

Prevalence of Comorbidities Among COPD Patients: A Comparative Case-Control Study in Kashmir

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ABSTRACT

Background: COPD is a chronic inflammatory lung disease characterized by airflow limitation, which is a result of continuous and consistent use of tobacco smoke or exposure of respiratory tract to noxious stimuli or recurrent childhood respiratory tract infection.

Methods: A cross section of population from one of the assembly constituencies of Srinagar city has been taken as an area of sampling. A sample size of about 400 subjects was taken from three different electoral wards based on random table method as per defined inclusion criteria.

Results: Majority of the COPD patients accounting for (33.8%) were aging from 40 to 50 years, followed by (31.1%) falling in the age interval (61-70) years. The present study revealed that commonest comorbidities among COPD patients were hypertension (56.7%), Osteoporosis (41%), anxiety (32.4%), diabetes (24.3%) and HTN CVD (22.9%).

Conclusion: The present study demonstrated that the prevalence of chronic diseases like hypertension, diabetes, HTN CVD, RA osteoporosis, anxiety, proximal myopathy, and insomnia are significantly higher among COPD cases compared to healthy controls.

Keywords: Chronic obstructive pulmonary disease, respiratory tract infection, comorbidities

INTRODUCTION

Undoubtedly chronic obstructive pulmonary disease (COPD) contributes significantly

towards the increasing rates of mortality and morbidity across the globe.¹ Although the disease is common with a worldwide prevalence of around 10.1% among individuals aging 40 years old or more but it is preventable and medically treatable disease though not fully reversible.^{2, 3} In 2019, globally COPD has been reported to be the 3rd leading cause of mortality. In fact, 3.23 million deaths across the world have been attributed to occur due to COPD, with majority of these deaths (80%) are from low and middle income countries.⁴ Presently, in Asia, the burden of COPD is immensely greater than western counter parts.⁵ COPD is a chronic inflammatory lung disease characterized by airflow limitation, which is a result of continuous and consistent use of tobacco smoke or exposure of respiratory tract to noxious stimuli or recurrent childhood respiratory tract infection. Of the multiple causal factors of COPD deaths, tobacco and air pollution have been identified as the preventable causes. It has been documented that 3/4th of disability adjusted life years due to COPD could be attributed to smoking and air pollution.⁶ Some studies have associated that financial strength is associated with the outcome of disease while as others have pointed out that diagnostic modalities and treatment possibilities which decides access to treatment and subsequent clinical outcome of disease.⁷ Comorbidities play an important

role in the prognosis of COPD patients. Comorbidities like; pulmonary artery disease and malnutrition have largely been attributed to be caused directly by COPD, however, others diseases such as obesity diabetes, sleep disturbance, anemia, systemic venous thromboembolism, anxiety, depression and osteoporosis have not been pathophysiologically associated with COPD.⁸ These extra-pulmonary comorbidities essentially develop chronic systemic inflammation with the result frequent hospitalization and overall healthcare costs increase manifold. The present paper aims to find out the prevalence of different comorbidities among COPD cases and compare it with controls.

MATERIAL AND METHODS

A cross section of population from one of the assembly constituencies of Srinagar city has been taken as an area of sampling. A sample size of about 400 subjects was taken from three different electoral wards based on random table method. To make our data more generalized we have subdivided the wards into Mohallas as per census 2011 of Kashmir, then from the randomly selected Mohallas from these wards, some Mohallas were taken as an index of the community and all persons above 40 yrs were made to participate provided they were willing, from each Mohalla a door to door survey has been conducted for each Mohalla.

All participants have to complete a self-administered questionnaire including questions about;

- a) Family and past medical history or Physicians documented proof of Diabetes mellitus, Hypertension, Hypertensive cardiovascular diseases, ischemic heart diseases, Osteoarthritis, Osteoporosis, Rheumatoid Arthritis, Depression, Poximal myopathy and insomnia.
- b) Self-administered questionnaire on respiratory symptoms based on pattern of BOLD (Burden of Lung Disease) Questionnaire.

- c) General and local examination of all body system on emphasis of respiratory system will be carried out for all participants.

Inclusive criteria

- Individuals of age >40yrs will be taken for the study provided they are willing to participate in study.
- Both sexes.

Exclusive criteria

- Haemoptysis of unknown origin – may aggravate the underlying condition.
- Pneumothorax.
- Unstable angina.
- Recent eye surgery.
- Recent Thoraco-abdominal surgery (6weeks).
- Acute disorder affecting spirometry (nausea, vomiting).
- Unstable CV status (e.g.; recent M.I/PE)- blood pressure changes may aggravate these conditions.
- Vertebra column/Neuromuscular abnormalities.
- Subjects unwilling to participate.

Statistical Methods

The recorded data on various parameters on COPD and comorbidities was compiled and entered in a spreadsheet (Microsoft Excel) and then exported to data editor of SPSS Version 20.0 (SPSS Inc., Chicago, Illinois, USA). Statistical software SPSS (version 20.0) and Microsoft Excel were used to carry out the statistical analysis of data. Continuous variables were expressed as Mean±SD and categorical variables were summarized as percentages. Chi-square test was employed for comparison of categorical variables and Students independent t-test was employed for continuous variables between the groups. A P-value of less than 0.05 was considered statistically significant. All P-values were two tailed.

RESULTS

In this section the results of the study will be described in tabular form

Table 1: Showing COPD across different age groups

Age (year)	COPD		Non COPD		p value
	N	%	N	%	
40 to 50	25	33.8	224	68.7	<0.001
51 to 60	15	20.3	64	19.6	
61 to 70	23	31.1	29	8.9	
71 to 80	9	12.2	9	2.9	
> 80	2	2.7	0	0	
Total	74	100	326	100	
Mean age	59.95±12.05 Yrs		49.75±8.18 Yrs		

We observe that the average age of COPD patients was (59.95±12.05) years and the average of non-COPD patients was (49.75±8.18) year, the difference was statistically significant. Majority of the COPD patients accounting for (33.8%) were aging from 40 to 50 years, followed by (31.1%) falling in the age interval (61-70) years.

Table 2: Prevalence of Comorbidities in Controls Vs COPD Individuals

Co morbidities	Controls (326)		COPD (74)		P value
	N	%	N	%	
	Hypertension	84	25.7	42	
HTN CVD	16	4.9	17	22.9	<0.001
IHD (Angina,MI)	16	4.9	8	10.8	0.001
Diabetes	36	11.0	18	24.3	0.004
Rheumatoid Arthritis (RA)	11	3.3	7	9.4	0.032
Osteoarthritis	30	9.2	12	16.2	0.167
Osteoporosis	43	13.9	31	41.8	0.055
Anxiety/depression	39	11.9	24	32.4	<0.001
Proximal Myopathy	8	2.4	13	17.5	<0.001
Malignancy	16	4.9	7	9.4	0.167
Insomnia	9	2.7	8	10.8	0.006

Evidently there was a significant difference between cases and controls with respect to the prevalence of hypertension, HTN CVD, anxiety/depression and proximal myopathy, IHD, diabetes, RA Insomnia with a p-value <0.05. We observe that the overall prevalence of hypertension as comorbidity was (126/400) (31.5%), with the corresponding prevalence of HTN among COPD patients was (42/74) 56% and that for non-COPD patients, it was (84/326) (25.7%). The prevalence of HTN CVD in overall studied group was 8.2% (33/400), with corresponding prevalence of HTN CVD in cases was 22.9% (17/74) against controls where it was 4.9%(16/326). The

overall prevalence of anxiety/ depressions in our studied population was 15.7% (63/400), whereas the prevalence among COPD was found to be 32.4% (24/74) and that in controls was 11.9% (39/326). The overall prevalence of proximal myopathy among studied population was found to be 5.2% (21/400), whereas the prevalence of the same diseases among COPD was 17.5% (13/74) and that in controls was 2.4% (8/326). Although the next highest prevalence among studied population was of osteoporosis, accounting for (74/400)18.5%, but osteoarthritis and malignancies were comparable between the groups. And, all other comorbidities reflected in above table were statistically significant between the groups.

DISCUSSION

In the present study on the comparison of prevalence rates of different comorbidities among cases and controls, we included 400 patients, of them 74 had COPD as per GOLD guidelines and 326 were healthy controls, thus placing the prevalence of COPD patient as (18.5%). We observed that the average age of COPD patients was (59.95±12.05) years and the average of non-COPD patients was (49.75±8.18) year, the difference was statistically significant. Majority of the COPD patients accounting for (33.8%) were aging from 40 to 50 years, followed by (31.1%) falling in the age interval (61-70) years. In a multi centric study by Jindal et al, authors reported the prevalence of COPD in India as 4.1%.⁹ Burney et al from Kashmir valley revealed that estimated population prevalence of COPD GOLD stage 1 or above by age and sex in Srinagar Kashmir was 19.3% (overall) with prevalence in males as 23.7% as against females where it was 14.5%.¹⁰ Similarly, Kim et al., reported from Korea the prevalence of 17.2% (25.8% men and 9.65 women) among the subjects older than 45 years using Global Initiative for Obstructive pulmonary lung disease criteria.¹¹ The highest prevalence of COPD observed in the present study may be due to

geographic location, life style, smoking habits, occupational exposure, domestic smoke exposures. The present study revealed that commonest comorbidities among COPD patients were hypertension (56.7%), Osteoporosis (41%), anxiety (32.4%), diabetes (24.3%) and HTN CVD (22.9%). All the comorbidities in our study were based on physicians documented proof (follow-up OPD cards, basic investigations). The prevalence of comorbidities among COPD patients vs. non COPD patients was as follows; Hypertension (56.7% vs. 25.7%), Hypertensive cardiovascular diseases (22.9% vs. 4.9%), Ischemic heart diseases (10.8% vs. 4.9%), Diabetes (24.3% vs. 11.0%), Rheumatoid arthritis (9.4 vs. 3.3%), Osteoarthritis (16.2% vs. 9.2%), Osteoporosis (41.8% vs. 13.9%), Anxiety and Depressive disorders (32.4% vs. 11.9%), Proximal myopathy (17.5% vs 2.4%), Malignancies (9.4% vs. 4.9%) and Insomnias (10.8% vs. 2.7%). There was a significant difference between cases and controls with respect to the prevalence of hypertension, HTN CVD, anxiety/depression and proximal myopathy, IHD, diabetes, RA Insomnia with a p-value <0.05. However, comorbidities like; osteoarthritis and malignancies were comparable between the groups. Contemporary to the literature, Kiani et al also reported that the most common comorbidities among patients with COPD were dyslipidemia, hypertension, metabolic syndrome, and diabetes mellitus (16.7%).¹² Moreover, likewise to our study, They reported the prevalence of hypertension (30.2% vs. 26.1%), cardiovascular disease (11.2% vs. 8.4%), chronic lung diseases (10.2% vs. 6.6%) and diabetes (16.7% vs. 14.3%) was significantly higher in people with COPD than in those without COPD.¹² Our results on prevalence rates of different comorbidities are relatively consistent with the study due to Kerry et al who reported that subjects with physician diagnosed COPD were more likely than subjects without physician diagnosed COPD

to have co existing arthritis (54.6% vs. 36.9%) , depression (20.6% vs. 12.5%) ,osteoporosis (16.9% vs. 8.5%) , cancer (16.5% vs. 9.9%) , coronary heart diseases (12.7% vs. 6.1%) , congestive heart failure (12.1% vs. 3.9%) , and stroke (8.9% vs. 4.5%).¹³ In the present study, subjects with COPD were also more likely to report mobility difficulty (55.6% vs. 32.5%), use of > 4 prescription medications (51.8% vs. 32.1%), dizziness/ balance problems (41.1% vs. 23.8%), memory problems (18.5% vs. 8.8%), low glomerular filtration rate (16.2% vs. 10.5%). All reported comparisons have P<0.05. Likewise to our results, Joan et al reported that in both COPD and Asthma, the total sum of diagnosis related to major organ systems was higher than in their matched population controls.¹⁴ Among incident COPD patients, a frequency > 1% within first year after diagnosis developed angina, cataracts, bone fractures, osteoporosis, pneumonia, and respiratory infections, the highest being angina with 4%. Compared to non COPD cohort, COPD patients were at increased risk for Pneumonia (RR=1.7), osteoporosis (RR=3.1), respiratory infections (RR=2.2), MI (RR=1.7), angina (RR=1.7) fractures (RR=1.6) and glaucoma (RR=1.3) (all fall below <0.05). In a longitudinal observational multi-centric study by Almagro similar kind of Spirometric confirmation was reported in patients hospitalized for a COPD exacerbation.¹⁵ They concluded that comorbidities are common in patients hospitalized for a COPD exacerbation, and they are related with short-term prognosis.¹⁵ This study indirectly indicates that comorbidities have been found to be important aspect of quality of life in COPD individuals as well as independent risk factor for hospitalization.

CONCLUSION

The present study demonstrated that the prevalence of chronic diseases like hypertension, diabetes, HTN CVD, RA osteoporosis, anxiety, proximal myopathy,

and insomnia are significantly higher among COPD cases compared to healthy controls. These comorbidities essentially potentiate the morbidity of COP, which in turn leads to increased hospitalizations, healthcare costs and even mortality. Comorbidities complicate the management of COPD and need to be evaluated carefully. Therefore, it is important to have knowledge of the prevalence rates of different comorbidities in order to achieve the optimal clinical outcome.

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