

Original Article

CARDIOVASCULAR DISEASE PREVALENCE AND DRUG UTILIZATION PATTERNS AT A TERTIARY CARE HOSPITAL IN NORTHEASTERN INDIA

MUKESH KUMAR^{a*}, VICKY DAHIYA^a, SHRUTI MISHRA^b, DINESH SHARMA^a, NEHA MISHRA^a, MANGLA LAHKAR^{a, c}

^aDepartment of Pharmacology and Toxicology, National Institute of Pharmaceutical Education and Research (NIPER), Guwahati, Assam, India., ^bDepartment of Pharmacy Practice, National Institute of Pharmaceutical Education and Research (NIPER), Guwahati, Assam, India,

^cDepartment of Pharmacology, Gauhati Medical College and Hospital, Guwahati, Assam, India.

Email: budhanimukesh1991@gmail.com

Received: 27 Jan 2016 Revised and Accepted: 20 Apr 2016

ABSTRACT

Objective: The objective of this study was to evaluate the disease prevalence and drug utilization pattern in the department of cardiology in a tertiary care hospital in northeastern India.

Methods: Indoor case papers 112 of patients fulfilling inclusion criteria were included in this study. The study was performed in between December 2014 to February 2015. Case papers analyzed and documented for demographic variables, indication, disease prevalence, co-morbidities and prescribing pattern of the physician.

Results: A total of 112 cases were evaluated. Patients of age group between 61-90 y were diagnosed 48.21% of cardiovascular diseases (CVDs). Male patients (67%) were diagnosed CVDs more than female patients (33%). Our findings indicated that hyperlipidemia (84.82%), hypertension (80.35%) and ischemic heart disease (66.96%) were most frequently diagnosed disease and most of the diseases were treated by the combination of two or three drugs. The use of statins, beta blockers, diuretics, calcium channel blockers and angiotensin-converting enzymes (ACE) inhibitors was very common. Diabetes, anemia and asthma were the comorbidities associated with CVDs.

Conclusion: Hyperlipidemia, hypertension and ischemic heart disease were the prevalent diseases among CVDs. Statins and antihypertensive were most prescribed drugs. Combinations of drugs were prescribed to the patients for effective therapy. The present study will help the healthcare professionals to optimize the efficient and safe use of cardiovascular drugs.

Keywords: Ischemic heart diseases, Hypertension, Rational, Health professionals

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INTRODUCTION

Drug utilization pattern study is a powerful exploratory tool to evaluate present trends of drug use and appropriateness of prescriptions. It is a descriptive and analytical method of collection, quantification, understanding and evaluation of the prescribing pattern, as well as dispensing and consumption for the advancement of existing therapy and enhancement of patient safety [1]. Nowadays inappropriate drug use is a common hurdle which receives the support of numerous worldwide research studies to determine the safe and effective drug utilization [2].

These studies are rising globally in different healthcare settings; provide enormous medical, social and economic significance. Drug utilization research helps in the management of drug-specific problems, and the evaluation of the appropriateness of drug therapy [3]. Identification and assessment of the prescribing pattern are one of the very first steps towards improving both medication quality and patient safety. Medication quality and patient, safety requires a rational prescription of medication and avoidance of inappropriate/irrational prescribing patterns [4]. Rational prescription of drugs means an efficient and safe drug according to clinical needs for an adequate period and at the minimum available cost. Prescribing unnecessarily branded drugs, the cost issue, inadequate drugs supply, and lack of patient counseling regarding dosing schedules and possible side effects are the major causes of irrational use of drugs [5], which may lead to failure of therapy and undesirable side effects [4]. Triad of right diagnosis, accurate prescription and excellent patient counseling leads to the effective and safe use of the drug. Also prescribing multiple drugs not only results of the cost and regimens complication but also increases the incidence of undesirable side effects and drug-drug interactions. Cardiovascular diseases (CVDs) are still the leading cause of death globally. The Global Burden of Disease study estimated that 29.6% of all deaths worldwide (15616.1 million deaths) were caused by CVD in 2010,

more than all communicable, maternal, neonatal and nutritional disorders combined, and double the number of deaths caused by cancers [6]. It was reported that by 2015 approximately 20 million patients will die mainly due to heart disease [7, 8]. The elevated levels of blood cholesterol, hypertension, smoking, excessive alcohol consumption, diabetes, obesity and malnutrition, etc. are some of the risk factors for CVDs [8].

Previous studies reported different preventive strategies related to the rational use of drugs have been taken by developed countries which reduced the risk associated with the occurrence of CVDs [9], also reported that population-based prescribing trends have a significant impact on patient health. Nonetheless, the studies in developing countries are insufficient and incomplete in nature, particularly in tertiary care setups. [10]. In the present study, we examined the disease prevalence and prescribing trends and various co-morbidities among the inpatient admitted to the department of cardiology in northeastern India.

MATERIAL AND METHODS

The present study was performed to understand the prescription pattern and to analyze the utilization of different classes of drugs in inpatients, admitted to the department of cardiology, of Guahati Medical College and Hospital (GMC & H), Guwahati, Assam. The study was approved by the Institutional Ethics Committee (approval no. MCI/233/2013/349). Patients (age 30-90 y) suffering from CVDs and admitted in the department of cardiology with informed consent were included in the study as study populations. Patient referred from other hospitals within one week was also included in the survey. Patients with incomplete case record form and transferred to other units within a day of admission from the department of cardiology were excluded. Drug prescription was collected, and documented in Microsoft Excel sheet and further analyzed. Documented datum was analyzed by

using Graph pad Prism version 5.0. Non-parametric values were expressed as the percentage.

Study population

This observational study was held from December 2014 to February 2015. In total 126 patients were identified and 112 patients were recruited for further study as they fulfill all inclusion criteria. Study subject medical record and prescription were examined on the regular hospital visit to the department of cardiology GMC & H Guwahati Assam. Data collection was based on prescriptions which were issued to them in which all the patients are designated by names, age, gender and other necessary information.

RESULTS

A total of 112 patients with cardiovascular disease were included in which male patients (67%) had a high frequency of cardiovascular incidence as compared to female patients (33%) as showed in fig. 1. In our study out of 112 patients, 21.42 % of patients belong to the

ages group of 30-40 y, 30.35 % of patients belongs to the age groups of 41-60 y while 48.21 % of patients belongs to the age groups of 61-90 y as mentioned in table 1.

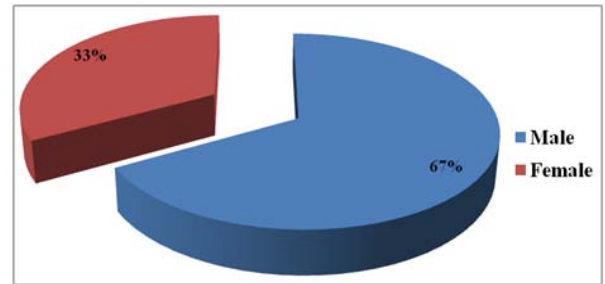


Fig. 1: Percentage of male and female patients

Table 1: Age groups of the patients (n=112)

Age group (in years)	Male	Female	Total	Percentage (%)
30-40	16	8	24	21.42
41-60	24	10	34	30.35
61-90	36	18	54	48.21

Hyperlipidemia, ischemic heart disease (IHD) and hypertension (HTN) were the most diagnosed disease among 112 patients, 84.82 % patients were diagnosed with hyperlipidemia, 66.96 % patients with IHD, 80.35 % patients with HTN, and 35.71% with myocardial infarction (MI) as shown in table 2.

Table 2: Percentages of different diseases found in patients (n=112)

Medical conditions	No. of patients	Percentage (%)
Ischemic heart disease	75	66.96
Hypertension	90	80.35
Myocardial infarction	40	35.71
Hyperlipidemia	95	84.82
Heart failure	28	25

Co-morbidity assessment

In the present study, doctors diagnosed some comorbidity like diabetes, asthma, etc.; in a number of cardiovascular patients. The

most frequently encountered comorbidities were diabetes, anemia and asthma. In total 112 subjects, 100 with diabetes (89.28%), 54 patients with asthma (48.21%) and 75 patients with anemia (66.96%) were reported during the study period (table 3).

Table 3: Co-morbidity assessment (n=112)

Co-morbidity	Male	Female	Total	Percentage (%)
Diabetes	65	35	100	89.28
Asthma	30	24	54	48.21
Anemia	21	54	75	66.96

Drug utilization pattern

Fig. 2, indicated that 7% patients were prescribed with a single drug while 44% patients were prescribed two drugs and 36% patients and 13% patients were found to be prescribed with three and four medications respectively.

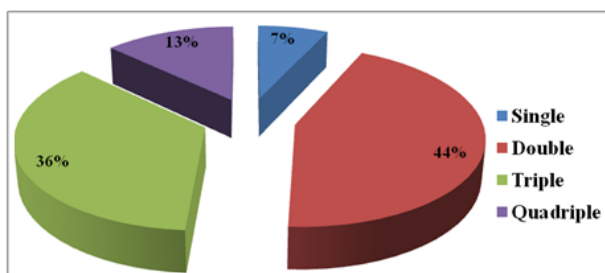


Fig. 2: Percentages of drugs used alone and in combinations

Fig. 3, showed the prescribing pattern of different cardiovascular drugs. Results indicated that most commonly prescribed drugs were found to be the beta blocker (84 %), statins (68 %), diuretics (40 %), calcium channel blocker (35%), ACE Inhibitors (42 %) and antiplatelet (34 %).

Antihyperlipidemic drugs

Among the antihyperlipidemic drugs, atorvastatin was prescribed to most of the patients (66.96%) while the second choice was rosuvastatin (22.32%) (table 4).

Antihypertensive drugs

Antihypertensive drugs were the most prescribed drugs for the CVDs patients. Among different classes of the antihypertensive drugs most preferred class were beta-blockers, diuretics, calcium channel blocker and ACE inhibitors. Most of the doctors' prescribed single agent rather than combinations. Metoprolol (61.66%) and carvedilol (44.44%) were the first choices for the patients. On the other hand combination of beta blocker and calcium channel blocker was prescribed to the minority (18.75%) of the patients (table 4).

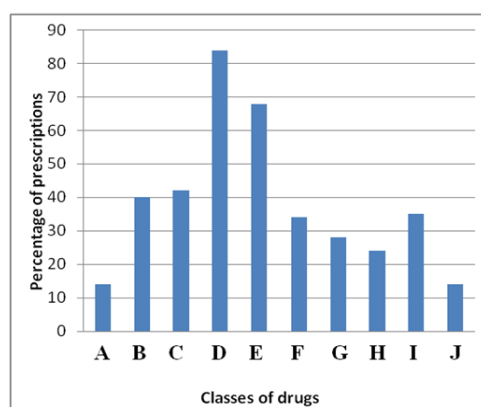


Fig. 3: Prescribing pattern of the physicians in cardiovascular patients (n=112), A = Antianginal; B = Diuretic; C = ACE Inhibitor; D = Beta-blockers; E = Statin; F = Antiplatelet; G = Anticoagulant; H = Vasorelaxant; I = Calcium Channel Blocker; J = Miscellaneous

Patients were also prescribed ACE inhibitors and diuretics might be due to the widening of the indications such as hypertension, diabetic nephropathy and heart failure, etc.

Anti-ischemic drugs

The combination of antiplatelet drugs clopidogrel and aspirin was prescribed to 48.36% for synergistic activity whereas 37.21% patients were treated with only clopidogrel. Aspirin and warfarin were prescribed to only 10.12% and 4.33% patients, respectively. Anti-ischemic agents such as direct vasodilators were used commonly. Nitroglycerine was prescribed in 30.35% patients whereas the combination of isosorbide mononitrate and nitroglycerine was prescribed in 47.32% patients. Calcium channel blockers such as amlodipine and diltiazem were also prescribed frequently (table 4).

DISCUSSION

A survey based on the prescription is considered to be one of the most cost-effective methods to determine the prescribing approach of physicians [11]. The first and third leading cause of death among adult age group is CVDs and stroke [12]. This study was carried out at a tertiary care hospital in northeastern India. Clinical studies on drug utilization which allows different treatment choice of the specialists in the CVDs patients are quite uncommon in developing nations.

Previous studies explain the gender gap in CVDs and the rapid increase in CVDs mortality among middle-aged men. Men develop CVDs more frequently than age-matched women [13].

Table 4: Different classes of drugs prescribed to the cardiovascular patients (n=112)

Drugs	No. of prescription	Prescription rate (%)
Beta blockers		
Metoprolol	69	61.60
Carvedilol	50	44.64
Metoprolol+Nefedipine	21	18.75
Antihyperlipidemic		
Atorvastatin	75	66.96
Rosuvastatin	25	22.32
Simvastatin	14	12.5
Anti-atherogenic		
Clopidogrel	44	39.28
Aspirin	23	20.53
Clopidogrel+Aspirin	56	50
Warfarin	14	12.5
Streptokinase	32	28.57
Diuretic		
Furosemide	66	58.92
Spirolactone	13	11.60
Antianginal		
Nitroglycerine	34	30.35
Isosorbide mononitrate	24	21.42
Nitroglycerine+Isosorbide mononitrate	53	47.32
Miscellaneous		
Proton pumps inhibitors	34	30.35
Anxiolytics	12	10.71
Ferrous sulphate	26	23.21

Among all CVDs, coronary artery disease (CAD) is widely documented disease in older males. Also, comparisons between the sexes revealed that the differences in psychosocial and behavioral coronary risk factors in men and women. The psychosocial and behavioral coronary risk factors favor women, which show women's coping with a stressful environment may be more cardioprotective [14]. These studies were supported by our findings in which male patients are more prone to cardiovascular incidence as compared to female patients. The impact of CVDs increases with age in both sexes. People with the age of <50 y having the chance of CVDs 11/100,000 and 4/100,000 in men and women, respectively while the age of <75 y this rate increases to 120/100,000 men and 60/100,000 women [15]. In the present study, 48.21% of patients belong to the age group of 61-90 y which strengthens the previous studies which showed a high incidence of CVDs in older people. Earlier research in the United States reported approximately 74.5

million cases were related to hypertension, followed by 17.6 million and 6.4 million cases of coronary heart disease and stroke respectively [16]. Among 122 patients half of the patients were diagnosed with hyperlipidemia, which is the key risk factor for coronary heart diseases (CHDs). The elevated blood cholesterol level may be due to bad food habits, less physical exercise, poor health hygiene and urbanization. One previous study reported that hypertension is the second leading disease among CVDs if untreated may lead to diseases such as heart failure, stroke, and myocardial infarction, etc. [17]. During present study different adjustable related risk factors were also determined which may be associated with CVDs particularly bad food habits, alcohol intake, physical inactivity, smoking and obesity. Patients with diabetes mellitus (DM) as co-morbid diseases are frequently confound hypertension, which increases its morbidity and mortality [18]. Type II DM is a co-morbid disease and independent risk factor for cardiovascular disease.

There is an increasing body of data from clinical trials revealed that strict control of blood pressure to levels <140/90 mm Hg significantly reduces CVD morbidity and mortality in patients with type 2 DM [19]. These previous reports were supported by the present study where DM was frequently occurring co-morbid disease among CVDs patients.

Beta blockers are a class of drugs, which are used primarily in hypertension. Antihypertensive and cardioprotective effects β -blockers support more frequently use as found in our study. In a previous study by Heaton *et al.* [20] reported that beta blockers decrease the mortality rate in myocardial infarction patient. Cardio-selective β blockers, metoprolol and carvedilol, were the most prescribed drugs in the present study which was a rational approach to the therapy. With an objective to control various complications of CVDs patients were prescribed the combination of drugs. Physicians mostly prescribed dual and triple drug regimen. Patients were advised to do physical exercise with daily blood pressure monitoring. Our study showed that most of the hyperlipidemic patients were prescribed atorvastatin which decreases blood LDL cholesterol level while increasing the HDL level. In addition, it also reduces the risk of CHD, MI and stroke, etc. [21]. The patients with ischemic heart disease were treated with antiplatelet drugs which prevent blood clotting or atheroma. Atheroma in coronary blood vessels may lead to a sudden heart attack or myocardial infarction. Drugs like antiplatelet agents are used individually or in the combination for prevention as well as terminating the heart attack. In the present study antiplatelet drugs such as clopidogrel, aspirin and nitrates such as nitroglycerine, isosorbide mononitrate was used most frequently in IHD patients.

CONCLUSION

In the present study, the prevalence of IHD and hypertension was high. The male patient with an age group of 60-90 y was most affected and admitted to the department of cardiology. Statins, beta blockers, diuretics, calcium channel blocker and ACE inhibitors were the most frequently prescribed drugs. The use of anticoagulants and anti-platelet is value addition in the effective treatment as well as prevention of ischemic heart diseases. Moreover, time to time studies is required to assess drug utilization pattern for improving disease management strategy and quality of life of patients. In order to achieve optimal therapeutic outcomes unnecessary multifaceted prescription must be avoided. In addition from regular workshops or seminars for the health care professionals and dissemination of treatment guidelines could facilitate rational use of the drug.

ACKNOWLEDGEMENT

This work received the support of National Institute of Pharmaceutical Education and Research-Guwahati, under the aegis of Department of Pharmaceuticals, Ministry of Chemicals and Fertilizers, Government of India. The authors would like to acknowledge Dr. (Mrs) Bernali Dutta, Associate Professor Department of Cardiology, Gauhati Medical College and Hospital, Guwahati, Assam, for her kind suggestion and support during the study period.

CONFLICT OF INTERESTS

The authors declare no conflict of interest.

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