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AUDIT OF METABOLIC SYNDROME IN PATIENTS WITH CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD)

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ABSTRACT

Introduction: Chronic obstructive pulmonary disease (COPD) is characterized by persistent airflow limitation that is usually progressive resulting from exposure to noxious stimuli or gases. Additionally, exacerbations and comorbidities contribute to the overall severity in the individual patient. **Objective:** The objective of this study was to assess the frequency of metabolic syndrome in patients with chronic obstructive pulmonary disease. **Material and Methods:** This study was conducted in Department of Medicine Bahawalpur Victoria Hospital during August 2018 to August 2019. This is a cross sectional study which include 148 patients, who were presented with COPD in the hospital. After approval from ethical committee all the parents were informed for the purpose of the study and a written informed consent was taken from the patients. Their Waist Circumference, Glucose Level (mg/dL), Triglyceride level (mg/dL), High Density Lipoprotein level (mg/dL), Systolic & diastolic blood pressure was measured for the diagnosis of metabolic syndrome. Effect modifiers like age, gender and BMI were addressed through stratification of data. All the data was collected through a well-defined Performa. **Results:** From 148 patients, it was observed that the minimum age was 36 years and maximum age was 65 years with mean and standard deviation of the age was 52.44 ± 7.83 years. The minimum waist circumference was 70 cm and maximum was 114 cm with mean and standard deviation was 90.24 ± 13.80cm. The minimum glucose level was 80 mg/dL and maximum was 115 mg/dL with mean and standard deviation was 94.05 ± 11.15 mg/dL. **Conclusion:** The frequency of metabolic syndrome was found in 43.9% patients with chronic obstructive pulmonary disease. All effect modifiers have significant influence.

KEYWORDS: Metabolic Syndrome, Chronic Obstructive Pulmonary Disease, Plasma Glucose, Triglyceride.

INTRODUCTION

Chronic obstructive pulmonary disease (COPD) is a common respiratory condition involving the airways and characterized by airflow limitation.[1,2] It affects more than 5 percent of the population and is associated with high morbidity and mortality.[3] It is the third-ranked cause of death in the United States, killing more than 120,000 individuals each year.[4] As a consequence of its high prevalence and chronicity, COPD causes high resource utilization with frequent clinician office visits, frequent hospitalizations due to acute exacerbations, and the need for chronic therapy (eg, supplemental oxygen therapy, medication).[1] Correct diagnosis of COPD is important because appropriate management can decrease symptoms (especially dyspnea), reduce the frequency and severity of exacerbations, improve health status, improve exercise capacity, and prolong survival.[5] The definition of COPD and its subtypes (emphysema, chronic bronchitis, and chronic obstructive asthma) and the interrelationships between the closely related disorders that cause airflow limitation provide a foundation for understanding the spectrum of patient presentations. The predominant pathologic changes of COPD are found in the airways, but changes are also seen in the lung parenchyma and pulmonary vasculature. In an individual, the pattern of pathologic changes depends on the underlying disease (eg, chronic bronchitis, emphysema, alpha-1 antitrypsin deficiency), possibly individual susceptibility, and disease severity.[6]

The most important risk factor for COPD is cigarette smoking and the amount and duration of smoking contribute to disease severity. Thus, a key step in the evaluation of patients with suspected COPD is to ascertain the number of pack years smoked (packs of cigarettes per day multiplied by the number of years), as the majority (80 percent) of patients with COPD have a history of cigarette smoking.[7] It is useful to ask the age of starting and the age of quitting, as patients may underestimate the number of years they smoked. With enough smoking, almost all smokers will develop measurably reduced lung function. While studies have

shown an overall "dose-response curve" for smoking and lung function, some individuals develop severe disease with fewer pack years and others have minimal to no symptoms despite many pack years.[8]

Background of the study

The critical weakness of the current metabolic syndrome construct is that treatment of the syndrome is no different than treatment for each of its components. Virtually all agree clustering of risk factors for diabetes and cardiovascular disease is a real phenomenon. All agree that the presence of one component of the metabolic syndrome should lead to evaluation for other risk factors. Whether patient benefit is gained from diagnosing patients with a syndrome of such uncertain characteristics or predictive value remains an open question. The advice remains to treat individual risk factors when present and to prescribe therapeutic lifestyle changes and weight management for obese patients with multiple risk factors.

Objectives of the study

The basic aim of the study is to find the frequency of Metabolic Syndrome in Patients with Chronic Obstructive Pulmonary Disease in Pakistan.

Methodology of the study

The present study was conducted at Department of Medicine Unit-II, Bahawalpur Victoria Hospital during August 2018 to August 2019. This was basically a cross sectional study. Sample size of 148 cases is estimated using 95% confidence level, d=0.08 with an expected frequency of metabolic syndrome of 38.3% among the patients of stable COPD.

Inclusion criteria

1. Age 25 – 65 years
2. Either gender
3. Diagnosis of COPD with post-bronchodilator FEV1/FVC <0.70 in presence of symptoms as per operational definition.

Exclusion criteria

1. Patients with tuberculosis diagnosed on AFB
2. COPD patients with chest deformity diagnosed on X -ray
3. COPD patient with lung tumor diagnosed on history and CT scan findings.

Data Collection

148 patients, who were presented with COPD in the Bahawalpur Victoria Hospital, were included in the study. After approval from ethical committee all the parents were informed for the purpose of the study and a written informed consent was taken from the patients. Their Waist Circumference, Glucose Level (mg/dL), Triglyceride level (mg/dL), High Density Lipoprotein level (mg/dL), Systolic & diastolic blood pressure was measured for the diagnosis of metabolic syndrome. Effect modifiers like age, gender and BMI were addressed through stratification of data. All the data was collected through a well-defined Performa. (Attached)

Statistical analysis

All the collected data was entered into SPSS version 16. Numerical variables i-e age, Waist Circumference, Glucose Level (mg/dL), Triglyceride level (mg/dL), High Density Lipoprotein level (mg/dL), were presented by mean ±SD. Categorical variables i-e gender, metabolic syndrome were presented as frequency and percentage. Data was stratified for age, gender and BMI and duration of COPD and smoking (>5 pack years) and Post stratification Chi-square test was applied at < 0.05 as level of significance.

RESULTS

From 148 patients, it was observed that the minimum age was 36 years and maximum age was 65 years with mean and standard deviation of the age was 52.44 ± 7.83 years. The minimum waist circumference was 70 cm and maximum was 114 cm with mean and standard deviation was 90.24 ± 13.80cm (table 01).

Table 1: Descriptive Statistics (n = 148)

	Minimum	Maximum	Mean	Std. Deviation
Age	36	65	52.44	7.83
Waist Circumference	70	114	90.24	13.80
Glucose Level	80	115	94.05	11.15
Triglyceride Level	100	370	181.70	88.03
HDL	30	58	46.22	9.03

The minimum glucose level was 80mg/dL and maximum was 115mg/dL with mean and standard deviation was 94.05 ± 11.15mg/dL. The minimum triglyceride level was 100 mg/dL and maximum was 370 mg/dL with mean and standard deviation was 181.70 ± 88.03mg/dL. The minimum High Density Lipoprotein level was 30 mg/dL and maximum was 58 mg/dL with mean and standard deviation was 46.22 ± 9.03 mg/dL (table 02).

Table 2: Distribution of Metabolic Syndrome.

Metabolic Syndrome	Frequency	Percent
Yes	65	43.9%
No	83	56.1%
Total	148	100.0

By using chi-square test it was found that presence of metabolic syndrome was significantly associated with age group with p-value = 0.005. Significant association was found between the presence of metabolic syndrome and gender with p-value = 0.001 (table 03 and 04).

Table 3: Stratification with respect to Age (n = 148)

Age	Metabolic Syndrome		Total	P-value
	Yes	No		
≤ 40 years	6	0	6	0.005
> 40 years	59	83	142	
Total	65	83	148	

Chi-square test was applied.

Table 4: Stratification with respect to Duration of COPD (n = 148)

Duration of COPD	Metabolic Syndrome		Total	P-value
	Yes	No		
< 5 years	11	71	82	0.000
≥ 5 years	54	12	66	
Total	65	83	148	

Chi-square test was applied.

There was significant association between presence of metabolic syndrome and BMI with p-value = 0.000. Significant association was found between the presence of metabolic syndrome and duration of COPD with p-value = 0.000. There was significant association between presence of metabolic syndrome and smoking with p-value = 0.000 (table 05).

Table 5: Stratification with respect to Smoking (n = 148)

Smoking	Metabolic Syndrome		Total	P-value
	Yes	No		
Yes	51	31	82	0.000
No	14	52	66	
Total	65	83	148	

Chi-square test was applied.

DISCUSSION

The objective of the present research was to assess the frequency of metabolic syndrome in patients with chronic obstructive pulmonary disease. In this regard the present cross sectional study was conducted department of medicine, Bahawalpur Victoria Hospital. So one hundred and forty eight patients presented with COPD were included by fulfilling the inclusion and exclusion criteria by using non probability consecutive sampling.[9] From 148 patients, it was observed that the minimum age was 36 years and maximum age was 65 years with mean and standard deviation of the age was 52.44 ± 7.83 years. The minimum waist circumference was 70 cm and maximum was 114 cm with mean and standard deviation was 90.24 ± 13.80cm. The minimum glucose level was 80 mg/dL and maximum was 115 mg/dL with mean and standard deviation was 94.05 ± 11.15 mg/dL.

In a previous study, compared to the non-COPD people, COPD patients were at increased risk for cardiovascular events [ischemic heart disease (6.9% in the general population vs. 13.6% in COPD patients), cardiac arrhythmia (6.6% in the general population vs. 15.9% in COPD patients), heart failure (2.0% in the general population vs. 7.9% in COPD patients), and other forms of heart disease (10.7% in the general population vs. 23.1% in COPD patients); with a higher impact of COPD in the elderly]; non-psychotic mental disorders, including depressive disorders (29.1% in the general population vs. 41.6% in COPD patients; with a higher impact of COPD on women aged <75 years); diabetes mellitus (10.5% in the general population vs. 18.7% in COPD patients); osteoporosis (10.8% in the general population vs. 14.8% in COPD patients), with a higher impact of COPD on women aged <75 years, and malignant pulmonary

neoplasms (0.4% in the general population vs. 1.9% in COPD patients).[10] In present study the minimum triglyceride level was 100 mg/dL and maximum was 370 mg/dL with mean and standard deviation was 181.70 ± 88.03 mg/dL. The minimum High Density Lipoprotein level was 30 mg/dL and maximum was 58 mg/dL with mean and standard deviation was 46.22 ± 9.03 mg/dL. There were 48% male patients and 52% were female patients. Metabolic syndrome was found in 43.9% patients while metabolic syndrome was not found in 56.1% patients.[11]

MetS was present in 37.8% COPD patients. The frequencies of MetS in patients with GOLD stages I, II, III, and IV were 33.3%, 48.8%, 31.6%, and 23.1%, respectively. MetS frequencies were not significantly different between GOLD stages. The multivariate logistic regression analysis revealed leukocyte count and CRP level as significant independent predictors of the presence of Mets in COPD patients (OR =1.321, 95%CI: 1.007-1.628, p =0.009 and OR =1.184, 95% CI: 1.020-1.376, p =0.027 respectively).[12]

The presence of MS was 38.3% of the COPD patients ($p<0.05$). The presence of MS is associated with significantly worse cough, sleep and mood ($p<0.02$) and higher total CAT score ($p=0.035$). Average BMI is 28.17. There is a correlation between the presence of MS and exacerbations of COPD last two years ($p=0.02$) and no correlation between the pulmonary function presence of the metabolic syndrome.[13]

CONCLUSION

The frequency of metabolic syndrome was found in 43.9% patients with chronic obstructive pulmonary disease. All effect modifiers have significant influence.

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