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Prevalence and Drug Utilization Patterns of Cardiovascular Disease in a Tertiary Care Hospital of Bihar - A Prospective and Observational Study

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Abstract
Objective: *The objective of this study was to evaluate the prevalence of cardiovascular disease and drug utilization pattern.*
Methods: *Total 448 patients of cardiovascular disease were randomly selected from outdoor and indoor of General Medicine and Cardiology department of IGIMS, Patna. Prescriptions and bed head ticket of selected patients were analyzed and documented for demographic variables, indication, disease prevalence, co-morbidities and prescribing pattern of the physician.*
Results: *Majority (48.21%) of patients in age group of 61-90 years were diagnosed with different cardiovascular diseases (CVDs). Male patients (68%) were diagnosed CVDs more than female patients (32%). This study indicated that hyperlipidaemia (84.82%), hypertension (80.36%) and ischemic heart disease (66.96%) were most frequently diagnosed CVDs and most of the diseases were treated by the combination of two or three drugs. Common drugs prescribed were beta blockers (83%), statins (68%), angiotensin-converting enzymes(ACE) inhibitors (42%), diuretics (40%), calcium channel blockers (37%) and antiplatelets (34%). Diabetes (89.29%), asthma (48.21%) and anaemia (67%) were the comorbidities associated with CVDs.*
Conclusion: *Hyperlipidaemia, 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.*

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 counselling 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 counselling 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 prevalence of cardiovascular diseases and prescribing trends and various co-morbidities.

Material and Methods

The present study was performed to understand the prescription pattern and to analyze the utilization of different classes of drugs among the outpatient and indoor patients from the department of General Medicine and Cardiology in IGIMS, Patna. The study was approved by the Institutional Ethics Committee. Patients of either sex and age between 30-90 years suffering from CVDs were included in this study. Patient referred from other hospitals within one week was also included. Patients with incomplete case record form and transferred to other units within a day of admission from the department of general medicine and cardiology were excluded. Drug prescription was collected and documented in Microsoft Excel sheet and further analyzed. Documented data was analyzed by using Graph Pad software. Non-parametric values were expressed as the percentage.

This observational study was done from January 2007 to December 2009. Total 500 patients were identified but 448 patients were given consent and included for study after fulfilling all inclusion criteria. Study subject medical record and prescription were examined on the regular hospital visit to the department of general medicine and cardiology. 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 448 patients with cardiovascular disease were included in which male patients (68%) had a high frequency of cardiovascular incidence as compared to female patients (32%) as showed in table 1. In our study out of 448 patients, 21.43 %, 30.36 % and 48.21 % patient belong to the ages group of 30-40 years, 41-60 years and 61-90 years respectively (table 1).

Table 1: Age groups of the patients (n=448)

Age Group (in years)	Male	Female	Total	Percentage (%)
30-40	64	32	96	21.43
41-60	96	40	136	30.36
61-90	144	72	216	48.21
Total	304	144	448	
Percentage (%)	68%	32%	100%	100%

Hyperlipidemia, ischemic heart disease (IHD) and hypertension (HTN) were the most diagnosed diseases among 448 patients, 84.82 % patients were diagnosed with hyperlipidemia, 66.96 % patients with ischemic heart disease (IHD), 80.35 % patients with hypertension (HTN), and 35.71% with myocardial infarction (MI) as shown in table 2.

Table 2: Percentages of different diseases found in patients (n=448)

Medical conditions	No. of patients	Percentage (%)
Ischemic heart disease	300	66.96
Hypertension	360	80.36
Myocardial infarction	160	35.71
Hyperlipidemia	380	84.82
Heart failure	112	25

Table 3: Co-morbidity assessment (n=448)

Co-morbidity	Male	Female	Total	Percentage (%)
Diabetes	260	140	400	89.29
Asthma	120	96	216	48.21
Anaemia	84	216	300	66.96

Table 4 Drug utilization pattern

No of drugs prescribed	No. of patients prescribed	Percentage %
Single drug	31	6.92
Double drugs	198	44.12
Triple drugs	162	36.16
Quadruple drugs	58	12.95

Table 5- showed the prescribing pattern of different cardiovascular drugs (n=448)

Drugs for CVDs	No. of prescriptions	Percentage %
Beta blockers	372	83.04
Statins	305	68.08
Angiotensin converting enzyme inhibitors (ACEI)	188	41.96
Diuretics	180	40.18
Calcium channel blockers (CCBs)	166	37.05
Antiplatelets	152	33.91
Anticoagulants	130	29.02
Vasodilators	99	22.1
Antianginal	63	14.06
Miscellaneous	68	15.18

Table 6: Different classes of drugs prescribed to the cardiovascular patients (n=448)

Drugs	No. of prescription	Prescription rate (%)
Beta blockers		
Metoprolol	276	61.61
Carvedilol	200	44.64
Metoprolol+Amlodipin	84	18.75
Antihyperlipidemic		
Atorvastatin	300	66.96
Rosuvastatin	100	22.32
Simvastatin	56	12.5
Anti-atherogenic		
Clopidogrel	176	39.29
Aspirin	92	20.54
Clopidogrel+Aspirin	224	50
Warfarin	56	12.5
Streptokinase	128	28.57
Diuretic		
Frusemide	264	58.93
Spironolactone	52	11.61
Antianginal		
Nitroglycerine	136	30.36
Isosorbide mononitrate	96	21.43
Nitroglycerine+Isosorbide mononitrate	212	47.32
Miscellaneous		
Proton pumps inhibitors	136	30.36
Anxiolytics	48	10.71
Ferrous sulphate	104	23.21

Table 6, among the antihyperlipidemic drugs, atorvastatin was prescribed to most of the patients (66.96%) while the second choice was rosuvastatin (22.32%). 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 (61.61%) and Carvedilol (64.44%) 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.

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.

The combination of antiplatelet drugs clopidogrel and aspirin was prescribed as anti-ischemic drugs to 50% for synergistic activity whereas 39.29% 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 30.36% 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 6).

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] 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]

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 behavioural coronary risk factors in men and women. The psychosocial and behavioural coronary risk factors favour 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 448 patients half of the patients were diagnosed with hyperlipidaemia, 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.

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.

In our study atorvastatin showed decrease in 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 years were most affected. Beta blockers, Statins, ACE inhibitors, diuretics and calcium channel blocker 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.

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