

Pulmonary Diseases in Hypertensive Patients: A Study in Tertiary Care Hospital

Sulfeena T P¹, Bharathi D R², Nataraj G. R³, N.Gowthami⁴

¹Pharm D Intern, SJM College of Pharmacy, Chitradurga-577502,

²Professor, SJM College of pharmacy, Chitradurga, 577502

³Asst. Professor, Department of Pharmacology, SJM College of pharmacy, Chitradurga. 577502.

⁴Pharm D Intern, SJM College of Pharmacy, Chitradurga-577502,

Corresponding Author: Sulfeena T.P

ABSTRACT

Background: Chronic respiratory disease is a leading cause of morbidity and mortality worldwide. Pulmonary disease is the common co-morbidity in Hypertensive patients.

Objectives: To study the prevalence, risk factors and management of Pulmonary disease in Hypertensive patients.

Methodology: A prospective observational study was carried out for a period of six months at Medicine department of Basaveshwara Medical College & Hospital, Chitradurga.

Results: A total of 126 patients were enrolled for the study. Out of 126 Hypertensive patients 66 were also diagnosed with Pulmonary disease. Among them males 44 were more prone to develop pulmonary disease as compared to the females 22. Pulmonary disease was mostly seen between age group of 61-70 (36.3%) in males and 71-80 (10.6%) in females. Major risk factors for Pulmonary disease in Hypertensive patient was history of alcohol consumption and smoking. Selective β -2 agonist (Salbutamol 24%), followed by combination of Penicillin+ β -lactamase inhibitors (Piperacillin+Tazobactam 41.8%) and Calcium channel blockers (Amlodipine 37.6%) were commonly prescribed drugs during the study period. The main drug related problems in Pulmonary disease with Hypertensive patients was found to be drug interactions, followed by adverse drug reaction, contraindication, inappropriate drug use, inappropriate dose.

Conclusion: The study reveals a high prevalence of Pulmonary disease in Hypertension with risk factors of age, gender, history of alcohol consumption and smoking. Antiasthmatics, Antimicrobials and Calcium

channel blockers were commonly prescribed drugs in this study.

Key words: Pulmonary disease, Calcium channel blockers, Adverse drug reaction, Contraindication.

INTRODUCTION

Chronic respiratory diseases (CRDs) are affecting the air ways and the other structures of the lungs. Common CRDs are Asthma, Bronchiectasis, Chronic obstructive lung disease, Hypersensitivity pneumonitis, Lung cancer and neoplasms of respiratory and intrathoracic organs, Lung fibrosis, Chronic pleural diseases, Pulmonary heart disease and diseases of pulmonary circulation (pulmonary embolism, pulmonary hypertension and cor-pulmonale), Rhinitis, Sarcoidosis, Sleep apnea syndrome. [1]

The prevalence of CRD is increasing everywhere and in particular amongst children and the elderly. The burden of CRD has major adverse effects on the quality of life and disability of affected individuals. [2]

Hypertension (HTN) is a common disease that is simply defined as persistently elevated arterial blood pressure (BP). High blood pressure is defined as BP \geq 140/90 millimeters of mercury (mmHg). [3]

Pulmonary arterial hypertension (PAH), pulmonary vascular disease, is defined by the elevation of systolic pulmonary arterial pressure above 35 mm Hg. [4]

The prevalence of COPD has been increasing, and the World Health Organization (WHO) estimates that it will become the third leading cause of death worldwide in 2030. Worldwide prevalence estimates for hypertension may be as much as 1 billion individuals, and approximately 7.1 million deaths per year may be attributable to hypertension and its complications. [5,6]

Risk factors of Pulmonary diseases (PD) in HTN patients include age, gender, family history, overweight, stress, alcohol consumption, diet, exposure to dust and smoking. [7]

Antibiotics are often thought to be the first line treatment in lower respiratory tract infections; however, these are not indicated in viral infections. It is important to use an appropriate antibiotic selection based on the infecting organism and to ensure this therapy changes with the evolving nature of these infections and the emerging resistance to conventional therapies. [8]

Joint National Committee on prevention, detection, evaluation & treatment of high blood pressure (JNC VII) recommends the use of thiazide type diuretics alone or in combination with drugs from other classes in uncomplicated essential hypertension. The most frequently prescribed antihypertensive drugs were diuretics followed by Angiotensin receptor blockers (ARBs), Beta Blockers, Calcium channel blockers (CCB's) and Angiotensin converting enzyme (ACE) inhibitors. JNC guidelines recommend diuretics as the first choice in hypertensive patients with no co-morbidities. [9,10]

Treatment of co-morbid condition includes combination therapy with multiple medications can lead to the occurrence of Drug Related Problems (DRPs) such as adverse effects of the drugs, drug-drug interaction, the inappropriate choice of drugs and also the inappropriate dose of drugs administered. [11]

So, from the above mentioned statement, it is very clear that a study is needed to be

conducted on the topic "Pulmonary Diseases in Hypertensive Patients in Tertiary Care Hospital."

MATERIALS AND METHODS

Study design : This was a prospective observational study.

Study site : The study was conducted in Medicine Department at Basaveshwara Medical College Hospital & Research Centre, Chitradurga.

Study period : The study was conducted over a period of six months from 2017 to 2018.

Study subjects: All in-patients who were presented to the Medicine Department of the hospital during the study period were enrolled into study. Patient who met the following criteria were enrolled.

Inclusion criteria:

- Patients of both genders.
- Patients who are Hypertensive with Pulmonary Diseases.
- Patients who are above 30 years.

Exclusion criteria:

- Patients who are comatose.
- Patients who are diagnosed as Hypertension with cardiovascular and DM.

Ethical approval:

The study was approved by the Institutional Ethical Committee of Basaveshwara Medical College Hospital & Research Centre, Chitradurga.

Sources of data:

- Demographics of the patient.
- Past medical history.
- Other relevant lab data.
- Interact with patient.

Study procedure:

- The study was started after obtaining the approval from institutional ethical committee (IEC) of SJM college of Pharmacy.

- Patients who satisfied the above study criteria were included in the study after taking the informed consent.
- Patient's demographic details, complaints, history, diagnosis, and prescribed drugs will be collected from the medical records of the patient and will be documented in a suitably designed data collection form.
- Details of prescription includes:- Brand/generic name, class, dosage, route, frequency.
- The collected data will be used to assess the prevalence, risk factors, treatment and drug related problems in patients with Hypertension and Pulmonary Diseases.

Statistical analysis:

- The data were entered in Microsoft excel and data were analyzed by SPSS software version 19.
- Categorical data were presented as frequency, percentage and quantitative data were analyzed by descriptive method.

RESULTS

A total of 126 Hypertensive in-patients with or without co-morbid were considered for the study. Among them 66 in-patients were diagnosed with pulmonary diseases as co-morbid condition. The data of 66 pulmonary hypertensive in- patients were analyzed and presented as follows,

Prevalence Pattern of Pulmonary Disease in Hypertensive Patients

According to age and gender Hypertensive patient with age groups 61-70 years males (36.3%) and patients with age group 71-80 year females (10.6%) were suffering from Pulmonary diseases. This study showed that male patients were more prone to Pulmonary disease than female. The prevalence of pulmonary disease in HTN was found to be 52.38%.Results are shown in Figure 1.

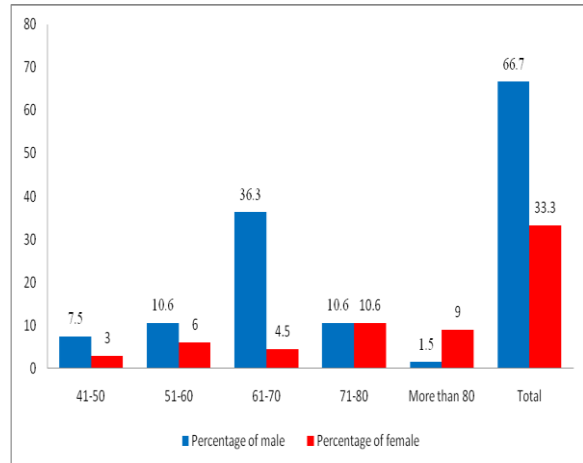


Fig 1: Distribution of Subjects Based on Different Age Group and Gender.

Risk Factors of Pulmonary Diseases in Hypertensive Patients

The result shows that, Hypertensive patient with age groups 51-60 years and 61-70 years were more prone to develop pulmonary diseases followed by males were more prone as compared to female and the patient with history of alcohol and smoking were more prone to get Pulmonary symptoms. The results are shown in Table 1.

Table 1: Risk Factors of Pulmonary Diseases in Hypertensive Patients (n=66)

	VARIABLES	Number of patients with pulmonary diseases
Age	41-50 years	6
	51-60 years	25
	61-70 years	19
	71-80 years	10
	More than 80 years	6
	Total	66
Sex	Male	44
	Female	22
	Total	66
Other factors	Alcohol	20
	Smoking	30
	Exposure to dust	14
	Overweight	2
	Total	66

Distribution of Subjects Based on Major Diagnosis

Among 66 patients,20 (30.3%) were suffering from Asthma with HTN. This study shown that Asthma was most commonly seen Pulmonary disease among Hypertensive patients. The results are shown in Figure 2.

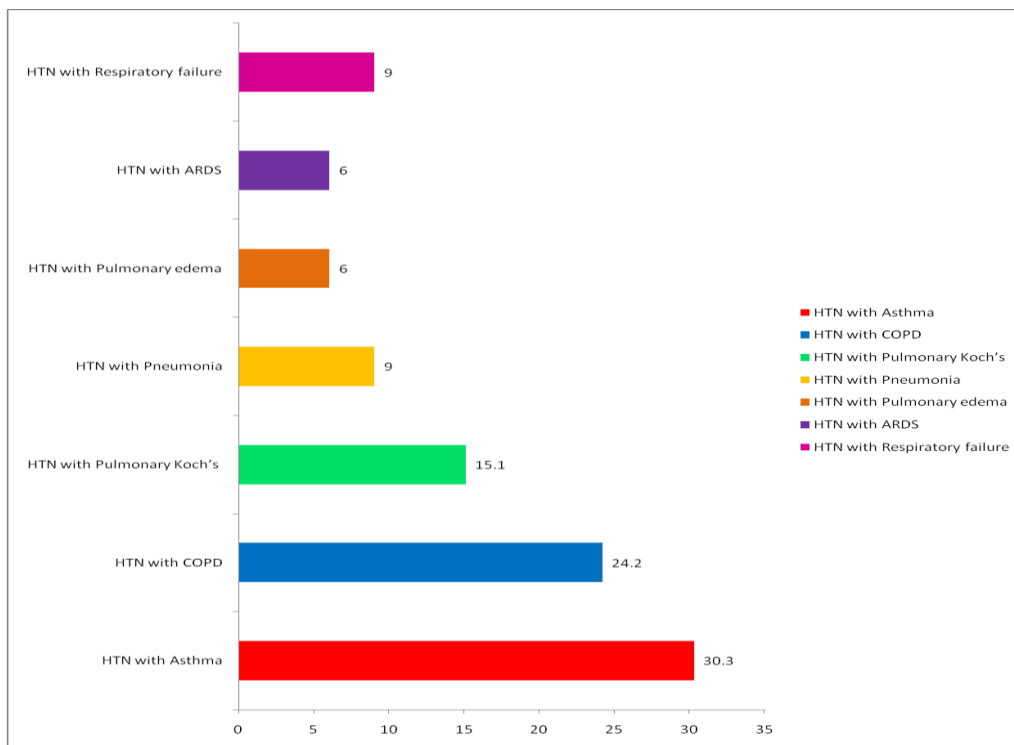


Fig 2: Distribution of Subjects Based on Major Diagnosis

Prescribing Pattern of Antiasthmatics

Among 533, 245 drugs were Antiasthmatics, the most commonly prescribed Antiasthmatic drug was found to be selective beta-2 agonist (Salbutamol) 59 (24%) and least commonly prescribed drug was found to be secretolytic agent (Ambroxol) 2 (0.8%). The results are shown in Table 2.

Table 2: Prescribing Pattern of Antiasthmatics (n=245)

	Class	Generic name	Freq (%)
Antiasthmatic	Methylxanthines	Acebrophylline	2 (0.8%)
		Etiophylline+Theophylline	52 (21.2%)
	Mast cell stabilizers+Antihistamine	Montelukast +Levocetizine	19 (7.7%)
	Selective beta-2 agonist	Salbutamol	59 (24%)
	Corticosteroids	Methylprednisolone	2 (0.8%)
		Hydrocortisone	8 (3.2%)
		Dexamethasone	3 (1.2%)
		Budesonide	43 (17.5%)
	Secretolytic agent	Ambroxol	2 (0.8%)
	Anti-cholinergics	Ipratropium bromide	55 (22.4%)
Total			245 (100%)

Table 3: Prescribing Pattern of Antimicrobial Agents (n=110)

	Class	Generic name	Freq (%)
Anti-microbials	Cephalosporin	Ceftriaxone	28 (25.4%)
		Ceftazidime	3 (2.7%)
		Cefpodoxime	2 (1.8%)
	Penicillin	Amoxicillin	3 (2.7%)
	Fluoroquinolones	Ofloxacin	2 (1.8%)
		Levofloxacin	10 (9%)
	Tetracycline	Doxycycline	2 (1.8%)
	Macrolide	Azithromycin	2 (1.8%)
	Anti - TB antibiotics	Isoniazid	2 (1.8%)
		Ethambutol	2 (1.8%)
Rifampicin		2 (1.8%)	
Combination drug	Penicillin+Beta lactamase inhibitors	Piperacillin+Tazobactam	46 (41.8%)
	Cephalosporin+ Beta lactamase inhibitors	Ceftriaxone+Sulbactam	6 (5.4%)
Total			110(100%)

Prescribing Pattern of Antimicrobial Agents

Among 533 drugs, 110 drugs were Antimicrobials, the most commonly prescribed drug was found to be combination of Penicillin and Beta lactamase inhibitors (Piperacillin+ Tazobactam) 46 (41.8%). The results are shown in Table 3.

Prescribing Pattern of Antihypertensives

Among 533, 178 drugs were antihypertensive agents the most commonly prescribed drug was found to be Calcium channel blockers (Amlodipine 46) 37.6% and least commonly prescribed drug was found to be ACE inhibitors (Enalapril 4) 12.6%. The details are illustrated in Table 4.

Table 4: Prescribing Pattern of Antihypertensives (n= 178)

	Class	Generic name	Frequency (%)
Antihypertensive	Angiotensin-receptor blockers	Telmisartan	36 (20.2%)
		Losartan	2 (1.12%)
		Olmesartan	2 (1.12%)
	ACE inhibitors	Ramipril	14 (7.8%)
		Enalapril	4 (2.2%)
	Calcium channel blockers	Amlodipine	46 (25.8%)
		Nifedipine	2 (1.12%)
		Cilnidipine	7 (3.9%)
	Beta blockers	Atenolol	19 (10.6%)
		Metoprolol	7 (3.9%)
		Carvedilol	4 (2.2%)
	Diuretics	Hydrochlorothiazide	19 (10.6%)
		Spirolactone	6 (3.37%)
		Furosemide	2 (1.12%)
Torseamide		2 (1.12%)	
Metolazone		3 (1.68%)	
Others	Prazosin	2 (1.12%)	
	Clonidine	1 (0.5%)	

Drug Related Problems

Drug Interactions

Out of 66 Pulmonary disease with Hypertensive in-patients prescriptions, 66 drug interactions were found. Among them moderate drug interaction were more 40(60.7%) followed by minor 20(30.3%) and major 6(9%) drug interactions. The results are graphically represented in Fig 3.

Adverse Drug Reactions (n=66)

Out of 66 Pulmonary disease with HTN patients, 23 ADRs were found by using Naranjo ADR assessment scale. In the study we found 14(21.2%) probable ADRs and 9(3%) possible ADRs. Among them

probable was more than that of possible. Details are graphically representation in the Fig 4.

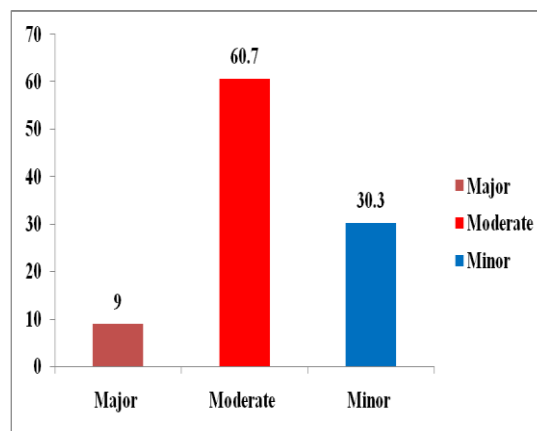


Fig 3: Drug Interactions

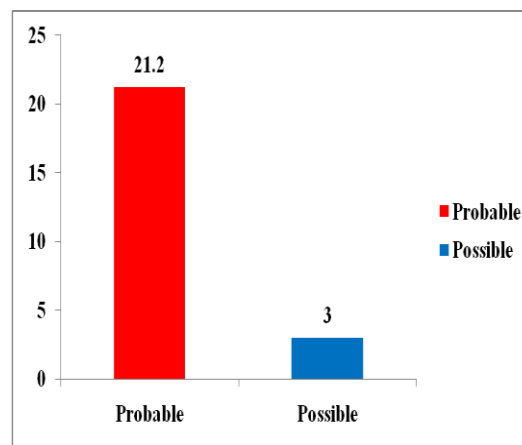


Fig 4: Adverse Drug Reactions

Other Types of DRPS (n=66)

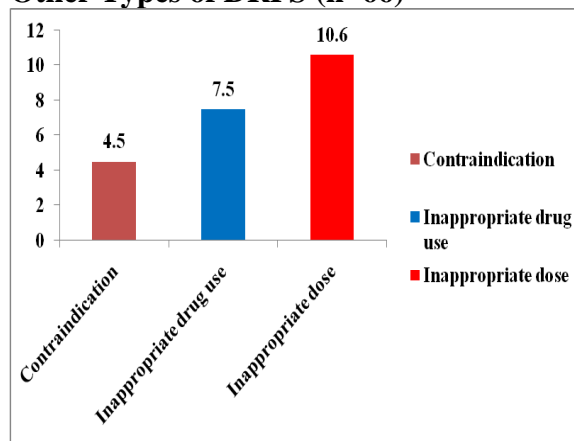


Fig 5: Other Types of DRPs

66 Pulmonary disease with HTN in-patient prescriptions were assessed for other DRPs like inappropriate dose, inappropriate drug use and contraindication. 7 prescription were found with inappropriate dose

7(10.6%) followed by inappropriate drug use 5(7.5%) and contraindication 3(4.5%). The details are given below.

DISCUSSION

Chronic respiratory disease (CRD) is a leading cause of morbidity and mortality worldwide. Age and smoking are common risk factors for CRD and other illnesses, often leading CRD patients to demonstrate multiple co-existing comorbidities. CRD exacerbations and comorbidities contribute to the overall severity in individual patients. Exacerbations and comorbidities contribute to the overall severity in individual patients. Comorbidities are most often responsible for impairing quality of life for early-stage patients, for increasing mortality in end-stage patients, for increasing the burden of CRD management. [12]

High blood pressure can succinctly be defined as the persistent elevation of blood pressure above the normal range of 140/90 mmHg. Hypertension is most times referred to as a silent killer probably because it may be asymptomatic for many years until it finally damages certain critical organs. Hypertension is one of the major risk factors for cardiovascular morbidity and its prevalence is high in most countries of the world. [13]

The study was conducted to assess the prevalence, risk factors, management and DRP in Hypertensive Pulmonary disease patients in a tertiary care hospital.

In the present study a total of 126 Hypertensive in-patients with or without co-morbid were considered for the study. Among them 66 in-patients were diagnosed with Pulmonary diseases as co-morbid condition. Among 66 patients 44 were male and 22 were female. The Pulmonary disease was mostly seen in the age group of 61-70 (36.3%) in males and 71-80 (10.6%) in females. The male patients were more prone to develop Pulmonary disease as compared to the females.

Rakesh B *et al.*, conducted a study on Assessment of co-morbidities in hypertension in tertiary care teaching

hospital, MIMS Mandya. The study population consisted 200 Hypertensive patients, majority of the patients were male n=81 (40.5%) and n= 119 (59.5%) were females. Among 200 patients 69 were found to be RD with HTN. The prevalence of RD was 34.5% in Hypertensive patients. [3]

In the present study the major risk factors for Pulmonary disease in HTN patient was found to be history of alcohol consumption and smoking. ChuchalinAG *et al.*, revealed that smoking was the major risk for CRDs. [2]

Selective beta-2 agonist, combination of Piperacillin+Tazobactam and CCBs were commonly prescribed drugs during the study period. Similar study was conducted by Ahmed MM *et al.*, on Prescription patterns of antibiotics in treating lower respiratory tract infections at Sohag Chest Hospital and the result shows that the majority of patients included in the study received cephalosporins (42%), combination of broad spectrum penicillins and cephalosporins (32%), combination of broad spectrum penicillins and aminoglycosides (12%). [8] Rajasekhar DG *et al.*, conducted a study on Prescribing pattern of antihypertensive drugs based on compelling indications with Hypertension and they concluded that calcium channel blockers and angiotensin II receptor blockers were the most commonly prescribed class of drugs either alone or in combination with other class of drugs for effective control of blood pressure patients with different compelling indications. Monotherapy was preferred than combination therapy. [6]

CONCLUSION

According to the analyzed results and from view of literature, the conclusions made are;

- Pulmonary disease was most prevalent in Hypertensive patients.
- Male patients were more prone to develop PD as compared to females.
- The common risk factors of PD in Hypertensive patient were age, gender,

history of alcohol consumption and smoking.

- Asthma was the most commonly seen PD among Hypertensive patients.
- Selective beta-2 agonist (Salbutamol), followed by combination of Penicillin + β lactamase inhibitors (Piperacillin+Tazobactam) and CCBs (Amlodipine) were commonly prescribed drugs in PD with Hypertensive patients.
- The main drug related problems in PD with Hypertensive patients was found to be drug interactions, followed by adverse drug reaction, contraindication, inappropriate drug use, inappropriate dose.

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