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An Observational Study on Due and Associated Comorbidities in Patients with Myocardial Infarction in Tertiary Care Hospital

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ABSTRACT

Myocardial infarction (MI), also known as a heart attack, occurs when blood flow decreases or stops to a part of the heart, causing damage to the heart muscle. myocardial infarction (MI), is permanent damage to the heart muscle. "Myo" means muscle, "cardial" refers to the heart, and "infarction" means death of tissue due to lack of blood supply. The term " Myocardial Infraction" focuses on the myocardium (the heart muscle) and the changes that occur in it due to the sudden deprivation of circulating blood. The main change is necrosis (death) of myocardial tissue

A prospective , observational study was carried out in a 450 bedded tertiary care hospital in cardiac and general medicine department to analyse the drug utilisation evaluation and comorbid conditions in patients with myocardial infarction. The study was carried out for a period of 6 months.Not less than 100 patients diagnosed with MI was enrolled in the study. Patient's demographic details ,presenting complaints, past medical medication history ,drugs prescribed and drug interaction was collected in specially designed data entry form.Awareness about the disease was provided to the patients through Patient information leaflet. The documented data was analysed and result was shown by graphical method.

Analysis of the comorbid conditions for myocardial infarction in 100 patients showed that hypertension [20.28%], smoking [72%], alcohol consumption [70%], female gender [55%] and the age between 60-69 [39%] are the common factors for developing myocardial infarction. The major symptoms was found to be chest pain [76%] .32% of patients were having IWMI.The prescribing pattern of myocardial infarction reveals that antiplatelet drugs are the most frequently prescribed drugs , in which Aspirin [42.22%] is most commonly prescribed drug .Other drugs prescribed includes Anticoagulants ,among that Enoxaparin [57.14%], antianginal drugs ,among that Metoprolol [59.78%], antihyperlipidemics in which Atorvastatin [84.21%], hypoglycemics among that Metformin [42.85%], Antihypertensives in which Ramipril [62.71%], diuretics among that Furosemide [86.84%] , bronchodilators in which Salbutamol [50%] , proton pump inhibitors among that Pantoprazole [93.25%] and analgesics in which Tramadol [53.3%] .

The major modifiable risk factor as well as the comorbid condition in MI patients was found to be hypertension. Hence efforts should be made to modify this risk factor through education . Awareness on MI was provided to the patient through patient information leaflets. Life style modifications and adherence to medications can help the patients to keep the comorbid conditions under control and thereby helps to prevent further complications.Overall, the study demonstrated the importance of the DUE and comorbid conditions for myocardial infarction in 100 patients. The management of MI was found to be based on standard drug treatment guidelines.

KEYWORDS: Myocardial infarction , DUE , Comorbid condition of MI , MI patients, Risk Factor , Management of MI

I. INTRODUCTION

Myocardial infarction (MI), also known as a heart attack, occurs when blood flow decreases or stops to a part of the heart, causing damage to the heart muscle. myocardial infarction (MI), is permanent damage to the heart muscle. "Myo" means muscle, "cardial" refers to the heart, and "infarction" means death of tissue due to lack of blood supply. The term " Myocardial Infraction" focuses on the myocardium (the heart muscle) and the changes that occur in it due to the sudden deprivation of circulating blood. The main change is necrosis (death) of myocardial tissue.MI is

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defined by the demonstration of myocardial cell necrosis due to significant and sustained ischaemia. MI results from either coronary heart disease, which implies obstruction to blood flow due to plaques in the coronary arteries or, much less frequently, to other obstructing mechanisms (e.g. spasm of plaque-free arteries).

The three types of heart attacks are

- ST segment elevation myocardial infarction (STEMI).
- Non-ST segment elevation myocardial infarction (NSTEMI).
- Coronary spasm, or unstable angina.

SIGNS AND SYMPTOMS OF MI

- Angina :Chest pain or discomfort in the center of the chest; also described as a heaviness, tightness, pressure, aching, burning, numbness, fullness or squeezing feeling that lasts for more than a few minutes or goes away and comes back. It is sometimes mistakenly thought to be indigestion or heartburn.
- Pain or discomfort in other areas of the upper body including the arms, left shoulder, back, neck, jaw, or stomach.
- Difficulty breathing or shortness of breath.
- Sweating or "cold sweat".
- Fullness, indigestion, or choking feeling (may feel like "heartburn").
- Nausea or vomiting.
- Light-headedness, dizziness, extreme weakness or anxiety.
- Rapid or irregular heart beats.

DRUG UTILISATION EVALUATION

According to World Health Organization (WHO), drug utilization evaluation is the marketing, distribution, prescription and use of drugs in society with special prominence on the resulting medical, social and economic consequences.The purpose of DUR is to ensure drugs are used appropriately, safely and effectively to improve patient health.Pharmacist plays a major role in DUR program development, supervision and coordination.DUR helps the pharmacist to document and evaluate the benefit of pharmacy intervention in improving therapeutic outcome. DUR designed to review drug use and prescribing patterns. It also provides a proper feedback of results to physicians and develops criteria and standards which describe optimal drug use.It helps to promote the appropriate drug use for evaluation and other interventions. Interventions can be educational or operational. Educational interventions include informal and formal counseling, preparing newsletters, guidelines on drug use and other informational materials. Operational interventions can include development of drug order forms, formulary additions and deletions, implementing standard treatment guidelines, changes in hospital policies and procedures etc.

Steps in Conducting a Drug Use Evaluation

1. Identify or Determine Optimal Use.
3. Evaluate
2. Measure Actual Use.
4. Intervene
5. Evaluate the DUR Program
6. Report the DUR Findings

II. AIM AND OBJECTIVE

AIM

To assess drug utilisation pattern and comorbid conditions in patients with MI

OBJECTIVE

- To assess the prevalence of MI
- To assess drug utilisation pattern in patient with MI
- To assess the comorbid conditions
- To provide awareness on MI

III. METHODOLOGY

STUDY DESIGN:

An observational study will be conducted by collecting data from patient case records and the patient medication interview from cardiology and general medicine department of a 450 bedded tertiary care hospital.

STUDY SITE:

The study will be conducted in cardiology and general medicine department of a 450 bedded tertiary care hospital.

STUDY DURATION:

The study will be carried out for a period of 6 months.

STUDY POPULATION:

Not less than 100 patients diagnosed with MI will be enrolled in the study.

STUDY TOOL:

- Data entry form
- Patient information leaflet

STUDY CRITERIA:

INCLUSION CRITERIA :

- All inpatients diagnosed with MI
- Patients of either sex will be included
- All the patients having a past medical history of MI

EXCLUSION CRITERIA:

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- OP patients who are not willing to participate in the study
- Paediatric ,pregnancy and lactating mother

DATA COLLECTION:

- Not more than 100 patients were expected to include in the study according to study criteria.
- Patient's demographic details ,presenting complaints ,past medical medication history ,drugs prescribed and drug interaction will be collected in specially designed data entry form.
- Awareness about the disease will be provided to the patients through Patient information leaflet.

IV. DATA ANALYSIS:

The documented data will be analysed and result will be shown by graphical method.

V. RESULT

DISTRIBUTION BASED ON AGE[N=100]

AGE	NUMBER OF PATIENTS	PERCENTAGE OF PATIENTS
<40	3	3
40-49	2	2
50-59	17	17
60-69	39	39
79-79	20	20
80-89	17	17
>90	2	2

Table 1: Percentage distribution based on age

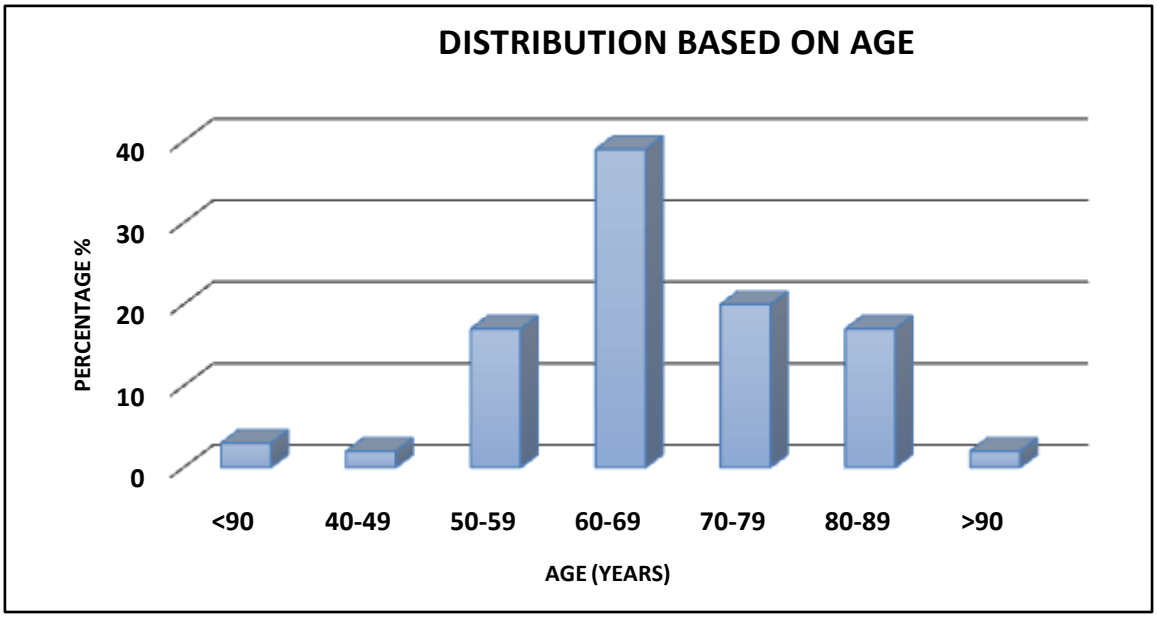

Figure 1: Percentage distribution based on age

DISTRIBUTION BASED ON GENDER [N=100]

GENDER	NUMBER OF PATIENTS	PERCENTAGE OF PATIENTS
MALE	45	45
FEMALE	55	55

Table 2: Percentage distribution based on gender

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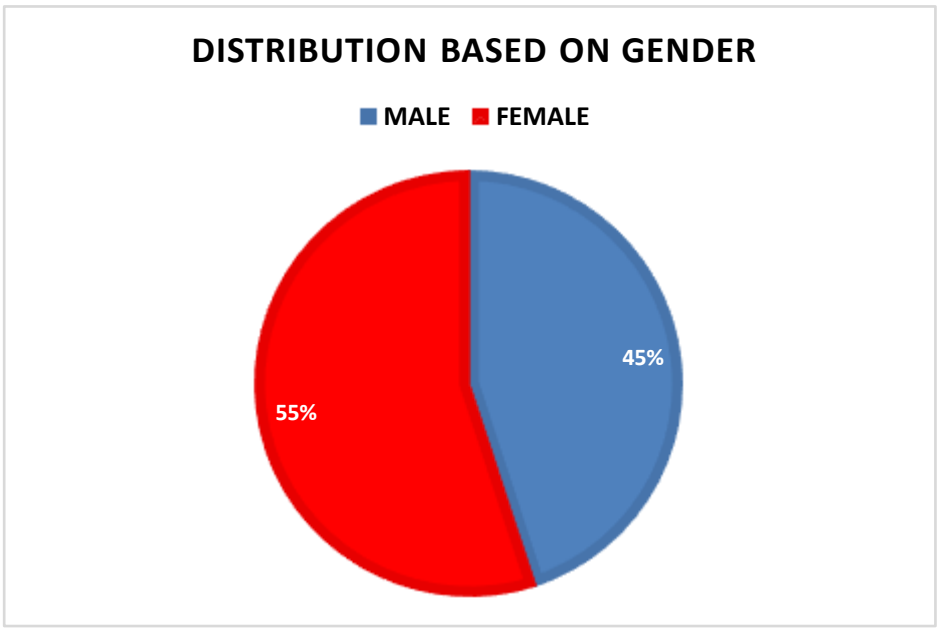

Figure 2: Percentage distribution based on gender

DISTRIBUTION BASED ON ALCOHOL CONSUMPTION [N=100]

ALCOHOLCONSUMPTION	NUMBER OFPATIENTS	PERCENTAGE OF PATIENTS
ALCOHOLIC	30	30
NON-ALCOHOLIC	70	70

Table 3: Percentage distribution based on alcohol consumption

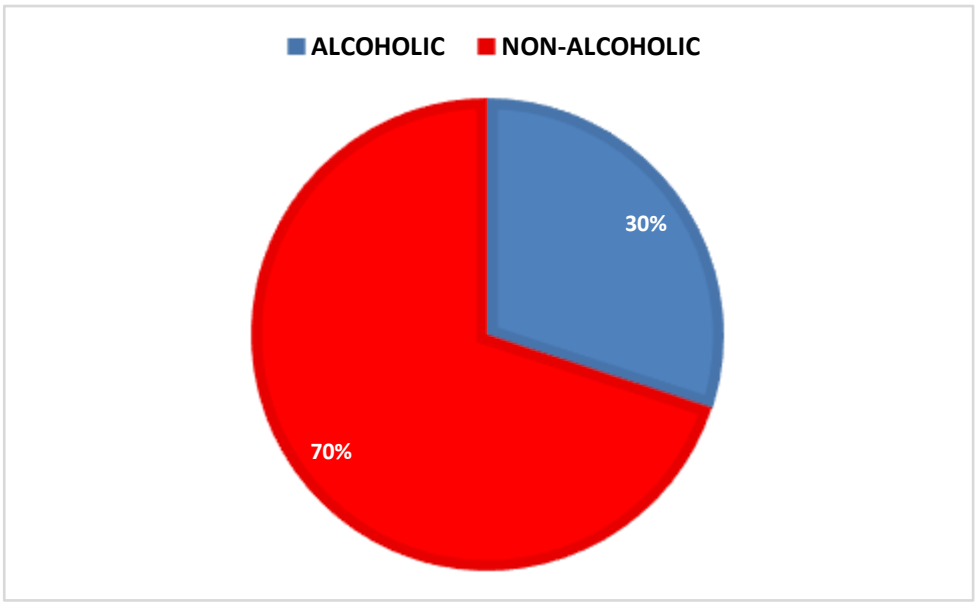

Figure 3: Percentage distribution based on alcohol consumption

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DISTRIBUTION BASED ON SMOKING [N=100]

SMOKING	NUMBER OF PATIENTS	PERCENTAGE OF PATIENTS
SMOKERS	28	28
NON- SMOKERS	72	72

Table 4: Percentage distribution based on smoking

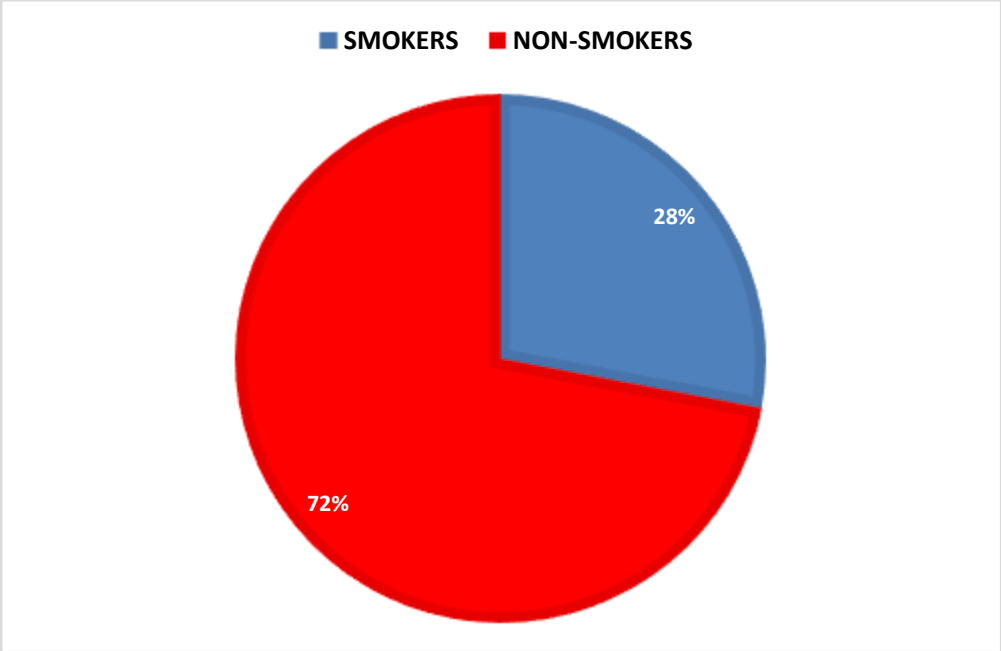

Figure 4: Percentage distribution based on smoking

DISTRIBUTION BASED ON TYPES OF MI [N=100]

TYPES	NUMBER OF PATIENTS	PERCENTAGE OF PATIENTS
STEMI	13	13
NSTEMI	29	29
IWMI	32	32
AWMI	26	26

Table 5: Percentage distribution based on types of MI

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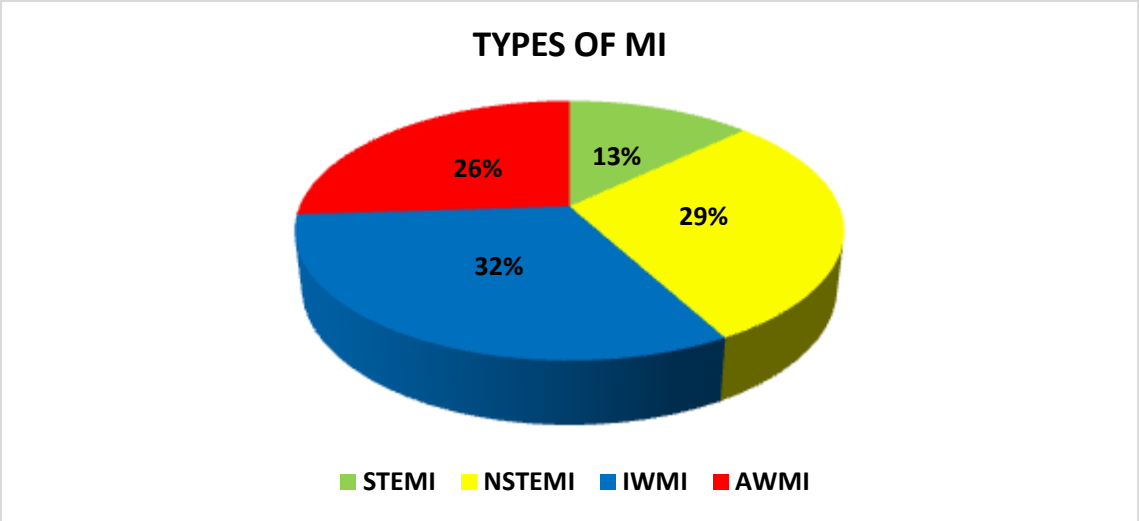

Figure 5: Percentage distribution based on types of MI

DISTRIBUTION BASED ON SYMPTOMS [n=131]

SYMPTOMS	NUMBER OF PATIENTS	PERCENTAGE OF PATIENTS
CHEST PAIN	76	58.01
SWEATING	9	6.87
BREATHLESSNESS	27	20.61
PALPITATION	1	0.76
VOMITING	4	3.05
GIDDINESS	6	4.58
ABDOMINAL PAIN	3	2.29
OTHER	5	3.81

Table 6: Percentage distribution based on symptoms

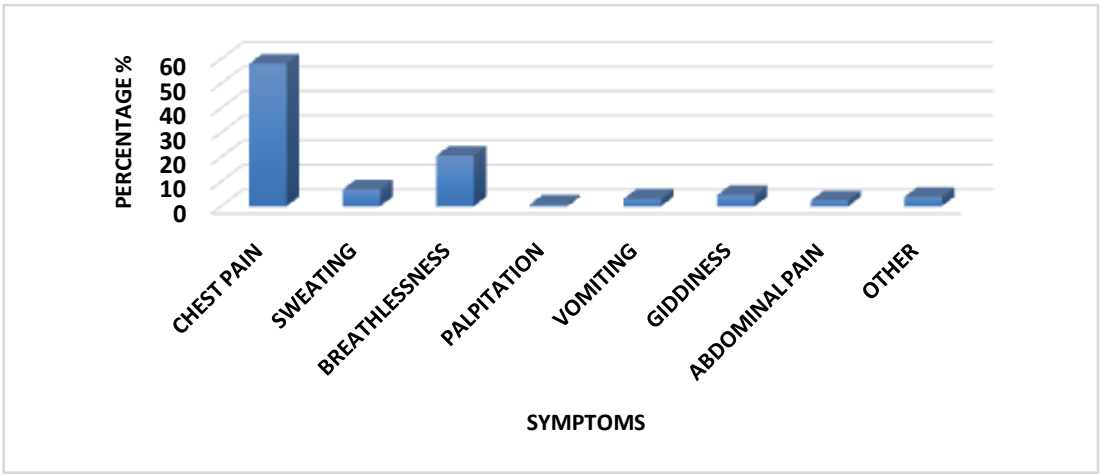

Figure 6: Percentage distribution based on symptoms

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DISTRIBUTION BASED ON CO-EXISTING ILLNESS [n=157]

ILLNESS	NUMBER OF PATIENTS	PERCENTAGE OF PATIENTS
HYPERTENSION	32	20.28
DM	17	10.82
HYPERTENSION & DM	24	15.28
OLD CAD	20	12.73
DYSLIPIDEMIA	18	11.46
HYPOTHYROIDISM	5	3.18
ASTHMA/COPD	4	2.54
OTHER	19	12.10
NONE	18	11.46

Table 7: Percentage distribution based on co-existing illness

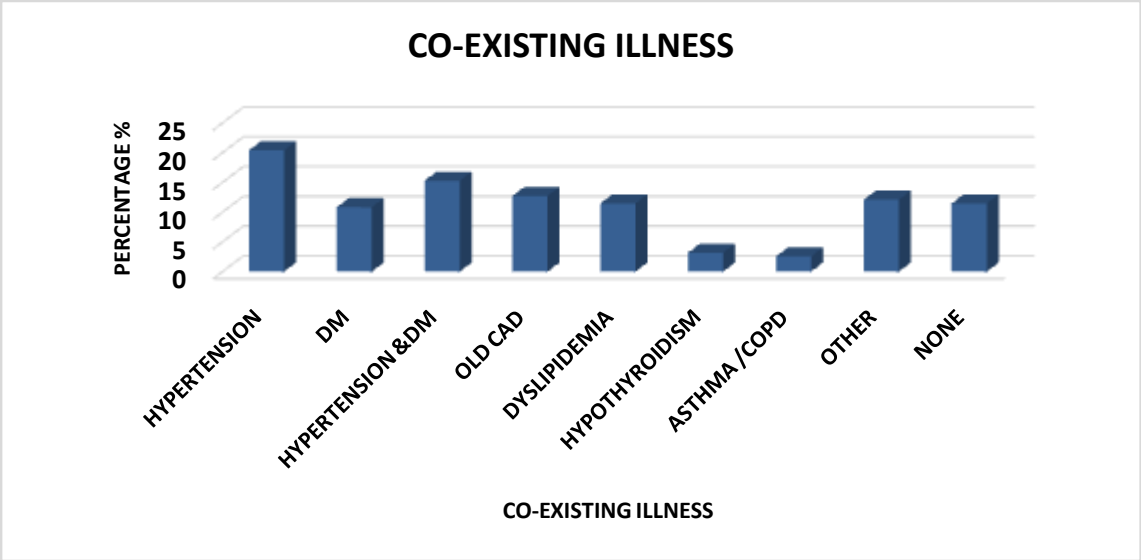

Figure 7: Percentage distribution based on co-existing illness

DISTRIBUTION BASED ON RISK FACTORS [n=153]

RISK FACTORS	NUMBER OF PATIENTS	PERCENTAGE OF PATIENTS
FAMILY HISTORY	10	6.54
SMOKING	28	18.30

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DYSLIPIDEMIA	18	11.76
DIABETES	41	26.79
HYPERTENSION	56	36.60

Table 8: Percentage distribution based on risk factors

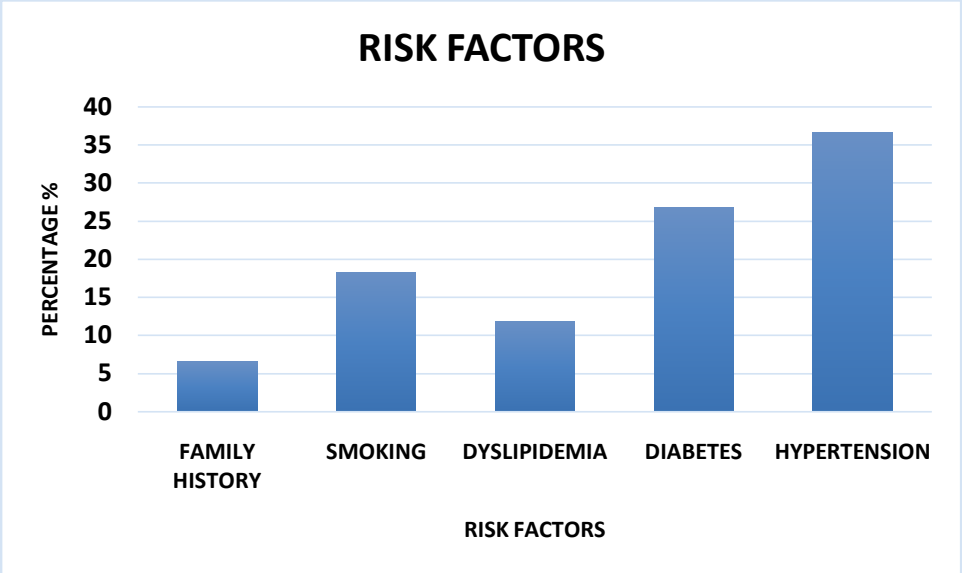

Figure 8: Percentage distribution based on risk factors

DISTRIBUTION BASED ON CLASS OF DRUGS PRESCRIBED [n=636]

CLASS	FREQUENCYOF PRESCRIBING	PERCENTAGE OF PRESCRIBING
ANTI PLATELETS	135	21.22
ANTI COAGULANTS	70	11.00
ANTI ANGINALS	92	14.46
ANTI HYPERLIPIDEMICS	76	11.94
ANTIHYPERTENSIVES	59	9.27
DIURETICS	38	5.97
HYPOGLYCEMIC DRUGS	42	6.60
BRONCHODILATORS	20	3.14
PROTON PUMP INHIBITORS	89	13.99
ANALGESICS	15	2.35

Table 9: Percentage distribution based on drug prescribed

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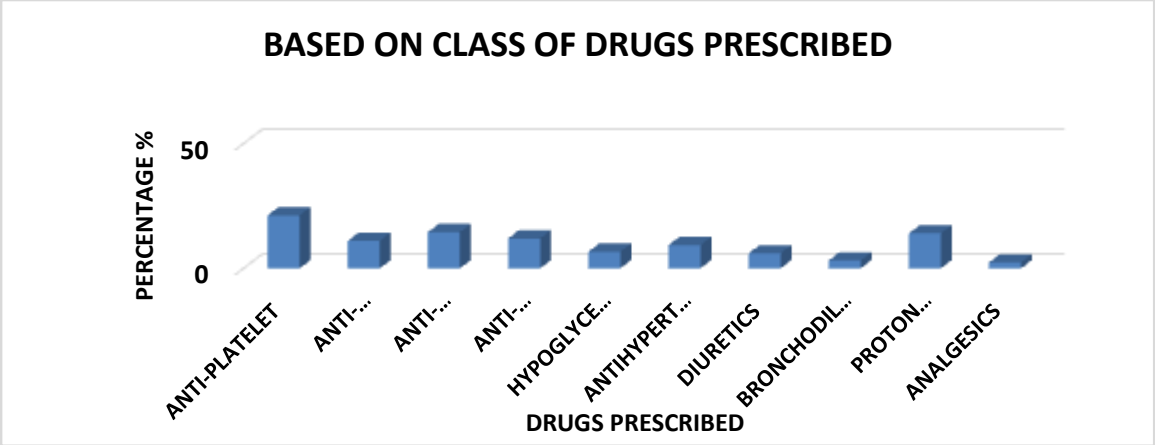

Figure 9: Percentage distribution based on drug prescribed

ANTIPLATELET DRUGS [n=135]

DRUGS	FREQUENCY OF PRESCRIBING	PERCENTAGE OF PRESCRIBING
CLOPIDOGREL	47	34.81
ASPIRIN	57	42.22
ASPIRIN + CLOPIDOGREL	24	17.77
PRASUGREL	7	5.18

Table 10: Percentage distribution based on antiplatelet drugs

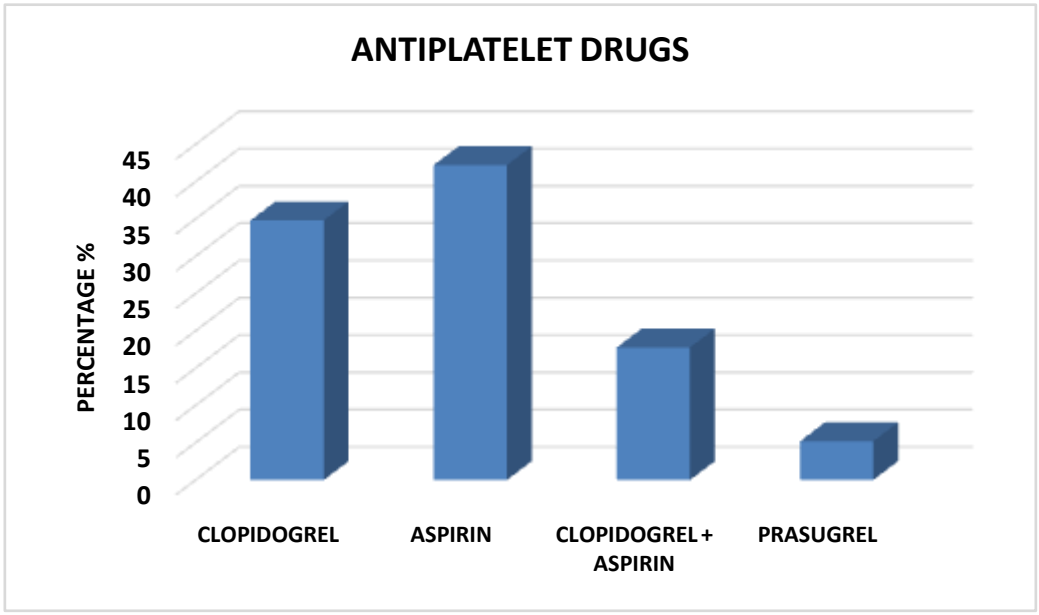

Figure 10: Percentage distribution based on antiplatelet drugs

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ANTI-COAGULANT DRUGS [n=70]

DRUGS	FREQUENCY OF PRESCRIBING	PERCENTAGE OF PRESCRIBING
HEPARIN	29	41.42
ENOXAPARIN	40	57.14
WARFARIN	1	1.42

Table 11: Percentage distribution based on anticoagulant drugs

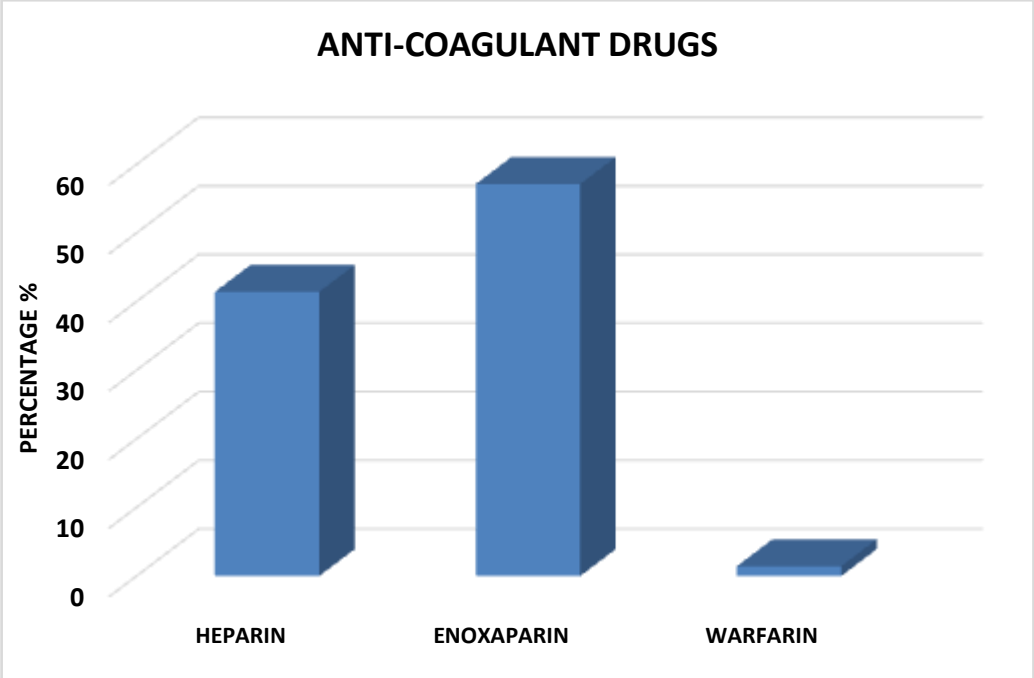

Figure 11: Percentage distribution based on anticoagulant drugs

ANTI-ANGINAL DRUGS [n=92]

DRUGS	FREQUENCY OF PRESCRIBING	PERCENTAGE OF PRESCRIBING
NITRATES	14	15.21
NICORANDIL	3	3.26
IVABRADINE	7	7.60
ATENOLOL	1	1.08

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METOPROLOL	55	59.78
BISOPROLOL	2	2.17
NEBIVOLOL	1	1.08
CARVEDILOL	9	9.78

Table 12: Percentage distribution based on antianginal drugs

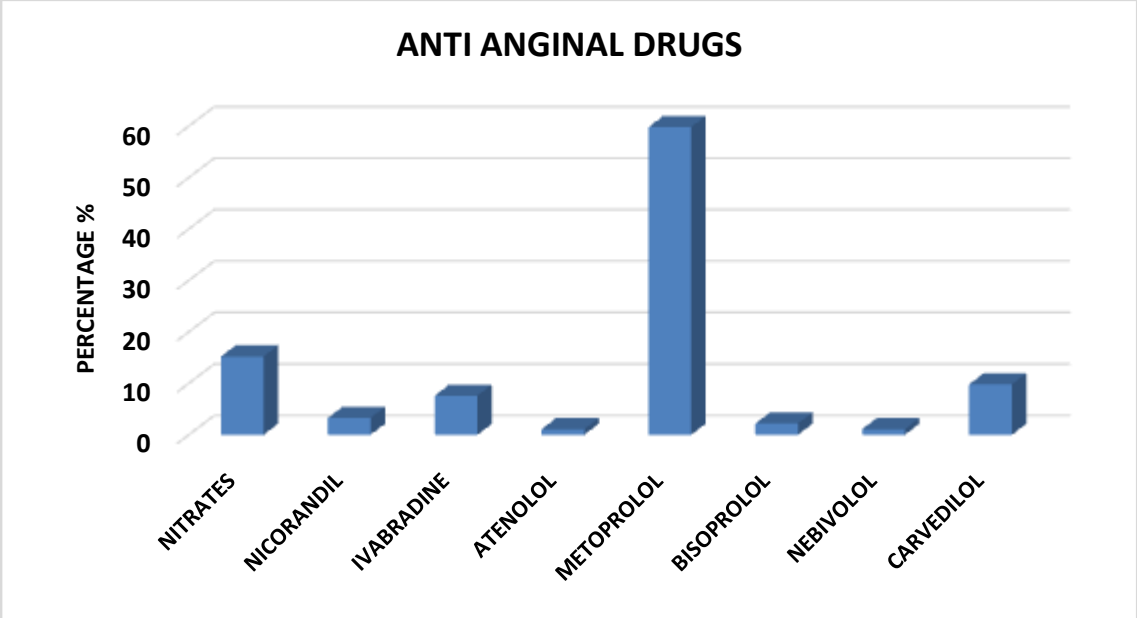

Figure12: Percentage distribution based on antianginal drugs

ANTIHYPERLIPIDEMICS [n=76]

DRUGS	**FREQUENCY OF PRESCRIBING**	**PERCENTAGE OF PRESCRIBING**
ATORVASTATIN	64	84.21
ROSUVASTATIN	12	15.78

Table 13: Percentage distribution based on antihyperlipidemics drugs

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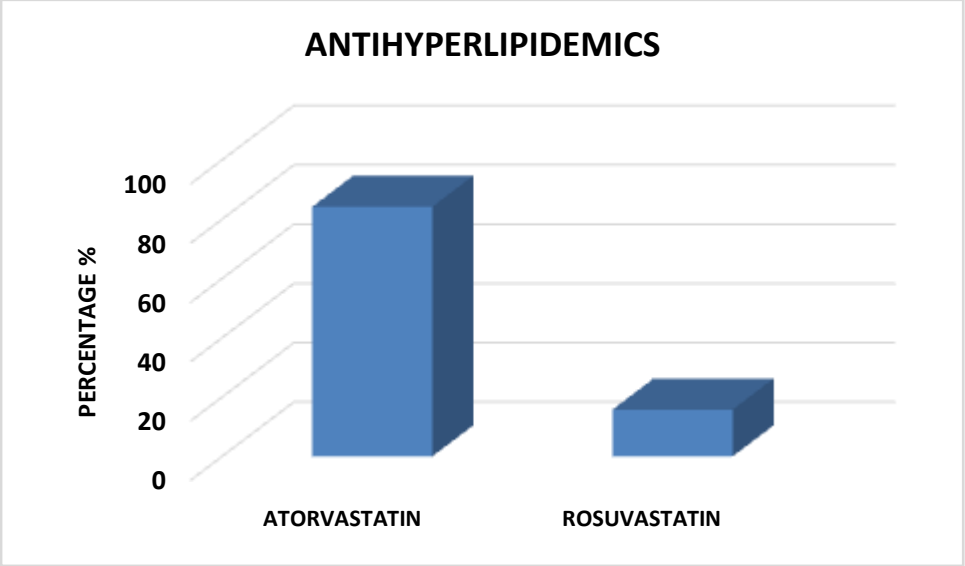

Figure 13: Percentage distribution based on antihyperlipidemic drugs

HYPOGLYCEMIC DRUGS [n=42]

DRUGS	NUMBER OF DRUGS PRESCRIBED	PERCENTAGE OF PRESCRIBING
INSULIN	10	23.80
METFORMIN	18	42.85
GLIMIPIRIDE	12	28.57
GLICLAZIDE	2	4.76

Table 14: Percentage distribution based on hypoglycemic drugs

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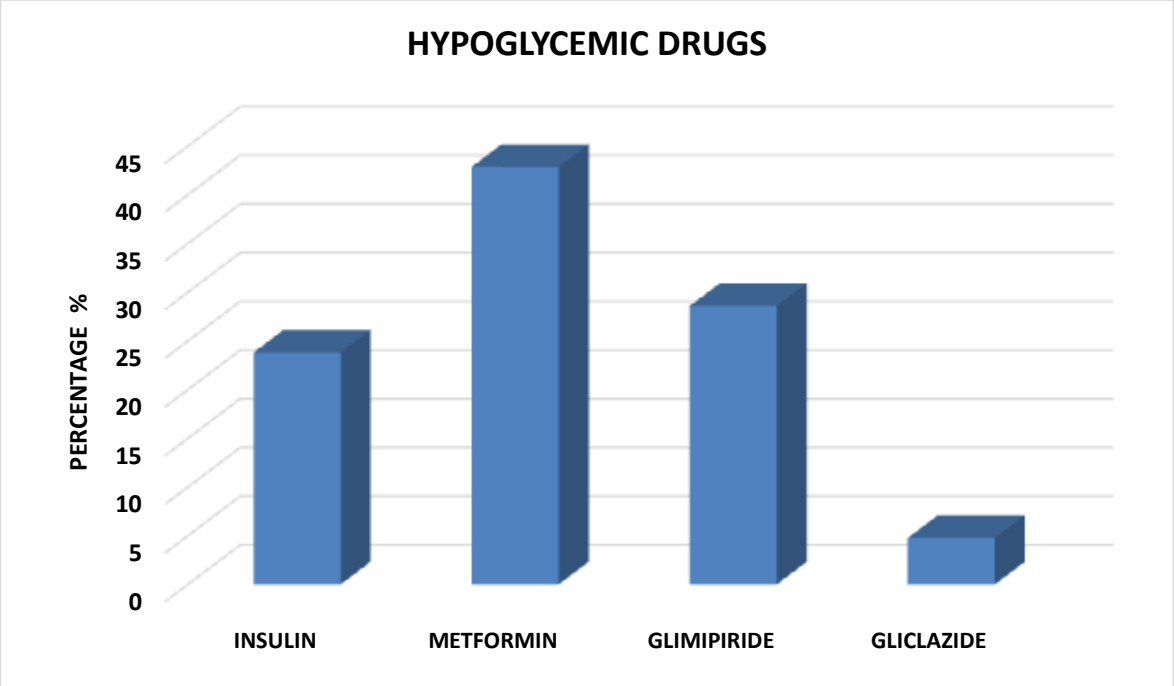

Figure 14: Percentage distribution based on hypoglycemic drugs

ANTI-HYPERTENSIVES [n=59]

DRUGS	FREQUENCY 0F PRESCRIBING	PERCENTAGE OF PRESCRIBING
ANGIOTENSIN CONVERTING ENZYME INHIBITOR		
RAMIPRIL	37	62.71
ANGIOTENSIN RECEPTOR II BLOCKER		
TELMISARTAN	9	15.25
LOSARTAN	3	5.08
CALCIUM CHANNEL BLOCKER		
DILTIAZEM	1	1.69
VERAPAMIL	2	3.38
CILNIDIPINE	7	11.86

Table 15: Percentage distribution based on antihypertensive drugs

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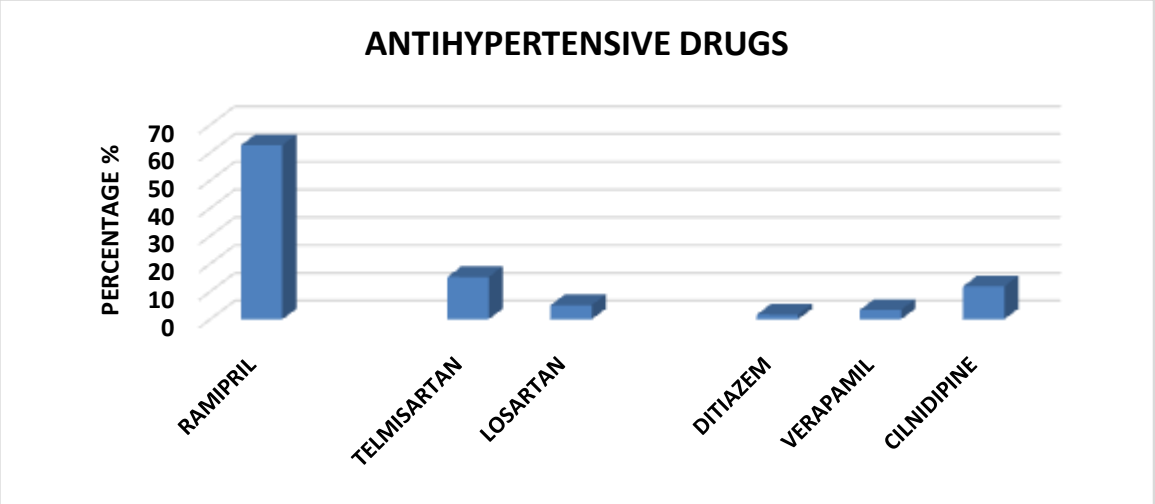

Figure 15: Percentage distribution based on antihypertensive drugs

DIURETICS [n=38]

DRUGS	FREQUENCY OF PRESCRIBING	PERCENTAGE OF PRESCRIBING
FUROSEMIDE	33	86.84
TORSEMIDE	4	10.52
SPIRONOLACTONE	1	2.63

Table 16: Percentage distribution based on diuretic drugs

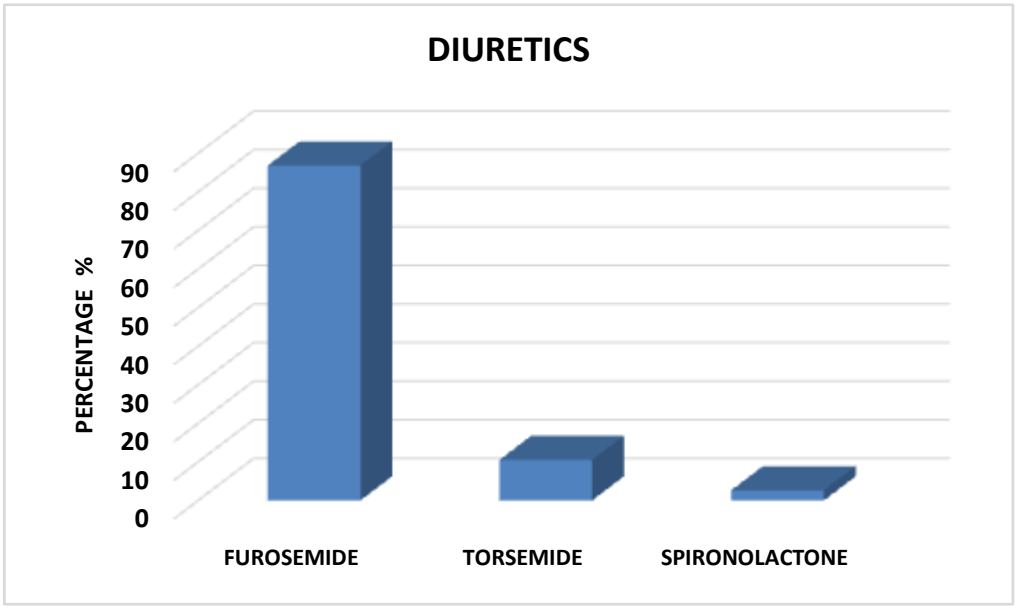

Table 16: Percentage distribution based on diuretic drugs

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BRONCHODILATOR DRUGS [n=20]

DRUGS	FREQUENCY OF PRESCRIBING	PERCENTAGE OF PRESCRIBING
THEOPHYLLINE	5	25
SALBUTAMOL	10	50
BUDESONIDE	5	25

Table 17: Percentage distribution based on bronchodilator drugs

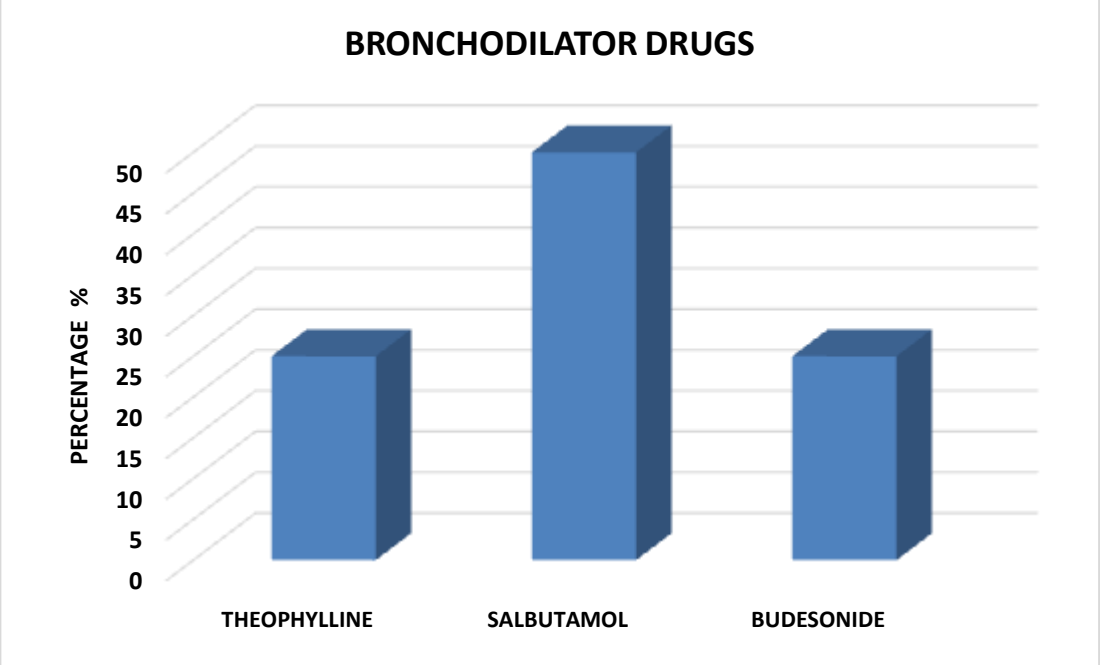

Figure 17: Percentage distribution based on bronchodilator drugs

PROTON PUMP INHIBITORS [n=89]

DRUGS	FREQUENCY OF PRESCRIBING	PERCENTAGE OF PRESCRIBING
OMEPRAZOLE	2	2.24
PANTOPRAZOLE	83	93.25
RABEPRAZOLE	3	3.37

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ESOMEPRAZOLE	1	1.12

Table 18: Percentage distribution based on proton pump inhibitors

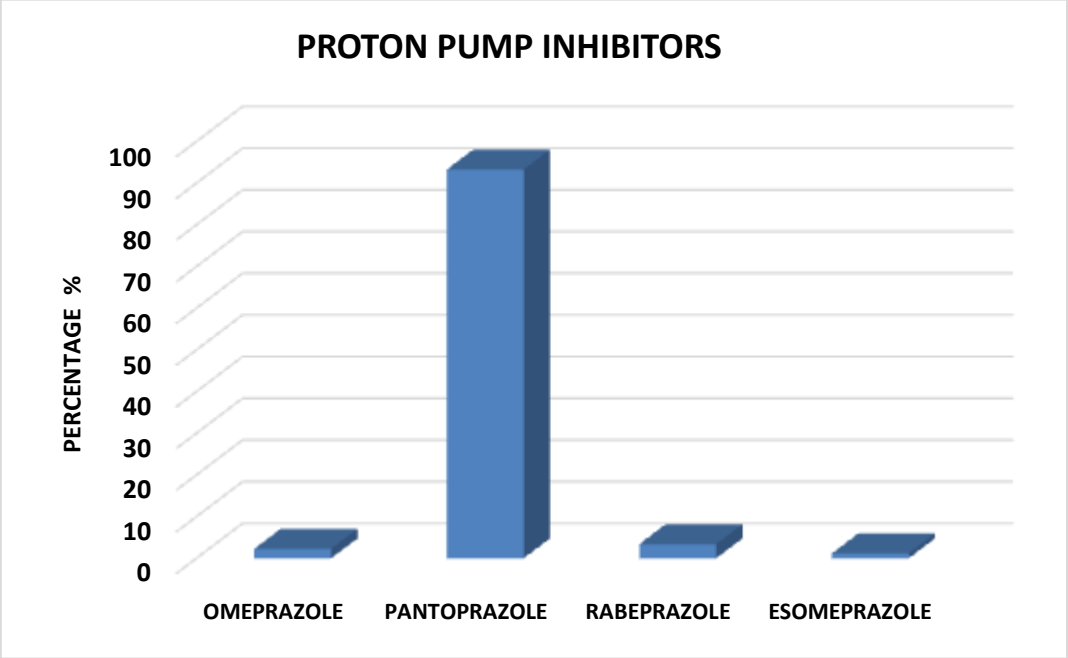

Figure 18: Percentage distribution based on proton pump inhibitors

ANALGESICS [n=15]

DRUGS	FREQUENCY OF PRESCRIBING	PERCENTAGE OF PRESCRIBING
ACETAMINOPHEN	5	33.33
TRAMADOL	8	53.33
MEFENAMIC ACID	1	6.66
MORPHINE	1	6.66

Table 19: Percentage distribution based on analgesics

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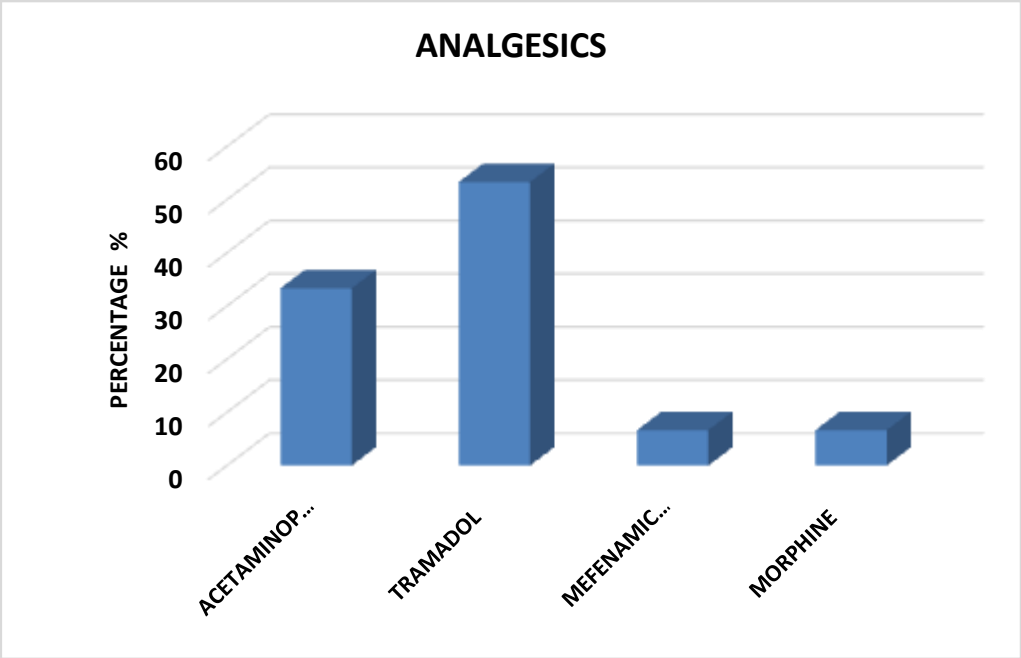

Figure 19: Percentage distribution based on analgesics

VI. DISCUSSION

A total of 100 patients were surveyed in 6 months to assess the drug utilization pattern and the associated comorbidities in patients with myocardial infarction.The patients who were satisfied within the inclusion criteria were enrolled in the study.The patient medication charts were reviewed and the details were noted in the data entry form.

DISTRIBUTION BASED ON AGE:

Patient's age was categorised into 7 groups.Among the 100 patients ,the highest percentage of MI was in the group of 60-69 years (39%) and the lowest percentage was found in 40-49 years (2%) and above 90 years (2%). As depicted in Table:1 and Figure:1 the age distribution among other groups were as follows , less than 40 years (3%) , 50-59 years (17%) ,70-79 years (20%) and 80-89 years (17%).

DISTRIBUTION BASED ON GENDER:

Among the 100 patients ,55% were females and 45% were males.It indicates that MI is slightly more prevalent in the female gender as shown in Table:2 and Figure:2 .

DISTRIBUTION BASED ON ALCOHOL CONSUMPTION:

Among the 100 patients , it was found that 70% patients were non-alcoholics and 30% were alcoholics. As depicted in Table:3 and Figure:3 , it is clear that MI is more prevalent in non-alcoholics.

DISTRIBUTION BASED ON SMOKING:

As depicted in Table:4 and Figure:4 , 28% were smokers and 72% were non-smokers.It indicates that MI is more prevalent in non-smokers.

DISTRIBUTION BASED ON TYPES OF MYOCARDIAL INFARCTION:

Among the 100 patients the common type of MI was inferior wall myocardial infarction (32%) followed by NSTEMI (29%) , AWMI (26%) and STEMI (13%) as depicted in Table:5 and Figure:5.

DISTRIBUTION BASED ON PRESENTING SYMPTOMS:

Among the 100 patients ,the most predominant symptom of MI was chest pain contributing to 58.01%.As depicted in Table:6 and Figure:6 the percentage of other symptoms presented by the MI patients were sweating (6.87%) , breathlessness (20.61%) , palpitation (0.76%) , vomiting (3.05%) , giddiness (4.58%) , abdominal pain (2.29%) and other symptoms (3.81%).

DISTRIBUTION BASED ON CO-EXISTING ILLNESS:

Among the 100 patients ,20.38% patients were having hypertension along with MI.As depicted in Table:7 and Figure:7 , the occurance of

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other diseases are hypertension and diabetes mellitus (15.28%) , old CAD (12.73%) , dyslipidaemia (11.46%) , diabetes mellitus (10.82%) , hypothyroidism (3.18%) and asthma or COPD (2.54%). 11.46% of patients were having no co-existing illness.

DISTRIBUTION BASED ON RISK FACTOR:

Among the 100 patients ,it was observed that the major risk factor was hypertension(36.60%) followed by diabetes mellitus(26.79%). As depicted in Table:8 and Figure:8 , the other risk factors are smoking(18.30%) , dyslipidemia (11.76%) and family history (6.54%).

DISTRIBUTION BASED ON CLASS OF DRUG PRESCRIBED:

During the study of 100 patients ,it was observed that the most prescribed class of drug was anti-platelets 135(21.22%). The other class of drugs prescribed were Anti- coagulants 70(11.00%), Anti-anginals 92(14.46%), Anti-hyperlipidemics 76(11.94%), Hypoglycemic drugs 40(6.60%), Anti-hypertensives 59(9.27%), Diuretics 38(5.97%), Bronchodilators 20(3.14%), Proton Pump Inhibitors 89(13.99%) and Analgesics 15(2.35%) as depicted in Table 9and Figure 9.

ANTI PLATELET DRUGS

As depicted in Table 10 and Figure 10, the prescription pattern of Anti-platelet drugs were found to be Aspirin 57(42.22%) followed by Clopidogrel 47(34.81%), Combination of Aspirin and Clopidogrel 24(17.77%) and Prasugrel 7(5.18%).

ANTI COAGULANT DRUGS

As depicted in Table 11 and Figure 11 , among the Anti-coagulant drugs the mostly prescribed drugs were found to be Enoxaparin 40(57.14%), Heparin 29(41.42%) and Warfarin 1(1.42%)

ANTI ANGINAL DRUGS

As depicted in Table 12 and Figure 12, among the Anti-anginal drugs, the mostly prescribed drugs were found to be Metoprolol 55(59.78%), followed by Nitrates 14(15.21%). The least prescribed drugs were Ivabradine 7(7.60%), Carvedilol 9(9.78%), Nicorandil 3(3.26%), Bisoprolol 2(2.17%), Nebivolol 1(1.08%) and Atenolol 1(1.08%).

ANTI HYPERLIPIDEMICS

As depicted in Table 13 and Figure 13, among the Anti-hyperlipidemics, the mostly prescribed drugs were found to be Atorvastatin 64(84.21%), followed by Rosuvastatin 12(15.78%).

HYPOGLYCEMIC DRUGS

As depicted in Table 14 and Figure 14, among the Hypoglycemic drugs, the mostly prescribed drugs were found to be Metformin 18(42.85%), followed by Glimipiride 12(28.52%), Insulin 10(23.80%) and Gliclazide 2(4.76%).

ANTI HYPERTENSIVES

As depicted in Table 15 and Figure 15, among the Anti-hypertensives, the mostly prescribed drugs were found to be Ramipril 37(62.71%) which belongs to the class of ACE inhibitors. Among the ARB drug category, the prescribed drugs were Telmisartan 9(15.25%) and Losartan 3(5.08%). Among the CCB drug category, the prescribed drugs were Cilnidipine 7(11.86%), Verapamil 2(3.38%) and Diltiazem 1(1.69%).

DIURETICS

As depicted in Table 16 and Figure 16, among the Diuretics, the mostly prescribed drugs were found to be Furosemide 33(86.84%), followed by Torsemide 4(10.52 %) and Spiranolactone 1(2.63%).

BRONCHODILATOR DRUGS

As depicted in Table 17 and Figure 17, among the Bronchodilator drugs, the mostly prescribed drugs were found to be Salbutamol 10(50%), followed by Theophylline 5(25%) and Budesonide 5(25%).

PROTON PUMP INHIBITORS

As depicted in Table 18 and Figure 18, among the PPIs, the mostly prescribed drugs were found to be Pantoprazole 83(93.25%), followed by Rabeprazole 3(3.37%), Omeprazole 2(2.24%) and Esomeprazole 1(1.12%).

ANALGESICS

As depicted in Table 19 and Figure 19, among the Analgesics, the mostly prescribed drugs were found to be Tramadol 8(53.33%), followed by Acetaminophen 5(33.33%), Mefenamic acid 1(6.66%) and Morphine 1(6.66%).

VII. CONCLUSION

A prospective , observational study was carried out in a 450 bedded tertiary care hospital in cardiac and general medicine department to analyse the drug utilisation evaluation and comorbid conditions in patients with myocardial infarction.The major modifiable risk factor as well as the comorbid condition in MI patients was found to be hypertension. Hence efforts should be made to modify this risk factor through education . Awareness on MI was provided to the patient

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through patient information leaflets. Life style modifications and adherence to medications can help the patients to keep the comorbid conditions under control and thereby helps to prevent further complications. Overall, the study demonstrated the importance of the DUE and comorbid conditions for myocardial infarction in 100 patients. The management of MI was found to be based on standard drug treatment guidelines.

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