with at least one index drug were 462,894 and the percentage was about 15.9% and the patients with chronic COPD who were treated were 126,283.

DISCUSSION
The data of the study 1 proves that the prevalence of comorbidities in COPD patients of a cohort study is very

high due to 73.8% of patients of 70 years old age had at least one comorbidity of clinical relevance.[3] The prevalence of comorbidities was high in females than in males were significantly proved and the results were 3.0 in females versus 2.5 in males per patient respectively. In this study, they have proved that cardiovascular disease is the most common disease in COPD patients when compared to other comorbidities and the percentage prevalence is also very high when compared to other studies. Some other comorbidity like congestive heart failure was also high in women while chronic corpulmonale and arrhythmias were high in males and ischemic heart disease is common in both genders.[3] These results explain the increasing tobacco use in females since the last decades in our country. Other diseases like pneumonia, chronic respiratory failure, pleural effusion were high in males and bronchiectasis and Asthma – COPD Overlap Syndrome (ACOS) is high in females. Metabolic disorders were less compared to other studies. In this study, anemia is also significantly more in females than in males. The prevalence has been investigated using different GOLD stages and the results were found to be progressive from stage I to stage IV increase in COPD patients except in patients with cardiovascular diseases and metabolic disorders which has maintained constant stage III GOLD stage but showed the immediate drop to stage IV GOLD stage and the study has some limitations that it is a cross-sectional study and so it does not provide any perspective information in present scenario and specific information about different phenotypes in COPD had not been mentioned in present study.[3] The occurrence of comorbidities severity during the collection of history in COPD patients confirms that it affects the socioeconomic impact, quality of life and mortality of COPD patients. In other studies (study 2) the important thing is that the sample size is about 126,283 COPD patients. The main therapeutic classes prescribed to COPD patients were listed and those are antibiotic agents, cardiovascular drugs, gastrointestinal and metabolic disorders, musculoskeletal system, Blood and Lymphatic system, Endocrine system, Nervous system. The use of antibiotic agents in patients was 95,845 and the percentage of COPD patients was 75.9% and the use of cardiovascular drugs was 92,367 patients and the percentage was about 73.1%. The gastrointestinal and metabolic disorders were 75,303 patients and the percentage was about 59.6%. The musculoskeletal system was 71,384 patients and the percentage was about 56.5% and in the blood and lymphatic system the patients were 55,922 and the percentage was about 44.3%. The endocrine system was 53,692 patients and the percentage was about 42.5% and the nervous system was 30,248 patients and the percentage was about 24.0% respectively.[4] In this study population, they have found that 98% patients received drugs other than respiratory agents and antibiotics were most commonly used because of the frequent occurrence of bacterial infections in COPD patients but there is high exposure to anti-inflammatory, cardiovascular and gastrointestinal agents which results that there is the

presence of different diseases in the same patient. There is another detailed list of chronic comorbidities in COPD patients in which total only one comorbidity were 65,831 patients and the percentage was about 52.1% and specific disease like cardiovascular disease were 60,500 patients and the percentage was about 47.9% and diabetes were 2,711 and the percentage was about 2.1% and depression were 2,620 and the percentage was about 2.1%.[6] The total of two comorbidities were 19,168 patients and percentage was about 15.2% and specific diseases like diabetes with cardiovascular diseases were 12,848 patients and the percentage was about 10.2% and in cardiovascular disease with depression were 6,140 patients and percentage was about 4.9% and in diabetes with depression were 180 patients and the percentage was about 0.1%.[5] The total of three comorbidities was 1,352 patients and the percentage was about 1.1 and the specific disease was diabetes with cardiovascular disease with depression was 1,352 patients and the percentage was about 1.1%. The total of comorbidities was 86,351 patients and the percentage was about 68.4%. The summary of this study states that in COPD patients the comorbidities were the underlying cause for its severity. So, treating the comorbidities along with COPD can help the patient preventing from the chronic condition.

CONCLUSION
The conclusion of both the studies is that COPD should be considerations of comorbidities existence and should be rearranged according to related disorder and should consider the social and economic burden of particular disease while estimating and specific comorbidity/s should be treated along with the COPD.

ACKNOWLEDGEMENT

CONFLICT OF INTEREST
We have no conflict of interest.

REFERENCES
1. N. Tyagi1, K. Gulati1, V.K. Vijayan and A. Ray. (A Study to Monitor Adverse Drug Reactions in Patients of Chronic Obstructive Pulmonary Disease: Focus on Theophylline), The Indian journal of chest diseases and allied sciences, 2008; 50.
2. Rimland JM, Abraha I, Luchetta ML, et al. (Validation of chronic obstructive pulmonary disease (COPD) diagnoses in healthcare databases: a systematic review protocol), BMJ open, 2016 Jun 1; 6(6): e011777.
3. R. W. Dal Negro L. Bonadiman and P. Turco. (Prevalence of different comorbidities in COPD patients by gender and GOLD stage), multidisciplinary Respiratory Medicine, 2015; 10(1): 24.
4. Caterina Anecchino, Elisa Rossi, Caterina Fanizza, Marisa De Rosa, Gianni Tognoni, Marilena Romero, For working group "ARNO project".

(Prevalence of Chronic obstructive pulmonary disease and pattern of comorbidities in a General Population), Int J Chron Obstruct Pulmon Dis, 2007; 2(4): 567-74.

5. Jean Joel Bigna, Angeladine Malaha Kenne, Serra Lem Asangbeh, Aurelie T Sibetcheu (Prevalence of chronic obstructive pulmonary disease in the global population with HIV: a systematic review and meta-analysis), Lancet Glob Health, 2018; 6(2): e193-e202.

6. McKay AJ, Mahesh PA, Fordham JZ, Majeed A. (Prevalence of COPD in India: a systematic review), 2012; 21(3): 313-21.

7. Akhila Yerubandi, Sivakshari Makkapati, Sreenu Thalla, Padmalatha Kantamneni. (Precipience of biological mechanisms of chronic obstructive pulmonary disease and its risk of lung cancer). World Journal of Pharmaceutical and Life Sciences, 2020; 6(3): 67 – 70.