

**ORIGINAL RESEARCH**

# Prevalence of Hypertension in COPD patients

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Received: 15 March, 2024

Accepted: 11 April, 2024

## ABSTRACT

This study was a cross sectional study to analyse the association of COPD with hypertension as a co-morbidity. Spirometry and Blood pressure was measured in 30 patients. There were 26 male patients in this study while 4 were females. The range of age was between 42 to 69 years in this study. Out of 30 patients studied 25 gave a positive history of smoking or were ex-smokers. Smoking elevates the blood pressure by increasing the arterial stiffness. 17 out of 30 patients were having hypertension in this study.

What causes hypertension in COPD patients may be related to alternation of autonomic function. This may be further elevated by increased arterial stiffness related to COPD.

Wherever possible spirometry should be done in all patients of hypertension and preventive measures such as discontinuation of smoking advised to relevant patients. Management of COPD and Hypertension is a quality driven process and community surveillance of cardiovascular diseases should be undertaken in an extensive manner wherever possible

**Key words:** COPD, hypertension, co-morbidity, spirometry, smoking

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## INTRODUCTION AND RATIONALE

COPD is a major public health problem and along with hypertension as a co-morbidity remains a therapeutic challenge in its control today. With the advent of better management protocols many chronic diseases have been showing a decreasing trend in mortality rates recently, however COPD-related mortality have been gradually increasing. World Health Organization (WHO) estimates that it will become the third leading cause of death worldwide in 2030. <sup>1</sup> Moreover, cardio-vascular diseases have been linked with COPD and approximately one-fourth of the patients with COPD die owing to cardiovascular events <sup>2</sup>. Hypertension has been linked with COPD as a co-morbidity and studies have shown that patients with stage 3 or 4 COPD had a higher prevalence of hypertension. In one of the studies, 17%

of hospitalized patients with COPD had accompanying hypertension. <sup>3</sup>

The risk of development of hypertension may be direct and independent or could be secondly associated with common risk factors such as age and smoking. COPD patients are often accompanied by various comorbidities, such as CVD, diabetes mellitus, obesity, and metabolic syndrome. In a study conducted to assess the link between hypertension and COPD, the prevalence rates of COPD were higher among patients with hypertension than in those without (22.91% vs. 14.32%,  $P < .001$ ). <sup>4</sup>

High blood pressure is ranked as the third most important risk factor for attributable burden of disease in south Asia. About, 33% urban and 25% rural Indians are hypertensive. Of these, 25% rural and 42% urban Indians are aware of their hypertensive status. Only 25% rural and 38% of urban Indians are

being treated for hypertension. Only one-tenth of rural and one-fifth of urban Indian hypertensive population have their Blood Pressure under control. <sup>5</sup>

The objective of this study was to investigate the relationship between COPD and hypertension by using spirometry as an index for COPD

**AIMS AND OBJECTIVES**

1. To study the prevalence of Hypertension along with COPD as a comorbidity
2. To study the patterns of spirometry in elderly

patients having COPD

**METHODOLOGY**

This study was a cross sectional study to analyse the association of COPD with hypertension as a comorbidity. On a OPD basis 30 patients had their blood pressure measured. In all these patients spirometry was also carried out (FEV1/FVC ratio) History of tobacco use, tuberculosis, diabetes or any chronic disease was also undertaken. Any other significant medical procedure undergone was also noted.

Hypertension was defined as follows as per American Heart Association \*

<b>BLOOD PRESSURE CATEGORY</b>	<b>SYSTOLIC mm Hg (upper number)</b>	<b>DIASTOLIC mm Hg (lower number)</b>
NORMAL	LESS THAN 120	LESS THAN 80
ELEVATED	120 - 129	LESS THAN 80
HIGH BLOOD PRESSURE (HYPERTENSION) STAGE 1	130 - 139	80 - 89
HIGH BLOOD PRESSURE (HYPERTENSION) STAGE 2	140 OR HIGHER	90 OR HIGHER
HYPERTENSIVE CRISIS	HIGHER THAN 180	HIGHER THAN 120

\*<https://www.heart.org/en/health-topics/high-blood-pressure>

**OBSERVATIONS AND RESULTS**

S No	Age	Sex	Spirometry FEV1/FVC (in %age)	BP	Smoking	Comments/ Comorbidities
1	60	M	60	160/90	YES	CAD with CABG
2	82	M	58	120/70	YES	
3	47	M	47	100/70	YES	
4	57	M	50	140/80	YES	Cachexia
5	64	M	67	120/70	Ex-smoker	Post TB
6	77	M	67	130/70	YES	Post TB
7	74	M	65	150/100	NO	
8	70	M	68	120/90	EX-smoker	
9	70	M	68	140/80	YES	
10	65	F	66	160/74	YES	
11	65	M	63	180/100	YES	Cholelithiasis
12	68	M	55	140/80	YES	
13	57	M	69	120/70	EX-smoker	CAD with Angioplasty
14	60	M	42	160/100	YES	Post TB
15	64	M	61	120/70	YES	DNS with Post TB
16	62	M	65	130/70	YES	
17	69	M	68	130/80	YES	
18	64	M	58	130/80	EX-smoker	
19	50	M	68	140/96	YES	
20	65	M	65	140/72	NO	
21	53	F	58	140/90	NO	
22	58	M	56	130/70	YES	
23	65	M	53	160/100	Ex-smoker	
24	68	M	55	140/60	YES	
25	59	M	61	110/60	Ex-smoker	
26	55	M	57	130/70	Ex-smoker	NIDDM
27	60	M	54	110/76	YES	
28	54	F	49	100/68	NO	IDDM with CAD
29	70	M	61	120/74	YES	
30	58	F	63	120/80	NO	IDDM

There were 26 male patients in this study while 4 were females. The range of age was between 42 to 69 years in this study.

A patient with COPD was defined among persons over 40 years of age showing a forced expiratory volume in 1 s (FEV1)/forced vital capacity (FVC) ratio <0.7. Ideally the patient should not be a smoker and should not be suffering from any lung disease such as Tuberculosis or any occupational lung disease.

All patents in this study had their FEV1\FVC values below the normal values. The normal value of FEV1/FVC should be 70 to 80%

Out of 30 patients studied 25 gave a positive history of smoking or were ex-smokers. Smoking elevates the blood pressure by increasing the arterial stiffness. 17 out of 30 patients were having hypertension in this study. 2 patient were diabetic in this study.

### DISCUSSION

17 out of 30 patients were having hypertension in this study. Hypertension is one of the major risk factors for CVD, which in turn is an important contributor to poor prognosis and mortality in COPD. <sup>6</sup> What causes hypertension in COPD patients may be related to alternation of autonomic function. This may be further elevated by increased central arterial stiffness related to COPD. <sup>7</sup>

Elastin is an extracellular matrix protein responsible for the extensibility and elastic recoil of many tissues in the body such as large arteries, heart valves, pulmonary tissues, skin, and certain ligaments and cartilages. This structural protein maintains airway elasticity and patency in the lungs and regulates the tone of vascular smooth muscle cells in the arterial walls. Development of arterial stiffness and elastin degradation are features of the normal aging process. However, the increase in elastin degradation and protease— antiprotease imbalance in tissues responsible for emphysematous COPD which accelerates arterial stiffening. <sup>8</sup>

Increases vascular stiffness could result from recurrent hypoxia and oxidative stress related to COPD. This could be due to the release of proinflammatory cytokines thereby causing sympathetic overactivation leading to an increased risk of atherosclerosis and autonomic dysfunction, which consequently augments the pathogenesis of

COPD and increasing vascular arterial stiffness thereby causing hypertension

### CONCLUSION

This study showed that COPD is independently associated with hypertension. Wherever possible spirometry should be done in all patients of hypertension and preventive measures such as discontinuation of smoking advised to relevant hypertensive patients. Management of COPD and Hypertension is a quality driven process and community surveillance of cardiovascular diseases should be undertaken in an extensive manner wherever possible,

as this is not routinely carried out in the institution of many health programs such as NPCDCS (National Program for Prevention and Control of Cancer, Diabetes Cardiovascular diseases and Stroke).

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