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Research Article

Drug Use Evaluation (DUE) of Antiplatelet agents in a Tertiary Care Hospital : A Prospective Observational Study

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ABSTRACT

To evaluate the utilization pattern of antiplatelet agents in cardiovascular and cerebrovascular patients admitted to a tertiary care hospital. A prospective observational study was conducted in a tertiary care hospital involving 250 inpatients over a period of six months. Eligible patients were enrolled in the study. Data regarding demographics, diagnosis, prescribed antiplatelet therapy, comorbidities, and treatment details were collected using a structured data collection form. Drug-drug interactions (DDIs) were assessed using Lexicomp and categorized according to severity. Among 250 patients, 75.6% were male and 24.4% were female, with the majority belonging to the 51–60 years age group. Antiplatelet agents were most frequently prescribed in the Cardiology department (55.2%). Acute Coronary Syndrome (76.4%) was the most common indication, followed by stroke (21.6%). Comorbidities were present in 66.8% of patients, with hypertension being the most prevalent. Dual antiplatelet therapy (82%) was prescribed more frequently than monotherapy (18%), with aspirin plus ticagrelor being the most common combination. Drug interaction analysis revealed 270 DDIs among 200 patients, of which 67% were moderate, 24.1% minor, and 8.9% major. Dual antiplatelet therapy, particularly Aspirin plus Ticagrelor, was the predominant treatment approach. Regular drug use evaluation and monitoring of drug interactions can optimize therapeutic outcomes and improve patient safety, especially in individuals with multiple comorbidities.

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INTRODUCTION

According to WHO Drug Use Evaluation (DUE) defined as an continuous, systematic , criteria-based program of medicine evaluation that will ensure appropriate medicine use ^[1]. DUE may be applied to a drug, therapeutic class, disease state or condition, a drug use method or specific outcomes ^[2]. This terminology DUE is similar to the drug use review (DUR) and medication use review (MUR).

The primary cause of increased mortality and morbidity is cardiovascular disease (CVD) ^[3]. There are two condition that are very common: over 80% of deaths from CVD are caused by Ischemic heart disease & stroke ^[4]. Among all the CVD, the world's biggest health problem is Ischemic heart disease (IHD), which includes myocardial infarction & angina pectoris ^[3].

Deep vein thrombosis, pulmonary embolism, peripheral artery disease, coronary artery disease, and cerebrovascular disease are all included in the category of heart and blood vessel illnesses known as cardiovascular disease. Atherosclerotic alterations in the inner wall of the blood vessels supplying the heart are the primary cause of coronary artery disease. Fatty deposits accumulate, plaque forms, and the walls of vessels thicken as a result of the atherosclerotic process. The lumen progressively narrows as a result of these alterations, limiting blood flow to the myocardium ^[5].

A higher risk of myocardial infarction (MI) and stroke is linked to coronary artery disease ^[6]. Acute Coronary syndrome (ACS) is composed of ST elevation myocardial infarction, Non ST elevation myocardial infarction, or unstable angina ^[7]. Acute stroke is defined as a clinical event that ends in death from an unidentified source other than a vascular origin and creates a localised or generalised neurological disturbance that lasts

more than 24 hours ^[8]. There are two types of stroke: hemorrhagic stroke and ischaemic stroke. A transient ischaemic attack (TIA) is a kind that typically lasts 30 minutes and lasts less than 24 hours. Stroke is the second leading cause of mortality globally and a major contributor to permanent disability. The global burden of stroke is currently rising in terms of death, morbidity, and disability ^[8,9].

Platelets are crucial for both thrombus development and physiological haemostasis. The primary pathophysiological factor in the development of arterial ischaemic events, such as peripheral arterial disease, coronary artery disease, and cerebrovascular accidents, is platelet aggregation ^[10]. The most effective and preventable treatment for blood clotting is antiplatelet. One of the main risk factors for developing cardiac abnormalities is the development of blood clots. Antiplatelets, also referred to as "blood thinners," lower the risk of blood clotting. In patients with established illness or those at high risk of cardiovascular disease, antiplatelet treatment reduces the frequency of cardiovascular events by around 20–25 ^[11]. Antiplatelet drugs are primarily used to prevent and/or reverse platelet aggregation in arterial thrombosis in myocardial infarction and ischaemic stroke ^[12]. Among the available medications, aspirin and clopidogrel, either alone or in combination, have the most favourable risk-benefit profile ^[13]. These days, aspirin, clopidogrel, ticagrelor, and prasugrel are the most widely used antiplatelet medications ^[14].

MOA of Antiplatelet agents: Antiplatelet agents inhibits platelet aggregation & prevent formation of the platelet plug. Platelet plug forms in place of vascular injury to stop bleeding, & it can also cause pathological atherosclerosis & thrombosis ^[15].



1. MATERIAL AND METHODS

This prospective observational study was conducted at Tertiary care Hospital Pune, over a period of 6 months. A total of 250 patients were included in the study to evaluate the drug utilization pattern of antiplatelet agents among hospitalized patients. The study was carried out in inpatients prescribed with antiplatelet therapy.

Data collection was performed using a structured data collection form that captured detailed information on patient demographics (age, gender, social history), clinical diagnosis, laboratory investigations (such as platelet count, hemoglobin, and red blood cell count), prescribed medications (brand name, generic name, dose, route, frequency, and indication), and the occurrence of drug-drug interactions. Patients medication charts were thoroughly reviewed to analyze prescribing patterns, with a specific focus on whether monotherapy or dual antiplatelet therapy (DAPT) was prescribed.

Drug-drug interactions involving antiplatelet agents were identified and classified based on their

severity (minor, moderate, or major) using the Lexicomp® drug interaction database. All collected data were entered into a Microsoft Excel spreadsheet and subjected to descriptive statistical analysis to determine trends in utilization, comorbidity patterns, and the frequency and severity of drug interactions.

Inclusion-

- 1) Age of the patients > 18 i.e adult patients were included in the study.
- 2) Patients admitted in the hospital.
- 3) Patient Prescribed with Antiplatelet Agents.

Exclusion-

- 1) Pediatric patients (Age < 18 years)
- 2) OPD Patients
- 1) Lactating and Pregnant woman

2. RESULT

3.1 Gender wise distribution: - The study was done in 250 patients, 189 (75.6%) were male and 61 (24.4%) were female.

Table 1. Gender wise distribution

Gender	Frequency(N)	Percentage (%)
Male	189	75.6
Female	61	24.4

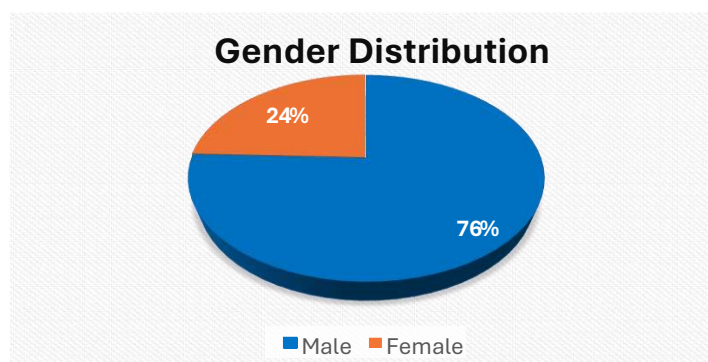


Fig.1- Gender wise Distribution



3.2 Age wise distribution: - In this study 250 Patients were involved within the age range, 21-90 years from the analyzed data. 4 (1.6%) participants were between the age group 21-30 years, 11 (4.4%) participants were found between 31-40 years, 53 (21.2%) participants were found between 41-50

years, 67 (26.8%) participants were found between 51-60 years, 62 (24.8%) participants were found between 61-70 years, 44 (17.6%) participants were found between 71-80 years, 9 (3.6%) participants were found between 81-90 years.

Table 2. Age wise distribution

Age (Years)	Frequency(N)	Percentage(%)
21-30	4	1.6
31-40	11	4.4
41-50	53	21.2
51-60	67	26.8
61-70	62	24.8
71-80	44	17.6
81-90	9	3.6

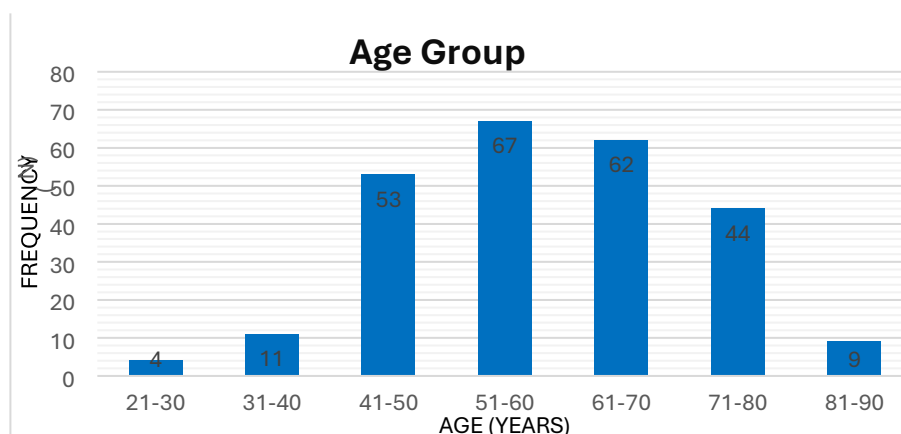


Fig. 2 – Age wise Distribution

3.3 Department wise distribution: - In this study revealed that Cardiology department 138 (55.2%) prescribed more antiplatelet agent compared to

Internal medicine 59 (23.6%), Neurology 43 (17.2%), Cardiothoracic surgery department 10 (4%).

Table 3. Department wise distribution

Department	Frequency (N)	Percentage (%)
Cardiology	138	55.2
Internal Medicine	59	23.6
Neurology	43	17.2
Cardiothoracic surgery	10	4



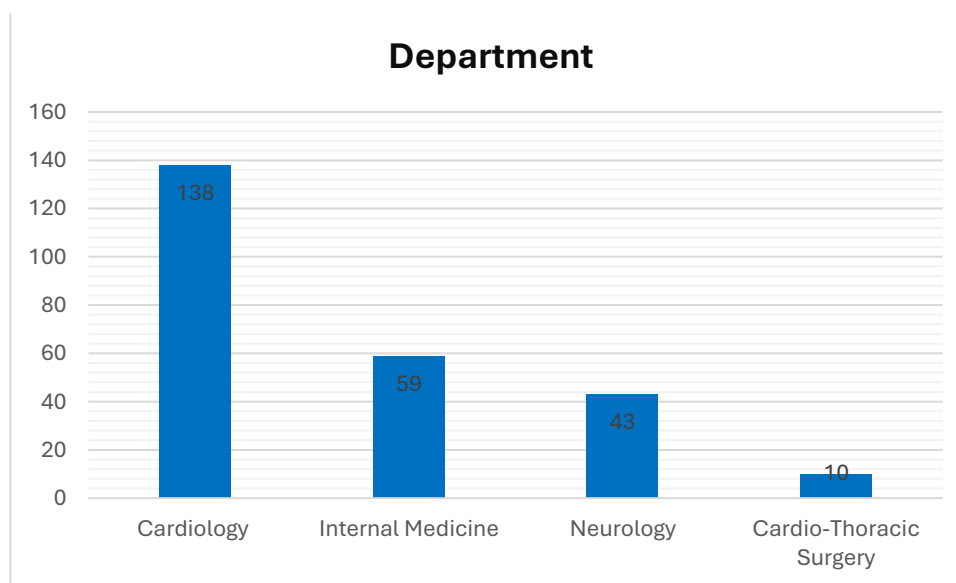


Fig.3- Department wise Distribution

3.4 Coronary Angioplasty: - In this study out of 250 patients, 196 patients had diagnosed with ACS, out of those 113 patients (57.6%) underwent Angioplasty, whereas 83 patients (42.4%) were managed without procedure.

Table 4. Coronary Angioplasty

Coronary angioplasty (ACS)	Frequency (N)	Percentage (%)
Done	113	57.6
Not Done	83	42.4
	196	

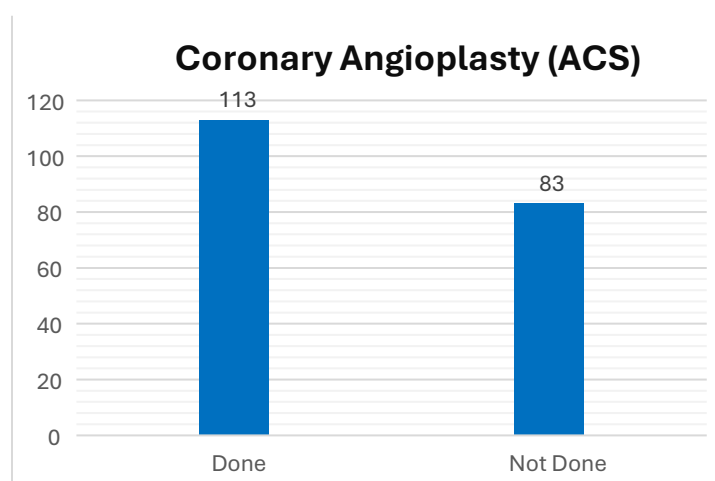


Fig. 4- Coronary Angioplasty

3.5 Diagnosis wise distribution: - Out of 250 patient prescribed with antiplatelet agent followed by stroke 54 (21.6%) & CAD 5 (2%) is found to be most prevalent diseases among

Table 5. Diagnosis wise Distribution

Diagnosis	Frequency (N)	Percentage (%)
ACS	191	76.4
Stroke	54	21.6
CAD	5	2

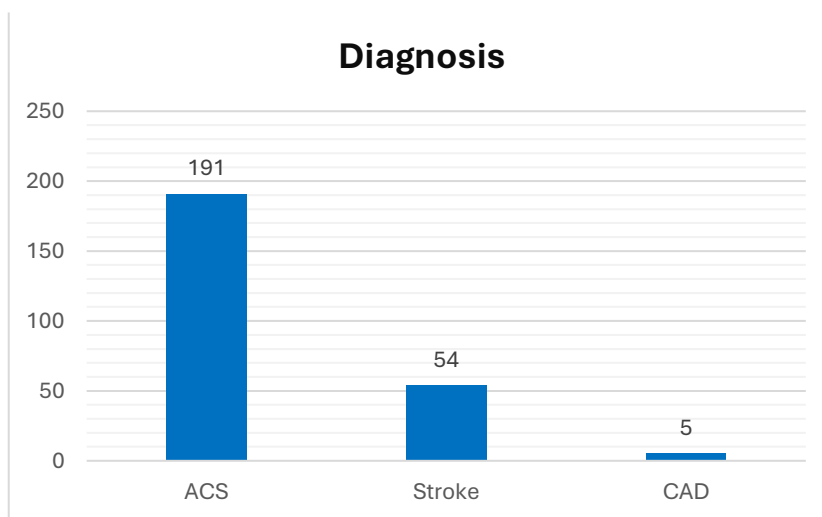


Fig.5- Diagnosis wise Distribution

3.6 Comorbidities wise distribution: - In this study participants data was distributed based on 167 (66.8%) comorbid condition and 83 (33.2%) without comorbid condition. A risk of complications particularly for patient with multiple comorbidities such as HTN, DM, IHD.

Table 6. Comorbidities wise distribution

Comorbidities	Frequency (N)	Percentage (%)
HTN	53	21.2
HTN, DM	38	15.2
DM	21	8.4
HTN, DM, IHD	16	6.40
HTN, IHD	10	4
DM, IHD	6	2.4

IHD	8	3.2
Others	15	6
Nil	83	33.2

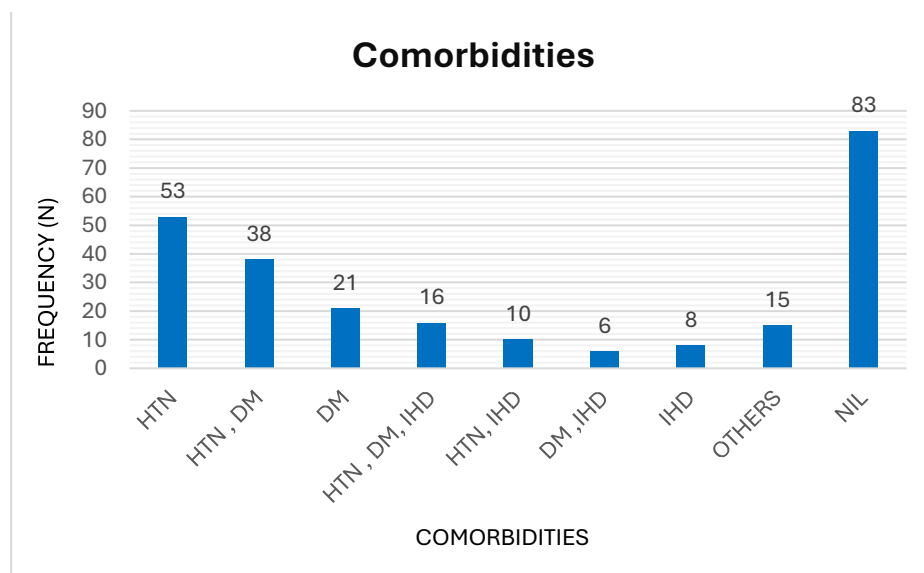


Fig. 6- Comorbidities

3.7 Utilization pattern of Antiplatelet Agents: - as compared to patients participants who were on
 In this study, out of 250 patients, the frequency of monotherapy 45 (18%)
 dual antiplatelet regimen was highest 205 (82%),

Table 7. Utilization pattern of Antiplatelet Agents

Utilization pattern	Frequency (N)	Percentage (%)
Monotherapy	45	18
Dual therapy	205	82

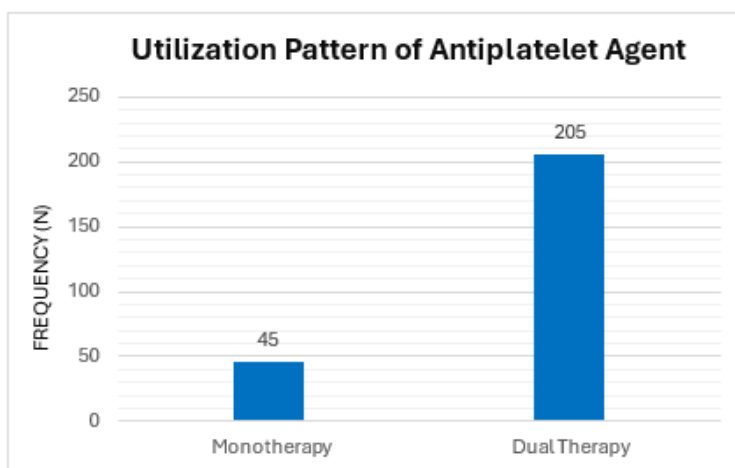


Fig. 7- Utilization Pattern of Antiplatelet Agents

3.7.1 Monotherapy: - The study revealed that Clopidogrel has frequency 7 (15.5%) and aspirin frequency was found to be 35 (77.7%), ticagrelor has frequency 3 (6.6%), which is most used antiplatelet agent followed by

Table 7.1. Monotherapy

Monotherapy	Frequency (N)	Percentage (%)
Aspirin	35	77.7
Clopidogrel	7	15.5
Ticagrelor	3	6.6

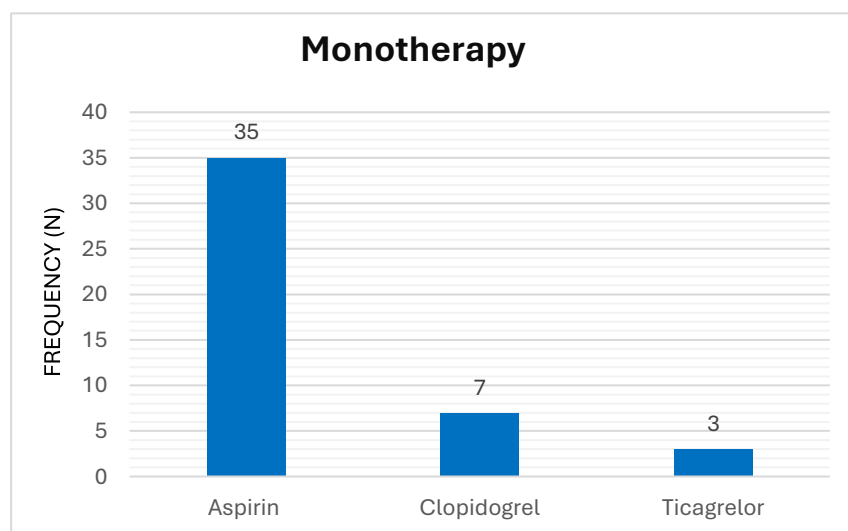


Fig.7.1 - Monotherapy

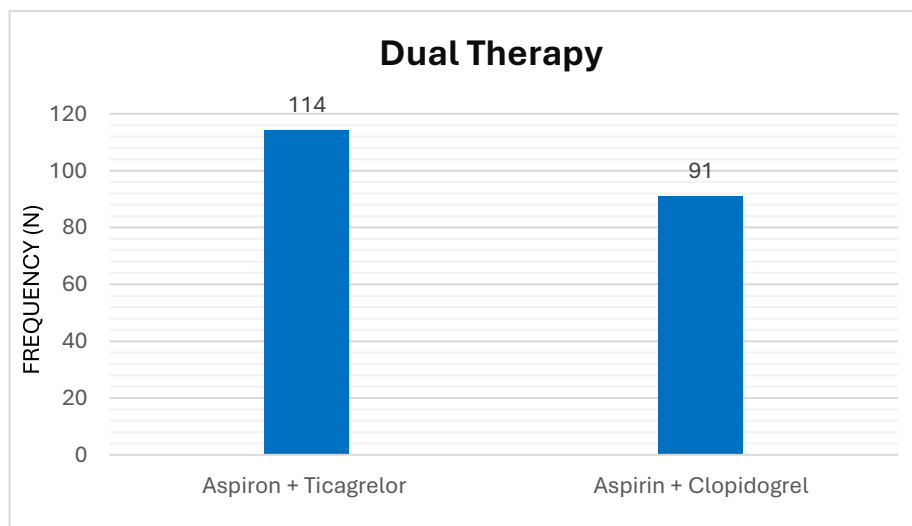
3.7.2 Dual therapy (DAPT):- The study revealed that Aspirin+ Ticagrelor combination is frequently prescribed in 114 (55.6%) patients with ACS because clinical trials have shown that this

combination can more rapidly and potentially inhibit platelet compared to older regimen such as Aspirin + Clopidogrel has frequency 91 (44.3%)



Table 7.2. Dual therapy (DAPT)

Dual therapy	Frequency (N)	Percentage (%)
Aspirin + Ticagrelor	114	55.6
Aspirin + Clopidogrel	91	44.3

**Fig.7.2 - Dual Therapy**

3.8 Drug Interactions: - In a study involving 250 patients, the occurrence of drug-drug Interactions (DDIs) was analyzed & categorized based on the severity of Interaction- Major, Moderate & Minor. 200 patients had at least one drug-drug Interaction. 50 patients had no interactions detected. Among 200 patients, the total 270 interaction were found altogether, which include one, two, & three interactions. Severity analysis showed that

moderate interaction predominated 181 event (67%), whereas minor interaction accounted for 65 events (24.1%) & major interaction for only 24 events (8.9%). Frequency at the patient level, most individuals had only a single interaction. 136 patients recorded exactly one event; 58 patient recorded two events & 6 patients progressed to three successive interaction events.

Table 8. Drug Interactions

Severity	Frequency (N)	Percentage (%)
Major	24	8.9
Moderate	181	67
Minor	65	24.1

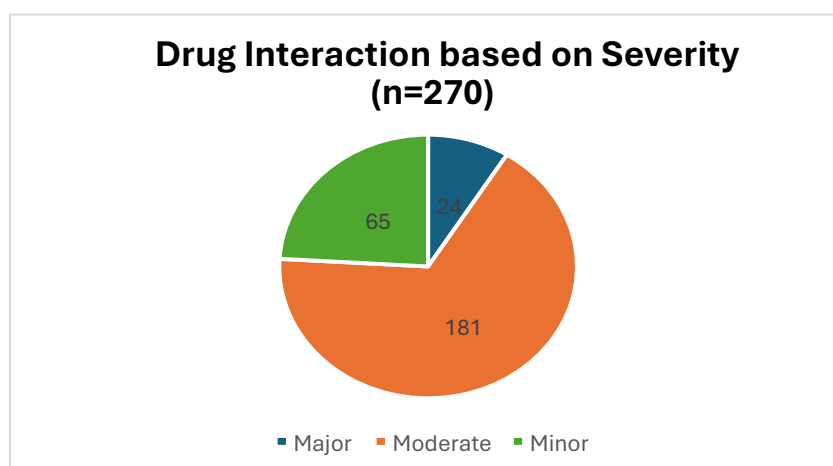


Fig.8- Drug Interaction based on Severity

3. DISCUSSION

1. Cardiovascular and cerebrovascular diseases remain major contributors to morbidity and mortality worldwide, making the appropriate use of antiplatelet therapy essential for preventing thrombotic complications. The present prospective observational study evaluated the utilization pattern of antiplatelet agents among 250 hospitalized patients in a tertiary care hospital. In the present study, male patients (75.6%) received antiplatelet therapy more frequently than females (24.4%), with the highest proportion of patients belonging to the 51–60 years age group (26.8%). This finding may be attributed to the higher prevalence of cardiovascular risk factors, including hypertension, diabetes mellitus, and age-related vascular changes in this population.

1. The Cardiology department accounted for the highest proportion of prescriptions (55.2%), followed by Internal Medicine (23.6%), Neurology (17.2%), and Cardiothoracic Surgery (4%). Acute Coronary Syndrome was the most common indication (76.4%), followed by stroke (21.6%) and coronary artery disease (2%), reflecting current guideline-based recommendations for early antiplatelet therapy in high-risk cardiovascular conditions.

Comorbidities were observed in 66.8% of patients, with hypertension being the most common associated condition.

1. Dual antiplatelet therapy was prescribed in 82% of patients, whereas monotherapy was used in 18%. Aspirin plus Ticagrelor (55.6%) was the most frequently prescribed dual regimen, followed by Aspirin plus Clopidogrel (44.3%). Among monotherapy, Aspirin was the most commonly prescribed agent (77.7%). These findings are in agreement with current clinical guidelines, which recommend dual antiplatelet therapy for patients with acute coronary syndrome and following percutaneous coronary intervention to reduce recurrent ischemic events.

1. A total of 270 drug–drug interactions were identified among 200 patients. Moderate interactions constituted the majority (67%), followed by minor (24.1%) and major interactions (8.9%). Overall, the prescribing pattern observed in the present study was largely consistent with current evidence-based recommendations, highlighting the importance of rational antiplatelet use, adherence to treatment guidelines, and continuous monitoring for potential drug–drug interactions to optimize therapeutic outcomes.



1. CONCLUSION

The present study focused on the Drug Use Evaluation (DUE) of antiplatelet agents among 250 inpatients admitted to Hospital. Aspirin and Ticagrelor were the most commonly prescribed antiplatelet agents, with dual antiplatelet therapy (DAPT) being prescribed more frequently than monotherapy. DAPT, particularly the combination of Aspirin and Ticagrelor, was found to be superior to antiplatelet monotherapy. Aspirin remained the cornerstone of antiplatelet therapy because of its established role in the secondary prevention of coronary artery disease (CAD). Acute coronary syndrome was more commonly observed in male patients, while patients in the 51–60 years age group represented the largest proportion of the study population. Percutaneous coronary intervention (PCI), especially angioplasty, was frequently performed as the preferred revascularization strategy because of its minimally invasive nature and favorable clinical outcomes. The majority of probable drug–drug interactions identified were of mild to moderate severity, and no major drug interactions were observed during the study. The prescribing pattern of antiplatelet agents was found to be largely consistent with current evidence-based recommendations, supporting the rational use of DAPT in appropriate high-risk cardiovascular patients.

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