



A Pharmacoepidemiological Study of Cardiovascular Drugs in Intensive Cardiac Care Unit Patients in a Tertiary Care Hospital

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ABSTRACT

Aim: A cardiovascular disease increases the burden of mortality and morbidity across the globe. The aim of the study was to assess and evaluate the prescribing pattern of the cardiovascular drugs among the patients admitted in the intensive care unit of Department of Cardiology of a tertiary care hospital. **Materials and methods:** It is a single centered, observational, non-interventional, prospective study which has been carried out in a tertiary care hospital of Hyderabad, Princess Esra Hospital for a period of 6 months. The data was collected in the specifically designed form. Total 70 study sample was collected and analyzed in terms of descriptive and inferential analysis. The continuous variables were presented as mean \pm SD and categorical variables were presented as numbers. Statistical analysis was done using graph pad version 7.03. **Results:** The percentage of male (51%) patients were slightly higher than females (49%). Most of the patients were in the age group of 51 to 60 years. Atorvastatin (82.85%) were found to be the most highly prescribed drug and the fixed drug combination of aspirin and clopidogrel (72.85%) was present in most of the prescriptions. **Conclusion:** The drugs were found to be prescribed according to the current guidelines. This study analyzes the present prescribing trends of the cardiovascular drugs in the clinical scenario. The study has found that majority of the drugs prescribed were in alliance with the current guidelines. In addition to the proper prescription auditing, patients should be educated regarding the modifiable and non-modifiable risk factors causing cardiovascular diseases.

Keywords: Cardiovascular drugs, Statins, Anti-angina agents, Anti-coagulants, Diuretics, Coronary artery disease

INTRODUCTION

Cardiovascular diseases (CVDs) are a group of disorders of the heart and blood vessels which include, coronary artery diseases, cerebrovascular diseases, peripheral arterial disease, rheumatic heart disease, congenital heart disease, deep vein thrombosis and pulmonary embolism. CVDs are the frontiers among the non-communicable diseases across the globe responsible for increasing the burden of morbidity and mortality.

Elevated prevalence rate of obesity, type-2 diabetes mellitus, and metabolic syndrome are major risk factors of atherosclerosis and these factors have reportedly been associated with the industrialization, urbanization, and sedentary lifestyle [1].

According to WHO factsheet, approximately 17.5 million deaths occurred due to CVDs in 2012, representing 31% of all global deaths. Out of which about 7.4 million were due to coronary heart disease and 6.7 million were due to stroke. More than 75% of deaths have occurred in underdeveloped and developing countries and an estimated percentage of >80% of deaths are attributed to heart attacks and strokes [2]. The mortality rate due to CVDs is expected to hit an elevation of 2-3 million with approximately 85% of which occurring in low and middle-income countries [3]. It has been reported that most of the cardiovascular diseases can be prevented by modifying behavioral risk factors like tobacco use, unhealthy diet, obesity, physical inactivity, and harmful use of alcohol [2].

The optimum and rational utilization of pharmacological therapy helps in improving the public health. But in high risk patients, the drugs prescribed for the pharmacotherapeutic effects can cause life-threatening complications [4]. Medication errors in the prescription can be due to myriad reasons such as inadequate knowledge regarding drugs or

diseases or due to mistakes in the spelling of the drugs with the similar names [5-8]. These errors can be encountered in daily clinical practice [8].

The prescription analysis study not only work as a pivotal tool to detect the medication errors but also helps to identify the areas in the prescribing that needs modifications, ensures rational drug utilization and helps to provides cost-effective patient care [9].

Several studies have evaluated the prescriptive trends of specific cardiovascular drugs such as anti-hypertensives, anti-thrombotic, anti-coagulants, etc. But studies related to the analysis of complete prescription of the patients admitted to the Cardiology Department are scarce in literature. The present study sought to analyze the demographic details, clinical characteristics and the prescriptive trend of the patients admitted in the inpatient Department of Cardiology.

MATERIALS AND METHODS

It is a single centered, observational, non-interventional, The study was undertaken after the approval of Institutional Ethics Committee. Prospective study which has been carried out in a tertiary care hospital of Hyderabad, Princess Esra Hospital for a period of 6 months The study was undertaken after the approval of Institutional Ethics Committee. The subjects included were within the age group of 18 to 80 years which had definite diagnosis of cardiovascular disease and were admitted in the intensive care unit of Department of Cardiology. Prescriptions of the subjects enrolled in the study were evaluated for the demographic data and pharmacotherapeutic pattern.

The study data was analyzed in terms of descriptive and inferential analysis. The continuous variables were presented as mean \pm SD and categorical variables were presented as numbers. Statistical analysis was done using Graph Pad version 7.03.

RESULTS

Demographic Data

Age

Patients were divided based on their age into seven categories ranging from 31-40 age groups to 81-90 age groups. The highest percentage of subjects (31.4%) were found to be in the age between 51-60 years. The age wise distribution of patients is shown in Figure 1.

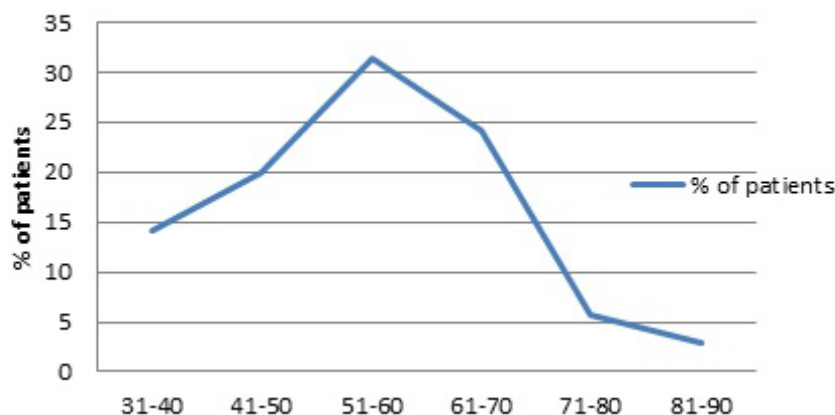


Figure 1 Age-wise distribution of patients

Gender

The percentage of male patients was slightly higher than females. The gender wise distribution is illustrated in Figure 2.

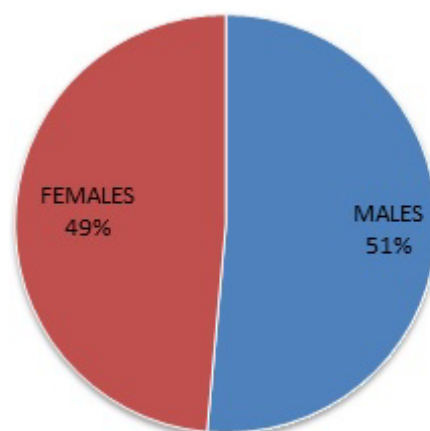


Figure 2 Gender wise distributions of patients

Risk Factors for Cardiovascular Diseases

The patients were evaluated for the prevalence of the risk factors for cardiovascular diseases. Prevalence is represented as percentage. Most prevalent risk factor was hypertension (65.71%) followed by diabetes mellitus (58.57%), smoking (21.42%), drinking alcohol and tobacco chewing (8.57%). The risk factors among patients is presented in the Table 1.

Table 1 Risk factors for cardiovascular diseases

Risk Factors	Number of Subjects (N)	Percentage of Subjects (%)
Hypertension	46	65.71
Diabetes Mellitus	41	58.57
Smoking	15	21.42
Alcohol	6	8.57
Tobacco	6	8.57

History of Interventional Procedure

Patients with the history of coronary artery bypass graft (CABG) were 15.71% and percutaneous transluminal coronary angioplasty (PTCA) were 10%.

Co-morbidities

Prevalence of co-morbidities was evaluated and is presented as percentage. CKD was found to be most prevalent among the patients (12.85%). A detailed account of prevalence of various co-morbidities among patients is presented in Table 2.

Table 2 Prevalence of co-morbidities among patients

Co-Morbidities	Number of subjects (N)	Percentage of subjects (%)
Chronic kidney disease	9	12.85
Cardiomyopathy	5	7.14
Pulmonary edema	4	5.71
Congestive cardiac failure	3	4.28
COPD	3	4.28
Hypothyroidism	3	4.28
Asthma	1	1.42

Diagnosis

Highest percentage of patients were diagnosed with myocardial infarction (STEMI- ST segment elevation myocardial infarction/NSTEMI, non-ST segment elevation myocardial infarction) (44.28%) followed by left ventricular failure (21.42%), unstable angina (14.28%) and cardiomyopathy (10%). A detailed analysis of various diagnosis is in Table 3.

Table 3 Diagnosis wise distribution of patients

Diagnosis	Number of Subjects (N)	Percentage of Subjects (%)
Myocardial infarction	31	44.28
Left ventricular failure	15	21.42
Unstable angina	10	14.28
Cardiomyopathy	7	10.00
Congestive cardiac failure	6	8.57
Atrial fibrillation	1	1.42

Drug Therapy**Distribution of drug therapy**

The drugs prescribed were found to be of 13 different drug classes. Out of which the most commonly prescribed drug atorvastatin (82.85%), belonged to the class HMG Co-A reductase inhibitors which are indicated in primary prevention of cardiovascular events. Heparin, an anti-coagulant, was given to about 81.42% followed by diuretic furosemide (57.14%), anti-anginal isosorbide dinitrate (30%), and beta blocker metoprolol (30%). A detailed analysis is presented in Table 4.

Table 4 Distribution of patients based on drug therapy

Drug class	Drugs (generic name)	Number of subjects (N)	Percentage of subjects (%)
Anti-anginal agents	Isosorbide dinitrate	21	30.00
	Nicorandil	19	27.14
	Nitroglycerine	16	22.85
	Ranolazine	14	20.00
	Trimetazine	1	1.42
Anti-platelets	Aspirin	11	15.71
	Clopidogrel	11	15.71
	Ticagrelor	1	1.42
Anti-coagulants	Low molecular weight Heparin	57	81.42
	Fondaparinaux	6	8.57
	Acecoumarol	4	5.71
	Enoxaparin	1	1.42
Fibrinolytics	Retepase	11	15.71
	Streptokinase	9	12.85
Beta blockers	Metoprolol	21	30.00
	Carvedilol	8	11.42
	Sotalol	1	1.42
	Bisoprolol	1	1.42
Angiotensin converting enzymes inhibitors	Enalapril	18	25.71
	Ramipril	4	5.71
Angiotensin receptor blockers	Losartan	5	7.14
	Telmisartan	4	5.71
Diuretics	Furosemide	40	57.14
	Spirolactone	15	21.42
	Torsemide	3	4.28
	Metolazone	2	2.85
Inotropes	Digoxin	8	11.42
	Dobutamine	5	7.14
	Noradrenaline	5	7.14
	Dopamine	3	4.28
Calcium channel blockers	Amlodipine	8	11.42
Statins	Atorvastatin	58	82.85
	Rosuvastatin	12	17.14
Alpha blockers	Prazosin	1	1.42
Anti-arrhythmic	Amiodarone	2	2.85

Distribution of fixed dose combinations

The most highly prescribed fixed dose combination was found to be of aspirin and clopidogrel (72.85%) which are widely used to prevent the major cardiovascular events MACE. Spironolactone and torsemide was found to be prescribed in about 15.71% of patients whereas, telmisartan and hydrochlorothiazide combination was prescribed to about 5.71% of patients.

DISCUSSION

Management of patients with the major cardiac events is challenging and it demands utmost care considering the life-threatening condition and the immediate measures that need to be taken leaves no room for any error. The risks and benefits of the drug therapy given needs to be weighed prior to their administration.

In the present study, highest percentage of patients was found to be above the age of 50 years. This suggests that the elders are more prone to the cardiac events [10]. An analysis of risk factors found that approximately 21.42% of patients were smokers, 65.71% of patients were hypertensive and 58.57% were diabetics. Patients with the diagnosis of myocardial infarction (STEMI/NSTEMI) were highest (44.28%).

The prevalence of myocardial infarction can be attributed to the presence of risk factors such as smoking, alcohol consumption, tobacco chewing, and diseases such as hypertension, diabetes mellitus, obesity, and dyslipidemia [11,12].

The most frequently prescribed drug class was anti-anginal (100%) and the statins (100%). These results are common, as this was also found in other studies [13]. Anti-coagulants were found to be prescribed in about 97.14% of patients.

The study has shown that the most highly prescribed drug was atorvastatin. USPSTF recommends low to moderate intensity statin therapy for the people in the age group of 40 to 75 years without the history of CVD who have either one or more than one risk factors for CVD [14].

The drug combination of aspirin and clopidogrel was present in most of the prescriptions (72.85%). ACC/AHA guidelines for the management of coronary artery disease recommend the use of dual anti-platelet therapy for the patients who has recently undergone stenting or bypass surgery or experienced a heart attack. Dual anti-platelet therapy usually includes aspirin along with a P2Y₁₂ receptor inhibitor [15].

Although the limitation of the study is smaller size of the sample. The results of the present study evaluate the prescribing trends of cardiovascular drugs in the clinical practice. This may help further studies to analyze the educational intervention in improving the prescribing practices.

CONCLUSION

The data was assessed and evaluated for the demographical data and the pharmacotherapeutic patterns. The drugs were prescribed rationally and according to the current guidelines. Patient's education should not be undermined regarding the modifiable risk factors to prevent further complications.

DECLARATIONS

Conflict of Interest

The authors have disclosed no conflict of interest, financial or otherwise.

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