

Prescribing Pattern in Coronary Artery Disease: A Prospective Study

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ABSTRACT

Prescribing pattern of various drugs prescribed in coronary artery disease was studied. It is a prospective, observational study in the Department of Cardiology at Global Hospital, Hyderabad conducted from January 2012 to September 2012. Pattern of different drugs prescribed in coronary artery disease were analyzed. 170 patients were included in the study. Out of these, 124 (72.94%) were male patients and 46 (27.06%) were female patients. Most of the patients diagnosed with coronary artery disease were of the age group of 46-66 (72.36%). The most common co-morbid conditions were hypertension in 110 (64.71%) and diabetes in 66 (38.82%) patients. The prescription pattern of various cardiovascular drugs were found to be as - antiplatelet drugs 169 (99.41%), antihyperlipidemic drugs 162 (95.29%), antibiotics 158 (92.94%), anti-anginal drugs 137 (80.59%), antihypertensives 110 (64.71%), anticoagulants 110 (64.71%), diuretics 106 (62.35%) and bronchodilators 31 (18.24%). Non-cardiological drugs use was also recorded. The average number of drugs per prescription was found to be 9.68 and the percentage of drugs prescribed by generic name was found as 1.76%. The percentage of encounters with an antibiotic prescribed was 92.94%. The most commonly prescribed drug classes in coronary artery disease were antiplatelet drugs followed by antihyperlipidemics and antibiotics. This was followed by anti-anginal drugs, antihypertensives and anticoagulants. Polypharmacy (9.68 drugs per prescription) was noticed. Very few drugs were prescribed by generic name. The prescribing pattern could be improved by reducing the number of drugs per prescription and by prescribing generic drugs to reduce the economic burden of the patients.

Keywords: Antihyperlipidemics, antiplatelet drugs, coronary artery disease, prescription pattern, hypertension

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INTRODUCTION

Cardiovascular diseases (CVDs) are a group of disorders of the heart and blood vessels which include coronary heart disease, cerebrovascular disease, peripheral arterial disease, rheumatic heart disease, congenital heart disease, deep vein thrombosis and pulmonary embolism. CVDs are the leading non-communicable diseases and also leading cause of death and disability in the world. More people die annually from CVDs than from any other cause. An estimated 17.3 million people died from CVDs in 2008, representing 30% of all global deaths. Of these deaths, an estimated 7.3 million were due to coronary heart disease and 6.2

million were due to stroke. By 2030, almost 23.6 million people will die from CVDs, mainly from heart disease and stroke. These are projected to remain the single leading causes of death [1].

Coronary artery disease has emerged as an epidemic in India. According to the projections of National Commission and Macroeconomics and Health, Government of India, the total no. of coronary artery disease (CAD) patients in India at the turn of the century was 30 million (5.3% of adult population) which could increase to more than 60 million (7.6%) by the year 2015 [2]. The incidence, prevalence, morbidity and

mortality from coronary artery disease among Asian Indians have been reported to be higher than among Europeans, Americans, and other Asians, irrespective of whether they live in India or abroad [3].

Coronary artery disease (CAD) is mainly due to atherosclerosis (plaque in artery walls) of the inner lining of the blood vessels that supply blood to the heart. CAD begins when hard cholesterol substances (plaques) are deposited within a coronary artery. The plaques narrow the internal diameter of the arteries which may cause a tiny clot to form, which can obstruct the flow of blood to the heart muscle. This reduces the supply of oxygen and nutrients to the heart muscles, which is essential for proper functioning of heart. This may eventually result in a portion of heart being suddenly deprived of its blood leading to death of that area of heart tissue resulting in a chest pain or heart attack.

The treatment for CAD involves the use of various categories of drugs namely antiplatelet drugs, anticoagulants, anti-anginal drugs, beta-blockers, angiotensin converting enzyme inhibitors (ACEI)/angiotensin II receptor blockers (ARBs), Calcium channel blockers, diuretics, etc. Effective screening, evaluation, and management strategies for CAD are well established in high-income countries, but these strategies have not been fully implemented in India [4]. Guidelines based on evidence from randomized controlled trails recommend that aspirin, beta-adrenergic blockers, ACEI, and hydroxyl methylglutarate coenzyme A reductase inhibitors (statins) be used in all patients with symptomatic chronic stable angina or asymptomatic survivors of acute myocardial infarction and following percutaneous coronary intervention or coronary bypass surgery for secondary prevention of myocardial infarction, stroke and death [5-8]. It has been hypothesized that if used collectively these agents could reduce long term risk of cardiovascular events and mortality by as much as 75% [5]. However the actual impact depends on the extent to which they are used in practice [9-11].

The quality of medical care requires prescribing to be judicious, appropriate,

safe, effective and economic. 'Good' prescribing is a complex balance between various conflicting factors. The aim is to achieve clinical benefit with minimum risk at cost-effective price while respecting the patient's choice [12]. The study of prescribing pattern is a component of medical audit that does monitoring and evaluation of the prescribers as well as recommends necessary modifications to achieve rational and cost-effective medical care [13]. Irrational prescribing of drugs is of common occurrence in clinical practice [14], important reasons being lack of knowledge about drugs, unethical drug promotions and irrational prescribing habits of clinicians. Inappropriate prescribing habits lead to ineffective and unsafe treatment, prolongation of illness, distress and unnecessary economic burden to the patient [15]. Studies of prescribing patterns and drug utilization are useful to identify the problems and provide feedback to prescribers so as to create awareness about rational use of drugs [16].

Therefore, this study attempts to analyze the current prescription patterns of drugs used in the treatment of coronary artery disease in order to ensure appropriate drug use to reduce the morbidity and mortality of the disease and reduce the unnecessary economic burden on the patient. The findings of this study are expected to provide relevant and useful feedback to physicians.

METHODOLOGY

Study Site: The study was carried out at Global Hospital, Lakdi-ka-pul, Hyderabad. Global hospitals group is one of India's leading healthcare institutions offering multi-super specialty tertiary care of international standards. Global hospital, Hyderabad situated at Lakdi-ka-pul has earned the reputation for being one of the best tertiary care multi-super specialty hospitals in India. It is a 200-bedded hospital providing tertiary level multi-superspecialty care and multi-organ transplantation services. It provides specialized services in Gastroenterology, Minimal Access Surgery, Cardiology and Cardio Thoracic Surgery, Nephrology, Urology, Neurology, Orthopaedics, Joint

Replacement, Spine surgery, Multi-organ transplantation.

Study Design: A Prospective observational study

Study Criteria: The patients visiting the cardiac in patient departments were enrolled in to the study after taking their consent and by considering following inclusion and exclusion criteria.

Inclusion criteria:

- All the in-patients diagnosed with coronary artery disease by a consultant cardiologist, in the cardiology unit were included in the study.

Exclusion criteria:

- Patients who were under day care management.
- Patients who were not willing to participate in the study.
- Patients who were in critical condition.
- Patients who are diagnosed with other cardiac diseases.

Data collection:

The data was collected from the patients who met the inclusion criteria. To study the prescribing patterns, relevant details of every in-patient with coronary artery disease were collected in suitably designed proforma. The relevant data on drug prescription of each patient was collected from the in-patient record. The demographic data (age, sex), the diagnosis by the treating cardiologist was obtained from the in-patient case records of each patient. Also, associated co-morbid conditions, risk factors identified for developing coronary artery disease were noted from the medical records.

The drug data - drugs, dosage form, dose, route of administration, frequency were noted. The laboratory parameters which were monitored during the treatment such as blood pressure, blood glucose levels, lipid profile, serum creatinine levels, serum electrolytes, prothrombin time, international normalized ratio (INR) were also recorded. Any other relevant data required which could not be obtained from case records were obtained by interviewing the patients, their caretakers or health care providers.

Study procedure: The following data was collected and recorded in the data collection

form- demographic details (name, age, sex), drugs (name of the drug, dosage form, dose, route of administration, frequency), principal diagnosis and co-morbid conditions. To study the drug prescribing patterns in coronary artery disease, all patients included in the study were considered for analysis. The trade names of drugs were deciphered and classified into pharmacological groups that included aspirin, clopidogrel - antiplatelet agents, beta-blockers, ACEI or ARBs, calcium channel blockers (CCBs), statins, other lipid-lowering medicines such as fenofibrate, short- and long-acting nitrates, potassium channel openers (eg, nicorandil), heparin and other anticoagulants such as dalteparin sodium and enoxaparin sodium, diuretics, bronchodilators, antibiotics, multivitamins, diabetic medications, and other medications. Utilization of different classes of drugs as well as individual drugs was analyzed and presented as percentage. The average number of drugs per prescription and the percentage of drugs prescribed by generic name were determined. The percentage encounters with an antibiotic prescribed were also determined.

RESULTS

A total number of 170 patients were enrolled in the study of which 124 (72.94%) were male patients and 46 (27.06%) were female patients. The male to female ratio among the patients was 3:1. The incidence of CAD was more common in male compared to female. Age wise distribution is shown in (**Fig. 1**).

Various co-morbid conditions like hypertension, diabetes mellitus, hypothyroidism, dyslipidemia were seen among patients and many of these were found to be risk factors of coronary artery disease. Hypertension and diabetes were the two most common co-morbid conditions found in most of the patients which increase the risk of coronary artery disease (**Table 1**).

Treatment of coronary artery disease involves various categories of drugs namely antiplatelet drugs, anticoagulants, fibrinolytics, anti-anginal drugs, antihypertensives, antihyperlipidemic agents, bronchodilators,

antibiotics. The usages of these drugs were recorded and analyzed (**Table 2**).

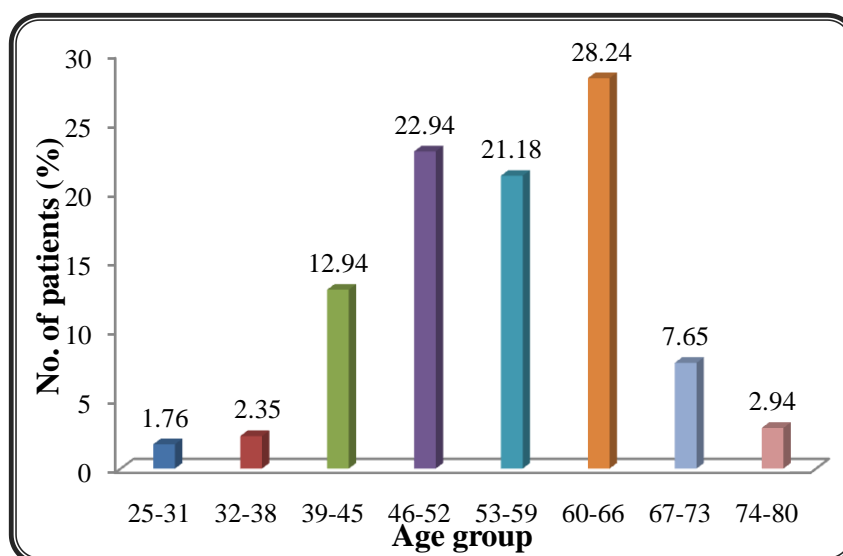


Fig.1: Age wise Distribution of Patients

Table 1: Details of the Patients based on Co-morbid Conditions

| Co-morbid condition | No. of patients (n=170) | Percentage (%) |
|--|-------------------------|----------------|
| Hypertension | 44 | 25.88 |
| Hypertension+Diabetes | 43 | 25.29 |
| Hypertension+ Others (CKD, Hypothyroidism, Dyslipidemia,COPD) | 13 | 7.65 |
| Diabetes mellitus | 10 | 5.88 |
| Hypertension + Diabetes +Others (Hypothyroidism, Dyslipidemia, Asthma, COPD) | 10 | 5.88 |
| Others(Asthma, COPD, PND, APD) | 5 | 2.94 |
| Diabetes + Others (Dyslipidemia, Hypothyroidism, COPD) | 3 | 1.76 |

CKD = Chronic Kidney disease, COPD = Chronic obstructive Pulmonary Disorder, PND = Paroxysmal Nocturnal Dyspnoea, APD = Acid Peptic Disorder

Table 2: Different Categories of Drugs Prescribed to the Patients

| Drug categories | No. of Patients (n=170) | Percentage (%) |
|--------------------|-------------------------|----------------|
| Antiplatelets | 169 | 99.41 |
| Antihyperlipidemic | 162 | 95.29 |
| Antibiotics | 158 | 92.94 |
| Anti-anginal | 137 | 80.59 |
| Antihypertensives | 110 | 64.71 |
| Anticoagulants | 110 | 64.71 |
| Diuretics | 106 | 62.35 |
| Bronchodilators | 31 | 18.24 |

Different combinations of anti-thrombotic drugs, which include the antiplatelet drugs (aspirin, clopidogrel), anticoagulants (heparin, enoxaparin sodium, dalteparin

sodium), fibrinolytic (streptokinase, tenecteplase) were prescribed. The % and no. of patients received anti-thrombotic drugs is shown in (**Table 3**).

Table 3: Combination of Anti-thrombotic Drugs Prescribed to the Patients

| Drug combinations | No. of patients (n=169) | Percentage (%) |
|--|-------------------------|----------------|
| Antiplatelets | 60 | 35.29 |
| Antiplatelets +Anticoagulants | 107 | 62.94 |
| Antiplatelets+Anticoagulants+Fibrinolytics | 2 | 1.18 |

The anti-platelet drugs aspirin and clopidogrel were used to reduce the cardiovascular mortality and non-fatal myocardial infarction in coronary artery disease. Among 170 prescriptions analyzed anti-platelet drugs were prescribed in 169 (99.41%) patients. Details of anti-platelet drugs prescribed are shown in (Table 4). Out of these (n=156), a fixed dose combination

(75 mg) of aspirin and clopidogrel was found to be used in 30 (19.23%) and aspirin (150 mg) and clopidogrel (75 mg) singly were used in 126 (80.77%) of the patients. Aspirin alone was used in very few patients 10 (5.88%) and in least no. of patients 3 (1.76%) clopidogrel alone was used. All these drugs were prescribed in oral dosage form.

Table 4: Details of Anti-platelet Drugs Prescribed to the Patients

| Drug | No. of patients (n=169) | Percentage (%) |
|-----------------------|-------------------------|----------------|
| Clopidogrel | 3 | 1.78 |
| Aspirin | 10 | 5.92 |
| Aspirin + Clopidogrel | 156 | 91.76 |

Anticoagulant drugs prescribed include heparin and low molecular weight heparins- dalteparin sodium and enoxaparin sodium. Details of

anticoagulants prescribed are shown in (Table 5). These were prescribed in the form of injections given either by IV or SC route of administration.

Table 5: Details of Anticoagulant Drugs Prescribed to the Patients

| Drug | No. of patients (n=110) | Percentage (%) |
|-------------------|-------------------------|----------------|
| Enoxaparin sodium | 52 | 47.27 |
| Heparin | 44 | 40 |
| Dalteparin sodium | 14 | 12.73 |

Details of prescribed antianginals (Table 6), anti-hyperlipidemics (Table 7), anti-hypertensives (Table 8), combination of antihypertensives (Table 9), diuretics

(Table 10), bronchodilators (Table 11), antibiotics (Table 12) and miscellaneous drugs (Table 13) are shown.

Table 6: Details of Anti-anginal Drugs Prescribed to the Patients

| Drug | No. of patients (n=137) | Percentage (%) |
|------------------------------------|-------------------------|----------------|
| Nitrates | 86 | 62.78 |
| Nicorandil | 11 | 8.02 |
| Ivabradine | 5 | 3.65 |
| Nitrates + Nicorandil | 14 | 10.22 |
| Nitrates + Ivabradine | 14 | 10.22 |
| Nicorandil + Ivabradine | 1 | 0.73 |
| Nitrates + Nicorandil + Ivabradine | 6 | 4.38 |

Table 7: Details of anti-hyperlipidemic Drugs Prescribed to the Patients

| Drug | No. of patients (n=162) | Percentage (%) |
|----------------------------|-------------------------|----------------|
| Atorvastatin | 114 | 70.37 |
| Rosuvastatin | 8 | 4.94 |
| Fenofibrate | 4 | 2.47 |
| Atorvastatin + Fenofibrate | 27 | 16.67 |
| Atorvastatin+ Rosuvastatin | 2 | 1.24 |
| Rosuvastatin + Fenofibrate | 7 | 4.32 |

Table 8: Details of anti-hypertensive Drugs Prescribed to the Patients

| Drug | No. of patients (n=170) | Percentage (%) |
|---------------------------------|-------------------------|----------------|
| Beta-blockers | 101 | 59.41 |
| Beta-selective | 100 | 99 |
| Non-selective | 1 | 1 |
| Alpha and beta blockers | 23 | 13.53 |
| Carvedilol | 23 | 13.53 |
| ACEI | 46 | 27.06 |
| Ramipril | 39 | 84.78 |
| Enalapril | 7 | 15.21 |
| ARBs | 43 | 25.29 |
| Losartan | 25 | 58.13 |
| Telmisartan | 13 | 30.23 |
| Olmesartan | 6 | 13.95 |
| Calcium channel blockers | 36 | 21.18 |
| Amlodipine | 28 | 77.77 |
| Diltiazem | 8 | 22.22 |

Table 9: Combination of Anti-hypertensives Prescribed to Patients

| Drug Combinations | No. of patients (n=110) | Percentage (%) |
|---|-------------------------|----------------|
| Beta blockers+ ACE Inhibitors | 21 | 19.09 |
| Beta blockers+ Calcium channel blockers | 12 | 10.91 |
| ACE Inhibitors+ Calcium channel blockers | 1 | 0.9 |
| Beta blockers+ ACE Inhibitors+ Calcium channel blockers | 1 | 0.9 |

Table 10: Details of Diuretics Prescribed to the Patients

| Drugs | No. of patients (n=106)♣ | Percentage (%) |
|---------------------|--------------------------|----------------|
| Furosemide | 72 | 67.92 |
| Torsemide | 46 | 43.40 |
| Hydrochlorothiazide | 19 | 17.92 |
| Spiranolactone | 19 | 17.92 |
| Amiloride | 11 | 10.38 |

♣One prescription may contain more than one diuretic.

Table 11: Details of Bronchodilator Drugs Prescribed to the Patients

| Drug | No. of patients (n=31) ♣ | Percentage (%) |
|----------------------------------|--------------------------|----------------|
| Theophylline + Etophylline | 22 | 70.97 |
| Salbutamol + Ipratropium bromide | 13 | 41.94 |
| Budesonide | 6 | 19.36 |
| Levosalmeterol | 2 | 6.45 |
| Salmeterol | 1 | 3.23 |

♣One prescription may contain more than one bronchodilator

Table 12: Details of antibiotics Prescribed to the Patients

| Drug | No. of patients (n=158) ♣ | Percentage (%) |
|-----------------|---------------------------|----------------|
| Cephalosporins | 102 | 64.56 |
| Quinolones | 22 | 13.92 |
| Aminoglycosides | 14 | 8.86 |
| Penicillins | 11 | 6.96 |
| Others | 9 | 5.7 |

♣One prescription may contain more than one bronchodilator

Table 13: Miscellaneous Drugs Prescribed

| Drug | No. of patients (n=170) | Percentage (%) |
|------------------|-------------------------|----------------|
| Pantoprazole | 140 | 82.35 |
| Lactulose | 51 | 30 |
| Diphenhydramine | 45 | 26.47 |
| NSAIDS | 43 | 25.29 |
| Alprazolam | 40 | 23.52 |
| Paracetamol | 38 | 22.35 |
| Thyroxine sodium | 14 | 8.24 |
| Amiodarone | 12 | 7.06 |

Out of 170 patients, 66(38.82%) patients had diabetes mellitus. Most of the patients were prescribed with human actrapid insulin during hospital stay of treatment. The doses of insulin were given based on the blood glucose levels. Very few patients were prescribed with oral hypoglycaemic agents.

The total number of drugs prescribed among 170 in-patients (prescriptions) with

the diagnosis of coronary artery disease included in the study was 1646. The average number of drugs per patient (prescription) was determined and found to be 9.68 (Table 14). The number of drugs prescribed by generic name was only 62 (3.77%). Amikacin, ceftriaxone and heparin were the drugs prescribed by generic name.

Table 14: Details of Prescriptions Expressed in Numbers (percentage)

| Details of prescriptions | Number |
|--|------------|
| Total no. of patients prescriptions analyzed | 170 |
| Total number of drugs prescribed | 1646 |
| Average number of drugs per prescription | 9.68 |
| Number of drugs prescribed by generic name out of total number of drugs prescribed | 62 (3.77%) |

DISCUSSION

In a study conducted by Kamath A et al., of the 349 patients, 81% were males and 19% females and 40% were more than 65 years of age [17]. In a retrospective study conducted by Tasneem Sandozi and Fouzia Nausheen, of the 140 patients was studied, 96 of these patients were men and 44 of them were women. Average age of men was 62 years (Range 36-83 years) and of women was 61 years (Range 30- 80 years) [18].

In the present study, out of 170 patients, 72.94% were male and 27.06% and 66% were more than 65 years of age. The results of this study were found to be in consistence with previous studies and indicated that male were more prone to

coronary artery disease compared to female and the risk increased with increasing age.

In a study conducted by Jorg Muntwyler, et al., the drug prescription rates for antithrombotic agents, beta-blockers, ACE-inhibitors/angiotensin receptor blockers and lipid lowering drugs were 91%, 58%, 50% and 63% respectively [19].

In the present study, the drug prescription rates of anti-thrombotic agents were 99.41%, beta-blockers 59.41%, ACE-inhibitors/angiotensin receptor blockers and lipid lowering drugs were 52.35% and 95.29% respectively. The prescription rate of lipid lowering drugs in this study were comparatively very high than the previous study.

In a study conducted by Tasneem Sandozi and Fouzia Nausheen the drug utilization of various antiplatelet drugs were as aspirin alone (25.71%), aspirin & clopidogrel (60.00%) [18], whereas in the present study, the prescription rate of Aspirin alone was 5.88% and combination of aspirin & clopidogrel (91.76%). The present study the combination of aspirin and clopidogrel were prescribed in more number of patients compared to previous study.

In a study conducted by Tasneem Sandozi and Fouzia Nausheen drug prescription rates for Unfractionated heparin (55.71%), Low molecular weight heparin (20.00%) [18]. In another study by Banerjee S., et al., unfractionated heparin was used in 36.8% of the patients and low molecular weight heparin in 25.2% [20].

In the present study, the prescription rate of unfractionated heparin (40%) and low molecular weight heparin (62.73%). The results of this study were in not in consistence with previous studies. A greater variation in the use of anticoagulant was observed. In the present study, the use of low molecular weight heparin was much higher than unfractionated heparin.

In a study conducted by Supratim Datta the overall use of antihypertensives in coronary artery disease was follows, Calcium channel blockers (73%), Beta blockers (37.2%), ACEIs (42.3%) [22]. A study conducted by Jorg Muntwyler, et al., observed the drug prescription rates for beta-blockers, ACE-inhibitors/angiotensin receptor blockers as 58% and 50% respectively [19].

In the present study, the use of antihypertensives were as follows calcium channel blockers (21.18%), Beta blockers (59.41%), ACEIs (27.06%). The previous study indicated high use of calcium channel blockers, whereas in the present study beta-blockers were found to be the preferable choice of antihypertensive prescribed more frequently.

In a study conducted by Sreedevi K et al., the different statins prescribed were Atorvastatin (261 prescriptions), Rosuvastatin (26 prescriptions) in 1000 prescriptions [21]. A study conducted by Tasneem Sandozi and Fouzia Nausheen

indicated prescription of lipid lowering drugs to be 68.57% [18].

In the present study, Atorvastatin is prescribed in (143) prescriptions and rosuvastatin (17) prescriptions out of 170 prescriptions. This study recorded the use of lipid lowering drugs as 95.29%. From the previous and present study, it can be concluded that atorvastatin remains the most commonly prescribed drug among the various statins available to reduce cholesterol levels. The prescription of lipid lowering drugs was found to be very high in this study compared to earlier studies.

In a study conducted by Supratim Datta, et al., the use of diuretics was (41%) [22], whereas in the present study the prescription of diuretics was recorded as 62.35%. The results of this study varied slightly from the previous studies.

In a study conducted by Banerjee S., et al., the commonly prescribed drugs were as follows - isosorbide mononitrate among the nitrates, clopidogrel among the antiplatelet agents, metoprolol among the beta blockers, amlodipine among the Calcium channel blockers, ramipril among the ACE inhibitors, atorvastatin among the hypolipidaemics and unfractionated heparin (UFH) among the anticoagulants [20].

In the present study, the commonly prescribed drugs were isosorbide dinitrate among the nitrates, aspirin among the antiplatelet agents, metoprolol among the beta blockers, amlodipine among the Calcium channel blockers, ramipril among the ACE inhibitors, atorvastatin among the hypolipidaemics and enoxaparin among the anticoagulants. A variation in prescribing of antiplatelet drugs, anticoagulants was observed, aspirin and enoxaparin sodium were prescribed in more number of patients as compared to earlier studies.

In a study conducted by Tasneem sandozi et al., the average number of drugs used per patient was 9.93 which are high. Percentage of drugs prescribed by generic names was 6.00% [18]. In a study conducted by Sreedevi, et al., the average number of drugs per prescription was found to be 5.5. Rare prescriptions were observed with generic names of the drugs, many prescriptions

especially of CVD were containing fixed dose combinations (FDC) [21].

In the present study, the average no. of drugs per patient is 9.68 which are similar to the previous study. The percentage of drugs prescribed by generic name is 2.33%. The present and previous studies have not shown much variation in the average number of drugs per prescription whereas the percentage of drugs used by generic name varied.

CONCLUSION

In this study, it was observed that the risk for coronary artery disease increased with increasing age. Hypertension and diabetes were the most common co-morbid conditions associated with coronary artery disease. The most commonly prescribed drug classes for main indications in coronary artery disease were anti-platelet drugs 169 (99.41%) followed by anti-hyperlipidemics 162 (95.29%), anti-anginal drugs 137(80.59%). This was followed by anti-hypertensives and anticoagulants 110 (64.71%) respectively. Extensive polypharmacy (9.68 drugs per prescription) was noticed in the prescriptions. The prescribing pattern can be improved by reducing the number of drugs per prescription. Very few drugs were prescribed by generic name. The economic burden of the patients can be reduced by prescribing generic drugs. The study of prescribing pattern is a component of medical audit that does monitoring and evaluation of the prescribers as well as recommends necessary modifications to achieve rational and cost-effective medical care. The results of this study on drug prescribing pattern can provide a framework for continuous prescription audit in a hospital in-patient setting. This will help prescribers improve patient management by rationalizing prescribing practices.

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