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Original Article

DRUG UTILIZATION STUDY IN THE PATIENTS OF MYOCARDIAL INFARCTION AT A TERTIARY CARE HOSPITAL

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ABSTRACT

Objective: To evaluate the pattern of drug utilization, demographic characteristics, routes of administration, duration of hospital stay, and clinical outcomes in patients with myocardial infarction admitted to a tertiary care hospital.

Methods: This was a hospital-based observational study conducted over a period of six months in the Pharmacology Department in coordination with the Cardiology Department of a tertiary care hospital in southern Rajasthan. A total of 100 patients with confirmed diagnosis of myocardial infarction were included. Data regarding demographics, drug prescriptions from admission to discharge, routes of administration, fixed-dose combinations, and clinical outcomes were collected from inpatient records and analysed descriptively.

Results: The majority of patients were aged 61–70 y (37%), followed by 51–60 y (32%), with a marked male predominance (82%). Most patients recovered (93%), while in-hospital mortality was 7%. Combination routes of drug administration (oral, sublingual, and parenteral) were used in 84% of patients. Half of the patients had a hospital stay of 3–4 d. Antiplatelet drugs were prescribed to 99% of patients, with dual antiplatelet therapy being most common (73%). Statins (94%), beta-blockers (88%), anticoagulants (85%), and nitrates (89%) were widely used. Proton pump inhibitors were prescribed to all patients, while antibiotics were used in 51%. Fixed-dose combinations, particularly aspirin with clopidogrel and statins, were frequently prescribed.

Conclusion: The study demonstrates a high level of adherence to evidence-based guidelines in the pharmacological management of myocardial infarction at the tertiary care hospital. The prescribing pattern reflects rational use of essential cardiovascular drugs and effective acute management, as evidenced by favourable clinical outcomes. However, the use of certain non-cardiac medications highlights the need for regular prescription audits to further promote rational drug use.

Keywords: Drug utilization, Cardiology, MI, Fibrinolytic, Anticoagulant

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INTRODUCTION

World Health Organization (WHO) defines "Drug Utilization study as marketing, distribution, prescription and use of drugs in a society, with special emphasis on the resulting medical, social, and economic consequences [1].

The objective of drug utilization study is to increase the rational use of drugs, to compare the observed pattern of drug use with current recommendations or guidelines for the treatment of a certain disease. These types of studies can estimate to what extent drugs are being properly used, overused or underused [2].

The aspects pertaining to the prescription, dispensing, administering, and effects of drug use-whether positive or negative-are the main focus of studies on drug consumption. Through history, we have learned that interdisciplinary cooperation among doctors, pharmacists, clinical pharmacologists, and epidemiologists is necessary for successful drug utilization research the field of drug utilization study is constantly developing [3].

Drug utilization studies focus on the factors related to the prescribing, dispensing, administering and effects of drug utilization, beneficial or adverse. History has taught us that successful research in drug utilization requires multidisciplinary collaboration between clinicians, clinical pharmacologists, pharmacists and epidemiologists. The study of drug utilization is an evolving field [3].

Myocardial infarction (MI), commonly referred to as a heart attack, represents a significant health care burden globally, contributing substantially to co-morbidity and mortality rates. Despite advancements in medical science and health care delivery, Myocardial infarction continues to be leading cause of cardiovascular-related deaths worldwide prompt and effective management of myocardial infarction is crucial to reduce the risk of complications, to improve patient outcomes, and enhance overall quality of life [4, 5].

Tertiary care hospitals serve as referral centers for complex medical conditions, including myocardial infarction, and play a critical role in the management of acute cardiovascular events. Therefore, concluding a drug utilization study in a tertiary care hospital setting provides valuable insights into the prescribing practices and treatment patterns among myocardial infarction patients. By evaluating the utilization of medications in this context, health care providers can assess the extent to which current treatment practices align with established guidelines and identify opportunities for improvement [5-7].

This study aims to investigate the patterns of drug utilization among patients diagnosed with myocardial Infarction at [Super-speciality block of MB Hospital, Udaipur), a leading health care institution known for its expertise in cardiovascular care. By analyzing medical records of myocardial infarction patients, this study seeks to identify drug utilization patterns, and explore associations between drug utilization and clinical outcomes. The findings of this study are expected to inform evidence-based practice, guide quality improvement initiatives, and ultimately enhance the delivery of care for Myocardial Infarction patients in tertiary care settings.

Such study has not been conducted in southern Rajasthan to the best of my knowledge, so I have planned to do this drug utilization study in pharmacology department of RNT Medical College, Udaipur.

MATERIALS AND METHODS

It is a hospital-based observational study. Study conducted at Pharmacology department in coordination with cardiology department of super speciality Block of Maharana Bhupal Government Hospital Udaipur, a tertiary care hospital in southern

Rajasthan. The study was conducted over 6 mo from fab 2025 to July 2025 after approval of the institutional ethics committee.

Study population

This study includes 100 patients admitted in Cardiology department of Super speciality Block of Maharana Bhupal Government Hospital Udaipur with confirmed diagnosis of Myocardial Infarction.

Inclusion criteria

1. All patients of both sex the age in between 25 to 70 y, who will admitted to tertiary care hospital with confirmed diagnosis of Myocardial infarction.

2. Patients or relatives willing to give informed consent.

Exclusion criteria

Pregnancy and Lactation

STATISTICAL ANALYSIS

The details of the patients (age, gender, indoor patient no., address, occupation etc.) will be noted in data collection proforma. All the data regarding the treatment of the patients, starting from admission till discharge will be recorded from IPD prescription slip. The recorded data will be used for the pattern of prescription of drugs in treatment of myocardial infarction patients all data will be collected and entered in the MS Excel and statistically analyzed by latest data analysis software.

RESULTS

A total of 100 patients diagnosed with myocardial infarction were included in the present study. The age-wise distribution revealed that the majority of patients belonged to the older age groups. Patients aged 61–70 y constituted the largest proportion (37%), followed by those in the 51–60 y age group (32%). Individuals aged 41–50 y accounted for 26% of cases, while only 5% of patients were in the 31–40 y age group, indicating an increased burden of myocardial infarction with advancing age.

Gender distribution showed a marked male predominance among myocardial infarction patients. Out of the total study population, 82% were males and 18% were females, reflecting a significantly higher incidence of myocardial infarction among male patients.

Regarding clinical outcomes, the majority of patients showed favourable recovery. A total of 93% of patients recovered following treatment, while 7% of patients expired during the hospital stay, indicating a relatively low in-hospital mortality rate in the study population.

Analysis of the route of drug administration revealed that combination routes were commonly employed. Most patients (84%) received drugs via a combination of oral, sublingual, and parenteral routes. Oral and parenteral administration alone was observed in 12% of patients, while 4% of patients received drugs through oral, sublingual, inhalational, and parenteral routes, highlighting the need for multimodal drug delivery in acute myocardial infarction management (table 1).

Table 1: Route of drug administration of myocardial infarction patients

S. No.	Route of drugs	N (%)
1	Oral, parenteral	12 (%)
2	Oral, Sublingual, parenteral	84 (%)
3	Oral, Sublingual, Inhalational, parenteral	4 (%)
4	Total	100 (100%)

Table 2: Description of the current pattern of drug utilization in myocardial infarction patients

S. No.	Cardiac group name	n	Cardiac drug name	n
1	Fibrinolytic/Thrombolytics	18	1. Inj. Tenecteplase	2
			2. Inj Streptokinase	8
			3. Inj Reteplase	8
2	Nitrates	89	1. Inj. Nitroglycerin	3
			2. Tab Isosorbide dinitrate	75
			3. Tab Isosorbide mononitrate	2
			4. Inj. Nitroglycerin+Tab Isosorbide dinitrate	5
			5. Tab Isosorbide dinitrate+Tab Isosorbide mononitrate	4
3	Anticoagulant	85	1. Inj. Enoxaparin	85
4	ACE Inhibitor	57	1. Tab. Ramipril	57
5	ARBs	34	1. Tab. Losartan	16
			2. Tab. Valsartan	7
			3. Tab. Telmisartan	11
6	Beta blocker	88	1. Metoprolol	88
7	CCB	9	1. Tab. Amlodipine	9
8	Diuretics	32	1. Inj. Furosemide	26
			2. Tab. Hydrochlorothiazide	2
			3. Inj. Furosemide+Tab. Spironolactone	3
			4. Inj. Furosemide+Tab. Spironolactone+Tab. Torsemide	1
9	Antiplatelet drugs	99		
	Single Platelet Therapy	1	1. Tab Aspirin+atorvastatin	1
	Double Platelet Therapy	73	1. Tab Aspirin+Tab. Clopidogrel	54
			2. Tab Aspirin+Tab. Ticagrelor	6
			3. Tab Aspirin+Tab. Prasugrel	12
			4. Tab Aspirin+Inj. Tirofiban	1
	Triple Platelet Therapy	19	1. Tab Aspirin+Tab. Clopidogrel+Tab. Ticagrelor	1
			2. Tab Aspirin+Tab. Clopidogrel+Tab. Prasugrel	5
			3. Tab Aspirin+Tab. Clopidogrel+Inj. Tirofiban	10
			2. Tab Aspirin+Tab. Ticagrelor+Tab. Prasugrel	1
			3. Tab Aspirin+Tab. Prasugrel+Inj. Tirofiban	2
	Quadruple Platelet Therapy	6	1. Tab Aspirin+Tab. Clopidogrel+Tab. Ticagrelor+Inj. Tirofiban	2
			2. Tab Aspirin+Tab. Clopidogrel+Tab. Prasugrel+Inj. Tirofiban	4
10	Statins	94	1. Tab. Atorvastatin	94
11	Potassium Channel opener	4	1. Tab Nicorandil	4
12	Neprilysin inhibitor	7	1. Tab. sacubitril+Tab valsartan	7
13	Centrally acting antihypertensives	10	1. Tab. Moxonidine	10

The duration of hospital stays varied among patients. Half of the study population (50%) had a hospital stay of 3–4 d. This was followed by 26% of patients who stayed for 5–6 d. Shorter hospital stays of 1–2 d were observed in 7% of patients, whereas 13% stayed for 7–8 d and 4% required prolonged hospitalization of 9–10 d.

Evaluation of cardiac drug utilization patterns demonstrated extensive use of evidence-based pharmacotherapy. Antiplatelet drugs were prescribed to 99% of patients, with dual antiplatelet therapy being the most common regimen (73%), followed by triple (19%) and quadruple (6%) antiplatelet therapy. Single antiplatelet therapy was used in only 1% of patients. Statins were prescribed in 94% of cases, with atorvastatin being the sole agent used. Beta-blockers were administered to 88% of patients, predominantly metoprolol. Anticoagulants were prescribed in 85% of patients, exclusively in the form of enoxaparin. Nitrates were used in 89% of patients, mainly as oral isosorbide dinitrate. Thrombolytic therapy was administered to 18% of patients, with streptokinase and reteplase being the most frequently used agents. ACE inhibitors were prescribed in 57% of patients, while angiotensin receptor blockers were used in 34%. Diuretics were administered to 32% of patients, and calcium channel blockers were used in 9%. Other less commonly used cardiac drugs included potassium channel openers (4%), neprilysin inhibitors (7%), and centrally acting antihypertensives (10%) (table 2).

Non-cardiac drug utilization showed universal use of proton pump inhibitors, with pantoprazole being prescribed to 100% of patients. Antiemetics were administered to 95% of patients, predominantly ondansetron. Antibiotics were prescribed to 51% of patients, mainly ceftriaxone. Antidiabetic drugs were used in 12% of patients, with dapagliflozin being the most common agent. Laxatives and corticosteroids were used in a small proportion of patients (2% and 4%, respectively) (table 3).

Table 3: Description of the current pattern of drug utilization in Myocardial Infarction patients

S. No.	Non-cardiac group name	N	Non-cardiac drug name	n
1	Proton pump inhibitor	100	1. Inj. Pantoprazole	100
2	Antiemetic drug	95	1. Inj. Ondansetron	95
3	Antibiotic	51	1. Inj. Ceftriaxone	49
			2. Inj. Meropenem	2
4	Antidiabetics	12	1. Tab. Metformin	1
			2. Tab. Metformin+Glimepiride	4
			3. Tab. Dapagliflozin	7
5	Laxatives	2	1. Syp. lactulose	2
6	Corticosteroids	4	1. Inhaler Budesonide	4

Analysis of fixed-dose combination (FDC) prescriptions revealed frequent use of cardiovascular combinations. The most commonly prescribed FDC was aspirin plus clopidogrel (44%), followed by aspirin, clopidogrel, and atorvastatin (33%). Aspirin plus atorvastatin was prescribed in 21% of patients. Other FDCs included spironolactone plus torsemide (19%), sacubitril plus valsartan (7%), and various antihypertensive combinations, each accounting for a smaller proportion of prescriptions.

DISCUSSION

The present drug utilization study was undertaken to evaluate demographic characteristics, clinical outcomes, and prescribing patterns in patients with myocardial infarction admitted to a tertiary care hospital. Drug utilization studies are essential for assessing the rational use of medicines, adherence to evidence-based guidelines, and identifying areas requiring improvement in clinical practice.

In the present study, myocardial infarction was predominantly observed among elderly patients, with the majority belonging to the 61–70 y age group, followed by 51–60 y. This finding reflects the cumulative impact of cardiovascular risk factors such as hypertension, diabetes mellitus, dyslipidaemia, and smoking with advancing age. Similar age distributions have been reported in Indian studies, including the CREATE registry and other epidemiological reports, where most patients with myocardial infarction were above 50 y of age [8, 9].

A marked male predominance was observed, with males constituting 82% of the study population. This observation is consistent with previous Indian and international studies [10, 11]. Higher exposure to lifestyle-related risk factors, occupational stress, and smoking, along with the cardio-protective effect of oestrogen in premenopausal women, may explain this gender difference.

Regarding clinical outcomes, the majority of patients recovered, with an in-hospital mortality rate of 7%. The relatively low mortality rate may be attributed to early diagnosis, prompt initiation of guideline-directed pharmacotherapy, and improved coronary care facilities. Comparable in-hospital mortality rates have been reported in Indian hospital-based studies and registries [8, 15].

Most patients received drugs through a combination of oral, sublingual, and parenteral routes, which reflects standard practice in acute myocardial infarction, where rapid therapeutic action is required initially, followed by oral maintenance therapy. Similar patterns of drug administration have been reported in earlier drug utilization studies in acute coronary syndrome [12].

The duration of hospital stay was relatively short, with nearly half of the patients discharged within 3–4 d. This may indicate early stabilization, effective pharmacological management, and absence of major complications. Comparable lengths of hospital stay have been reported in previous Indian studies [14].

Analysis of cardiac drug utilization revealed a high level of adherence to evidence-based treatment guidelines. Antiplatelet agents were prescribed to almost all patients, with dual antiplatelet therapy being the most commonly used regimen, in accordance with ACC/AHA and ESC guidelines [13, 14]. Similar high utilization of antiplatelet therapy has been reported in earlier drug utilization studies [15]. Statins were prescribed in the majority of patients, exclusively as atorvastatin, reflecting compliance with recommendations for high-intensity statin therapy for secondary prevention [13, 15].

Beta-blockers were used in most patients, predominantly metoprolol, which is known to reduce myocardial oxygen demand and improve survival after myocardial infarction. Anticoagulants were prescribed mainly in the form of enoxaparin, likely due to its predictable anticoagulant effect, favourable safety profile, and ease of administration. Similar trends have been observed in other tertiary care studies [12]. Nitrates were commonly used for symptomatic relief, consistent with standard management protocols.

Thrombolytic therapy was administered to a smaller proportion of patients. Lower utilization may be due to delayed hospital presentation, contraindications, or preference for alternative reperfusion strategies. Comparable thrombolytic usage rates have been reported in Indian studies [8, 15]. Among renin–angiotensin system inhibitors, ACE inhibitors were prescribed more frequently than angiotensin receptor blockers, reflecting their proven role in reducing post-MI mortality and preventing ventricular remodelling.

Non-cardiac drug utilization showed universal use of proton pump inhibitors, mainly for gastroprotection due to concomitant antiplatelet and anticoagulant therapy. Although similar high usage has been reported in previous studies, routine prophylactic use

warrants periodic evaluation. Antibiotics were prescribed in a substantial proportion of patients, possibly for associated infections or prophylactic purposes, a trend also observed in earlier hospital-based studies [15].

Fixed-dose combinations, particularly of aspirin, clopidogrel, and atorvastatin, were frequently prescribed. Such combinations help reduce pill burden and improve patient compliance, especially during long-term secondary prevention.

Overall, the findings indicate good adherence to evidence-based pharmacotherapy in the management of myocardial infarction, while highlighting the need for continued prescription audits to ensure rational use of non-cardiac medications.

STRENGTHS

The present study provides real-world evidence on drug utilization patterns in patients with myocardial infarction managed at a tertiary care teaching hospital, thereby reflecting routine clinical practice. Prescriptions were analysed comprehensively from admission to discharge, covering cardiac and non-cardiac drugs, routes of administration, fixed-dose combinations, and short-term clinical outcomes. The inclusion of guideline-recommended drug classes such as antiplatelets, statins, beta-blockers, and anticoagulants enabled assessment of adherence to evidence-based management protocols. Well-defined inclusion and exclusion criteria ensured a uniform study population, and the generation of region-specific data from southern Rajasthan adds to the limited Indian literature on drug utilization in myocardial infarction.

LIMITATIONS

The study has certain limitations, including its single-center design and relatively small sample size, which may limit the generalizability of the findings to other healthcare settings. The short duration of the study and observational nature precluded assessment of long-term outcomes, causality, and post-discharge medication adherence. Additionally, detailed evaluation of dose appropriateness, adverse drug reactions, drug–drug interactions, and pharmacoeconomic parameters was not performed, and the study relied on inpatient records, which may be subject to documentation bias.

CONCLUSION

This drug utilization study demonstrates a high level of adherence to evidence-based guidelines in the pharmacological management of myocardial infarction at a tertiary care hospital, with extensive use of essential cardiovascular drugs and favorable in-hospital outcomes. The prescribing pattern reflects rational and effective acute management of myocardial infarction; however, the frequent use of certain non-cardiac medications highlights the need for periodic prescription audits. Regular drug utilization reviews and continued emphasis on rational prescribing can further optimize therapy, improve patient outcomes, and strengthen quality of care in myocardial infarction management.

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AUTHORS CONTRIBUTIONS

All authors have contributed equally

CONFLICT OF INTERESTS

Declared none

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