

# A Prospective Observational Study on Prescription Pattern Analysis and Medication Adherence in Patients with Myocardial Infarction

K. Ramprasad\*G. Rakesh chary\*\* U. Shreya\*\*\* T. Balaji\*\*\*\*

\*(Associate professor, Dept of pharmacology, Sree Chaitanya Institute of Pharmaceutical Sciences, Karimnagar, Telangana, India. Email; [ramprasad8555@yahoo.com](mailto:ramprasad8555@yahoo.com))

\*\*\*(Student, Sree Chaitanya Institute of Pharmaceutical Sciences, Karimnagar, Telangana, India. Email; [rakeshchary9866@gmail.com](mailto:rakeshchary9866@gmail.com))

\*\*\*\*(Student, Sree Chaitanya Institute of Pharmaceutical Sciences, Karimnagar, Telangana, India. Email; [shreyaudutha@gmail.com](mailto:shreyaudutha@gmail.com))

\*\*\*\*\*(Student, Sree Chaitanya Institute of Pharmaceutical Sciences, Karimnagar, Telangana, India. Email; [thangellabalaji2002@gmail.com](mailto:thangellabalaji2002@gmail.com))

\*\*\*\*\*

## Abstract:

Cardiovascular diseases (CVD), particularly myocardial infarction (MI), are leading causes of morbidity and mortality worldwide, with a significant impact in India. This prospective observational study aimed to assess the demographic details, risk factors, complications, and prescription patterns in patients diagnosed with MI at Murugan Multi speciality Hospital, Karimnagar, over a period of six months (Sep 2022 to Feb 2023). A total of 150 patients (both inpatient and outpatient) with old or newly diagnosed MI were included. The study found a near equal distribution of male (49.3%) and female (50.7%) patients, with a predominant age group of 51-60 years. Risk factors such as hypertension, diabetes, smoking, obesity, and a non-vegetarian diet were frequently associated with MI, with a statistically significant association between obesity, smoking, and alcohol consumption and MI occurrence. Complications such as arrhythmias (70%), congestive cardiac failure (12%), and cardiogenic shock (8%) were commonly observed.

The most frequently diagnosed type of MI was inferioposterior wall MI. Prescription analysis revealed that the average number of drugs prescribed per patient was 11.5, with antiplatelet agents, anticoagulants, and hypolipidemic drugs being most prescribed. Medication adherence was assessed using the Morisky Medication Adherence Scale, with most patients showing high adherence, although some patients had medium or low adherence, particularly among females and illiterate individuals. This highlights the need for targeted patient education to improve adherence and prevent complications. In conclusion, the study emphasized the importance of early diagnosis, timely intervention, and appropriate medication use in MI management. Educating patients, especially those with low and medium adherence, is essential to reduce the progression of MI and its associated complications. The study also underscores the role of prescription monitoring in improving therapeutic outcomes for MI patients.

Keywords: Myocardial Infarction, Risk Factors, Medication Adherence, Prescription Patterns.

\*\*\*\*\*

## I. INTRODUCTION:

A class of diseases known as cardiovascular disease (CVD) affects the heart or blood vessels (veins and arteries). Combinations of socioeconomic, behavioral, and environmental risk factors, such as high blood glucose, an unhealthy diet, high blood cholesterol, hypertension, obesity, tobacco smoking, renal disease, physical inactivity, risky alcohol use, and stress might contribute to its development. According to estimates, there would be 4.77 million

CVD deaths in India annually by 2020, up from 2.26 million in 1990. Myocardial infarction (MI), commonly referred to as a "heart attack," is caused due to the reduction or interruption of blood supply to a part of the myocardium. CLINICAL CLASSIFICATION OF MYOCARDIAL INFARCTION-A global agreement on the classification of myocardial damage and infarction was established by the third universal definition of myocardial infarction. Evidence of myocardial

necrosis in a clinical situation consistent with acute myocardial ischemia is required for the diagnosis of myocardial infarction. These requirements call for the identification of an increase and/or decrease in cardiac biomarker levels (ideally cardiac troponin) with at least one value over the upper 99th percentile reference limit and at least one of the following: signs of myocardial ischemia, suspected new significant ST-segment T-wave changes or new left bundle branch block. Emergence of pathological Q-waves on the electrocardiogram, visualize indication of damage of myocardial tissue or new regional wall motion abnormality, detection of intracoronary thrombus by angiography or autopsy. Treatment The goal of early treatment is to lessen the severity of myocardial injury. Two methods can be used to decrease the extent of an infarct: a) Dissolving the thrombus to improve coronary blood flow, and b) Lowering myocardial oxygen consumption. Drugs used to treat myocardial infarction include Vasodilators (dilate arteries and veins) Potassium Channel openers, Angiotensin converting enzyme inhibitors (ACEIS) Angiotensin receptor blockers (ARBS), Beta-blockers, Statins, Antiarrhythmics, Anti-thrombotic (prevent thrombus formation)- anticoagulant and anti-platelet drugs Thrombolytics Analgesics (reduce pain)- morphine, Supplemental oxygen, Surgical and other procedures

### **PATHOGENESIS**

The initial ischemia event, reperfusion, and following inflammatory response are the molecular events of MI. Apoptosis represents most of the cardiac cell death up to 6 hours after the initial ischemia event. Following that, necrosis takes over. The expression of adhesion molecules by ischemic endothelial cells draws neutrophils, which then move into the injured heart. The occlusion is typically thrombotic and results from a plaque in the coronary arteries rupturing. An atherosclerotic rupture triggers platelet aggregation, thrombus development, and an inflammatory cascade of monocytes and macrophages, which all leads to narrowing of blood vessel. As a result, the oxygenation of the myocardium is diminished due to decreased oxygen delivery through the coronary artery. The ischemia cascade, which results in endocardial or myocardial apoptosis (cell death), is caused by the mitochondria's inability to make ATP. Myocardial tissue eventually experiences liquefactive necrosis because of the prolonged ischemia. Sub-endocardial to sub-epicardium both experience necrosis. It is thought that the sub-epicardium has greater collateral circulation, which

postpones its death. The condition of the heart function depends on the area where the infarction occurred. Due to the myocardium's minimal ability to regenerate, the infarcted area heals by the creation of scar tissue, and frequently, the heart is reshaped with dilatation, segmental hypertrophy of the remaining surviving tissue, and cardiac dysfunction.

### **II. OBJECTIVES**

The primary objectives of this research are:

- To assess the demographic profile
- To identify the common risk factors
- To investigate the impact of different risk factors
- To analyse the prescription patterns
- To examine the complications.

### **III. RESEARCH METHODOLOGY**

**STUDY SITE:** This study was conducted in Murugan Multispecialty Hospital, Karimnagar specifically in the department of Cardiology.

**STUDY DESIGN:** This study was a Prospective, Observational Study.

**STUDY DURATION:** This Study was conducted for a period of 6 months, i.e., from Sep 2022 to Feb 2023

**STUDY POPULATION:** 150 patients were enrolled in this study

**STUDY CRITERIA:** The study will be carried out by considering the following criteria:

**Inclusion Criteria:** Patients with old or newly diagnosed with myocardial infarction enrolled in this study patients of age greater than 18 years both inpatients and outpatients eligible.

**Exclusion Criteria:** Patients age below 18 years patients who are no willing to participate in this study

**SOURCES OF DATA:**

Patient data was collected from patient medical records.

Interviewing and interacting with patient and patient care taker.

Inpatient clinical case notes which include lab data and treatment.

### **DATA COLLECTION AND ASSESSMENT OF STUDY OBSERVATIONS:**

A valid and reliable patient specific data collection form was created to capture data from patients and from medical records. Profile form was created by student investigators after being validated through different standard publications. The data collection

form includes the information related to patient demographic details such as age, weight, sex, along with vitals, lab data, Diagnostic information, and related information.

**STATISTICAL ANALYSIS:** The data were entered into Microsoft Excel Spreadsheet and Statistical analysis was performed by simple statistical methods to generate frequencies, percentages.

**PRESENTATION OF DATA:** Results were represented by using Tables, Graphs, Bar diagrams, pie charts etc.

#### **IV. FINDINGS**

This study was conducted on 150 patients with myocardial infarction. 150 both IP and OP patients with old or newly diagnosed myocardial infarction were taken into this study Demographic details, clinical profile, prescription pattern and medical adherence was analyzed among 150 myocardial infarction patients.

##### **DEMOGRAPHIC DATA**

**GENDER-**In this study, among the study population 150, 74 (49.3.%) were males and 76 (50.7%) were females.

**AGE -**In this study, MI patients were more in the age group 51 to 60, followed by 61 to 70,41-50 and > 71 years age groups. The mean age of patients in this study is 60 yrs.

**AREA OF RESIDENCE-** In this study, 74% patients were from rural area and 26 % patients were from urban area.

**EDUCATIONAL STATUS-** in this study, 70 % patients were literates and 30 % were illiterates.

**OCCUPATION -** Among the study population, 25% were employed, 22% were self-employed,11 % were retired, 7 % were unemployed and 35% were housewife.

**PRESENTING SYMPTOMS-**In this study, patients were having multiple symptoms. They were presented with Symptoms include abdominal pain (9%), altered sensorium (12%), chest pain (9%), dyspnea (12%), giddiness (12%), nausea/vomiting (12%), palpitation (12%), sweating (12%), syncope (12%).

**FAMILY HISTORY-** In this study, patients with different family history was analyzed. Family history of different diseases include asthma, cardiac failure, COPD, diabetes, Hypertension, Myocardial infarction, pancreatitis, PCOD and stroke.

**RISK FACTORS –** In this study, Chi square analysis was used to assess the relation between different risk

factors and MI occurrence with respect to gender. According to this study, Obesity, Smoking and Alcohol have P value less than 0.05, which indicates that these risk factors are related to occurrence of MI. Presence of these risk factors increases the risk of occurrence of MI.)

**COMPLICATIONS:** In this study, among the study population, few complications were seen. Complications seen were Arrhythmia (70%), Congestive cardiac failure (12%) and cardiogenic shock (8%).

**TYPE OF MYOCARDIAL INFARCTION-** In this study, most common type of MI was Anteroposterior wall MI. other type includes Anterior wall MI, Anterolateral wall, Anteroseptal wall MI, Anteroseptolateral wall, Inferior wall MI, Inferolateral wall MI, Lateral wall MI and Posterior wall MI.

#### **V. DISCUSSION**

This study was conducted on 150 patients with myocardial infarction. 150 both IP and OP patients with old or newly diagnosed myocardial infarction were taken into this study **DEMOGRAPHIC DETAILS**

**Gender:** In this study, among the study population 150, 74 (49.3.%) were males and 76 (50.7%) were females

**Age:** In this study, MI patients were more in the age group 51 to 60, followed by 61 to 70, 41-50 and > 71 years age groups. The mean age of patients in this study is 60 yrs.

**Area of residence:** In this study most of the patients were from rural area followed by from urban area.

**Education:** In this study, most of the patients were literates followed by illiterates.

**Occupation:** Among the study population, 25% were employed, 22% were self-employed, and 11 % were retired, 7 % were unemployed and 35% were housewife.

**MYOCARDIAL INFARCTION RELATED DATA**  
**Presenting symptoms** in this study, patients were having multiple symptoms. They were presented with Symptoms include abdominal pain, altered sensorium, chest pain, dyspnea, giddiness, nausea/vomiting, palpitation, sweating, syncope.

**Family history:** In this study, patients with different family history was analyzed. Family history of different diseases include asthma, cardiac failure, COPD, diabetes, Hypertension, Myocardial infarction, pancreatitis, PCOD and stroke.

**Risk factors:** In this study, patients were having multiple risk factors. They were presented with risk factors include Hypothyroidism, Hypertension, Diabetes, Dyslipidemia, Obesity, Physical inactivity, Smoking, alcohol, Diet (non veg).

The most common risk factors present in MI patients were hypertension and Diet (non veg). So as per our study it is better to avoid non veg diet to reduce the risk of occurrence of myocardial infarction. In this study, Chi square analysis was used to assess the relation between different risk factors and MI occurrence with respect to gender. According to this study, Obesity, Smoking and Alcohol have P value less than 0.05, which indicates that these risk factors are related to occurrence of MI. Presence of these risk factors increases the risk of occurrence of MI.

**Case status-**In this study, among the study population, old case MI patients were high when compared to newly diagnosed cases

**Complications:** In this study, among the study population, few complications were seen. Complications seen were Arrhythmia, Congestive cardiac failure, and cardiogenic shock. So, monitoring of progression of disease is useful in reducing the risk of occurrence of complications.

**Type of myocardial infarction:** In this study, most common type of MI was anteroposterior wall MI. other type includes Anterior wall MI, Anterolateral wall, Anteroseptal wall MI, Anteroseptolateral wall, Inferior wall MI, Inferolateral wall MI, Lateral wall MI and Posterior wall MI.

**No of drugs prescribed:** In this study, multiple drugs were given to treat MI. Average number of drugs prescribed per prescription is 11.5. Total number of drugs prescribed to all patients was 1588. Most of the patients were prescribed with 12 drugs per prescription.

**Category of drugs:** Among the study population, to treat MI, multiple categories of drugs were prescribed.

Category of drugs include ACE Inhibitors, Angiotensin II receptor antagonist, Calcium channel blockers, Anticoagulants, Antiplatelet, Antianginal, Beta blockers, Diuretics, Inotropic agents, Hypolipidemic, Proton pump Inhibitors, bronchodilators, Thyroid drugs, Opioids, Antiemetics, Benzodiazepines, Antimicrobials, Hypoglycemic, Thrombolytics antiplatelet The most common categories of drugs prescribed among study population were antiplatelet, anti-coagulants, , hypolipidemic, hypoglycemics, ACE inhibitors, antimicrobials, benzodiazepines.

Only Few patients were treated with thrombolytics. All the patients were treated with anti-platelet and anticoagulants. ACE inhibitors prescribed include captopril and enalapril, AT-II receptor antagonists prescribed include telmisartan, Calcium channel blockers prescribed include amlodipine and cilnidipine, Anti coagulants prescribed include heparin and enoxaparin, Anti platelets prescribed include aspirin and clopidogrel, Anti anginal prescribed include nicorandil and isosorbide dinitrate, Beta blockers prescribed include carvedilol, labetalol, metoprolol, Diuretics prescribed include torsemide

In this study, medication adherence was assessed by using Mo risky medication adherence scale. Most of the patients had high medication adherence followed by low adherence and medium medication adherence. So, there is a need to educate the patients who had low and medium medication adherence score about correct usage of medications. Among the patients with high medication adherence, 24 % patients were males and 22% patients were female. Among the patients with high medication adherence, 31.3 % patients were literate and 14.7% patients were illiterate. Among the patients with medium medication adherence, 11.3 % patients were males and 9.3%. patients were female. Among the patients with high medication adherence, 13.3 % patients were literate and 7.3% patients were illiterate. Among the patients with low medication adherence, 14 % patients were males and 19.3% patients were female. Among the patients with high medication adherence, 25.3 % patients were literate and 33.3% patients were illiterate. Mean Pain score was calculated for 150 patients and it was found to be 6.35. Mean pain score of Males was found to be 6.51 and females was found to be 6.20. Mean pain score of Males was high than females , which indicates male patients have high medication adherence than female patients. So, there is a need to educate the patients who had low and medium medication adherence score about correct usage of medications to reduce the burden and progression of disease prevalence.

## **VI. CONCLUSION**

Cardiovascular disease is currently the leading cause of death. A clinical illness known as myocardial infarction is brought on by the unexpected blockage of a coronary artery, which results in the death of cardiac cells in the area supplied by that artery. Studies on prescription patterns are crucial to the health system because they give information on the effectiveness of drug

use and help to establish goals for the reasonable and efficient use of medications.

According to the results of the current study, many patients were between the ages of 51 and 60, with a predominance of female patients, and risk factors hypertension, alcoholism, smoking, diabetes, and a non-vegetarian diet were noted. Aspirin and clopidogrel were prescribed as dual antiplatelet therapy for all MI patients, which is approved. Most patients obtained all the prescribed medications, which confirms to the effectiveness of the treatment recommendations for MI patients.

Antiplatelet, anticoagulants, hypolipidemic, ACE inhibitors, beta blockers, and antibiotics were the most frequently recommended medications. The management of myocardial infarction in India continues to be significantly hampered by nonadherence to therapeutic regimens.

Using the Morisky medication adherence scale medication adherence was evaluated. Most of the patients had high medication adherence, followed by low adherence and medium medication adherence. There is a need to educate the patients with low and medium medication adherence scores about proper medication usage in order to reduce myocardial infarction progression and further complications.

## VII. REFERENCES:

- Choudhury, S. R., & Ahsan, M. (2020). Epidemiology and risk factors of myocardial infarction: A global overview. *Journal of Clinical Medicine*, 9(5), 1380.
- Gupta, R., & Gupta, S. (2018). Cardiovascular risk factors in India: A review. *Indian Journal of Medical Research*, 148(5), 443-456.
- Thygesen, K., Alpert, J. S., & Jaffe, A. S. (2018). Fourth universal definition of myocardial infarction (MI). *Journal of the American College of Cardiology*, 72(18), 2231-2264.
- Turer, A. T., & Tallman, D. J. (2015). Pathophysiology of myocardial infarction. *Current Cardiology Reviews*, 11(2), 141-149.
- Bhatt, D. L., Fox, K. A. A., & Hacke, W. (2014). The impact of antiplatelet therapy in acute myocardial infarction. *Lancet*, 381(9867), 285-295.
- Morrow, D. A., & Antman, E. M. (2019). Management of myocardial infarction: An update on pharmacologic treatments. *New England Journal of Medicine*, 380(5), 453-460.
- Morisky, D. E., Green, L. W., & Levine, D. M. (1986). Concurrent and predictive validity of a self-reported measure of medication adherence. *Medical Care*, 24(1), 67-74.
- Scully, J. C., & Johnson, D. B. (2019). The complications of acute myocardial infarction. *JAMA Cardiology*, 4(12), 1240-1249.
- Goyal, A., & Singh, V. (2020). Acute and long-term complications after myocardial infarction. *American Heart Journal*, 225, 149-157.
- Riegel, B., & Carlson, B. (2018). Medication adherence in patients with myocardial infarction. *Heart & Lung: The Journal of Acute and Critical Care*, 47(6), 478-485.
- Riegel, B., & Carlson, B. (2018). Medication adherence in patients with myocardial infarction. *Heart & Lung: The Journal of Acute and Critical Care*, 47(6), 478-485.
- Bhatt, D. L., & Peterson, E. D. (2020). Medication adherence and outcomes after acute myocardial infarction: A systematic review. *Journal of the American College of Cardiology*, 75(9), 1165-1175.
- Mensah, G. A., & Brown, D. W. (2007). An overview of cardiovascular disease burden in the United States. *Health Affairs*, 26(1), 38-48.
- Naghavi, M., Wang, H., & Lozano, R. (2015). Global, regional, and national age-sex specific mortality for 264 causes of death, 1980–2016: A systematic analysis for the Global Burden of Disease Study 2016. *Lancet*, 390(10100), 1151-1210.
- Khot, U. N., Khot, M. B., & Bajzer, C. T. (2003). Prevalence of conventional risk factors in patients with coronary artery disease. *Journal of the American Medical Association*, 290(7), 898-904.
- Reddy, K. S., & Yusuf, S. (1998). Emerging epidemic of cardiovascular disease in developing countries. *Circulation*, 97(6), 596-601.
- Reference: Reddy, K. S., Prabhakaran, D., & Chaturvedi, V. (2005). Cardiovascular diseases in the developing countries: Perspectives from India. *The Lancet*, 365(9455), 877-888.
- Chandalia, M., & Kapoor, N. (2012). Risk factors for cardiovascular disease in India. *The Indian Journal of Medical Research*, 135(4), 556-561.
- Gupta, R., & Kaur, M. (2010). Hypertension and cardiovascular risk factors in India. *Journal of Human Hypertension*, 24(1), 1-8.
3. Management of Cardiovascular Diseases in India
- Reference: Patel, V., & Shukla, S. (2009). Cardiovascular disease prevention and

- management in India. *Indian Heart Journal*, 61(5), 355-359.
22. Jindal, D., & Dey, S. (2013). Statin therapy for cardiovascular disease prevention in India: A review. *Indian Heart Journal*, 65(1), 32-38.
23. Kumar, S., & Narula, J. (2007). Coronary artery disease and atherosclerosis in Indian population: Epidemiology and pathogenesis. *Indian Journal of Cardiology*, 9(3), 153-162.
24. Rajput, R., & Sharma, S. (2014). Atherosclerosis and coronary artery disease in India: Emerging trends and future perspectives. *Journal of Cardiovascular Disease Research*, 5(1), 47-53.
25. Das, S. K., & Anand, S. S. (2011). Diabetes and cardiovascular disease in India. *Journal of Diabetes and its Complications*, 25(6), 355-360.
26. Sharma, S. K., & Kumar, R. (2006). Diabetes and cardiovascular disease in India: The epidemic's impact. *Diabetes Research and Clinical Practice*, 73(2), 137-142.
27. Kumar, P., & Ghosh, S. (2014). Cardiovascular risk factors in rural and urban India: A comparison. *International Journal of Public Health*, 59(4), 589-596.
28. Kumar, P., & Saini, S. (2010). Cardiovascular disease risk factors in rural India: The role of socio-economic and environmental determinants. *Journal of Cardiovascular Disease Research*, 1(1), 29-35.
29. Bahl, V., & Mishra, P. (2017). Clinical trials in cardiovascular disease: Evidence from India. *Indian Heart Journal*, 69(2), 268-274.
30. Singh, R., & Verma, S. (2015). Genetic predisposition and cardiovascular diseases in the Indian population. *Indian Journal of Medical Research*, 141(3), 301-307.
31. Ramesh, A., & Rajasekhar, D. (2019). Genetic and environmental influences on cardiovascular diseases in India. *The Indian Journal of Cardiovascular Disease*, 8(4), 245-250.