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Original Research Paper

General Medicine

PREVALENCE OF METABOLIC SYNDROME IN COPD CASES IN CENTRAL INDIA AND ITS CORRELATION WITH BMI

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ABSTRACT

BACKGROUND: COPD is the third leading cause of death worldwide with more than 90% of COPD deaths occuring in low and middle income countries. While metabolic syndrome is a cluster of the most dangerous cardiovascular risk factors , defined to be associated with prothrombotic and proinflammatory states. About 20%-25% adult population of the world have Metabolic syndrome and are three times more likely to have coronary artery disease or stroke .

Increasing evidence shows association between Metabolic Syndrome in COPD. However, the frequency of Metabolic Syndrome and its individual components are not still been clearly shown especially in Indian population in central India .

METHODS: This was a cross sectional study conducted at Department of Respiratory Medicine, Gandhi Medical College & Hamidia hospital, Bhopal. 100 spirometrically confirmed COPD cases were enrolled after permission from institutional ethics committee . Detailed history , clinical examination , laboratory parameters and anthropometric parameters were taken.

RESULTS: Mean age of patients with COPD was 60.34±10.39 years .Mean weight, height and BMI of patients was 55.86±9.43 kg, 160.47±7.58 m and 21.65±3.01kg/m^2. .Majority - 57% patients had normal BMI (18.5 to 22.9 kg/m^2). About 25% and 11% patients were overweight and underweight respectively.

Metabolic syndrome was found to be present in 32% of the patients with COPD. BMI of patients with metabolic syndrome was significantly higher as compared to COPD patients without metabolic syndrome ($p<0.01$).

CONCLUSION: The prevalence of metabolic syndrome in COPD was 32% and BMI in COPD patients with metabolic syndrome was significantly higher than those without metabolic syndrome .

KEYWORDS : COPD, Metabolic syndrome, BMI

INTRODUCTION

Chronic Obstructive Pulmonary Disease (COPD) is a common , preventable and treatable disease that is characterised by persistent respiratory symptoms and airflow limitation that is due to airway and / or alveolar abnormalities usually caused by significant exposure to noxious particles or gases and influenced by host factors.[1] One of the major causes of chronic morbidity and mortality throughout the world, , the COPD burden is projected to increase in coming decades.[2] More than 90% of COPD deaths occur in low and middle income countries making us all the way more concerned .[3] The prevalence of COPD is about 5% in India[4] Metabolic Syndrome is recognised by the constellation of metabolic abnormalities which includes glucose intolerance (type 2 diabetes, impaired glucose tolerance, or impaired fasting glycaemia), insulin resistance, central obesity, atherogenic dyslipidaemia, and hypertension, which when grouped together, are associated with increased risk of cardiovascular disease.[5] There is increasing evidence of Metabolic Syndrome in COPD patients. However, the frequency of Metabolic Syndrome and its individual components are not still been clearly shown which is likely to vary in different population. According to International Diabetes Foundation, metabolic syndrome is a cluster of the most dangerous cardiovascular risk factors. It is also defined to be associated with prothrombotic and proinflammatory states. It is estimated that 20%-25% adult population of world have Metabolic syndrome and these people have three times more risk to have a coronary artery disease or stroke as compared to general population [6]. Cardiovascular mortality was markedly increased in subjects with the metabolic syndrome (12.0 vs. 2.2%, $P < 0.001$). [5] Thus, in COPD patients, the presence of the metabolic syndrome might explain in part the increment in cardiovascular diseases. It is important to study patients with COPD for the possible correlation with Metabolic syndrome so that the cluster of risk factors associated with metabolic syndrome can be identified early, and treated individually and collectively thereby reducing their isolated harmful impact on the body systems and that of systemic inflammation and cardiovascular morbidity and mortality associated with metabolic syndrome as a whole .

METHODOLOGY

This cross sectional study was conducted at Department of Respiratory Medicine, Gandhi Medical College & Hamidia hospital, Bhopal for a period of two years after approval of institutional ethics committee. 100 spirometrically confirmed COPD cases with radiological and clinical evidence of COPD were enrolled after their written informed consent excluding those with history or evidence of coronary artery disease. Spirometry was done on Helios 401- Record & Medicare systems by an experienced technician, 3 readings were obtained and the best of three was taken. FEV1 , FVC , FEF 25-75 and other parameters were recorded.

Anthropometric Details were recorded including Weight, height, waist circumference, BMI. Detailed history regarding breathlessness, exacerbations and hospitalization and clinical examination was undertaken.

Patients were classified as having metabolic syndrome if they fulfilled the NCEP ATP III criterion with waist circumference criterion modified according to Asian population .

Biochemical investigations included Complete blood count, Lipid profile including sr. HDL, LDL, Triglyceride, VLDL, Blood

Glucose levels : Fasting , Post Prandial. ECG & Chest X Ray was done for all patients to rule out CAD and other co morbidities like TB. Data was analysed using IBM SPSS software version 2.0. Unpaired t test , Chi square test were used. P value less than 0.05 was considered statistically significant.

RESULTS

Mean age of patients with COPD was 60.34±10.39 years with 35% patients belonging to 61 to 70 years of age and 14% to more than 70 years of age respectively.

Mean weight, height and BMI of patients was 55.86±9.43 kg, 160.47±7.58 m and 21.65±3.01kg/m^2. Consensus guidelines for Asian Indian population were used for classification of BMI and metabolic syndrome according to NCEP ATP III criterion. Majority - 57% patients had normal BMI (18.5 to 22.9 kg/m^2). About 25% and 11% patients were overweight and underweight respectively. About 7% cases with COPD were obese .Mean waist circumference among patients with COPD was 83.5±6.9 cm. Majority i.e. 50% patients had waist circumference in the range of 81 to90 cm. About 35% and 15% patients had lower and higher waist circumference respectively.

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Mean FEV 1 was 50.03±20.21 and majority i.e. 44% patients had FEV1 in the range of 30 to 49% followed by 28%, 15% and 13% patients with FEV1 50 to 79%, less than 30% and more than 80% respectively. Mean triglyceride levels in patients with COPD was 126.67±34.24 whereas mean HDL levels was 54.65±14.67. About 67% cases had raised triglyceride levels and 20% cases had lower HDL levels.

Mean fasting blood glucose among 100 patients with COPD was 115.31±26.85 mg/dl. Out of 100 cases, fasting blood glucose was raised in 41% cases.

Mean systolic blood pressure was 125.76±201.9 mmHg whereas mean diastolic blood pressure was 78.52±13.91 mmHg. Blood pressure was raised in 35% cases with COPD. Out of 100 cases with COPD, prevalence of metabolic syndrome was observed to be 32%.

Table 1- Prevalence of metabolic syndrome in patients with COPD

Metabolic syndrome	Frequency (n=100)	Percentage
Present	32	32.0
Absent	68	68.0

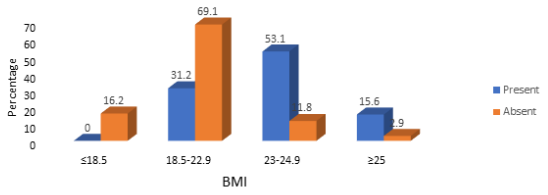
Figure 1- Prevalence of metabolic syndrome in patients with COPD

Table 2- Association of metabolic syndrome with BMI

BMI	Metabolic syndrome			
	Present		Absent	
	Frequency	Percentage	Frequency	Percentage
≤18.5	0	0	11	16.2
18.5-22.9	10	31.2	47	69.1
23-24.9	17	53.1	8	11.8
≥25	5	15.6	2	2.9
χ^2	30.54			
P value	0.001			

Majority of patients with metabolic syndrome were overweight (53.1%) whereas majority of cases without metabolic syndrome had normal BMI (69.1%). BMI of patients with metabolic syndrome was significantly higher as compared to COPD patients without metabolic syndrome (p<0.01). This finding helps us determine that the predominant component of metabolic syndrome in COPD is BMI in Indian population.

Figure 2- Association of metabolic syndrome with BMI



DISCUSSION

Our study which used the NCEP-ATP III criteria [7] with modification for South Asian population for waist circumference , found the prevalence of Metabolic Syndrome in COPD patients to be 32%, which when much less when compared to earlier studies by Marquis *et al*.[8] who observed a prevalence of MetS in 47% of patients compared with 21% of controls using the NCEPATP III criteria while Breyer *et al*. [9] showed MetS was present in 57% . Watz *et al*. [10] had shown the prevalence of MS in COPD patients to be 47.5% , Vujic *et al*. [11] with 37.8 %, Lipovec *et al*. with 34% .[12]

In an Indian population Acharyya *et al*.[13] found that among the COPD subjects, 44% had coexisting MS While Priyadarshini *et al*. [14] found 54% of patients to have MetS , Panda *et al*. [15] found it to be 40% & Dave *et al*. [16] had 42% of COPD patients and 22% of control participants fulfilling the MetS criteria .

On the lower side Gupta *et al*.(2017) [17] had 15.56% fulfilling the criteria according to NCEP ATP III .

The prevalence of Metabolic syndrome increased with increasing BMI as Majority of patients with metabolic syndrome were overweight (53.1%) whereas majority of cases without metabolic syndrome had normal BMI (69.1%). BMI of patients with metabolic syndrome (23.69±2.9) was significantly higher as compared to COPD patients without metabolic syndrome (21.65±3.01kg/m^2) (p<0.01).This was consistent with the findings of Panda *et al* . , Mekov *et al*. and Breyer *et al*.[9,15,18]

While all 100 patients were OPD patients with 41% having raised fasting blood sugar and 35% having raised blood pressure , BMI was raised in just 30.9% but significantly associated with metabolic syndrome. Thus it would be prudent to conclude that patients with COPD who have higher BMI's should be screened for metabolic syndrome. This can help us to predict, prevent and at last treat metabolic syndrome, its individual components and the associated cardiovascular and systemic morbidity and mortality in COPD patients allowing them a better quality of life.

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