AMERICAN JOURNAL OF PHARMTECH RESEARCH
Journal home page: http://www.ajptr.com/

A Study On Prevalence and Drug Utilization in Cardiovascular Diseases In A Tertiary Care Teaching Hospital

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ABSTRACT

Cardio Vascular Diseases(CVD) are the leading cause of death and its incidence is rapidly increasing in every region of the world and it remains the major threat to modern society. At present, CVD prevention becomes a major issue for world health and burden on risk factor remains alarmingly high. The main objective of this study was to assess the prevalence and drug utilization in CVD. A prospective observational study was carried out in 186 inpatients for a duration of 6 months (October-17 to March-18) in the Medicine Department of AH&RC, B.G.Nagara. The data was collected after obtaining consent from inpatients. Ethical clearance from Institutional Ethical Committee AIMS, B.G.Nagara was obtained. The data was analyzed by using MS-Excel. Among 186 CVD patients more of males(62.4%) than females(37.6%) were seen, most of them fell in age group of 61-90 years(52.7%). 22% were alcoholics, 32.8% were smokers, 15.6% used tobacco, 39.8% had raised blood-pressure and 21.5% had raised blood-glucose. Among CVD patients hypertension was more prevalent(31.2%) followed by heart failure(15.1%), cardiovascular accident(13.4%), and most prescribed drugs include diuretics (56.3%), Calcium Channel Blockers(CCB)(49%) and anti-coagulants(50.2%). This study can benefit patients in early detection, high risk patients deserving immediate attention and intervention. It was observed that more males suffered from CVD than females; the most common CVD was found to be Hypertension. Major risk factors were alcohol, smoking, raised blood pressure and raised blood glucose. Most prescribed drugs include diuretics, CCB, and anticoagulants.

Keywords: Cardiovascular Diseases, Risk factors, Prevalence, Drug utilization.

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Received 03 March 2018, Accepted 28 March 2019

Please cite this article as: Kumaraswamy M *et al*., A Study On Prevalence and Drug Utilization in Cardiovascular Diseases In A Tertiary Care Teaching Hospital. American Journal of PharmTech Research 2019.

INTRODUCTION

Cardio Vascular Diseases (CVDs) is the leading cause of deaths and its incidence is rapidly increasing in every region of the world. It remains a major threat to modern society. Recent shreds of evidence of different studies have shown that prevalence and mortality of CVDs have declined in the developed countries and rose in the developing countries and over three-quarters deaths take place in low and middle-income countries (LMICs). [1] Every year CVDs take the lives of 17.9 million people, 31% of all global deaths. CVDs manifest primarily as heart attacks and strokes and tobacco use, unhealthy diet, physical inactivity and the harmful use of alcohol trigger these diseases.[2]

The age-adjusted CVDs mortality has declined in high-income countries over the past decades, the incidence and mortality attributable to CVDs has been projected to reach epidemic levels in LMICs by the year 2020, resulting in it being the leading cause of death in these countries.[3]

In comparison with the people of European ancestry, CVDs affects Indians at least a decade earlier and in their most productive midlife years. For example, in Western populations only 23% of CVDs deaths occur before the age of 70 years; in India, this number is 52%.[4] Recent reports of 3 large prospective studies from India suggest a higher proportion of mortality attributable to CVDs (30%–42%) and an age-standardized CVDs mortality rate (255–525 per 100 000 population in men and 225–299 per 100 000 population in women) in comparison with the Global Burden of Disease study. Ischemic heart disease (IHD) and stroke constitute the majority of CVDs mortality in India (83%), with IHD being predominant.[16]

At present, CVD prevention becomes a major issue for world health, and the burden and risk factors remain alarmingly high. The magnitude of CVD continues to accelerate globally as a result of increasing various risk factors or determinants but these can be controlled, modified, and treated if certain steps can be taken and followed.[2] Risk factors includes; modifiable risk factors for cardiovascular disease include high blood pressure, obesity, tobacco use, high cholesterol and lack of physical activity, according to the World Heart Federation. Additional risk factors include diabetes, advancing age, family history, and gender. Evidence present various risk factors for heart infections: age, sex, hypertension, hyperlipidemic, diabetes mellitus, tobacco smoking, alcohol consumption, sugar consumption, family history, and increased weight, psychosocial components, and air pollution. On the other hand, numerous critical cardiovascular danger components are modifiable by lifestyle change, social change, drug medication.[3]

Risk factors are of 2 types: conditional risk factors and predisposing risk factors. The conditional risk factors are associated with increased risk for CHD, although their causative, independent, and quantitative contributions to CHD have not been well documented. The predisposing risk factors are those that worsen the independent risk factors. Two of them-obesity and physical inactivity, are designated major risk factors by the AHA.[3]

Preventive efforts should target each major risk factor. Any major risk factor, if left untreated for many years, has the potential to produce CVDs. Nonetheless, an assessment of total (global) risk based on the summation of all major risk factors can be clinically useful for 3 purposes: (1) identification of high-risk patients who deserve immediate attention and intervention, (2) motivation of patients to adhere to risk-reduction therapies, and (3) modification of intensity of risk-reduction efforts based on the total risk estimate. For the latter purpose, patients at high risk because of multiple risk factors may require intensive modification of risk factors to maximize risk reduction.[2]

The rational use of cardiovascular drugs in patients has been shown to decrease the risk associated with cardiovascular morbidity and mortality. During the past few years, numerous research studies have been conducted worldwide to determine the safe and effective drug utilization indicating that inappropriate drug use is a universal phenomenon. Drug utilization assessments are helpful to determine the prescribing patterns and to set the priorities to avoid irrational drug use.[7]

Drug utilization research is an essential part of pharmacoepidemiology as it describes the extent, nature, and determinants of drug exposure. The principal aim of drug utilization research is to facilitate the rational use of drugs in populations. For individual patient, rational use of a drug implies the prescription of a well-documented drug in an optimal dose on the right indication with the correct information and at an affordable price. Knowledge about drug prescription is required to discuss whether the treatment followed is rational or irrational and to plan for the better prescribing pattern. The correct use of cardiovascular drugs in patients has been shown to decrease the risk associated with cardiovascular morbidity and mortality.[4] The objective of this study is to determine the drug utilization pattern in cardiovascular diseases.

The drug utilization research is increasing and it is being carried out in health setups, in order to study the use of drugs in society. This has immense medical social and economic consequences. Drug utilization studies are needed to identify the trends as well as to set the priorities, not only in the interest of the regulatory control but also as a basis of the planning program of education and information.[1]

The present study was focused on identifying the prevalence, risk factors, and drug utilization and on prescribing practice of physicians in CVDs and which can be used if necessary for better patient care.

MATERIALS AND METHOD

Study site

The study was conducted in Medicine department of Adichunchanagiri Hospital and Research Center, B.G Nagara.

Study design

The study is a prospective and observational study.

Study period

The study was conducted for a period of 6 months from October 2017 to March 2018.

Ethical approval

The study was approved by the Institutional Ethical Committee, AH&RC, B.G.Nagara (AHRC No: AIMS/IEC/1642/2017-18).

Study criteria:

The study was carried out by considering the following criteria

Inclusion criteria

All inpatients who were diagnosed with cardiovascular diseases in medicine wards, ICU and ICCU.

Exclusion criteria

- Outpatients
- Infants and patients not willing to participate.

Source of data

i. Patient case sheets
ii. Prescriptions
iii. Patient laboratory data
iv. Enquiry from patient

Study procedure

All the patients who were admitted in the medicine department, ICU were reviewed daily to identify the patients diagnosed with cardiovascular disease.

Those patients who met the study criteria were enrolled in the study.

The suitably designed data collection form was used to record all the necessary information.

For assessing the cardiovascular diseases, the demographic details including following data were collected as (i) age, (ii) gender, (iii) reasons for admission (iv) patient medical history (v) laboratory report (vi) drug prescribed.

Risk factors like smoking status, alcohol consumption, raised blood pressure were obtained by patient interview and by assessing the patient case files.

The various types of CVD were identified by analyzing the sources of data.

All enrolled patients were followed from the day of admission until the discharge for assessing the drug usage.

Statistical analysis

The study data were analyzed by using descriptive statistics like frequency, percentage etc through Microsoft Excel.

RESULTS AND DISCUSSION

Table 1: Gender distribution

Gender	Number	Percentage
Male	116	62.4
Female	70	37.6
Total	186	100

A total of 186 patients ageing from 20 to 90 years were included in the study during 6 months data collection period. Amongst them, 116 were male (62.4%) and 70 were female (37.6%).

Table 2: Distribution of Age

Age distribution	Number	Percentage
20-30	3	1.6
31-40	16	8.6
41-60	69	37.1
61-90	98	52.7
Total	186	100.0

As mentioned in table 2 there were a total of 186 patients who had CVD and the maximum number was found in the age group under 61-90 followed by 41-60 years of age and the remaining is given in the table.

Table 3: Risk factor- Alcohol

Alcoholic	Number	Percentage
No	145	78.0
Yes	41	22.0
Total	186	100.0

From the total of 186 cases, 41 (22%) were found to consume alcohol.

Table 4: Risk factor- Smoking

Smoker	Number	Percentage
No	125	67.2
Yes	61	32.8
Total	186	100.0

Out of 186 cases assessed 61 of them (32.8%) were found to be smokers.

Table 5: Risk factor- Tobacco consumption

Tobacco	Number	Percentage
No	157	84.4
Yes	29	15.6
Total	186	100.0

Out of 186 cases 29 (15.6%) cases were found to use tobacco.

Table 6: Risk factor- Raised Blood Pressure

Blood Pressure	Number	Percentage
No	112	60.2
Yes	74	39.8
Total	186	100.0

Out of a total of 186 patients, 74 (39.8%) patients were found to have raised blood pressure.

Table 7: Risk factor- Raised Blood Glucose

Raised Blood Glucose	Number	Percentage
No	146	78.5
Yes	40	21.5
Total	186	100.0

40 cases (21.5%) out of 186 patients were found to have raised blood glucose.

Table 8: Risk factor- Abnormal Blood Lipid

Abnormal Blood Lipid	Number	Percentage
No	184	98.9
Yes	2	1.1
Total	186	100.0

2 cases (1.1 %) out of 186 patients were found to have abnormal blood lipid

Table 9: Distribution of diseases

Disease	Number	Percentage
Hypertension	58	31.2
Heart Failure	28	15.1
Cardiovascular Accident	25	13.4
Myocardial Infarction	20	10.8
Ischemic heart disease	19	10.2
Acute Coronary Syndrome	13	7.0
Dilated Cardiomyopathy	11	5.9
Angina	6	3.2
Atrial Fibrillation	3	1.6
Stroke	3	1.6

Total	186	100.0

After assessing CVD in 186 patients, it was found that the most prevalent disease among them was Hypertension (31.2%) followed by Heart Failure (15.1%), Cardiovascular Accident (13.4%) and so on.

Table 10: Drug utilization in CVDs

Drugs	Total	Percentage
Aspirin	117	21.58 %
Furosemide	**77**	14.2 %
Amlodipine	52	9.59 %
Atorvastatin	47	8.67 %
Clopidogrel	45	8.3 %
Telmisartan	42	7.74 %
Isosorbide Dinitrate	33	6.08 %
Trimetazidine	21	3.87 %
Ramipril	19	3.5 %
Streptokinase	16	2.95 %
Digoxin	15	2.76 %
Cilnidipine	13	2.39 %
Mannitol	12	2.21 %
Labetalol	11	2.02 %
Metoprolol	8	1.47 %
Citicoline	7	1.29 %
Enoxaparin	4	0.73 %
Nitroglycerin	2	0.36 %
Diltiazem	1	0.18 %

Table 11: Drug utilization in Hypertension

Drug	Number	Percentage
Furosemide	29	18.7
Amlodipine	24	15.4
Aspirin	23	14.8
Telmisartan	21	13.54
Atorvastatin	13	8.3
Cilnidipine	9	5.8
Clopidogrel	8	5.1
Labetalol	8	5.1
Isosorbide Dinitrate	7	4.5
Trimetazidine	4	2.5
Digoxin	3	1.9
Mannitol	3	1.9
Ramipril	1	0.6
Metoprolol	1	0.6
Citicoline	1	0.6
Total	155	100

For treating Hypertension, it was found that the most prescribed drug was Furosemide (18.7%) followed by Amlodipine (15.4%), Aspirin (14.8%) and Telmisartan (13.54%) and the remaining is given in the table.

Table 12: Drug utilization in Heart Failure

Drug	Number	Percentage
Furosemide	23	30.6
Aspirin	14	18.6
Amlodipine	11	14.6
Telmisartan	6	8
Atorvastatin	4	5.3
Isosorbide Dinitrate	3	4
Digoxin	3	4
Clopidogrel	2	2.6
Cilnidipine	2	2.6
Mannitol	2	2.6
Ramipril	1	1.3
Trimetazidine	1	1.3
Diltiazem	1	1.3
Labetalol	1	1.3
Nitroglycerin	1	1.3
Total	75	100

For treating Heart Failure, the most commonly prescribed drug was found to be Furosemide (30.6%) followed by Aspirin (18.6%), Amlodipine (14.6%) and Atorvastatin (5.3%) and the remaining is given in the table.

Table 13: Drug utilization in Cardiovascular Accident

Drug	Number	Percentage
Aspirin	20	31.7
Amlodipine	12	19
Atorvastatin	7	11.1
Telmisartan	6	9.5
Mannitol	6	9.5
Citicoline	5	7.9
Furosemide	1	1.5
Clopidogrel	1	1.5
Ramipril	1	1.5
Trimetazidine	1	1.5
Metoprolol	1	1.5
Nitroglycerin	1	1.5
Digoxin	1	1.5
Total	63	100

For treating Cardiovascular Accident, the most prescribed drug was found to be Aspirin (31.7%), followed by Amlodipine (19%), and Atorvastatin (11.1%) and the remaining is given in the table.

Table 14: Drug utilization in Myocardial Infarction

Drug	Number	Percentage
Clopidogrel	18	20
Aspirin	17	18.8
Isosorbide Dinitrate	13	14.4
Streptokinase	12	13.3
Ramipril	6	6.6
Furosemide	5	5.5
Atorvastatin	5	5.5
Enoxaparin	4	4.4
Metoprolol	3	3.3
Telmisartan	2	2.2
Cilnidipine	1	1.1
Labetalol	1	1.1
Digoxin	1	1.1
Mannitol	1	1.1
Citicoline	1	1.1
Total	90	100

For treating Myocardial Infarction, The most prescribed drug was found to be Clopidogrel (20%) followed by Aspirin (18.8%), Isosorbide dinitrate (14.4%), Streptokinase (13.3%) and the remaining is given in the table.

Table 15: Drug utilization in Ischemic Heart Disease

Drug	Number	Percentage
Aspirin	16	36.3
Furosemide	7	15.9
Trimetazidine	7	15.9
Atorvastatin	4	9
Clopidogrel	3	6.8
Isosorbide Dinitrate	2	4.5
Ramipril	2	4.5
Telmisartan	1	2.2
Labetalol	1	2.2
Digoxin	1	2.2
Total	44	100

For treating Ischemic Heart Disease, the most prescribed drug was found to be Aspirin (36.3%) followed by Trimetazidine (15.9%), Furosemide (15.9%), Atorvastatin (9%) and Clopidogrel (6.8%) and the remaining is given in the table.

Table 17: Drug utilization in Acute Coronary Syndrome

Drug	Number	Percentage
Aspirin	13	27
Atorvastatin	12	25
Clopidogrel	11	22.9
Streptokinase	4	8.3

Isosorbide Dinitrate	3	6.2
Furosemide	2	4.1
Amlodipine	1	2
Ramipril	1	2
Metoprolol	1	2
Total	48	100

For treating Acute Coronary Syndrome, the most prescribed drug was found to be Aspirin (27%), followed by Atorvastatin (25%), Clopidogrel (22.9%) and Streptokinase (8.3%) and the remaining is given in the table.

Table 18: Drug utilization in Dilated Cardiomyopathy

Drug	Number	Percentage
Furosemide	10	19.6
Aspirin	10	19.6
Trimetazidine	8	15.6
Ramipril	7	13.7
Digoxin	6	11.7
Telmisartan	5	9.8
Amlodipine	3	5.8
Isosorbide Dinitrate	1	1.9
Cilnidipine	1	1.9
Total	51	100

For treating Dilated Cardiomyopathy, the most prescribed drug was found to be Aspirin (19.6%), Furosemide (19.6%), Trimetazidine (15.6%), Ramipril (13.7%) and Digoxin (11.7%) and the remaining is given in the table.

Table 19: Drug utilisation in Angina

Drug	Number	Percentage
Aspirin	4	25
Isosorbide Dinitrate	4	25
Atorvastatin	2	12.5
Clopidogrel	2	12.5
Metoprolol	2	12.5
Amlodipine	1	6.2
Telmisartan	1	6.2
Total	16	100

For treating Angina, the most prescribed drug was found to be Aspirin (25%), Isosorbide dinitrate (25%), followed by Atorvastatin (12.5%), Clopidogrel (12.5%), and Metoprolol (12.5%) and the remaining is given in the table.

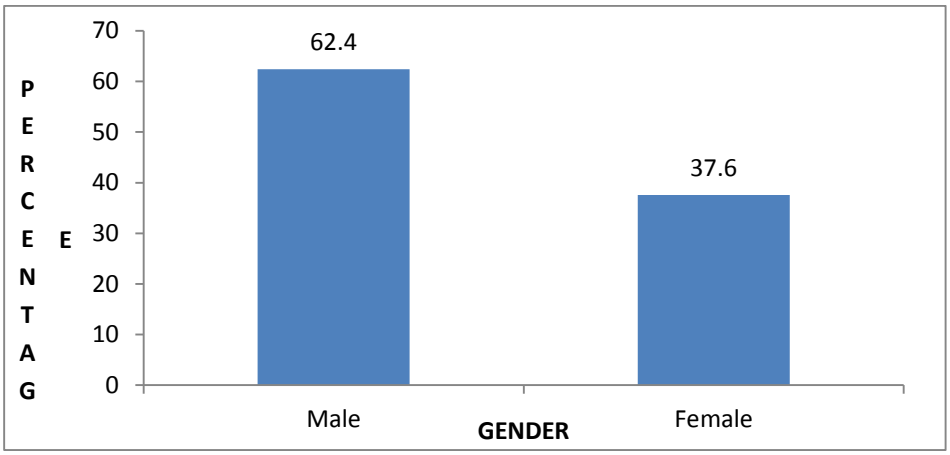

Figure 1: Gender distribution

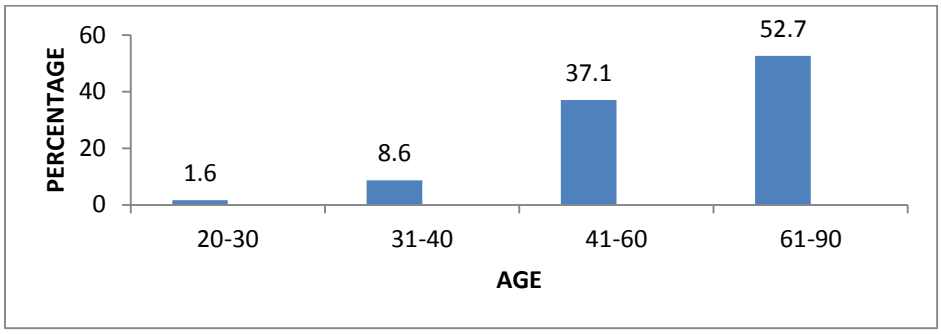

Figure 2: Distribution of Age

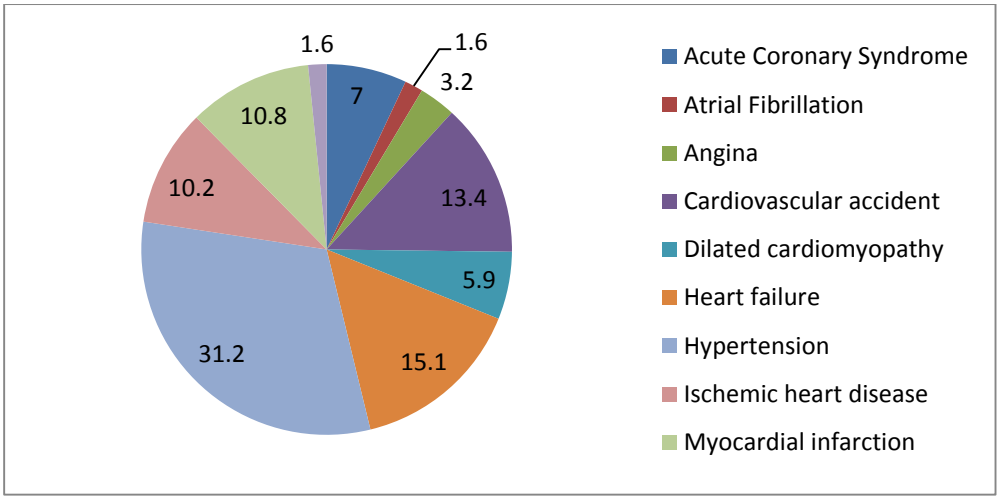

Figure 3: Distribution of diseases

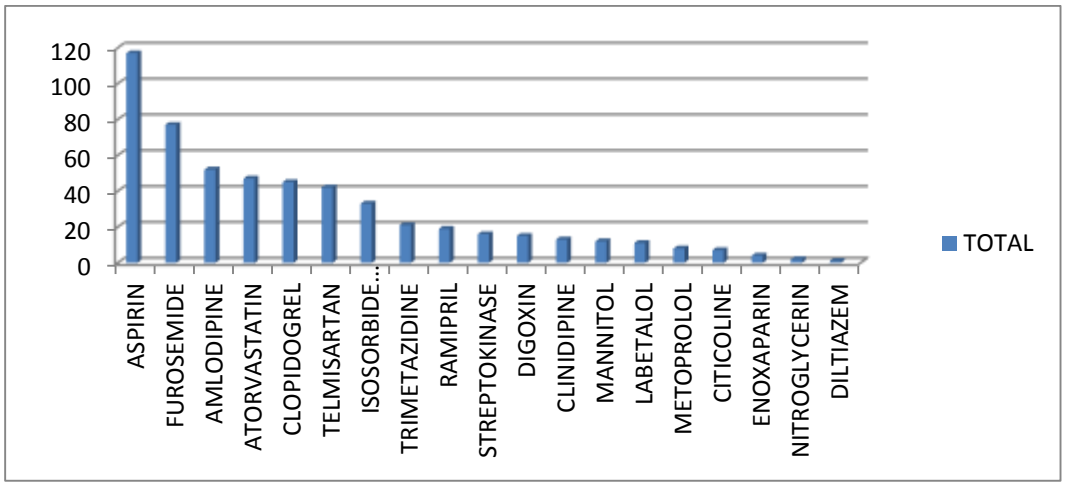

Figure 4: Drug utilization in CVDs

DISCUSSION

Our study was a "Prospective Observational Study" for a period of 6 months on 186 cases and the findings were similar to study conducted by Jyothi CH et al., and Ramesh P et al.,.[4,9] Among 186 cases, the majority (52.7%) were in an age group of 61-90 years i.e, 98 patients. Similarly, the study conducted by Kumar M et al. reported that patients of age group between 61-90 years were diagnosed with CVDs (48.21%) out of all cases.[10] The majority (62.4%) of the patients in this study were males and females were about 37.6%. Similarly, study conducted by Nagabhushan H et al. reported that 64.7% were males and 35.3% were females.[11]

Out of 186 cases, the majority of the patients were found to suffer from hypertension (31.2%), Heart Failure (15.1%), Similarly, the study conducted by Kumar M et al., reported that most of the patients(80.35%) suffered from hypertension, ischemic heart disease (66.96%).[10] Also similar data from Zafar F et al., reported that hypertension (41.3%), ischemic heart disease (20%) was most diagnosed and treated CVD.[5] In our study, the most common risk factors contributing to CVD was found to be raised blood pressure 39.8%, smokers 32.8%, and alcoholic 22%. Similarly, the study conducted by Ramesh P et al. reported that 33% were alcoholics and smokers 29% had more prevalence for CVD.[9]

About 19 types of drugs were prescribed in out of all 186 cases and the most prescribed drug was Aspirin(21.58 %), Furosemide(14.2), Amlodipine(9.59%). Similarly the study conducted by Kumar M et al., report that diurectics(18.7%) and aspirin(18.8 %) was prescribed.[10] It was observed that 15 types of drugs were prescribed for treating hypertension, and the most prescribed drug was found to be Furosemide (diuretics) 18.7% followed by Amlodipine (calcium channel blocker) 15.4%, Telmisartan (angiotensin receptor blocker) 13.54%. Similarly, the study conducted by Kumar M et al. reported that the use of diuretics was 51.3% and calcium channel

blockers 12% for treating hypertension.[10] Most prescribed drugs include Clopidogrel (20%), Aspirin (18.8%), Isosorbide dinitrate (14.4%), Streptokinase (13.3%) for patients with Myocardial Infarction, Likewise the study conducted by Jyothi CH et al., showed the result that Myocardial infarction patients received Streptokinase (61%), Aspirin (72%), statins (83%), Isosorbide dinitrate (27%).[4]

CONCLUSION

CVD is the major concern across the globe as it is a major threat to modern society. Therefore a study has been done in the Medicine Department of a tertiary care teaching hospital AH&RC, B.G.Nagara, Karnataka in order to observe the prevalence, drug utilization and risk factors leading in CVD. The prospective observational study conducted in 186 patients reports that majority (62.4%) patients were male and most(52.7%) of the patients are under the age group of 61-90 years. The major risk factors were found to be raised blood pressure (39.8%), smoking (32.8%), alcohol (22%), raised blood glucose (21.5%). Out of total 10, CVD studied, the majority(31.2%) of the patients suffered from hypertension followed by heart failure(15.1%), Myocardial Infarction (10.8%) and ischemic heart disease (10.2%). Out of the 19 drugs prescribed, the most prescribed drugs for CVD include diuretics (56.3%), anticoagulants (50.2%), calcium channel blockers (49%). The recommendations made by the clinical pharmacists are considered by the physician and the patient in order to obtain a better outcome, a daily process of medication reconciliation helps in better patient care by forming a squad of physician, pharmacist, and patient together.

ACKNOWLEDGMENT

The authors are extremely thankful to each and everyone for their guidance and their support for the accomplishment of our project.

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