

## A Study on Antiplatelets and Anticoagulants Utilisation in A Tertiary Care Hospital

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### ABSTRACT

Cardiovascular and cerebrovascular diseases were becoming predominant now a day due to the dramatic life style changes as well as the sedentary occupations in the people, which make them to find the medical interventions to prevent further morbidity and mortality. We explored the utilisation of antiplatelets and anticoagulants in the cardiovascular and non-cardiovascular indications by performing a prospective observational study using the patient medication records and through direct patient interview. About 131(65.5%) were males and elderly with occupation coolies in key share. Commonly observed modifiable risk factors were high blood pressure, alcohol, smoking, high blood sugar. Aspirin was the most commonly utilized drug in 146(61.86%) patients among antiplatelets followed by clopidogrel i.e., in 77(32.64%) patients. Combination of aspirin and clopidogrel was observed in the 4(87.25%) patients. Enoxaparin and acenocoumarol were the commonly utilized anticoagulants in 14(38.89%) and 13(36.12%) patients respectively. Combinations of the anticoagulants were preferred in only 7(3.5%) patients whereas combinations of antiplatelets along with anticoagulants were preferred in 20(10%) patients. Platelet count was the most commonly measured parameter compared to Bleeding time (BT), Clotting time (CT), Prothrombin time (PT), International normalized ratio (INR) and activated partial thromboplastin time (aPTT). In our study we have observed that use of antiplatelet and anticoagulants in high risk as well as contraindicated cases that have led to adverse outcomes. So the choice of therapy based on the patients risk status and comorbidities will aid in the better prognosis that can be possible through clinical pharmacist interventions along with physician.

**Keywords:** antiplatelets, anticoagulants, risk factors, bleeding, parameters, adverse outcomes.

### INTRODUCTION

Drug utilisation is defined by World Health Organization (WHO) in 1977 as "the marketing, distribution, prescription and use of drugs in a society, with special importance on the resulting medical, social and economic consequences. Drug utilisation is essential for detection of irrational use of drugs, making interventions to improve drug use and to improve quality of life. This requires an intermittent review to ensure safe and effectiveness of pattern of drug utilisation. As the developing countries such as India is in the health care burdens due to multitudinous factors such as Availability of more new drugs in the market, Wide variation in the patterns of drug prescribing and consumption, Concern about delayed Adverse drug reactions (ADRs) and Escalating drug costs. Drug utilisation studies are the powerful investigative tools to ascertain the role of drugs in determining the therapeutic efficacy, cost effectiveness and minimizing adverse effects<sup>1</sup>. Without the knowledge of how drugs are being prescribed and utilized, it is impossible to go for a debate on rational drug use and to suggest procedures to improve prescribing practice. To improve the patient outcomes in view of drug therapy as well as interventions, Drug utilisation evaluation (DUE) has to be studied in the hospital<sup>2</sup>. DUE is concerned with the review of Prospective, Concurrent, and Retrospective which will be

useful for the assessing of components such as indications, selection, dosing, interactions, preparation, administration, patient education, monitoring and outcomes. Since the reviewing of all components is difficult, 3- 5 components can be established for each medicine.

As the active lifestyle and agrarian diet of India has changed to sedentary lifestyle and fast foods in shorter span of time, the fatality rate due to non- communicable diseases like stroke, Cardiovascular diseases, and diabetes has been increased rapidly<sup>3</sup>. The transition of epidemics from predominantly infectious disease conditions to non-communicable diseases has happened over a rather brief period of time<sup>4</sup>. The non-communicable diseases (such as Ischemic heart disease and stroke) are the dominant causes which are responsible for >80% of Cardiovascular disease (CVD) deaths<sup>3,4</sup>. In spite of wide variations in the prevalence of cardiovascular risk factors across different regions, CVD has emerged as the leading cause of death in all parts of India, including poorer states and rural areas. The progression of this outbreak depends on the socioeconomic gradients, tobacco use, low fruit and vegetable intake, poor compliance have become more prevalent among those from lower socioeconomic backgrounds leading to poorer outcomes. Though non-modifiable risk factors cannot be changed, modifiable risk

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Table 1: Age wise distribution of patients with antiplatelets and anticoagulants.

Age Range (Years)	Number of Patients (n=200)	Percentage (%)
20 - 30	5	2.5
31 - 40	15	7.5
41 - 50	27	13.5
51 - 60	56	28
61 - 70	73	36.5
71 - 80	20	10
81 - 90	4	2
<b>TOTAL</b>	<b>200</b>	<b>100</b>

The majority of patients with antiplatelet and anticoagulant therapy were belonging to the age group of 61-70 years with 36.5% followed by 51-60 years (28%), 41-50 years (13.5%), 71-80 years (10%), 31-40 years (7.5%), 20-30 years (2.5%), and 81-90 years (2%) respectively.

Table 2: Gender wise distribution of patients with anticoagulant and anti platelet therapy.

Gender	No. of patients (n =200)	Percentage (%)
Males	131	65.5
Females	69	34.5

Among 200 study population, males occupied a major share 65.5% (131 patients) when compared to that of females 34.5% (69 patients).

factors can be changed through clinical interventions to prevent the further complications<sup>4</sup>.

Hemostasis is a process of limiting the blood loss consequent to bleeding. An injured blood vessel must induce the formation of a blood clot to prevent blood loss and to allow healing. Antiplatelets are the root for prevention of arterial thrombosis, whereas anticoagulants are effective for venous thrombosis; however, recent molecular investigations suggest the interdependence of platelets and the coagulation system in both forms of thrombosis<sup>5</sup>. The Antiplatelets prevents the clot formation by inhibiting the thromboxane formation, whereas Anticoagulants target clotting factors that are crucial to the blood clotting process. Antiplatelets and anticoagulants deviates from general principle of specificity. Complex associations include chronic comorbidities, disease chronicity, ageing of population. Consequently, Triple drug regimens with Anticoagulants and two Antiplatelets, were introduced for secondary and tertiary prevention of pro thrombotic risk. Although triple combination is more powerful, clinically important bleedings is unpleasantly increased. Consequently it is prudent and timely to review strategies to reduce bleeding risk in patients treated with these therapies<sup>1</sup>. Thus our present study focuses on the utilisation pattern of antiplatelets and anticoagulants, their use in different indications with special focus on individual basis of risk factors, contraindications, parameters tested, adverse reactions and drug interactions.

## MATERIAL AND METHODS

**Study design:** A Prospective observational study was carried out by collecting the cases and interviewing the

patients treated with antiplatelets and anticoagulant therapy.

**Study site:** Department of General Medicine and Surgical Wards in tertiary care hospital.

**Study duration:** Study duration was 6 months that is from November 2016 to April 2017.

**Study population:** Within the study period we have collected 200 cases of Patients treated with antiplatelet and anticoagulant therapy.

**Ethical approval:** Our study was approved by institutional ethical committee with proposal no: SPSP/2016-2017/PD01.

**Study criteria**

**Inclusion criteria:** In-patients of either gender aged greater than 20 years up to 90 years treated with antiplatelets, anticoagulants or both in general medicine and surgical wards with or without co-morbidities were included in our study.

**Exclusion criteria:** Patients unwilling to participate in the study.

Patients who are unable to communicate such as severely ill patients and psychiatric patients.

Patients on haemodialysis receiving Anticoagulant therapy.

**Study materials:** Patient data collection proforma, Informed consent form, micromedex, naranjo's causality assessment scale, stockley's drug interactions and FDA website and ADR form

**Method of Data collection:** This prospective observational study was carried out after obtaining the permission of Institutional review board, Sri Padmavathi School of Pharmacy, Tiruchanoor, Tirupati, A.P, India. Inpatients treated with antiplatelets, anticoagulants or both in the General medicine and surgical ward were selected by using a specially designed proforma the following data was collected: Patient demographics (Name, Age, Gender, Occupation), Provisional diagnosis, Past medical and medication history, Risk factors for the indication, Present medical and medication history, Anticoagulant or Antiplatelet used, Hematologic parameters monitored, Drug interactions and adverse drug reactions.

This data was obtained by direct patient interview and from patient case profiles. The collected data was assessed according to:

Sociodemographics (Age, Gender, and Occupation) profile of patients prescribed with Anticoagulants and Antiplatelets.

Indication of patients receiving Anticoagulants and Antiplatelets.

Risk factors for the indication:

Modifiable – Alcoholism, Smoking/Tobacco use, Diet, Elevated blood glucose levels, High blood cholesterol, High blood pressure.

Non-modifiable – Age, Family history, others

Utilisation of Antiplatelets, Anticoagulants or both.

Number of Adverse drug reactions observed due to Antiplatelet and Anticoagulant therapy and their causality scores were calculated.

Number and nature of Drug interactions found in our study population.

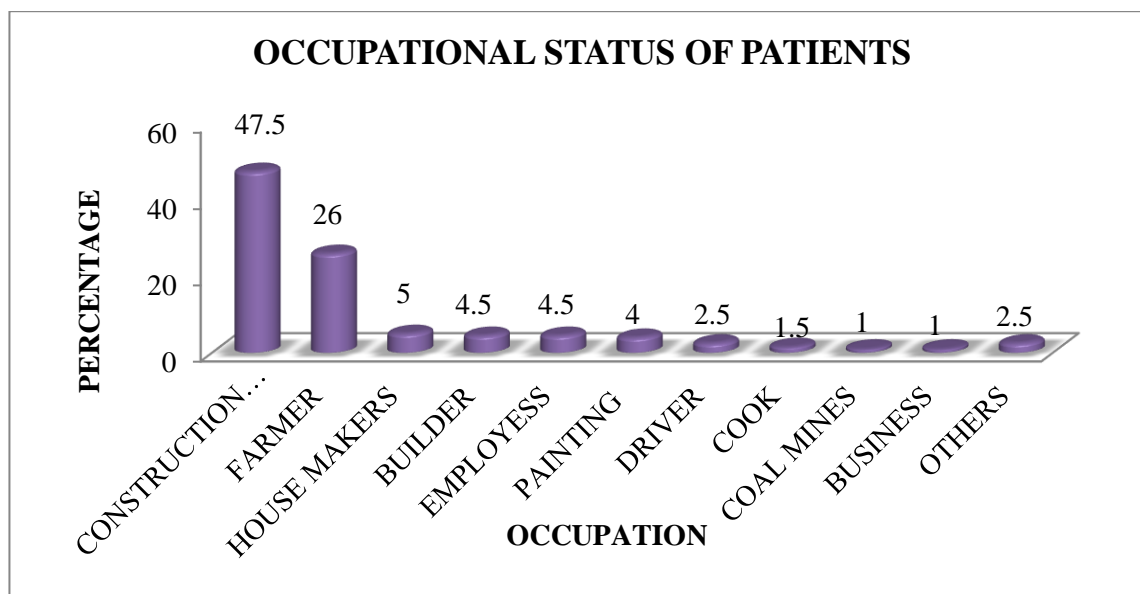


Figure 1: Occupational status of patients with Antiplatelets and Anticoagulants therapy.

The patients were found to be wide range of occupations, of them construction coolie occupied a major portion with 47.5% followed by farmers making up 26% of the total study population. The other occupational groups observed in our study in the decreasing order were house maker (5%), builder (4.5%), private employees (4.5%), painting (4%), driver (2.5%), cook (1.5%), coal mines (1%), business (2%) and others accounting for about (2.5%).

Table 3: Indications of Patients with Antiplatelets and Anticoagulants therapy.

Indication	Number (n=200)	Percentage (%)
Non-Cardiovascular	112	56
Cardiovascular	81	40.5
CVS and Non- CVS	7	3.5
Total	200	100

Table 4: Non - Cardiovascular Indications of patients with Antiplatelet and Anticoagulant therapy.

Indication	Non haematological	- Haematologica l	Tota l
Number (n = 112)	98	14	112
Percentag e (%)	87.5	12.5	100

## RESULTS

Among 112 non- cardiovascular indications, Non-hematological indications were frequently observed *i.e.*, in 98 patients (87.5%) when compared to that of the hematological indications which were in only 14 (12.5%) patients.

Among the non-hematological indications of antiplatelets and anticoagulants, CVA occupied major portion of 89.79% followed by Gangrene (3.07%) and others such as pulmonary arterial hypertension, Migraine, Meningitis, Diabetic Foot, Diabetic nephropathy, Cellulitis With 1.02% respectively.

Among the hematological indications of antiplatelets and anticoagulants, PVD occupied about 42% followed by Cerebral venous thrombosis, DVT, TAO with 14.2 % and

Venous ulcer, Superficial thrombophlebitis with 7.14% respectively showing an high incidence of patients with PVD receiving antiplatelet and anticoagulant therapy.

Among the study population, 154 (53.66%) patients were having modifiable risk factors and 133 patients (46.34%) were with non-modifiable risk factors. The modifiable risk factors were more commonly observed in our study population with blood pressure and alcohol sharing similar percentages *i.e.*, 26.9% (84 patients) and 26.6% (83 patients) where smoking, high blood sugar, elevated blood cholesterol, Improper dietary habits were observed in 69, 50, 14, 12 patients with a percentage of 22.1%, 16.02%, 4.48% and 3.84% respectively.

Table 5: Cardiovascular Indications of patients with Antiplatelet and Anticoagulant therapy.

INDICATION	Number (n = 81)	Percentage (%)
HTN	27	33.4
CAD	17	21
CCF	8	9.86
DCMP	6	7.4
MI	6	7.4
AF	5	6.17
COR-PUL	5	6.17
ICMP	4	4.9
OTHERS	3	3.7
TOTAL	81	100

Diverse cardiovascular indications were found in our study which includes HTN with a major percentage 33.4% followed by CAD 21%, CCF 9.6%, DCMP and MI with 7.4% respectively, AF and COR-PUL with 6.17%, ICMP 4.9% and others with 3.7%.

Table 6: Patients with Risk factors.

Risk factors	Modifiable	Non- modifiable
Number	154	133
Percentage (%)	53.66	46.34

Table 7: Antiplatelet and Anticoagulants Utilization.

Drugs	Number of patients (n =200)	Percentage (%)
Patients With Antiplatelets	171	85.5
Patients With Anticoagulants	9	4.5
Patients With Anti-Coagulants And Antiplatelets	20	10
Total	200	100

Among the 200 patients, 171 (85.5 %) patients were treated only with anti-platelets while 9 (4.5%) patients were treated with anticoagulants only and 20 (10%) patients were treated with both of them.

Table 8: Utilization of Anti-Platelets among Patient.

Antiplatelets	Number	Percentage (%)
Aspirin	146	61.86
Clopidogrel	77	32.64
Cilostazol	13	5.5
Total	236	100

Among the non-modifiable risk factors age is the most common in about 101 patients (64.75%) followed by family history in 25 patients (16.02%) and others such as occupation, gender, thyroid (1 patient), trauma (7 patients) and non-compliance (20 patients) occupying 19.23%.

Among the combinations of antiplatelets, Aspirin + clopidogrel (87.2%) was most commonly found that is indicated for CVS in 20 patients and Non CVS in 21 patients. This was followed by other combinations such as ASP+CLIO for Thromboangitis obliterans (TAO), CLO+CILO for Peripheral vascular disease (PVD) and ASP+CLO+CILO for CAD+PVD, Cerebrovascular accident (CVA) in 2 patients accounting 4.25% respectively.

## DISCUSSION

According to the age wise distribution, about 36.5% of patients were belonging to the age group of 61-70 years which was similar to the findings reported by Vijay S<sup>6</sup>

et al., followed by the age group of 51-60 years (28%) which is comparable to the findings made by Vijay S et al., The majorly observed age group in our study was elderly which represent the patient population at high thromboembolic risk and furthermore the indications which have a major share in our study such as Cerebrovascular accident (stroke), Hypertension, Coronary artery disease, Congestive cardiac failure and Peripheral vascular diseases were also having the elderly age as a risk factor which has made the Antiplatelet and Anticoagulant therapy unavoidable in this population. Predominance of male patients was observed in our study with percentage of 65% than the females 35% which is similar to that of the findings reported by Vijay S et al., with male percentage of 72% and 69% respectively. This might be due to the increased prevalence and risk of the cardiovascular and cerebrovascular diseases in the male patients<sup>4</sup> for which antithrombotic therapy is preferred. The random sampling might also have the impact on these gender variations.

From the study, we found that construction coolies were more common occupying about 47.5% which was due to the increased job strain in the coolies and their exposure to the inorganic dust such as cement, concrete, wood dust, irritants that increases the risk of stroke and cardiovascular diseases respectively<sup>7</sup>. This was followed by the farmers, might be due to poor control of preexisting cardiovascular risk factors which was more common in Indian farming population<sup>8</sup>. Other occupations such as builders, drivers, cook, coalmines, have their own risk to the toxin exposure prolonged stable postures (sitting or standing) which in turn increases the cardiovascular risk.

The most commonly observed indications for Antiplatelet and Anticoagulant therapy were Non- cardiovascular with stroke as a major non-hematological indication. This is due to primary and secondary therapeutic choice of antiplatelet and anticoagulant therapy for stroke as well as increased incidence and prevalence of stroke in Indian population. In our study patients, among the hematological indications, the thrombosis was the underlying pathology which requires antiplatelet and anticoagulant therapy. We have also observed use of anticoagulant therapy in a venous ulcer patient suspecting it as the case of post thrombotic syndrome, a severe case of DVT<sup>9</sup>.

Though the prevalence of hypertension is also high, this therapy was mostly preferred for secondary prevention. In our study CAD has occupied 21 % of cardiovascular indication whereas MI is 7.4% for which Antiplatelet and Anticoagulant therapy is unavoidable to reduce risk of

Table 9: Indications of Combinations of Antiplatelets.

Combination	Indications	Number	Percentage (%)
ASP+CLO	CVS(20), NON-CVS(21)	41	87.25
ASP+CILO	TAO	2	4.25
CLO+CILO	PVD	2	4.25
ASP+CLO+CILO	CAD+PVD, CVA	2	4.25
TOTAL		47	100

From this study it was evident that among the Antiplatelets prescribed, Aspirin (ASP) was mostly prescribed i.e., in 146 patients (62%) followed by Clopidogrel (CLO) in 77 (32%) patients and Cilostazol (CILO) in 13 (5%) patients.

Table 10: Utilization of Anti-Coagulants among Patients.

Anticoagulants	Number	Percentage (%)
ENOXAPARIN	14	38.89
ACENOCOUMAROL	13	36.12
HEPARIN	7	19.44
WARFARRIN	2	5.55
TOTAL	36	100

From this study it was evident that among the anticoagulants prescribed, Enoxaparin was slightly predominant i.e., in 14 patients (38.8%) followed by Acenocoumarol (ACITROM) in 13 patients (36%), Heparin in 7 patients (19.4%) and Warfarin in 2 patients (5.5%).

stroke. CHF was observed in 9.8% for which antithrombotic therapy is required to prevent the risk of arterial and venous thrombosis. The other rare cardiovascular indications found in our study were cardiomyopathies, atrial fibrillation, cor-pulmonale, mitral valve stenosis and aortic valve degeneration for where this therapy was used as prophylaxis to prevent thrombosis risk<sup>4</sup>.

According to our observation, most of the patients were with modifiable risk factors than non-modifiable risk factors. This is due to the variations in indications such as stroke, cardiovascular diseases (such as hypertension, CAD, CCF etc.) for which the modifiable risk factors<sup>10</sup> were more common and similar. Among modifiable risk factors blood pressure is predominant which is comparable to the study conducted by Suresh P<sup>11</sup> *et.al.*. Similar major portion was observed for alcoholism which is increasing in the developing countries. These findings suggest that it is necessary to manage the modifiable risk factors to prevent the cerebrovascular and cardiovascular mortality.

Age is the major non-modifiable risk factor due to the increased prevalence of cerebrovascular and cardiovascular indications among elderly people who constituted key portion in our study. Family history was observed in 16.02% of patients especially for stroke, hypertension, CAD, PVD because of marked phenotype and genetic inheritance of hyperlipidemia genes among Indians<sup>10</sup>.

In our study we have observed that more number of patients received Antiplatelets compared to Anticoagulants. This is because Antiplatelets targets the arterial thrombus<sup>5</sup> which is the cause for more prevalent diseases (CAD, stroke, MI) whereas the Anticoagulants targets the venous thrombus<sup>5</sup> that cause less prevalent diseases (DVT, AF, cerebral venous thrombosis, thrombophlebitis and other thromboembolic conditions). However combination of the Antiplatelets and Anticoagulants were also preferred in our study due to arterial along and venous thrombosis indications in same patient as well as due to interdependence of platelet activation and coagulation cascade.

Among the Antiplatelets, we have found the utilisation of Aspirin, Clopidogrel and Cilostazol. Aspirin occupied a significant portion among the Antiplatelets (due to its less cost, more effectiveness and wide availability) with two

doses 75mg and 150 mg. It was given for primary and secondary prevention of cardiovascular and cerebrovascular events especially in stroke with 75mg in 58 patients and 150mg in 10 patients. Though aspirin low doses (75-160mg) will effectively reduce cardiovascular events in hypertensive patients, it should be given as primary prophylaxis in CKD and diabetic patients only. But we have observed its use as primary prophylaxis in 6 non-diabetics, non-CKD patients out of 21 hypertensive patients. We have also observed the use of Aspirin 75mg in bronchial asthma (1 patient), upper GI bleeding (1 patient) which were contraindicated. We have found the aspirin use in 1 DCLD and 2 CKD patients as they were devoid of esophageal varices and hypertension.

Clopidogrel was the second most commonly utilized antiplatelet drug in our study which is majorly indicated for high risk of future vascular events in 31 stroke patients or in patients who experienced a recent TIA. The use of clopidogrel is beneficial in HTN and CAD patients with aspirin intolerance or contraindications to aspirin. Though a CAD and a DCMP patients in our study were with bleeding conditions i.e., gastric carcinoma with hematemesis and DCLD with hemoptysis respectively, Clopidogrel was used in them. This is due to its less risk of GI bleeding when compared to that of aspirin<sup>12</sup>. The combination of aspirin with clopidogrel was preferred in 17 patients in our study to prevent stroke risk in patients who had previous stroke or TIA. This combination was also preferred for hypertension in 8 patients in spite of risk of resistance.

Cilostazol was the least utilized antiplatelet with two doses of 50mg and 100mg (more effective) in 4 PVD patients, 2 TAO patients, Gangrene, cellulitis in 1 patient and 1 CAD with PVD patient to prevent the critical limb ischemia, intermittent claudication, gangrene and critical limb ischemia initiated cellulitis. It was also indicated for CVA in 3 patients due to their risk factors such as age, diabetes and smoking status for the PAD. As the aspirin or clopidogrel alone were not much effective in treating the intermittent claudication<sup>13</sup>, they can be used in combination with Cilostazol which was observed in our study.

Among the Anticoagulants most commonly utilized was Enoxaparin followed by Acenocoumarol, Heparin and warfarin similar to that of the study conducted by Vijay S *et.al.*. This is because of rapid onset of action, less risk of adverse effects (osteoporosis, HIT) for Enoxaparin when compared to the Heparin. Whereas in case of Coumarin derivatives, Acenocoumarol was mostly preferred due to its rapid onset of action less adverse effects when compared to warfarin (1-3 days). Though anticoagulants were contraindicated in severe hypertension it was given for a patient with hypertension who had pulmonary fibrosis as comorbidity. This was due to increased procoagulant activity in pulmonary fibrosis<sup>14</sup>.

Acenocoumarol is preferable drug for MS in CRHD which was given in our patient in spite of his contraindication i.e., lower GI bleeding (hemorrhoids) and our patient experienced melena on day-4. Warfarin was least utilized

Table 11: Indications of Anticoagulant Combinations.

Combination	Indications	Number	Percentage (%)
ENOXAPARIN+ACITROM	CAD, CVA, HTN, IHD	4	57.15
HEPARIN+ACITROM	CVA, TAO	2	28.57
WARFARRIN+ENOXAPARIN	CVA	1	14.28
TOTAL		7	100

Among the combinations of anticoagulants ENOX+ACITROM was mostly observed which was given in 4 patients (57.15%) for CAD, CVA, Hypertension (HTN), Ischemic heart disease (IHD) then HEPARIN+ACITROM in 2 patients (28.5%) for CVA, TAO and least commonly WARFARRIN+ENOXAPARIN for CVA in 1 patient (14.2).

Among the study population, hematological parameters were tested in 138 patients (69%) whereas they were not tested in 62 i.e., in 31% of patients.

Table 12: Observed ADRS in Patients with Antiplatelet and Anticoagulant therapy.

S.No	Adverse effect	Score	Probability
01.	Aspirin Induced Epigastric Pain	04	Possible
02.	Warfarin Induced Epistaxis	05	Probable
03.	Acitrom Induced Melena	04	Possible
04.	Aspirin Induced Nephrotoxicity	07	Probable
05.	Aspirin Induced GI Irritation	06	Probable
06.	Aspirin Induced Epistaxis	06	Probable

Among 200 patients we have found 6 ADRs in which 2 were possible and 4 were probable which was calculated by using Naranjo's causality assessment scale.

in 2 patients among entire due to its adverse profile and delayed onset of action limiting its use.

Though the monitoring of parameters such as platelet count, BT, CT, PT, INR, aPTT were not much significant for the antiplatelet therapy they must be done for anticoagulants such as Heparin. But we have observed the monitoring of PLT count in 5 out of 7 patients with heparin whereas PT and INR were tested in 1 patient. For enoxaparin, platelet count measurement is necessary which was performed in 9 out of 14 patients. For acitrom (acenocoumarol) PT, INR, aPTT were necessary to be done twice weekly but were performed in only 3 patients out of 14 in our study. Warfarin needs daily monitoring of INR but in our study only one patient was measured with INR only once out of 2 patients.

The ADRs observed in our patients were predominantly due to aspirin as its use may lead to the GI side effects even with the low doses due to their risk factors<sup>15,16</sup>. These risk found in our study were female gender, geriatric age group in Epigastric pain patient while other patient with GI irritation has advanced age and smoking history. We have also observed aspirin induced nephrotoxicity in our study population due to chronic use of aspirin<sup>17</sup> along with other contributing factors such as alcoholism, smoking and high blood pressure. Aspirin induced epistaxis was observed in a hypertensive patient with alcohol abuse. We have observed acitrom induced melena for which risk factor is past history of hemorrhoids in that patient. Warfarin induced epistaxis was also observed in a patient for which contributing factors found to be its interaction with pantoprazole.

Among the probable drug interactions, we have observed 2 drug interactions that include: Pantoprazole and warfarin induced elevation of Prothrombin time and dose adjustment of warfarin was done. Aspirin and glimepiride induced hypoglycemia where patient had experienced hypoglycemic symptoms.

Table 13: Probable Drug Interactions with Antiplatelet and Anticoagulant therapy.

Drug interactions	Number
MAJOR	21
MODERATE	17
MINOR	3
TOTAL	41

Within our study we have found 41 probable drug interactions of which 21 were major followed by 17 moderate and 3 minor interactions.

## CONCLUSION

Though the utilisation of antiplatelets and anticoagulants were appropriate concerning their indications, their associated risks should also be considered according to the individual basis. As they were prescribed in the contraindicated as well as high risk patients in our study which is irrational. Rationalization of therapy should have to be promoted by the clinical pharmacist through individualized therapy based on the patient's age, comorbidities and other relevant risk factors. The clinical pharmacist should have to aid in modifying the risk factors especially hypertension, alcoholism, smoking, blood sugar, blood cholesterol and poor compliance which were most common causes of CVDs as well as responsible for poor prognosis of the diseases. It is prudent to monitor the parameters especially platelet count for antiplatelet therapy and PT, INR for anticoagulants before as well as after initiation of therapy in order to prevent bleeding risk. This will also help to make interventions such as administration of natural coagulants during bleeding manifestations in high risk patients when their use cannot be avoidable.

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