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# TO STUDY DRUG PRESCRIPTION PATTERN OF MYOCARDIAL INFRACTION

Mukesh Kumar Chaudhary*; Manisha Pokharel; Pooja Chalise; Rama Regmi; Ravin Bhandari; Susma Paudel

Crimson College of Technology, Butwal-11, Rupandehi, Nepal

Email address: pharmatext@yahoo.com*

## Abstract

The main aim of the study was to analyze the prescription pattern of drug used in MI patient. It has been found that MI is the most frequent cause of morbidity and mortality throughout the world. This study was a randomized prospective study. The study was carried out for period of 6 month in Gautam Buddha Heart Community Hospital, Rupandehi, Lumbini, Nepal. A total of 130 patients were included, among them male patients were higher in comparison to females. The age group of 61-80 years constituted the highest number of MI patient followed by 21-40 years age groups. The number of smoker is higher than non smoker. Out of 130 MI patient 65% were alcoholic consumption. Data analysis showed that 46.2% has engaged in the agriculture. Hypertension was seen in higher prevalence to MI patient along with many other diseases. Aspirin is most commonly used drug in this study. Anti-platelets were given to all patients. In conclusion, the result of this study supports the safety of MI drugs for the treatment of MI patient. The highest number of the prescribing pattern can be improved by the number of the drugs per prescription and by prescribing generic drugs to reduce the economic burden of the patient.

**Key words:** *Myocardial Infarction, Prescription, Aspirin, Prescribing Pattern, Patients.*

## Introduction

Cardiovascular diseases (CVD) are group of disorder of heart and blood vessel which included coronary artery disease, cerebrovascular disease, congenital heart disease, rheumatic heart disease, deep vein thrombosis and pulmonary embolism. CVD is mainly caused by high blood pressure, smoking, diabetes, lack of exercise, obesity, poor diet, high blood cholesterol and excessive alcohol consumption [1]. Hypertension is a major risk factor for coronary artery disease, myocardial infarction and stroke [2]. Myocardial infarction can be defined from a number of different perspectives related to clinical, electrocardiographic (ECG), biochemical and pathological characteristic. It is accepted that the term myocardial infarction reflects death of cardiac myocytes caused by prolonged ischaemia [3]. According to WHO cardiovascular diseases are number one cause of death globally. An estimated 17.5 million people died from cardiovascular disease in 2008 and by 2015 almost 20 million people may endure from death due to CVDs, mainly heart disease and stroke and they will remain the single leading causes of death [4]. The area of muscle that has either zero flow or so little flow that it cannot sustain cardiac muscle function is said to be infracted and overall process is called myocardial infarction (MI) or heart attack [5]. The most common symptoms of MI are chest pain or discomfort which may travel into the shoulder, arm back, neck or jaw. Often it is in the centre or left side of the chest and last for more than few minute without prompt treatment this can lead to damage to the affected part of heart [6]. Lipid lowering agent, calcium channel blocker, ACE inhibitor, diuretic, anti angina drug, anti platelets agent, proton pump inhibitor, *etc.* are the number of drug to obtain the best possible effect in the shortest period and at a reasonable cost [7].

The initial management plan for patient with acute MI has restoration of the balance between oxygen supply and demand to prevent further ischemia. Management of myocardial infarction should be based on sound evidence, derived from well-conducted clinical trials whenever possible, or motivetd expert opinion when needed. It must be recognized that, even when excellent clinical trials have been undertaken, the results are open to interpretation and treatments may need to be adapted take account of clinical circumstances and resources. [8]. After an attack of acute myocardial infarction only 10-20% cases do not develop major complication and recover, remainder 80-90% cases develop one or more major complication some of which are fetal [5].

*Aims and objectives*

The aim of this study was to determine the type of drugs commonly prescribed in myocardial infarction and to study relative use of monotherapy and combination therapy.

## Materials and methods

*Study type*

This was an observational, prospective, and non-interventional study.

*Study site*

The study was carried in Gautam Buddha Community Heart Hospital.

Study duration

The duration of this study was 6 months.

Sample size

130 patient's prescriptions that fit in selection criteria were included.

*Patient selection*

*Inclusion criteria*

i. Patients with the age group > 20 yrs.
ii. Alcoholic and non-alcoholic.
iii. Smokers and non-smokers.
iv. History with cardiovascular event.
v. History with cardiovascular event with and without diabetes mellitus.
vi. Patients receiving drugs with monotherapy or combination therapy.

*Exclusion criteria*

i. Pregnant women.
ii. Age < 20 yrs.
iii. Patient who refuse to undergo follow up regular visit.
iv. Treatment will change to other drugs within one week if patient exhibited any drug related adverse effect.

v. Patients with drug allergies.
vi. Patients with liver or kidney disease.
vii. Patients with opportunistic infections.

*Tools*

*Performa*

The Performa was prepared as give by WHO based prescription audit format. From which the data's such as age, sex, height, weight, ethnicity, dietary habit, diagnosis, and drug prescribed, etc.

*Data analysis*

Data analysis was done by using MS-Excel 2007 and SPSS, version 17.0.

*Results and discussion*

During the study period we collected a total of 130 patient's prescriptions as per inclusion criteria.

*Age distribution of patients*

The age distribution of patients is given in the table-1. At present study, most of MI patient from age group of 61-80 year (57.6%) followed by 41-60 year age group (31.5%). MI found to be less in the age group 21-40 (4.61%). The mean age is 63.23 and standard deviation is ±13.03. In a similar study conducted in tertiary care rural hospital in North India, the highest MI was seen in the age group more than 45 year (66%) and lowest MI was seen in the age group less than 45 year (34%). This may be due to the age increase hormone secretion decrease and immunity power decline so the maximum number of patient suffers MI at age above 45 [9].

*Gender distribution of patients*

During the study period, a total of 130 MI patients were visited. In our study, we found MI is more prevalent in male patient (60%) as compared to females (40%) (figure-1) it may be due to abdominal obesity, smoking, endogenous estrogen that on apolipoprotein and indirect effect fatty distribution or genetic variant that regulated lipid level. In another Indian study it was found that out of 123 patients, 84% were male and 16% were female. The incidence of cardiovascular disease was more common in males compared to females [1].

*Smoking and non- smoking wise distribution of patient*

Distribution of the patients regarding smoking habit is presented in figure -2. It was found that, smokers were more in number (59%) as compare to the non smokers (41%). The study conducted in North India showed the higher prevalence of MI in the smoker (60%) compared to non smoker (40%) [5].

*Alcoholic and non-alcoholic wise distribution of patients*

In our study, we found that out of 130 MI patient 65% were alcoholic consumption and 35% were found non–alcoholic patient. The similar study was conducted in US community and tertiary care hospital it was reported that 67% were alcoholic consumption and 34% were found non-alcoholic consumption, it may due to heavy alcohol intake cause unfavorable effect on metabolism lipid profile, blood coagulation and fibrinolysis which also promote the progression of atherosclerosis [10].

*Occupation wise distribution of patients*

The occupation wise distribution of the patients is given in table-2. Data analysis in our study showed that out of 130 patients (46.2%) has engaged in agriculture followed by housewife (20.8%). In a similar study conducted in Kaunas Lithuania, which concluded that male and female livestock worker has slightly higher standard mortality ratio compared with all gainfully employed men and women it is because they are mostly exposure to the organic dust, acute organophosphate and carbamate pesticide poising [11].

*Physical activity wise distribution of patients*

In our study, we found that 56% of patients are involved in physical activity and 44% are not involved in physical activity. In another similar study conducted in Italia which found that 51% were involved in physical activity and 49% are not involved in physical activity. Involvement in physical activity reduces insulin resistance, atherosclerosis process, peripheral arterial disease, and inflammation marker [12].

*Diet wise distribution of patients*

In our study, we found MI is more prevalent in non vegetarian (80.8%) compared to vegetarian patients (19.2%). In one Indian study reported that 65% was found to non vegetarian and 35% were

vegetarian. The non-vegetarian is subject to have high blood pressure, high apolipoprotein, and more fatty distribution [13].

*Other disease associated with MI*

In our study, the most frequently associated disease is hypertension which has the highest percent (36.9%) which is followed by DM (17.69%), both combination of HTN and DM (7.692%) and other disease is (23.07%) and similarly the patient which have no other associated disease is (23.07%). It is due to both systolic and diastolic hypertension, increase the rise of MI and the higher the pressure the greater the risk. Almost 40% of patient with ischemic heart disease who die suddenly have history of hypertension [14].

*Different drugs used in MI patients*

The details of different drugs used in MI patients are given in table-2. In our study, the most frequently use drug is aspirin which showed the result of 100% which followed by clopidogrel (58.5%), atrovastatin (51.3%) and the least drug used is enalapril (6.9%). The similar type of study was carried out in Canadian, which showed 89.3% aspirin is used it is due to aspirin exerts its major antithrombotic effect by irreversibly acetylating platelet, cyclo-oxygenase-1, thereby inhibition of enzyme prostaglandin synthesis which is necessary for the formation of thromboxane synthesis and it also prevent the second attack of MI [15].

*Classification of MI prescribed medication*

Classification of drugs prescribed in MI is given in table-3. In our study, the most frequently prescribed medication is anti-platelets which showed the result of 100% which is followed by dyslipidemics (51.3%), Anti angina (51.3%), Anti ulcer (44.6%), Anti coagulant (40.8%) and Anti hypertensive (36.6%). The similar type of study was carried out in Canadian cardiovascular society guidelines which estimated that 74.8% used the anti platelet agent it is due to it prevent from the second attack of MI [16].

*Combination of drug wise distribution of MI patients*

The details of drugs combination prescribed in MI patients are given in table-4, 5, 6 and 7. In our study, from the data analysis while prescribing two drug combination regimen AP + BB are mostly prescribed (60.34%), while in three drug combination regimen AP+ BB+ DYs is mostly prescribed (47.17%). Similarly, four drugs combination regimen ACE-I +DIR+ DIG+ AC is mostly prescribed (54.54%) while in five drug combination regimen ACE-I+ DIR+ DIG+AC+ BB is mostly prescribed (68.75%). Similarly study conducted in South India which estimate that prescribing drug combination regimen DIR + DIG +ACE-I + AC shows higher number *i.e.* 24 followed by ACE-I + DIR + DIG+ AC+ BB *i.e.*11 [17].

## Conclusion

In conclusion, the result of our study supports the safety of drugs for the treatment of MI patient. Our study support that the prevalence of MI is higher in male as compare to female. Patient at the age rank 61-80 are more likely to have MI. Anti-platelets and dyslipidemics agent are mostly used in our study. The prescribing pattern can be improved by the number of the drug per prescription and by prescribing generic drugs to reduce the economic burden of the patients.

*Limitations*

The study was conducted only in a single hospital, so the result of the study cannot be generalized to the whole population. Some seasonal variation may also affect to the number of patients suffering from MI. The duration of the study was also short. Some patient bias could have been present because only those patients were including in the study who visited the GBHC hospital.

## Acknowledgement

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## Conflicts of interest

None

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**Table 1:** age distribution of patients

| Age group | No. of patients | Percentage (%) |
|---|---|---|
| 21-40 | 6 | 4.61 |
| 41-60 | 41 | 31.5 |
| 61-80 | 75 | 57.6 |
| 81-100 | 8 | 6.1 |
| Total | 130 | 100 |

**Table 2:** Occupation wise distribution of patients

| Occupation | No. of patients | Percentage (%) |
|---|---|---|
| Agriculture | 60 | 46.2 |
| Housewife | 27 | 20.8 |
| Business | 15 | 11.5 |
| Others | 28 | 21.5 |
| Total | 130 | 100 |

**Table 3:** Different drugs used in MI patients

| Drugs | No. of patients (n) | Percentage (%) |
|---|---|---|
| Nitroglycerine | 48 | 36.9 |
| Aspirin | 130 | 100 |
| Losartan Potassium | 20 | 15.4 |
| Dobutamin | 12 | 9.2 |
| Pantoprazole | 67 | 51.5 |
| Atrovastatin | 69 | 51.3 |
| LMWH | 18 | 13.8 |
| Morphine | 21 | 16.2 |
| Clopidogrel | 76 | 58.5 |
| Clonazepam | 28 | 21.5 |
| Metoprol | 60 | 46.2 |
| furosemide | 13 | 10 |
| Enalapril | 9 | 6.9 |
| Amlodipine | 23 | 17.7 |
| Rabiprazole | 31 | 23.8 |
| Rosuvastatin | 21 | 16.2 |
| Digoxin | 11 | 8.5 |
| Losartan | 18 | 13.8 |
| Morphine + Odensetrone | 28 | 21.5 |

**Table 4:** Classification of MI prescribed drugs

| Drug Class | No. of patients | Percentage (%) |
|---|---|---|
| Anti-coagulants | 53 | 40.8 |
| Dyslipidemic | 77 | 51.3 |
| Anti-platelets | 130 | 100 |
| Anti-anginal | 77 | 51.3 |
| Antihypertensive | 47 | 36.3 |
| Anti-ulcer | 58 | 44.6 |
| Diuretics | 31 | 23.8 |
| NSAIDs | 35 | 26.9 |
| Anti-diabetics | 20 | 15.4 |

**Table 5:** Two drugs combination prescribed

| Drug combination | No. of patients | Percentage (%) |
|---|---|---|
| AP+Dys | 13 | 11.2 |
| BB+ACE-I | 23 | 19.82 |
| BB+Dys | 2 | 1.72 |
| AP+BB | 70 | 60.34 |
| DIR+DIG | 8 | 6.89 |

**Table 6:** Three drugs combination prescribed

| Drug combination | No. of patients | Percentage (%) |
|---|---|---|
| AP+BB+Dys | 25 | 47.16 |
| BB+ACE-I+Dys | 3 | 5.66 |
| ACE-I+DIR+DIG | 7 | 13.2 |
| AP+BB+ACE-I | 18 | 33.96 |

**Table 7:** Four drugs combination prescribed

| Drug combination | No. of patients | Percentage (%) |
|---|---|---|
| AP+BB+ACE-I+Dys | 11 | 25 |
| ACE-I+DIR+DIG+AC | 24 | 54.54 |
| AA+BB+AC+DIR | 1 | 2.27 |
| BB+ACE-I+DIR+DIG | 5 | 11.36 |
| ACE+DIR+DIG+AA | 3 | 6.81 |

**Table 8:** Five drugs combination prescribed

| Drug combination | No. of patients | Percentage (%) |
|---|---|---|
| ACE-I + DIR +DIG+AC+BB | 11 | 68.75 |
| AP+AC+DIR+AA+DIG | 3 | 18.75 |
| Dys+AA+AC+DIR+ACE-I | 2 | 12.5 |

AA= Anti-anginal, AC= Anti-coagulant, AP= Anti-Platelets, DYs= Dyslipidemics, BB= Beta blockers, ACE-I= Anginotension converting enzyme, DIR= Diuretics, DIG= Digoxin

**Figure 1:** Gender distribution of patients

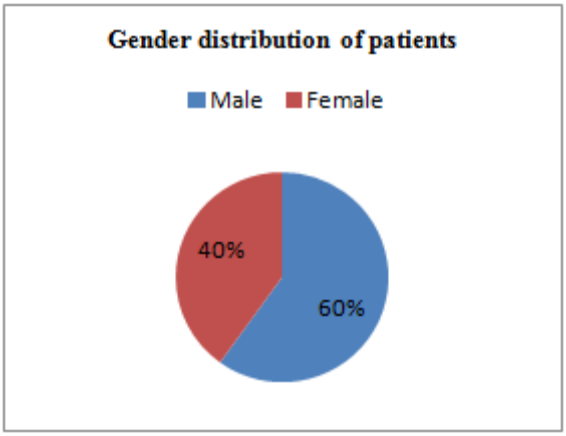


**Figure 2**: smoking and non-smoking wise distribution of patients