



AN OBSERVATIONAL STUDY ON EVALUATION OF ANTI-PLATELET AGENTS AND ITS UTILIZATION IN CARDIOVASCULAR DISEASE PATIENTS IN TERTIARY CARE HOSPITAL

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ABSTRACT

Background: Cardiovascular diseases are the leading cause of death globally. Cardiovascular disease (CVD) is a term for a number of disorders affecting the heart and blood vessels, which includes coronary heart disease (CHD), myocardial infarction, cerebrovascular disease, peripheral arterial disease, rheumatic and congenital heart diseases, and venous thromboembolism. **Objective:** To understand the anti-platelet drug utilization pattern among cardiovascular disease patients. To study the prescribing pattern of anti-platelet drugs in CVD patients with co-morbidities in patient more than 30 years of age. **Methodology:** A prospective observational and hospital-based study was conducted on 300 patients admitted in Cardiology and general medicine ward for a period of 6 months. Data regarding patient's demographic details, the prescription of the patient who was treated during the course of the study are audited prospectively using a specifically predesigned preform. The data collection form was assessed and thoroughly analyzed and appropriate analysis was done by using the written informed consent form was obtained from patients. **Results:** A total 300 number of patients were studied according to inclusion criteria. Among the study population female patients (57.67%) are highly prescribed with antiplatelet drugs than male patients (42.33%). According to age distribution the patients with the age group of 60-69 (30.67%) are highly prescribed with antiplatelet drugs. The patients diagnosed with myocardial infarction (38.67%) are highly prescribed with antiplatelet drugs. Aspirin and Clopidogrel are the mostly prescribed antiplatelet drugs which are prescribed in combination 93.33%. Along with aspirin and Clopidogrel, Ticagrel also prescribed in some patients. Among all medication the major class of drugs prescribed were Antiplatelet agents 568(31.41%), Lipid lowering agents 282(15.59%) and Beta blocker 180(9.98%), whereas least prescribed were Angiotensin receptor blocker 14(0.77%), Vasodilators 5(0.27%) and Inotropic agents 3(0.16%). **Conclusion:** The present study concludes that Dual Antiplatelet Therapy [Aspirin + Clopidogrel] was found to be superior to monotherapy. Patient in the group 51-60 were most affected with cardiovascular disease, and with female predominance over male. Newer antiplatelet agents such as a Ticagrel can be utilized.

KEYWORDS: Anti-Platelet drugs, Aspirin, Clopidogrel, Cardiovascular disease, Ticagrel.

INTRODUCTION

Cardiovascular diseases (CVDs) continue to be a leading cause of morbidity and mortality worldwide. Among all regions, China and India bear the highest burden of CVDs. These conditions encompass coronary heart disease, hypertension, heart failure, vascular calcification, and others. The Framingham Heart Study, initiated in 1948 and spanning three generations over the past 70 years, has extensively investigated cardiovascular diseases and their strong associations with biochemical, environmental, behavioral, and genetic factors. Early detection and diagnosis play a crucial role in improving treatment outcomes and prognosis for CVDs. Ischemic heart disease (IHD), including myocardial infarction and

angina pectoris, represents a major global health concern. Platelets play a significant role in arterial thrombosis, which is the final event leading to complications in cardiovascular and peripheral vascular diseases. Antiplatelet therapy has been shown to enhance patient survival in these conditions. Aspirin and clopidogrel, either alone or in combination, are among the most extensively studied antiplatelet agents, with well-established risk-benefit profiles. The primary objective of antiplatelet therapy is to prevent or reverse platelet aggregation in arterial thrombosis, particularly in cases of ischemic stroke and myocardial infarction. Dual antiplatelet therapy (DAPT) has become a standard practice for managing acute cardiovascular events and

for secondary prevention. This approach has been shown to reduce the incidence of cardiovascular events by approximately 20–25% in patients with established CVD or those at high risk. Managing CVDs often requires a combination of essential medications, which can lead to potential drug interactions. However, these medications are indispensable and cannot be omitted. Such interactions can be addressed through dose adjustments or modifications in the timing of administration. Additionally, routine monitoring of relevant laboratory parameters is necessary to detect and manage adverse drug reactions effectively. The present study was conducted to evaluate the utilization of antiplatelet therapy in the management of cardiovascular diseases.

Objectives

- To understand the anti-platelet drug utilization pattern among cardiovascular disease patients.
- To study the prescribing pattern of anti-platelet drugs in CVD patients with co-morbidities above age of 30 years.

Methodology

Study site: The study was conducted in the inpatient ward of Cardiology and General Medicine, Department of Karnataka Institute of Medical Sciences, (KIMS) Hospital, Hubballi.

Study design: A prospective observational study.

Sample size: A total number of 300 patients from the Cardiology and General Medicine department of KIMS Hospital.

Study period: The study was conducted for about 6 months duration.

Ethical approval: Ethical committee clearance has been obtained by the Institutional Ethical Committee.

Study criteria

Inclusion criteria

Patients diagnosed with cardiovascular disease, including those with comorbid conditions such as hypertension, diabetes mellitus, and other related disorders, will be included. Individuals who have undergone cardiac surgery and are receiving a standard care treatment regimen will also be considered. This study will enroll patients of either sex who voluntarily consent to participate.

Exclusion criteria

Patients with psychiatric or neurological disorders, those receiving treatment in the outpatient department, or individuals unwilling to participate in the study will be excluded.

Sources of data

Sources of data include patient case records, structured patient interviews, and comprehensive laboratory reports

Study procedure

A structured data collection form was developed to systematically gather patient information. The

prescriptions of patients receiving treatment during the study period were prospectively audited using a specially designed form to capture essential data. Key parameters, including demographic details, disease characteristics, comprehensive clinical history, and treatment regimens, were obtained from patient records and case files. The evaluation of antiplatelet therapy focused on its effectiveness, prescribing patterns, and patient-specific suitability. Additionally, the study assessed the safety profile, medication adherence, and bleeding risk associated with antiplatelet therapy. Data analysis was conducted using SPSS software to ensure a comprehensive evaluation of therapy outcomes.

RESULTS

Among the 300 participants, cardiovascular disease (CVD) was more prevalent among female patients, accounting for 173 cases (57.67%), compared to 127 cases (42.33%) in males. The majority of patients were within the 60–69 age group (92 individuals, 30.67%), followed by those aged 50–59 years (85 individuals, 28.33%) and those aged 70 years and above (54 individuals, 18%). The lowest representation was observed in the 30–39 age group, with only 19 patients (6.33%).

Regarding medication usage, 28 patients (9.33%) were prescribed 3–4 drugs, while 142 patients (47.33%) received 5–6 drugs. Additionally, 105 patients (35%) were on 7–8 medications, and 25 patients (8.33%) were prescribed 9–10 drugs. A statistically significant difference was noted between males and females in terms of medication usage, with males generally receiving fewer drugs than females ($p = 0.039$). Furthermore, a significant trend was observed, indicating that as age increases, the number of prescribed medications also rises.

Table 1 presents the distribution of cardiovascular conditions among the study population. Hypertension was the most prevalent, affecting 119 patients (39.67%), followed closely by ischemic heart disease in 118 patients (39.33%). ST-elevation myocardial infarction was observed in 116 individuals (38.67%), while acute coronary syndrome was identified in 97 patients (32.33%). Angina pectoris was noted in 29 cases (9.67%), and heart block in 20 cases (6.67%). Additionally, congestive cardiac failure was diagnosed in 15 patients (5%), whereas both dilated cardiomyopathy and coronary artery disease were reported in 11 individuals (3.67%) each. Rheumatic heart disease was found in six cases (2%), whereas arrhythmia was not documented in the study.

Table 1: Distribution of patient based on cardiovascular diseases.

Cardiovascular disease	Number of patients	Percentage
ANGINA PECTORIS	29	9.67
CCF	15	5.00
HTN	119	39.67
DCM	11	3.67
MI	116	38.67
IHD	118	39.33
RHD	6	2.00
ARRYTHMIA	0	0.00
HEART BLOCK	20	6.67
CAD	11	3.67
ACS	97	32.33

Table 2 provides an overview of the pharmacological management within the study cohort of 300 individuals, where a total of 1,808 medications were prescribed. Among the cardiovascular drugs, antiplatelet agents were the most frequently administered, accounting for 568 prescriptions (31.41%), followed by lipid-lowering

agents at 282 prescriptions (15.59%) and beta-blockers at 180 prescriptions (9.98%). Conversely, the least commonly prescribed medications included angiotensin receptor blockers (14 prescriptions, 0.77%), vasodilators (5 prescriptions, 0.27%), and inotropic agents (3 prescriptions, 0.16%).

Table 2: Class of drugs used in cardiovascular diseases.

Class of drugs	No of drugs (n=1808)	Percentage (%)
Lipid lowering agent	282	15.59
Antiplatelet agent	568	31.41
Anticoagulant agents	66	3.65
Antianginal agents	20	1.10
ACE	45	2.48
ARB	14	0.77
Antithrombotic	16	0.88
Beta blocker	180	9.95
CCB	35	1.93
Inotropic	3	0.16
Diuretic	117	6.47
DM	127	7.02
Antiulcer	77	4.25
Vasodilator	5	0.27
Others	253	13.99

In a study involving 300 patients, cardiovascular medications were prescribed in varying combinations. Specifically, 3-4 cardiovascular drugs were administered to 232 patients (77.33%), while 5-6 drugs were prescribed to 57 patients (19%). A smaller proportion, 11 patients (3.67%), received only 1-2 medications.

Regarding the route of drug administration, the study revealed that the oral route was the most frequently utilized, accounting for 1450 instances (75.67%). This was followed by the intravenous route, with 368 administrations (19.20%), while the subcutaneous route was the least common, with 98 instances (5.11%).

As depicted in Figure 1, a total of 581 antiplatelet medications were prescribed across 300 prescriptions. Among these, aspirin was the most frequently prescribed, administered to 299 patients (99.67%). Clopidogrel followed, being prescribed to 267 patients (46.29%), while ticagrelor was the least prescribed, given to only

13 patients (4.33%) out of the 267 who received clopidogrel. Additionally, the gender distribution of the sample indicated that 55.06% of the patients were female, while 44.93% were male. A statistically significant difference was observed in the prescription of clopidogrel between genders, whereas no significant difference was found for aspirin and ticagrelor prescriptions.

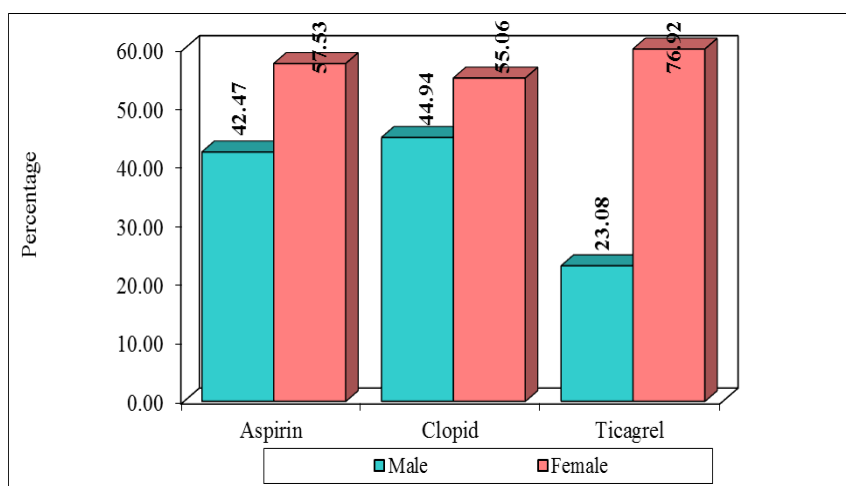


Figure 1: Prescription pattern of antiplatelet medication.

Among the study population, a combination of Aspirin, Clopidogrel, and Ticagrel was prescribed as dual antiplatelet therapy for 279 patients (93%), while Aspirin alone was administered to 21 patients (7%). A significant difference was observed between males and females regarding the use of mono and dual therapy, with females being more likely to receive dual therapy compared to males. Among the 300 patients included in the study, various comorbid conditions were identified among those receiving antiplatelet therapy. Diabetes mellitus was the most common, affecting 109 patients (36.33%), followed by pulmonary edema in 22 patients (7.33%), chronic obstructive pulmonary disease (COPD) in 6 patients (2%), renal disorders in 9 patients (3%), thyroid disorders in 4 patients (1.33%), anemia in 3 patients (1%), and seizures in 3 patients (1%). Additionally, 88 patients (29.33%) had other comorbidities, while 105 patients (35.3%) had no reported comorbid conditions.

Among the 300 patients, anti-diabetic medications were prescribed to 127 individuals (27.78%), while antiulcer drugs were given to 77 patients (16.84%). Antiemetic drugs were used by 20 patients (4.37%), whereas the remaining 233 patients (50.98%) received other types of medications.

As illustrated in Figure 2, the most frequently performed procedure among these patients was Percutaneous Transluminal Coronary Angioplasty (PTCA), conducted on 42 individuals. This was followed by Coronary Artery Bypass Grafting (CABG or CAG), which was performed on 14 patients. Other procedures included thrombolysis in 10 patients, heart valve repair or replacement in 5 patients, insertion of a pacemaker or implantable cardioverter defibrillator (ICD) in 2 patients, and the implantation of a ventricular assist device in another 2 patients.

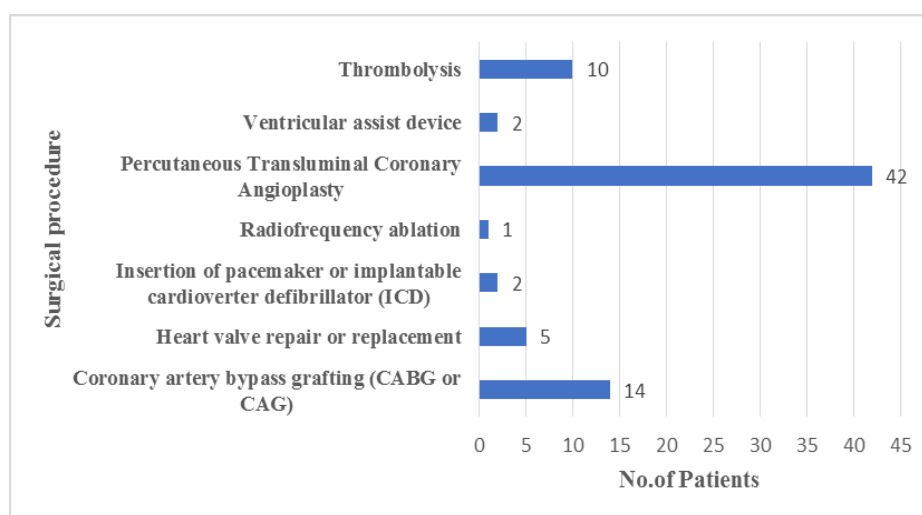


Figure 2: Surgery based patient distribution

Figure 3 highlights the most commonly conducted cardiac diagnostic tests among the 300 patients. These included cholesterol testing (300 patients, 13.66%), electrocardiograms (ECG) (300 patients, 13.66%), transthoracic echocardiograms (TTE or Echo) (300

patients, 13.66%), and lactate dehydrogenase (LDH) tests (300 patients, 13.66%). Additionally, C-reactive protein (CRP) was measured in 292 patients (13.29%), Troponin-I levels were assessed in 280 patients (12.75%), and cardiac CT scans were performed on 253

patients (11.52%). The D-dimer test was conducted in 171 patients (7.76%), making it one of the less frequently

performed investigations.

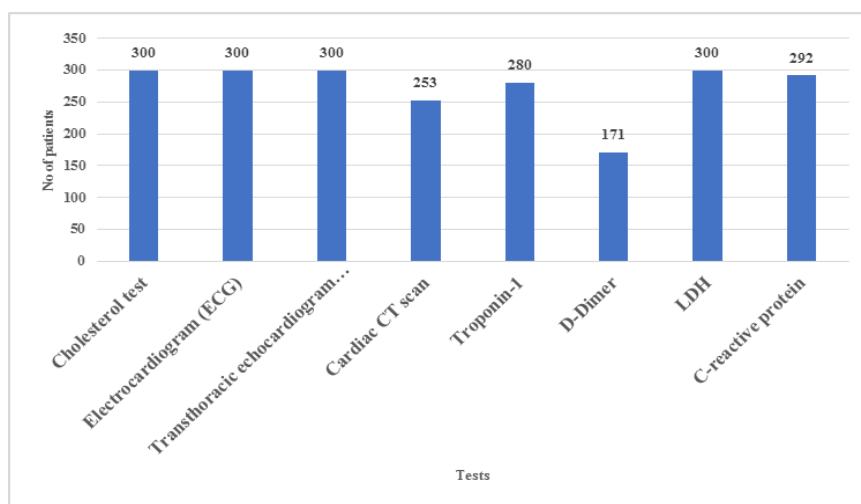


Figure 3

Figure 4 illustrates the assessment of INR levels among patients with cardiovascular disease (CVD). In our study, 11 patients (25%) had INR values below the

recommended range, while 8 patients (18.2%) exhibited elevated INR levels. The remaining 25 patients (56.8%) maintained INR levels within the stable range.

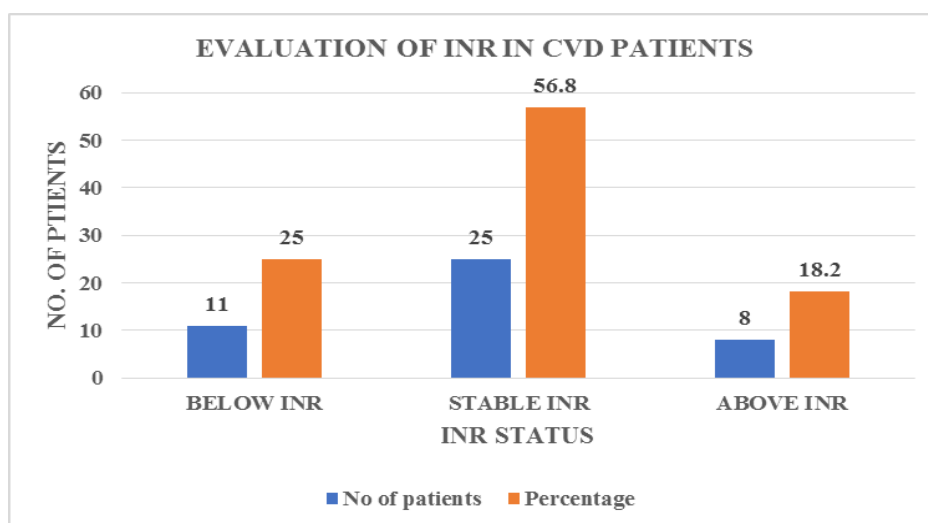


Figure 4: Assessment of INR levels among patients.

DISCUSSION

Cardiovascular disease (CVD) remains the leading non-communicable disease globally, contributing significantly to disability and mortality. It accounts for more annual deaths than any other condition. In 2008, an estimated 7.3 million deaths were attributed to CVDs, comprising approximately 30% of total global mortality. Projections suggest that by 2030, nearly 23.6 million individuals will succumb to CVDs, reinforcing its status as the primary cause of death worldwide. A prospective observational study was conducted over six months among inpatients in the General Medicine and Cardiology departments of the Karnataka Institute of Medical Sciences, Hubballi, Karnataka. The study aimed to evaluate the utilization of antiplatelet agents in CVD patients receiving treatment in a tertiary care hospital. A

total of 300 patients were included, with females constituting the majority (57.66%, 173 patients), while males accounted for 36.6% (53 patients). This finding suggests that females may have a higher predisposition to CVD, potentially due to greater exposure to certain risk factors.

The majority of patients (34%, 102 individuals) belonged to the 51-60 age group, a pattern consistent with a similar study conducted in Ayanavaram, Chennai, India (Pramod B. et al.), which also identified higher CVD prevalence in this age bracket. This indicates that middle-aged adults are at an increased risk of developing cardiovascular conditions. Regarding polypharmacy, 62.33% of patients received 6-8 medications, 29% were prescribed 3-5 drugs, and 8.66% received more than eight medications.

The evaluation of antiplatelet drug use revealed that a combination of aspirin and clopidogrel provided greater therapeutic benefits compared to monotherapy. This dual therapy has demonstrated efficacy in reducing mortality rates associated with myocardial infarction, ischemic heart disease, and acute coronary syndrome.

Among the 300 patients diagnosed with CVD, the most prevalent conditions were hypertension (120 cases, 22.47%), ST-elevated myocardial infarction (111 cases, 20.78%), ischemic heart disease (109 cases, 20.41%), and angina pectoris (29 cases, 5.43%). Other conditions observed included congestive cardiac failure (15 cases, 2.80%), heart failure (14 cases, 2.62%), coronary artery disease (11 cases, 2.05%), dilated cardiomyopathy (10 cases, 1.87%), rheumatic heart disease (6 cases, 1.12%), heart block (2 cases, 0.37%), and arrhythmia (2 cases, 0.37%). A total of 1,808 medications were prescribed to the study population, with antiplatelet agents being the most frequently prescribed (568 prescriptions, 31.41%). Lipid-lowering agents (282 prescriptions, 15.59%) and beta-blockers (180 prescriptions, 9.98%) were also commonly used. Conversely, angiotensin receptor blockers (14 prescriptions, 0.77%), vasodilators (5 prescriptions, 0.27%), and inotropic agents (3 prescriptions, 0.16%) were the least prescribed. Among the 300 patients, cardiovascular agents were prescribed in varying doses: 3-5 drugs were given to 248 patients (85.51%), 6-8 drugs to 32 patients (11.03%), and 0-2 drugs to 10 patients (3.44%). The oral route was the most common mode of drug administration (1,450 instances, 75.67%), followed by intravenous administration (368 instances, 19.20%), with subcutaneous administration being the least used (98 instances, 5.11%).

Regarding antiplatelet prescription patterns, 581 antiplatelet medications were prescribed, with aspirin being the most common (299 cases, 51.46%), followed by clopidogrel (269 cases, 46.29%) and ticagrelor (13 cases, 2.23%). Of the total patients, 299 (99.99%) received aspirin, 269 (89.66%) were prescribed clopidogrel, and 13 (4.33%) received ticagrelor. Single-agent therapy was administered to 20 patients (6.66%), while combination therapy—either aspirin plus clopidogrel or clopidogrel plus ticagrelor—was given to 280 patients (93.33%). Comorbid conditions among patients receiving antiplatelet therapy included diabetes mellitus (31.53%) and hypertension (36.03%) as the most common. Other associated conditions were anemia (0.90%), pulmonary edema (6.0%), chronic obstructive pulmonary disease (COPD) (1.80%), renal disorders (2.70%), thyroid disorders (1.2%), tuberculosis (1.2%), bronchopneumonia (1.80%), seizures (0.90%), and other conditions (5.40%). Notably, 46.54% of patients had no comorbid conditions. Additional prescribed medications included antiulcer and antidiabetic drugs (127 cases, 27.78%), antiulcer drugs alone (77 cases, 16.84%), antiemetics (20 cases, 4.37%), and other drug categories (233 cases, 50.98%).

The most frequently performed procedures were percutaneous transluminal coronary angioplasty (PTCA) (42 cases), coronary artery bypass grafting (CABG) (14 cases), thrombolysis (10 cases), heart valve repair or replacement (5 cases), insertion of a pacemaker or implantable cardioverter defibrillator (ICD) (2 cases), and ventricular assist device implantation (2 cases). Common diagnostic tests included cholesterol testing (300 cases, 13.66%), electrocardiography (ECG) (300 cases, 13.66%), transthoracic echocardiography (TTE) (300 cases, 13.66%), lactate dehydrogenase (LDH) testing (300 cases, 13.66%), C-reactive protein testing (292 cases, 13.29%), troponin-I (280 cases, 12.75%), cardiac CT scans (253 cases, 11.52%), and D-dimer tests (171 cases, 7.76%).

International normalized ratio (INR) evaluations in CVD patients revealed that eight individuals exhibited elevated INR levels, indicating a potential bleeding risk due to prolonged antiplatelet therapy. Meanwhile, 25 patients had INR levels below the normal range, and 20 maintained stable INR levels, suggesting minimal risk of bleeding from long-term antiplatelet use. Overall, this study underscores the significance of antiplatelet therapy in CVD management, highlighting the predominant use of aspirin and clopidogrel as combination therapy for superior clinical outcomes. The findings also emphasize the prevalence of polypharmacy and the necessity of careful INR monitoring to mitigate bleeding risks associated with prolonged antiplatelet drug use.

CONCLUSION

This study highlights the rational use of antiplatelet therapy in a tertiary care hospital, emphasizing its critical role in cardiovascular disease prophylaxis, particularly among patients with hypertension and diabetes mellitus. Dual antiplatelet therapy (DAPT) with aspirin and clopidogrel demonstrated superior efficacy compared to monotherapy, despite potential drug interactions. The study population predominantly consisted of individuals aged 51–60, with a higher prevalence among females. The findings suggest that newer antiplatelet agents, such as ticagrelor, could be considered for therapeutic optimization. Additionally, an increase in comorbidities was associated with greater drug utilization, raising concerns about polypharmacy-related complications. Clinical pharmacists play a crucial role in mitigating these issues by ensuring appropriate medication management. As this is a preliminary study, further research is necessary to enhance the evaluation of antiplatelet drug use.

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Nil

Conflict of interest

Nil

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