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A Study on Evaluation of Therapeutic Strategies for Management of Myocardial Infarction Patients in a Tertiary Care Hospital

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ABSTRACT
Introduction: Myocardial infarction colloquially known as "heart attack," is caused by decreased or complete cessation of blood flow to a portion of the myocardium. Methods: The prospective observational study was carried out for a period of 6 months. The study was conducted in cardiology department in a tertiary care hospital. A written and informed consent was obtained from the recruited patients. A Total of 95 patients were enrolled in the study. Aim: The study aimed to evaluate the therapeutic strategies for management of Myocardial infarction patients in a tertiary care hospital. Results and Discussion: In our study 41-50 years age patients were more 35(36.84%) compared to other ages. In our study male patients were more 57(60%), compared to female patients were 38 (40 %). Coronary arteries involvement includes LCX patients were more 41 (43.15%) compared to LMCA patients were 25 (26.31%), RCA patients were 29 (30.52%). Drug prescribing pattern for Myocardial infarction management includes Beta blockers prescribed patients were more 22 (23.15%), compared to other drugs. Number of drugs prescribed by Generic name was 118, Number of drugs prescribed by Brand name was 642, Drugs included in National list of essential medicines was 95. Conclusion: The study highlights the promotion of rational use of drugs by continuous encouraging generic prescriptions. The periodic verification of prescription pattern studies would be encouraged to ensure rational drug use in the medical practice.
Keywords: Myocardial infarction, Therapeutic strategies, Prescription pattern, Rational drug use, Medical Practice.

INTRODUCTION

Myocardial infarction colloquially known as "heart attack," is caused by decreased or complete cessation of blood flow to a portion of the myocardium. Myocardial infarction may be "silent" and go undetected, or it could be a catastrophic event leading to hemodynamic deterioration and sudden death. Most myocardial infarctions are due to underlying coronary artery disease, the leading cause of death in the United States. With coronary artery occlusion, the myocardium is deprived of oxygen. Prolonged deprivation of oxygen supply to the myocardium can lead to myocardial cell death and necrosis[1-3]. Patients can present with chest discomfort or pressure that can radiate to the neck, jaw, shoulder, or arm. In addition to the history and physical exam, myocardial ischemia may be associated with ECG changes and elevated biochemical markers such as cardiac troponins.

Etiology

- Smoking
- Abnormal lipid profile/blood apolipoprotein (raised ApoB/ApoA1)
- Hypertension
- Diabetes mellitus
- Abdominal obesity (waist/hip ratio) (greater than 0.90 for males and greater than 0.85 for females)
- Psychosocial factors such as depression, loss of the locus of control, global stress, financial stress, and life events including marital separation, job loss, and family conflicts
- Lack of daily consumption of fruits or vegetables
- Lack of physical activity
- Alcohol consumption (weaker association, protective)

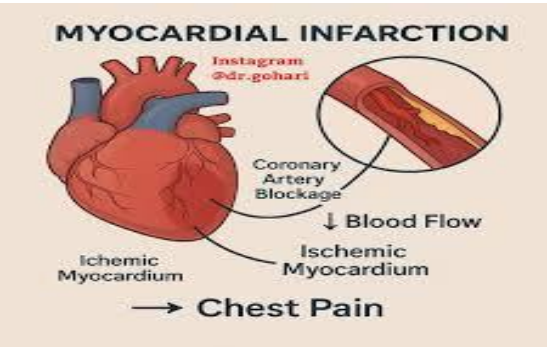

Fig 1: Myocardial infarction

Epidemiology

The most common cause of death and disability in the western world and worldwide is coronary artery disease. Based on 2015 mortality data from the National Health Interview Survey (NHIS-CDC), MI mortality was 114,023, and MI any-mention mortality (i.e., MI is mentioned as a contributing factor in the death certificate) was 151,863[4-5].

Pathophysiology

The acute occlusion of one or multiple large epicardial coronary arteries for more than 20 to 40 minutes can lead to acute myocardial infarction. The occlusion is usually thrombotic and

due to the rupture of a plaque formed in the coronary arteries. The occlusion leads to a lack of oxygen in the myocardium, which results in sarcolemmal disruption and myofibril relaxation. These changes are one of the first ultrastructural changes in the process of MI, which are followed by mitochondrial alterations.

Treatment for myocardial infarction[6-9]

1. Antiplatelet Drugs

Prevent further clot formation.

- **Aspirin** (chewed immediately)
- **P2Y12 inhibitors:**
  - Clopidogrel
  - Ticagrelor
  - Prasugrel

2. Anticoagulants

Prevent new clot formation and stop existing clot from enlarging.

- Unfractionated Heparin (UFH)
- Low Molecular Weight Heparin (Enoxaparin)
- Bivalirudin
- Fondaparinux

3. Nitrates (e.g., Nitroglycerin)

- Relieve chest pain
- Dilate coronary arteries
- Reduce cardiac workload

4. Beta-Blockers

- Metoprolol
- Atenolol
- Carvedilol

5. Morphine

- For severe chest pain not relieved by nitrates
- Reduces anxiety and sympathetic activity

6. Oxygen

- Only if oxygen saturation < 90%

Reperfusion Therapy (STEMI)

A. Thrombolytics (if PCI not available within 90–120 minutes)

- Alteplase (tPA)
- Tenecteplase
- Reteplase
- Streptokinase

Secondary Prevention (Long-Term Management)

1. ACE Inhibitors / ARBs

- Enalapril
- Lisinopril
- Ramipril
- Losartan (if ACE intolerant)

2. Statins (High-intensity)

- Atorvastatin
- Rosuvastatin

3. Aldosterone Antagonists

- Spironolactone
- Eplerenone

Risk factors

- Gender
- >45 years for males
- >55 years for females
- Cardiovascular risk factors: smoking, hypertension, low density lipoprotein (LDL) cholesterol, hyperlipidemia, diabetes, obesity, physical inactivity, air pollution
- Positive family history: a history of first-degree male relative (i.e. brother, father, son) with MI <55 years of age or first-degree female relative (i.e. mother, sister, daughter) with MI <65 years of age[10-11].

Laboratory markers

- The mainstay of diagnosis revolves around: Cardiac biomarkers; ECG findings; and clinical features.
- Troponin (T and I) is a protein of key importance in the functioning of skeletal and cardiac muscle.
- CK-MB (Creatine kinase- MB) is a enzyme which is found in heart muscle. But it is less specific than troponin but helps in detecting MI earlier.
- Myoglobin is a protein found in both heart and skeletal muscles.

Non Pharmacological therapy

Evidence based interventions for secondary prevention include the use of aspirin, beta-blockers, angiotensin converting enzyme inhibitors; lipid lowering drugs and other anti- hypertensive, as well as modifying lifestyle related risk behaviors[12-15].

Physical exercise

Although the role of exercise alone in reducing cardiovascular outcomes is not clear, systematic reviews of RCTs have found that cardiac rehabilitation which includes physical exercise improves coronary risk factors and reduces the risk of major cardiac events in people after MI.

Dietary Modification

RCTs have found that advising people with MI to eat more fish, fruit and vegetables, bread, pasta, potatoes, olive oil and margarine may result in a substantial survival advantage.

1. Heart-Healthy Diet

Follow a Mediterranean-style diet:

More: fruits, vegetables, whole grains, legumes, nuts

Lean protein: fish (especially oily fish like salmon), skinless poultry

Healthy fats: olive oil, avocado

Low-fat dairy

Saturated fat (butter, fatty meat)

Trans fats (fried/processed foods)

Excess salt (<5 g/day salt)

Sugary drinks and sweets

Red and processed meats

2. Stop Smoking

3. Regular Physical Activity

4. Maintain Healthy Weight

- Target BMI: 18.5–24.9
- Reduce abdominal fat
- Even 5–10% weight loss improves heart health

5. Control Risk Factors

Regular monitoring of:

- Blood pressure
- Blood sugar (especially if diabetic)
- Cholesterol levels
- Follow doctor's advice strictly.

6. Stress Management

Chronic stress increases heart risk.

- Helpful methods:
- Deep breathing exercises
- Yoga
- Meditation
- Prayer or mindfulness
- Adequate sleep (7–8 hours per night)

7. Limit Alcohol
8. Medication Adherence
   - Take medicines exactly as prescribed
   - Do not stop medications without consulting doctor
   - Attend regular follow-ups
9. Cardiac Rehabilitation
   - Structured exercise program
   - Education and counseling
   - Proven to reduce mortality

METHODOLOGY

The prospective observational study was carried out for a period of 6 months. The study was conducted in cardiology department in a tertiary care hospital. A written and informed consent was obtained from the recruited patients. A Total of 95 patients were enrolled in the study.

Study Design: It was Prospective observational study.

Study Period: The Present study was conducted for a period of six months.

Study site: The Present study was conducted in cardiology department in a tertiary care hospital.

Sample size: It was 95 Patients.

Inclusion criteria

- Patients with age of more than 18 years.
- Patients who are willing to give consent.
- Recently diagnosed with Myocardial infarction.
- Patients receiving treatment for Myocardial infarction.

Exclusion criteria

- Patients below 18 years.
- Patients who were not willing to join in the study.
- Special population including pregnant women and lactating women.
- Psychiatric abnormalities.

Institutional ethics committee (IEC) consideration: The research protocol was submitted to ethical committee and ethical Committee was permitted to perform the research work in the selected department of a tertiary care hospital.

Patient data collection and management: The data collection form contains information regarding age, sex, diagnosis, past medical history, medication history, laboratory data, and diagnosis, dose and frequency of administration and duration of therapy was collected from the patients treatment chart.

Statistical analysis: The data was represented as percentages.

RESULTS

Table 1: Age wise distribution

Age	Total (N=95)	Percentage (%)
25-30	14	14.73
31-40	25	26.31
41-50	35	36.84
51-60	21	22.10
Total	**95**	
Age	**Total (N=200)**	**Percentage (%)**

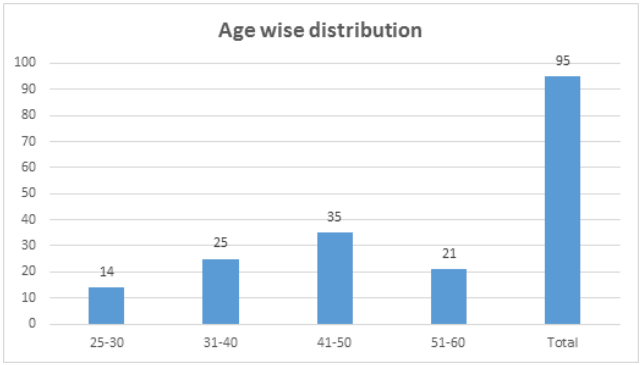

Fig 1: Age wise distribution

Table 2: Gender

Gender	Total (N=95)	Percentage (%)
Male	57	60
Female	38	40
Total	95	

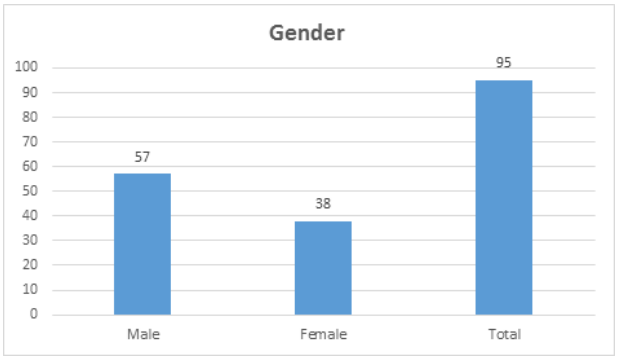

Figure 2: Gender

Table 3: Food habits

Food habits	Total (N=95)	Percentage (%)
Vegetarian	44	46.31
Non vegetarian	51	53.68
Total	**95**	

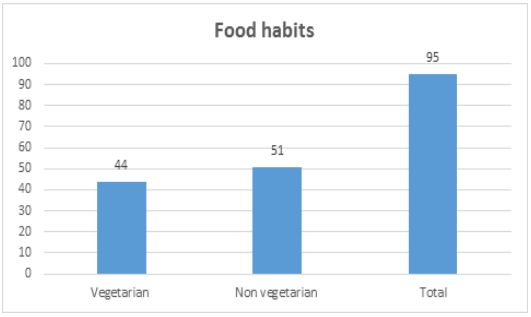

Figure 3: Food habits

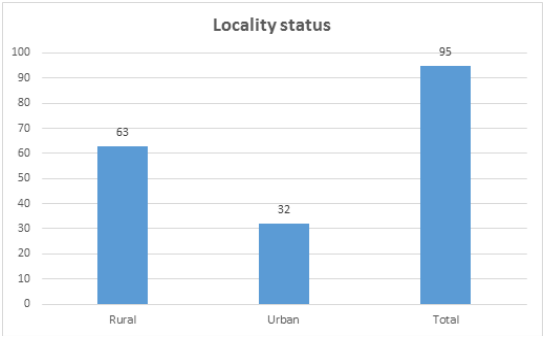

Figure 4: Locality status

Table 4: Locality status

Locality status	Total (N=95)	Percentage (%)
Rural	63	66.31
Urban	32	33.68
Total	**95**	

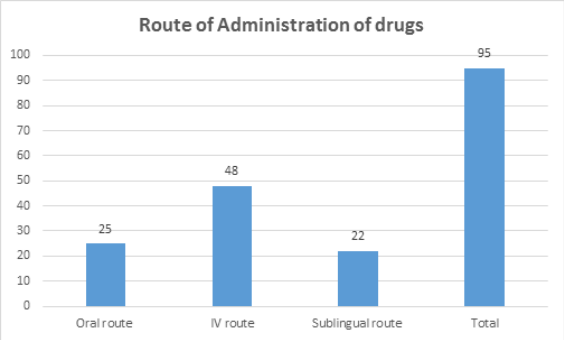

Figure 4: Route of Administration of drugs

Table 5: Route of Administration of drugs

Route of Administration	Total (N=95)	Percentage (%)
Oral route	25	26.31
IV route	48	50.52
Sublingual route	22	23.15
Total	**95**	

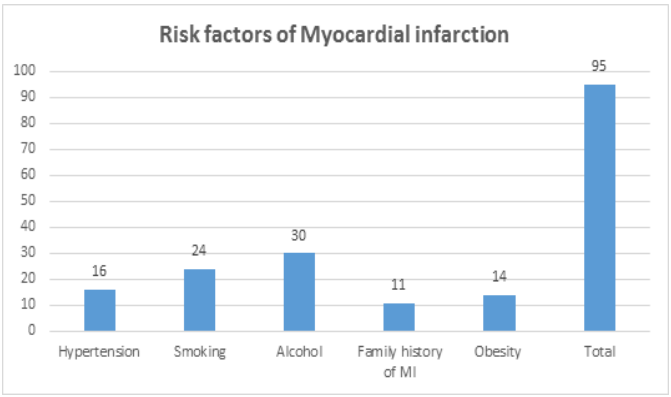

Figure 5: Risk factors of Myocardial infarction

Table 6: Risk factors of Myocardial infarction

Risk factors	Total (N=95)	Percentage (%)
Hypertension	16	16.84
Smoking	24	25.26
Alcohol	30	31.57
Family history of MI	11	11.57
Obesity	14	14.73
Total	**95**	

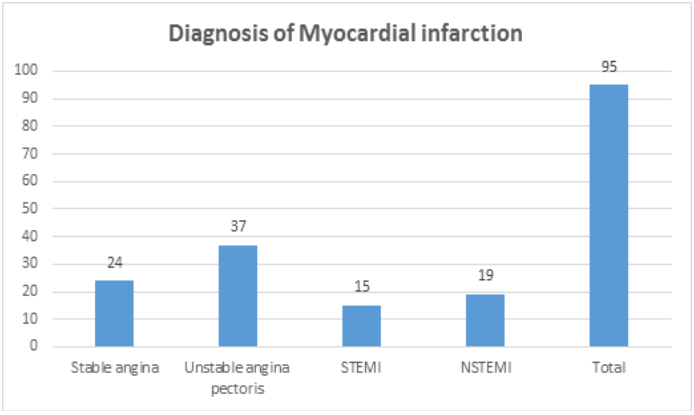

Figure 6: Diagnosis of Myocardial infarction

Table 6: Diagnosis of Myocardial infarction

Diagnosis	Total (N=95)	Percentage (%)
Stable angina	24	25.26
Unstable angina pectoris	37	38.94
STEMI	15	15.78
NSTEMI	19	20
Total	**95**	

DISCUSSION

- In our study 41-50 years age patients were more 35(36.84%) compared to other ages.
- In our study male patients were more 57(60%), compared to female patients were 38 (40 %).
- In our study Non- Vegetarian were more 51 (53.68 %) compared to vegetarian patients 44 (46.31%).
- In our study Rural area patients were more 63(66.31 %), compared to urban area patients were 32 (33.68 %).
- In our study Route of administration of drugs includes IV route patients were more 48 (50.52%), compared to oral route administration patients were 25 (26.31%), and sublingual route patients were 22 (23.15 %).
- Socioeconomic status includes middle income patients were more 41 (43.15 %) compared to low income patients were 28(29.47%), high income patients were 26 (27.36%),
- Occupations wise distribution includes Driver were more 33(34.73%) compared to Farmer were 18(18.94%), House wife were 28(29.47%), Employee were 16(16.84 %).
- No of days admission in hospital includes No of days admission in hospital includes 1-10 days patients were more 48(50.52%), compared to 11-16days patients were 25(26.31%), 17-25 days patients were 22(23.15%).
- Risk factors of Myocardial infarction includes Alcohol patients were more 30 (31.57%), compared to Hypertension patients were 16 (16.84%), Smoking patients were 24 (25.26%), Family history of MI patients were 11 (11.57%), Obesity patients were 14 (14.73%).
- Diagnosis of Myocardial infarction includes Unstable angina pectoris patients were more 37 (38.94%), compared to Stable angina patients were 24 (25.26%), STEMI patients were 15 (15.78%), NSTEMI patients were 19 (20%).
- Coronary arteries involvement includes LCX patients were more 41 (43.15%) compared to LMCA patients were 25 (26.31%), RCA patients were 29 (30.52%).
- Comorbidities includes Osteoarthritis patients were more 28(29.47%), compared to Scabies patients were 15 (15.78%), Glaucoma patients were 16(16.84%), Asthma patients were 17(17.89%), Cirrhosis patients were 19(20%).
- Clinical manifestations of Myocardial infarction includes Abnormal heart beating patients more 33(34.73%), compared to Cough 19 (20%), Chest pain 22 (23.15%), Shortness of breath 21 (22.10%).
- Lab test for Myocardial infarction includes Echocardiogram patients were more 30 (31.57%)

compared to ECG patients were 22 (23.15%), Blood test patients were 25(26.31%), Coronary angiogram patients were 18 (18.94%)[16].

- Drug prescribing pattern for Myocardial infarction management includes Beta blockers prescribed patients were more 22 (23.15%), compared to Antiplatelets prescribed patients were 15(15.78%), Thrombolytics prescribed patients were 7 (7.36%), nticoagulants prescribed patients were 15 (15.78%),Nitrates prescribed patients were 19 (20%), ACE Inhibitors prescribed patients were 9 (9.47%), Statin prescribed patients were 8 (8.42%)[17-18].
- WHO Drug prescribing indicators includes WHO Drug prescribing indicators includes Total number of patient's prescription analyzed were 95, Total number of drugs prescribed were 760, Average number of drugs per prescription were 8.0, Number of drugs prescribed by Generic name was 118, Number of drugs prescribed by Brand name was 642, Drugs included in National list of essential medicines was 95[19-20].

CONCLUSION

The study highlights the promotion of rational use of drugs by continuous encouraging generic prescriptions. The periodic verification of prescription pattern studies would be encouraged to ensure rational drug use in the medical practice. In order to attain maximum study results multifaceted prescription pattern must be discouraged at the beside. Constant lifestyle modification and preventing the clinical risk factors need to be improve drug prescribing therapy[21-24]. In our study most of the patients were prescribed prophylactic drugs for prevention of further ischemic events. The well noted drugs were antiplatelets followed by statins, angiotensin converting enzyme inhibitors and beta blockers etc. The rational use of drugs is a significant factor which would address the benefits of drug therapy in patient care. WHO core indicators helps to assess the patient's response to therapy, safety and effectiveness and to prevent the save the patients from medication linked problems[25].

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CONFLICT OF INTERESTS

The authors declare no conflict of interest

ETHICS APPROVAL: Not applicable

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AI TOOL DECLARATION

The authors declare that no AI and related tools are used to write the scientific content of this manuscript.

DATA AVAILABILITY

Data will be available on request

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