INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

PREVALENCE OF VARIOUS COMORBIDITIES IN CHRONIC OBSTRUCTIVE PULMONARY DISEASE

Pulmonary Medicine

Dr. Kunal Luthra	Senior Resident, Department of Chest and Respiratory Medicine, Delhi State Cancer Institute
Dr. Jyoti Singh*	Senior Resident, Department of ENT, Chacha Nehru Bal Chikitsalaya, Delhi*Corresponding Author
Maitri R. Hathi	Tutor-Statistician, Department of Community Medicine GAIMS, Bhuj, Kutch (Gujarat)
Dr. Rakhi Luthra	Associate Professor, Department of Community Medicine, PMCH, Udaipur (Rajasthan)

ABSTRACT

Chronic obstructive pulmonary disease is associated with important chronic comorbid diseases, diabetes, cardiovascular-disease, diabetes and hypertension. Sampling of 100 participants aged ≥30years done by stratification based on baseline according to GOLD criteria.
Hypertension was found to be associated with more comorbid disease. In regression models, there was increased percentage of prevalence of Hypertension , Dyslipidemia , nutritional Comorbidity , and depression with increase in severity of disease ,and this correlation was highly significant while correlation of anxiety and Chronic Kidney Disease with severity was significant.

KEYWORDS

COPD, Hypertension, Depression

INTRODUCTION:

Chronic obstructive disease is the most leading cause of mortality and morbidity worldwide, which results in an economic and social burden that is substantial as well as increasing.[1,2,3] According to the global burden of Disease study, COPD which ranked as a 6th cause of death in 1990, will become the 3rd leading cause of death worldwide by 2020; however in 2030 it is projected that COPD will be the 4th leading cause of death worldwide.[4]

Inhaled cigarette smoke and other noxious particles such as smoke from biomass fuels cause lung inflammation, a normal response that appears to be modified in patients who develop COPD. This chronic inflammatory response may induce parenchyma tissue destruction resulting in emphysema, and disrupt normal repair and defense mechanisms resulting in small airway fibrosis. These pathological changes lead to air trapping and progressive airflow limitation, and in turn to breathlessness and other characteristic symptoms of COPD.

Often COPD coexists with other diseases also called Comorbidities that may have a significant impact on prognosis.[5-7]Some of these arise independently of COPD whereas others may be casually related, either with shared risk factors or by one disease actually increasing the risk of another. The features of COPD, such as systemic inflammation, are shared with other diseases and as such this mechanism show a link between COPD and some of its comorbidities.[8]

Objectives:

1. To study the clinical profile of COPD
2. To study the prevalence of various Comorbidities in COPD

Methodology:

Sample Size: The present study was conducted on 100 cases, selected on the basis of simple random sampling method from the indoor/outdoor of Department of Respiratory Medicine, Tuberculosis and Chest Hospital, Bari attached to R.N.T.Medical College, Udaipur.

Inclusion Criteria: According to GOLD guidelines[9], any patient who had symptoms of chronic cough, sputum production, and/or dyspnoea, and/or a history of exposure to risk factors were considered, and confirmed by spirometry. The ratio of forced expiratory volume in first second to the fixed vital capacity less than 0.7(70 %) after post – bronchodilator inhalation was included in this study.

Exclusion Criteria:

* Bronchial asthma
* Tuberculosis (present or past)
* Interstitial lung disease

Study Procedure: After applying above inclusion and exclusion criteria, the 100 patients were selected and detailed history, through clinical examination, psychiatric evaluation by psychiatrist, and necessary investigations were done.
Patients was selected for the following investigations:

* Hb, TLC, DLC, ESR
* Blood urea, serum creatinine
* FBS/PPBS/ RBS
* Spirometry (pre and post bronchodilator therapy)
* Sputum for gram stain and AFB
* Chest X-ray PA view
* Urine: Albumin ,Sugar ,Microscopy
* Lipid Profile
* 2D-Echo
* Others (as indicated)

Statistical Analysis: Study sample of 100 patients were compiled in Microsoft excel and statistical analysis was done using a statistical software PASW-Statistics SPSS version 20. For demographic and epidemic characteristics descriptive statistics like mean, mean ± Standard Deviation, Median, Range, 95% Confidence Interval was performed. And for inferential Statistics Pearson's Chi- square Test was performed at a significance level of P value <0.05 and P value < 0.01.

Results:

Table 1A : Patient's characteristics according to socio demographic assessment.

Characteristics	Total number of patients n=100 (%)
Sex	
Male	93%
Female	7%
P – Value	0.00<0.05
Age Group(Years)	
31-40	7%
41-50	30%
51-60	35%
61-70	35%
>70	3%
Mean age	56.76 ± 8.9
Minimum age	38
Maximum age	76
Duration of illness (years)	

1-5	76%	
6-10	19%	
>10	5%	
Duration of Tobacco use (Smoking Index)		
<100 (Light)	8%	
100-300 (Moderate)	19%	
>300(Heavy)	73%	
Symptoms of Presentation		
Cough	100%	
Breathlessness	100%	
Sputum	55%	
Chest Pain	31%	
Hemoptysis	3%	
Physical signs at presentation		
Clubbing	23%	
Pedal Edema	15%	
Pallor	11%	
Parasternal heave	9%	
Cyanosis	6%	
Auscltatory Findings		
Rhonchi	46%	
Crepitations	23%	
Looud P2	9%	
Body Mass Index (B. M . I .)		
<18.4 (Under weight)	44%	
18.5-24.9 (Normal)	50%	
25-29.9 (Over Weight)	6%	
Mean B. M. I	19.20± 3.39	
Chest X-Ray Findings		
Pred. Emphysematous	52%	
Pred. Chronic Bronchitis	10%	
Cardiomegaly	4%	

Table 2: Severity of disease (FEV1%, GOLD Staging)

Degree of Severity	No. of Patients (%)
Mild (≥ 80)	5%
Moderate (≥ 50 - <80)	23%
Severe (≥ 30 - <50)	38%
Very Severe (< 30)	34%

Table 2 shows that mean FEV1% was 40.24 ± 16.8. Maximum number of patients 38 had severe airflow of obstruction.

Table 3: Prevalence of Comorbidities

Comorbidities	No. of Patients (%)
Hypertension	58%
Ischemic heart disease	13%
Heart Failure	12%
Diabetes Mellitus	18%
Dyslipidemia	29%
Nutritional	44%
Anxiety	13%
Depression	15%
Anxiety depression	16%
Chronic Kidney Disease	12%
Microalbuminuria	15%
Anemia	11%
Polycythemia	10%
Lung cancer	5%

Table 3 shows that hypertension was the most common Comorbidities present in 58% followed by nutritional in 44%, dyslipidemia was present in 29%, anxiety depression in 16%, heart failure in 12% of patients.

**Table 4: Correlation between Comorbidities and FEV1 % staging**

Comorbidities	FEV1% (No. of patients (%))			Pearson Chi Square Value	P Value	Statistical Significance
	≥50% N= 28	30-49 % N= 38	< 30 % N= 34			
Hypertension	21	68	76	21.82	0.00	HS
Ischemic heart disease (IHD)	3.5	21	11.7	4.42	0.11	NS
Heart Failure	3.5	18	11.7	3.36	0.19	NS
Diabetes Mellitus	10.7	23.7	17.6	1.84	0.40	NS
Dyslipidemia	10.7	26.3	47	10.06	0.01	HS
Nutritional	21	42	64	11.76	0.00	HS
Anxiety	11	29	44	8.32	0.02	S
Depression	7	39	41	10.37	0.01	HS
Chronic Kidney Disease	0	21	12	6.76	0.03	S
Microalbuminuria	11	21	12	1.74	0.41	NS
Anemia	11	13	9	0.34	0.84	NS
Polycythemia	3.5	10.5	15	20.13	0.34	NS
Lung cancer	0	10.5	2.9	4.33	0.12	NS

(S= Significant, HS = Highly Significant, NS = Non-Significant)

Table 4: There was increased percentage of prevalence of Hypertension, Dyslipidemia, nutritional Comorbidity, and depression with increase in severity of disease, and this correlation was highly significant (P-Value < 0.01), while correlation of anxiety and Chronic Kidney Disease (CKD) with severity was significant (P-Value < 0.05).

Figure 1: Comorbidities and FEV1%

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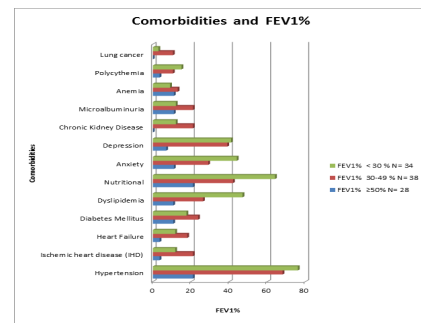
DISCUSSION:

Chronic obstructive pulmonary disease is one of the leading cause of morbidity worldwide. In this study, clinical profile and prevalence of Comorbidities seen in COPD patients were studied.

Sex Distribution: In this study the male to female ratio is 13.28: 1, i.e. males formed 93% (93 /100) of the study subjects. This higher incidence of COPD in males can be attributed to higher incidence of smoking amongst men. In this study none of the women were smokers, but all of them had history of cooking with dried wood fuel and other biomass exposure. In a study of 2013 done by Giorgio Fumagalli et.al percentage of males were 72.8.[8] In another study done by V.K. Sing et. al. Male percentage was nearby same as our study that is 94.6.[9]

Age Distribution: The maximum number of COPD patients 60% in this study was in the age group of 51 to 70 years with mean age 56.76 ± 8.9 years. A similar result 59 ± 7 was found in the study given by Keller & Shepard et.al. in 1986.[10] Patients aged between 51 and 70 years form the maximum number of patients admitted, mainly because of the longer duration of tobacco exposure and repeated respiratory tract infections.

Severity of disease: In the present study, 38 % of the patients had FEV1 between 30% to 49% of the predicted i.e. severe obstructive disease, 34% of the patients had FEV1 <30% i.e. very severe obstructive disease. According to BTS, patients start experiencing breathlessness on exertion when FEV1 falls below 40% and according to GOLD criteria , 1 patients usually experience worsening dyspnoea when the patient has FEV1 <50% of predicted. Thus they tend to seek medical attention during this stage, accounting for the majority of patients who have severe, and very severe obstructive disease.

Present study found hypertension was the most common Comorbidities present in 58% followed by nutritional in 44%, dyslipidemia was present in 29%, anxiety depression in 16%, heart failure in 12% of patients. While in other study Diabetes, hypertension and cardiovascular disease were present in 2,570 (12.7%), 8,137 (40.1%) and 3,091 (15.2%) subjects, respectively, which were round about same as our present study i.e. 18%,58% and 12% respectively.[4]

Also by regression analysis this conclude that here was increased percentage of prevalence of Hypertension, Dyslipidemia, nutritional Comorbidity , and depression with increase in severity of disease , and this correlation was highly significant (P-Value < 0.01), while correlation of anxiety and Chronic Kidney Disease (CKD) with severity was significant (P-Value < 0.05).

In present study average FEV1% was 40.24 with standard error of ± 16.8. Maximum number of 38 patients had severe airflow of obstruction.

Therefore, although these statistics need to be explored independently in different populations, this study suggests that at least in relation to comorbidities such as hypertension, dyslipidemia, nutritional Comorbidity , and depression ; FEV1 % pared is more closely related to the occurrence of chronic respiratory symptoms in the general population than other measures of lung function impairment , anxiety and chronic kidney diseases.

The validity of these observation still needs to be tested in other cohort group to look at validity within clinically diagnosed asthma and chronic obstructive pulmonary disease. Also in relation to other disease markers, symptoms and outcomes, such as mortality and natural history, to provide an additional picture of the relationship between COPD and disease severity.

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