

Cardiovascular disease and its risk factors: Frequency in patients with chronic obstructive pulmonary disease (COPD)

1. 4. 5. Senior Registrar,
Nishtar Hospital, Multan

2. Professor of Pulmonology,
BVH, Bahawalpur

3. Senior Registrar
Pulmonology, DHQ, teaching
hospital DG Khan

Muhammad Waseem Riaz¹, Muhammad Azam Mushtaq², Awais Naseem³, Waqas Afzal⁴, Syed Sharmal Ali Naqvi⁵

Abstract.....Object: is to ascertain the frequency of ischemic heart disease in patients with chronic obstructive pulmonary disease and to evaluate current magnitude of the problem in our local population. **Methodology:** This cross sectional study conducted in Department of Pulmonology, Nishtar Hospital Multan. Patients with COPD (as defined in Global Initiative for Chronic Obstructive Lung Disease (GOLD) criteria 2021) with duration of more than 3 months were taken in the study. **Results:** Of these 212 study cases, 127 (59.9 %) were male patients while 85 (40.1 %) were female patients. Mean age of our study cases was 56.75 ± 6.78 years. Diabetes was present in 57 (26.9 %), dyslipidemia in 43 (20.3%), hypertension in 98 (46.2%) our patients and 29 (13.7 %) were obese. Smoking was noted in 100 (47.2 %). Ischemic Heart disease was present in 57 (26.9%) of our study cases. **Conclusion:** High frequency of ischemic heart disease was noted in patients with chronic pulmonary obstructive disease in our study.

Keywords: Cardiovascular diseases, chronic obstructive pulmonary disease, Risk factor

Correspondence Address:
Muhammad Waseem Riaz
waseem_riaz123@hotmail.com
m, Mob #+923337401119

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INTRODUCTION

Chronic obstructive pulmonary disease (COPD) is one of the major causes of mortality and morbidity worldwide. It represents a huge social and economic burden¹. It is predicted to become the fourth main cause of early death by 2040². The disease is described by slowly increasing airflow obstruction, resulting in dyspnoea and exercise limitation³. According to different studies the frequent comorbidities associated with COPD are ischemic heart disease, diabetes, osteoporosis, hypertension, heart failure, anemia, depression and cancer. Recently, COPD was found to be strongly linked to cardiovascular disease⁴. Ischemic heart disease (IHD) is common in COPD and may be more prevailing than anticipated and is a particular risk in younger patients and those with milder disease⁵. Large population-based studies propose that patients with COPD are at two to three times' higher chance for cardiovascular mortality, which accounts for about 50% of the total number of deaths⁶. Clinical assessment is hampering by commonly occurring symptoms like dyspnea, chest pain and palpitations⁶. The relationship between COPD and CAD is far more complex than the simple coexistence of both diseases that is perhaps linked by systemic inflammation⁷.

It is now evident that screening in primary health care facility along with the involvement of interdisciplinary team of specialists is crucial for the management of COPD patients⁸. A better understanding of the physiological mechanisms underlying the two disorders would help cardiovascular risk stratification of COPD patients and promote early intervention with prompt treatment⁹. The rationale of my study is to document the frequency of ischemic heart disease in patients with COPD because this co existence is involved in significant morbidity and mortality. Upon extreme research (on google scholar and pakmedinet) it was found that there is single such study conducted in Pakistan but COPD patients are seen more frequently in our daily practice, so it seems reasonable to conduct this study in our population. The results will generate baseline database of our local population which was compared with that from different parts of the world. The results will help policy makers to formulate guidelines regarding proper management of IHD among targeted population. This will not only be helpful for suffering families but also for hospital authorities.

Methodology

This study was carried out to explicate the frequency of occurrence of cardiovascular disease and its

risk factors in patients with chronic obstructive pulmonary disease(COPD) in the Department of Pulmonology, Nishtar Hospital Multan from July 2019 to September 2020.It was a cross sectional study.

Sample size was 212 patients with COPD that was defined as patients who present with symptoms of chronic productive cough for 3 months having FEV 1/FVC < 70 % and B 2 agonist reversibility of predicted FEV 1 of < 15 % and 200 ml. Sampling technique was Non probability consecutive sampling. Both male and female patients with COPD with age ranging from 30 - 60 years were included. Duration of COPD more than 3 months was included. Patients with known cases with asthma, pulmonary embolus, lung cancer, sleep apnea (On history and clinical record),TB patients (sputum smear positive), Bronchiectasis on HRCT thorax, patients with CRF (on lab report) and pregnant ladies confirmed on urine pregnancy test were excluded from study.

A structured Performa was developed to record the findings of this study. All the patients who met the inclusion criteria of this study were included from Department of Pulmonology, Nishtar Hospital, Multan. Proper permission was taken from Institutional Ethical Committee to conduct this study. Informed consent was taken from the patients/attendants of these patients, ensuring them confidentiality of the information provided and fact that there was no risk involved to the patient while taking part in this study. Once registered in the study, all the relevant baseline investigations were done like ECG and echocardiography to diagnose Ischemic Heart Disease (as defined in operational definitions) by a senior cardiologist having minimum of 5 years experience after post-graduation. History was taken like diabetes, hypertension, family history of IHD, smoking (as defined in operational definitions) and other socio-demographic factors were inquired and noted in the study Performa.

Statistical analysis was performed by entering all the data in SPSS version 20. Mean and standard deviation for descriptive statistics like age, disease duration and BMI was calculated. Frequencies and percentages were calculated for categorical variably like gender, smoking, diabetes, family history y of IHD, hypertension, obesity, dyslipidemia, socioeconomic status, residential status, age groups and Ischemic Heart Disease. Effect modifiers like age, diabetes, duration of COPD, hypertension, obesity, dyslipidemia, family history of IHD, smoking, socioeconomic status, residential status and gender were controlled by stratification. Chi-square test was applied to see their effect on outcome. P-value equal or less than 0.05 was considered as significant.

Results

Our study comprised of total of 212 patients having COPD meeting inclusion criteria of study. Of these 212

study cases 127 (59.9%) were male patients while 85 (40.1%) were female patients (Table No. 1). Mean age of our study cases was 56.75 ± 6.78 years (with minimum age was 32 years while maximum age was 60 years). Mean age of the male patients was 58.44 ± 1.77 years while that of female patients was noted to be 54.24 ± 10.01 years. (p=0.000). Our study results have indicated that majority of our patients i.e. 198 (93.4 %) belonged to the age group ranging 46 - 60 years. (Table No. 1).

Of these 212 study cases, 71 (33.5%) were from rural areas while 141 (66.5%) were from urban areas and 170 (80.2%) were poor (Table No.1). Diabetes was present in 57 (26.9 %) and hypertension in 98 (46.2%) our patients. Dyslipidemia was present in 43 (20.3%) and family history of ischemic heart disease was present in 59 (27.8%) of our study cases. Ischemic Heart disease (IHD) was present in 57 (26.9%) of our study cases. (Table No. 2).

Mean body mass index was 23.24 ± 4.86 kg/m². Our study results reported 127 (59.9 %) were normal weight, 56 (26.4 %) were overweight and 29 (13.7 %) were obese (Table No.2). Smoking was noted in 100 (47.2 %) of our study cases. Mean duration of illness was 26.37 ± 15.21 months and 155 (73.1%) had disease duration more than 18 months.

Table-1: Demographic variables

| | |
|----------------------|-------|
| Male | 59.9% |
| Female | 40.1% |
| Age 30-40 years | 6.6% |
| Age 46-60 years | 93.4% |
| Rural Residence | 33.5% |
| Urban Residence | 66.5% |
| Poor Socioeconomic | 80.3% |
| Middle Socioeconomic | 19.8% |

Table-2: Common Co-morbidities

| | |
|---------------------|-------|
| Diabetes | |
| Yes | 26.9% |
| No | 73.1% |
| Hypertension | |
| Yes | 46.2% |
| No | 53.*% |
| Obesity | |
| Normal | 59.9% |
| Overweight | 26.4% |
| Obese | 13.7% |

| Dyslipidemia | |
|------------------------|-------|
| Yes | 20.3% |
| No | 79.7% |
| Ischemic heart disease | |
| Yes | 26.9% |
| No | 73.1% |

Table-3: Distribution of disease duration among study cases

| Disease duration | |
|---------------------|-------------|
| Upto 18 months | 57 (26.9%) |
| More than 18 months | 155 (73.1%) |

Table-4: Stratification of Ischemic heart disease with regards to gender

| Gender | Ischemic heart disease | | P Value |
|-----------------|------------------------|--------------|---------|
| | Yes (n =57) | No (n = 155) | |
| Male (n = 127) | 43 | 84 | 0.007 |
| Female (n = 85) | 14 | 71 | |

Discussion

Pakistan has fourth highest mortality rate in the world due to COPD with 71 deaths per 100,000¹⁰. A substantial reported prevalence of cardiovascular disease in patient's with COPD, comprising a range from 28% to 70%¹¹. Among several associated co morbidities, cardiovascular disease (CVD) is the most frequent. The association between COPD and CVD is multiplex. Systemic inflammation is proposed as a possible link between the two.

Among cardiovascular diseases, ischemic heart disease (IHD) is of particular interest¹². Over the years, many studies tried to solve the mystery between chronic obstructive pulmonary disease (COPD) and ischemic heart disease (IHD), showing that these diseases are mutually affected.

Many different biological processes such as systemic inflammation, enormous platelet reactivity, hypoxia, endothelial dysfunction and arterial stiffness interact in the development of the COPD-IHD comorbidity¹². Recent data regarding mechanisms, incidence and prognosis of this co morbidity, along with the emergence of new drugs and interventional approaches may enhance long-term outcome of COPD-IHD patients¹³.

A study done in UK by Patel et alhas also reported 61 % male gender predominance which is close to our results⁷. Another study has also reported 57.8

% male gender predominance which is similar to our results¹². A study conducted by Eriksson et al from Sweden has also documented 53.8 % male gender preponderance which is in compliance with our results¹⁵. Izquierdo et al from Spain has also documented very high male gender predominance with 83 % which is in compliance with our study¹⁶. Another study done among Swedish population shown that COPD was more frequent among women (53.8%), but the overall mortality rate was higher in men compared with women (45% vs. 38%)¹⁷.

Another report prepared in Italy, showed that the prevalence of COPD is higher in men than women (3.6% versus 2.5%, respectively)¹⁸. However, the female predominance is noted among the patients with COPD in recent years¹⁸. In another study conducted in Spain, results were opposite as compared to our study, female predominance of disease 52.6%¹⁹.

Another study done in Pakistan last year, the mean age of the patients was found to be 61.09±10.8 years which were quite close to our results²⁰. In another study done in Pakistan in 2016, mean age of the study sample was 61.6±12.5 years¹⁴. Another study conducted in Spain, mean age ± SD was 60 ± 11 years¹⁹. A study conducted by Nilsson et alhas reported 66.6 ± 10.6 years mean age of COPD patients which is slightly higher than that being reported in our study, the reason for this difference is due to our inclusion criteria as our age range was 30 - 60 years¹². Izquierdo et alfrom Spain has also documented 67 ± 10 years mean age which is also higher, again due to the same reason of our inclusion criteria.

A study conducted by Eriksson et al from Sweden has also documented 54.54 years mean age of COPD patients which is close to our study results¹⁵. Another study was done in Italy in which the median age was similar between males and females at 74 (66-81) versus 74 (64-82) years, respectively¹⁸.

Conclusion

High frequency of ischemic heart disease was noted among patients with chronic pulmonary obstructive disease in our study which lead to significant morbidity and mortality. Ischemic Heart Disease was linked more so with male gender, increasing age, residential status, poor socioeconomic status, diabetes, hypertension, obesity, positive family history for IHD and dyslipidemia.

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