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A PROSPECTIVE OBSERVATIONAL STUDY ON THE DRUG UTILISATION PATTERN AND ASSESS THE BLEEDING AND THROMBOTIC EVENTS AMONG CHRONIC KIDNEY DISEASE PATIENTS UNDERGOING MAINTENANCE HEMODIALYSIS TAKING ASPIRIN AND CLOPIDOGREL- A PILOT STUDY

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ABSTRACT

BACKGROUND

This prospective observational pilot study was conducted in chronic kidney disease patients undergoing hemodialysis who were taking aspirin, clopidogrel, or aspirin and clopidogrel. It aimed to clinically study bleeding and thrombotic events, assess the drug utilisation pattern among chronic kidney disease patients, and evaluate the impact of patient counselling on medication adherence.

AIM

To study the drug utilisation pattern and assess the bleeding and thrombotic events among chronic kidney disease patients undergoing maintenance hemodialysis taking aspirin, clopidogrel, or aspirin and clopidogrel.

OBJECTIVES

- To clinically study the bleeding events associated with aspirin, clopidogrel, or aspirin and clopidogrel.

- To study the clinically significant thrombotic events associated with aspirin, clopidogrel, or aspirin and clopidogrel.
- To assess the drug utilisation pattern in chronic kidney disease patients.
- To investigate the impact of patient counselling on improving patients' adherence to medication.

MATERIALS AND METHODS

The pilot study was carried out in 30 patients with chronic kidney disease. Patients were assigned to three groups: Group I consisted of 10 patients receiving aspirin, Group II consisted of 10 patients receiving clopidogrel, and Group III consisted of 10 patients receiving a aspirin and clopidogrel. Patients' case sheets were analyzed to evaluate comorbidities and different classes of drugs used. Medication adherence was measured before counselling and again after one month of counselling using the Adherence to Medication and Refills Scale (ARMS). Statistical analysis included paired t-tests and Chi-square tests using Microsoft Excel and SPSS, with a significance threshold of $\mathbf{p < 0.05}$.

RESULTS

This pilot study found that CKD occurrence increased with age and was more common in males. Poorer medication adherence was noted among patients with smoking or alcohol habits, but adherence improved significantly after counselling. Bleeding events were more frequent with aspirin, thrombotic events with clopidogrel, while Dual Antiplatelet Therapy offered a balanced safety profile. HAS-BLED scores indicated higher bleeding risk with aspirin. Drug utilization patterns showed frequent use of antihypertensives, lipid-lowering agents, erythropoietin, and nutritional supplements, highlighting the complex clinical needs of CKD patients.

CONCLUSION

This pilot study underscores key considerations in antiplatelet use among hemodialysis CKD patients. Aspirin monotherapy was associated with an increased risk of bleeding, while clopidogrel monotherapy carried a higher risk of thrombotic complications. Dual Antiplatelet Therapy appeared to offer a more favourable safety balance between bleeding and thrombotic risks. Importantly, patient counselling significantly improved medication adherence, underlining the critical role of patient counselling in optimizing treatment outcomes among CKD patients undergoing maintenance hemodialysis.

KEYWORDS: Chronic Kidney Disease (CKD), Hemodialysis, Antiplatelet Therapy, Bleeding and Thrombotic Events, Medication Adherence.

1. INTRODUCTION

The term chronic kidney disease (CKD) encompasses a range of reduced kidney function: mild, moderate, and severe chronic kidney failure.[1] The elderly are more likely to have CKD. 30% of CKD patients over 65 years maintain stable illness, whereas younger patients usually undergo a gradual decrease in renal function.[2] Cardiovascular disease is an important contributor to mortality and morbidity among CKD patients.[3]

1.1 CHRONIC KIDNEY DISEASE

A progressive decrease of kidney function that lasts for several months to years is known as chronic kidney disease (CKD). Regardless of the etiology, it is defined by the presence of kidney damage or an estimated Glomerular Filtration Rate (eGFR) of less than 60 ml/min that lasts for three months or more and necessitates renal replacement therapy (dialysis or transplantation).[4][5] Kidney damage may be structural or functional and can include the following:[6]

- GFR less than 60 mL/min/1.73m²
- ACR (urinary albumin-to-creatinine ratio) ≥30 mg/g or urine albumin ≥30 mg/24 hours (albuminuria)
- Deviations in imaging, histology, or urine sediment indicating kidney injury
- Diseases of the renal tubules
- History of kidney transplantation

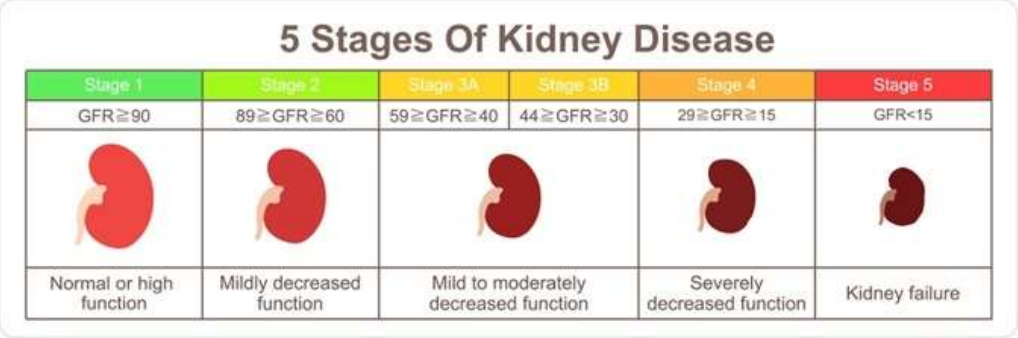

Fig 1: Stages of Chronic Kidney Disease.

1.2 ETIOLOGY

Evaluation of CKD etiology involves a patient's clinical history, physical examination, and urine results.[7][8]

Common causes include:

- Diabetes Mellitus (44%)
- Hypertension (28%)
- Chronic glomerulonephritis (7%)

Other causes:

- Polycystic kidney disease
- Congenital malformations
- Nephrolithiasis
- Interstitial nephritis
- Renal artery stenosis
- Renal carcinoma
- HIV-associated nephropathy
- CKD of unknown etiology

1.3 EPIDEMIOLOGY

- CKD affects about 800 million people (10% of the global population).[9]
- Prevalence is slightly higher in women.
- Between 1990 and 2017, CKD frequency rose by 33% globally, with China and India accounting for nearly one-third of all cases.[10]
- CKD of unknown etiology (CKDu), mainly seen in agricultural workers in Central America and Sri Lanka, may be linked to heat, stress, and dehydration.[10]

1.4 SIGNS AND SYMPTOMS

Signs and symptoms include: [11]

- Peripheral edema
- Pulmonary edema
- Hypertension

- Fatigue
- Reduced exercise capacity
- Reduced quality of life
- Cardiovascular disease
- CKD may be asymptomatic

1.5 RISK FACTORS

Medical conditions directly causing kidney damage.[8][12]

Risk factors include:

- Diabetes
- Hypertension
- Autoimmune diseases
- Systemic infections (HIV, hepatitis B/C)
- Nephrotoxic drugs (NSAIDs, herbal remedies, lithium)
- Recurrent UTIs
- Kidney stones
- Urinary tract obstruction
- Malignancy
- Obesity
- Reduced kidney mass
- Smoking
- IV drug use (heroin, cocaine)
- Genetic factors

1.7 COMPLICATIONS

CKD-related complications include:[13]

- Fluid and electrolyte imbalances
- Uremia
- Anemia
- Cardiovascular disease
- Mineral and bone disorders
- Malnutrition
- Acid-base imbalance

1.8 DIAGNOSIS

1.8.1 Medical History and Physical Examination[14]

- Medical History

- Physical Exam

1.8.2 Laboratory Tests

- Blood: Creatinine, Sodium, Potassium, Calcium, Phosphorus, Uric acid, Bicarbonate
- Urine: Urine Albumin-to-Creatinine Ratio (UACR), Urinalysis

1.8.3 Imaging Studies

- Ultrasound
- CT/MRI scans

1.8.4 Kidney Biopsy

1.9 INTRODUCTION TO ANTIPLATELET THERAPY: ASPIRIN AND CLOPIDOGREL

The prevention and treatment of thrombotic diseases, especially cardiovascular disorders such peripheral artery disease, myocardial infarction, and stroke, depend heavily on antiplatelet medication. The process of blood clotting, which aids the body in stopping bleeding, depends on platelets, which also known as thrombocytes. However, improper platelet activation can result in clots that obstruct blood arteries, causing ischaemia and serious side effect.

1.9.1 Aspirin

Aspirin, a commonly used NSAID and antiplatelet agent, prevents thrombotic events such as myocardial infarction and stroke. It inhibits the COX-1 enzyme, reducing thromboxane A2 production, thereby decreasing platelet aggregation and vasoconstriction.[15]

1.9.2 Clopidogrel

Clopidogrel, a thienopyridine, inhibits the $P2Y_{12}$ ADP receptor on platelets. This blocks activation of the glycoprotein IIb/IIIa complex, essential for platelet aggregation, thus reducing the risk of arterial clot formation.[16]

1.9.3 Dual Antiplatelet Therapy (DAPT)

DAPT (aspirin + clopidogrel) is often used in high-risk patients (e.g., with coronary stents or acute coronary syndrome). It offers enhanced platelet inhibition and helps prevent thrombosis in stented vessels, where clotting risk is elevated due to endothelial disruption.[17]

1.10 ROLE OF ANTIPLATELET THERAPY IN CKD PATIENTS

Antiplatelet therapy is often used in CKD patients to reduce thrombotic events and cardiovascular risks.[16] CKD increases cardiovascular risk, making antiplatelet agents (aspirin or clopidogrel) essential. However, CKD patients also face elevated bleeding risks due to platelet dysfunction and altered haemostasis.[18][19][20]

- Secondary prevention of cardiovascular events
- Antiplatelet therapy in maintaining vascular access patency

2. METHODOLOGY

2.1 STUDY POPULATION

A pilot study was conducted involving a total of 30 patients with chronic kidney disease (CKD) undergoing maintenance hemodialysis. The patients were divided into three groups: Group I consisted of 10 patients receiving Aspirin (75 mg), Group II consisted of 10 patients receiving Clopidogrel (75 mg), and Group III consisted of 10 patients receiving Aspirin (75 mg) and Clopidogrel (75 mg). These patients were included in this prospective observational study conducted in the Department of Nephrology at a multispecialty hospital in Thiruvananthapuram. Written informed consent was obtained from each subject after a detailed explanation of the objectives and protocol of the study.

2.2 DATA SOURCE

All relevant information regarding the study was collected from case records and through direct interviews with patients after obtaining informed consent. Data were collected using pre-designed data collection forms or proformas. The study was approved by the Institutional Ethics Committee of Cosmopolitan Hospital, Thiruvananthapuram, Kerala, India.

Bleeding and thrombosis outcomes were clinically studied. Bleeding outcomes were evaluated by the occurrence of AV fistula bleeding, intracerebral hemorrhage, and GI bleeding. Thrombotic events were evaluated based on fistula thrombosis, newly diagnosed acute coronary syndrome, and cerebrovascular accidents.

Patient adherence to the prescribed medications was assessed using the Adherence to Refills and Medications Scale (ARMS). The questionnaire consists of 12 questions, with a total score ranging from 12 to 48. Lower scores indicate better adherence. Adherence was categorized based on the total score as follows:

- 12–17: Good adherence
- 17–24: Moderate adherence
- >24: Poor adherence

2.3 STATISTICAL ANALYSIS

Statistical analysis was performed using Microsoft Excel and SPSS. A paired t-test was used to assess patient adherence to medications before and after counselling. The Chi-square test was used to assess bleeding and thrombotic events among CKD patients undergoing maintenance hemodialysis who were taking aspirin, clopidogrel, or both. A p-value of < 0.05 was considered statistically significant.

3. OBSERVATION AND RESULTS

In this pilot study, 30 patients were enrolled according to the inclusion and exclusion criteria and divided into three groups:

- **Group I**: 10 patients receiving Aspirin
- **Group II**: 10 patients receiving Clopidogrel
- **Group III**: 10 patients receiving both Aspirin and Clopidogrel

The results are as follows:

3.1 AGE-WISE DISTRIBUTION

Table 1: Age-wise Distribution

AGE (years)	GROUP I (ASPIRIN)		GROUP II (CLOPIDOGREL)		GROUP III (ASPIRIN + CLOPIDOGREL)	
	n=10	%	n=10	%	n=10	%
25-40	1	10%	1	10%	1	10%
41-55	1	10%	0	0%	2	20%
56-70	7	70%	4	40%	4	40%
71-86	1	10%	5	50%	3	30%

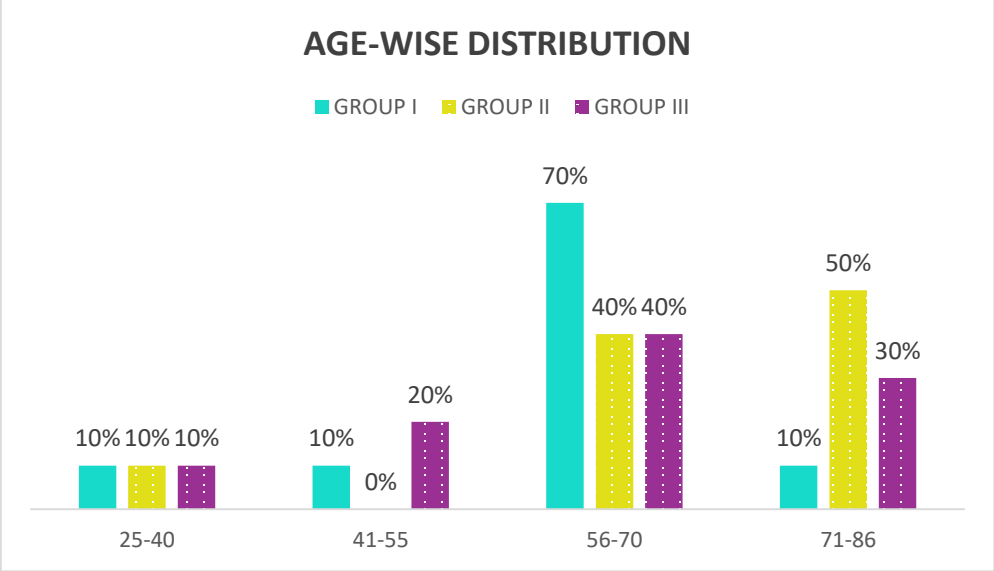

Fig 2: Age-wise Distribution

- Out of 10 patients of Group I taking Aspirin, 1(10%) comes under the age group of 25-40 years , 1(10%) comes under the age group of 41-55 years, 7(70%) come under the age group of 56-70 years and 1(10%) population comes under the age group of 71-86 years. It shows that when the age increases, the probability of occurrence of the disease condition (CKD) also increases.
- Out of 10 patients of Group II taking Clopidogrel, 1(10%) comes under the age group of 25-40 years, 0(0%) comes under the age group of 41-55 years, 4(40%) come under the age group of 56-70 years and 5(50%) population come under the age group of 71-86 years. It shows that when the age increases, the probability of occurrence of the disease condition (CKD) also increases.
- Out of 10 patients of Group III taking Aspirin and Clopidogrel, 1(10%) of the study population comes under the age group of 25-40 years, 2(20%) come under the age group of 41-55 years, 4(40%) come under the age group of 56-70 years and 3(30%) population come under the age group of 71-86 years. It shows that when the age increases, the probability of occurrence of the disease condition (CKD) also increases.

The age distribution across the three groups shows that as age increases, the occurrence of CKD also rises. Group I (Aspirin) had a majority in the 56–70 years age range, suggesting better potential adherence due

to relatively sustained cognitive and physical function. In contrast, Group II (Clopidogrel) had a higher proportion of very elderly patients (71–86 years), where adherence challenges such as memory issues and dependence on caregivers are more common. Group III (Aspirin + Clopidogrel) had a mixed age distribution, with both younger-old and older patients, indicating moderate adherence influenced by both age-related factors and the complexity of dual therapy.

3.2 GENDER-WISE DISTRIBUTION

Table 2: Gender-Wise Distribution

GENDER	GROUP I (ASPIRIN)		GROUP II (CLOPIDOGREL)		GROUP III (ASPIRIN + CLOPIDOGREL)	
	n=10	%	n=10	%	n=10	%
MALE	6	60%	9	90%	5	50%
FEMALE	4	40%	1	10%	5	50%

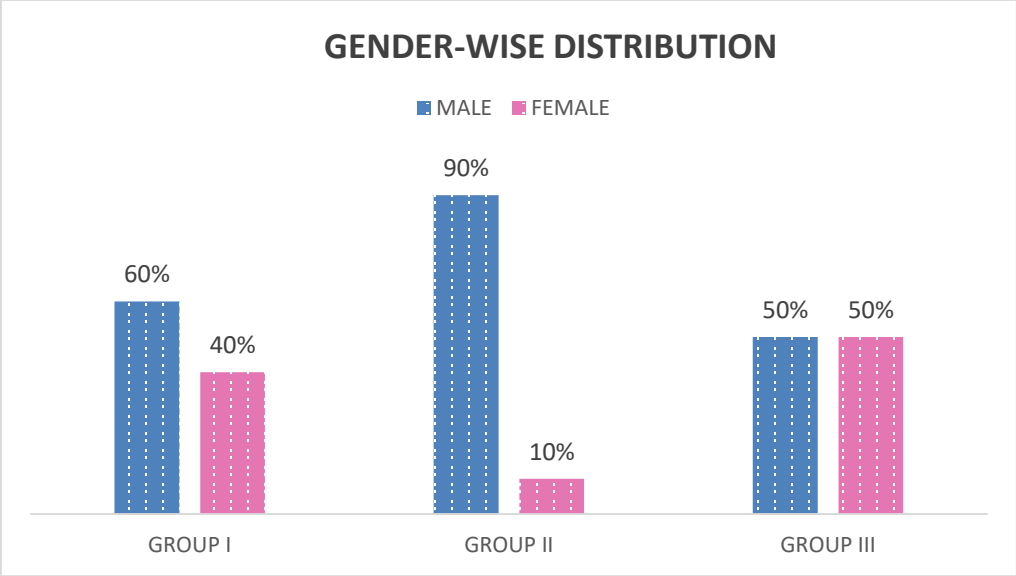

Fig 3: Gender-Wise Distribution

- Out of 10 patients of Group I taking Aspirin, 6(60%) were males and 4(40%) were females.
- Out of 10 patients of Group II taking Clopidogrel, 9(90%) were males and 1(10%) were female.
- Out of 10 patients of Group III taking Aspirin and Clopidogrel, 5(50%) were males and 5(50%) were females.
- It was observed that among patients with chronic kidney disease (CKD) and cardiovascular disease (CVD), gender distribution varied across different treatment groups. In Group I (Aspirin), CKD with CVD was slightly more prevalent in males than females. In Group II (Clopidogrel), suggesting a markedly higher prevalence of CKD with CVD in males. In contrast, in Group III (Aspirin + Clopidogrel), the distribution was equal, indicating that CKD with CVD affected both genders equally. Overall, the data suggest that CKD associated with CVD tends to occur more frequently in males than females, except in patients receiving combined Aspirin and Clopidogrel therapy, where the prevalence was comparable between genders.

3.3 WEIGHT-WISE DISTRIBUTION

Table 3: Weight-Wise Distribution

WEIGHT (Kg)	GROUP I (ASPIRIN)		GROUP II (CLOPIDOGREL)		GROUP III (ASPIRIN + CLOPIDOGREL)	
	n=10	%	n=10	%	n=10	%
41-50	3	30%	1	10%	2	20%
51-60	2	20%	4	40%	6	60%
61-70	5	50%	4	40%	2	20%
71-80	0	0%	1	10%	0	0%

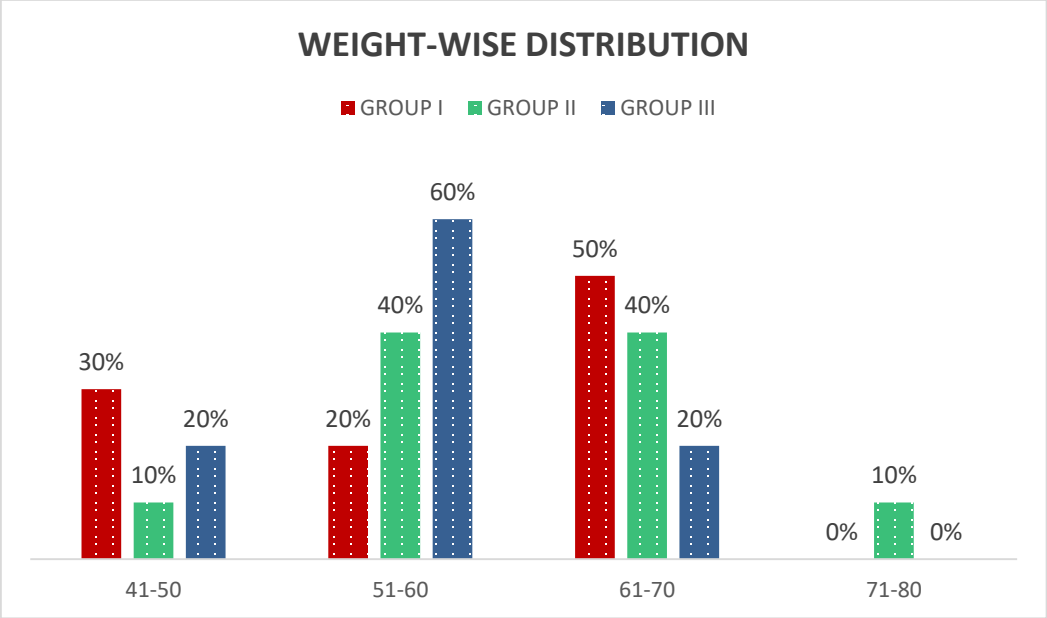

Fig 4: Weight-Wise Distribution

- Out of 10 patients of Group I taking Aspirin, 3(30%) patients come under the weight group 41-50 Kg, 2(20%) patients come under the weight group 51-60 Kg, 5(50%) patients come under the weight group 61-70 Kg and 0(0%) patients comes under the weight group 71-80 Kg. It shows that when the weight increases the risk occurrence of CKD also increases.
- Out of 10 patients of Group II taking Clopidogrel, 1(10 %) patient comes under the weight group 41-50 Kg , 4(40%) patients were evenly distributed among two groups: 51-60 Kg & 61-70 Kg. 1(10 %) patient comes under the weight group 71-80 Kg. It shows that when the weight increases the risk occurrence of CKD also increases.
- Out of 10 patients of Group III taking Aspirin and Clopidogrel, 2(20 %) patients come under the weight group 41-50 Kg, 6(60%) patients come under the weight group 51-60 Kg, 2(20%) patients come under the weight group 61-70 Kg and 0 patients comes under the weight group 71-80 Kg. It shows that when the weight increases the risk occurrence of CKD also increases.

3.4 LITERACY-BASED DISTRIBUTION

Table 4: Literacy-Based Distribution

QUALIFICATION	GROUP I (ASPIRIN)		GROUP II (CLOPIDOGREL)		GROUP III (ASPIRIN + CLOPIDOGREL)	
	n=10	%	n=10	%	n=10	%
LITERATE	9	90%	8	80%	9	90%
ILLETERATE	1	10%	2	20%	1	10%

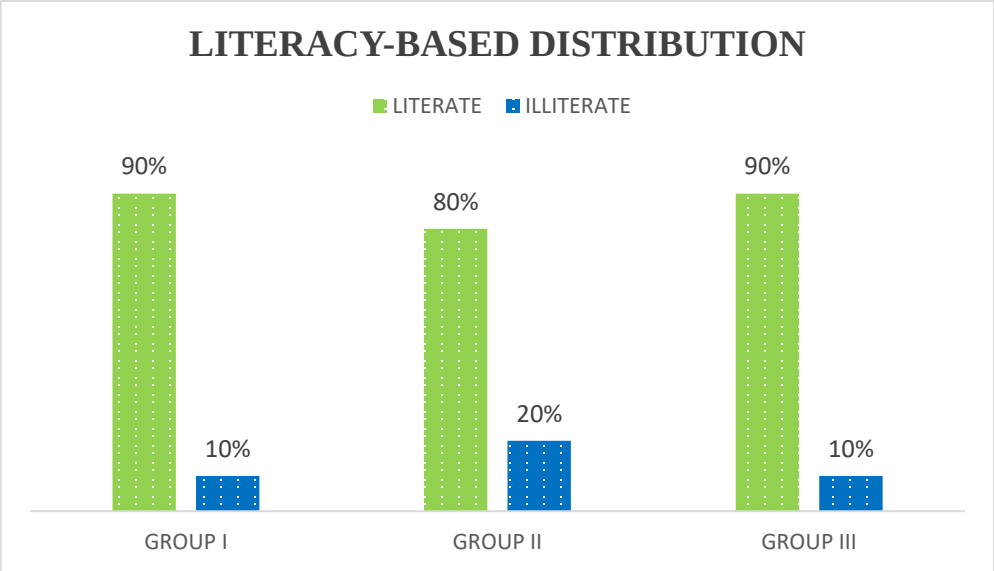

Fig 5: Literacy-Based Distribution

- Out of 10 patients of Group I taking Aspirin, 9(90%) of patients were literate, while 1(10%) was illiterate.
- Out of 10 patients of Group II taking Clopidogrel, 8(80%) of patients were literate, with 2(20%) illiterates.
- Out of 10 patients of Group III taking Aspirin and Clopidogrel, 9(90%) of patients were literate while 1(10%) was illiterate.

Literacy had a notable influence on adherence. Educated patients demonstrated significantly better adherence due to a clearer understanding of counselling and medication importance, underscoring the value of patient education in chronic kidney disease management.

3.5 SOCIAL HABITS

Table 5: Social Habits

SOCIAL HABITS	GROUP I (ASPIRIN)		GROUP II (CLOPIDOGREL)		GROUP III (ASPIRIN + CLOPIDOGREL)	
	n=10	%	n=10	%	n=10	%
ALCOHOL	2	20%	3	30%	3	30%
SMOKING	3	30%	2	20%	2	20%
NEITHER	3	30%	4	40%	2	20%
BOTH	2	20%	1	10%	3	30%

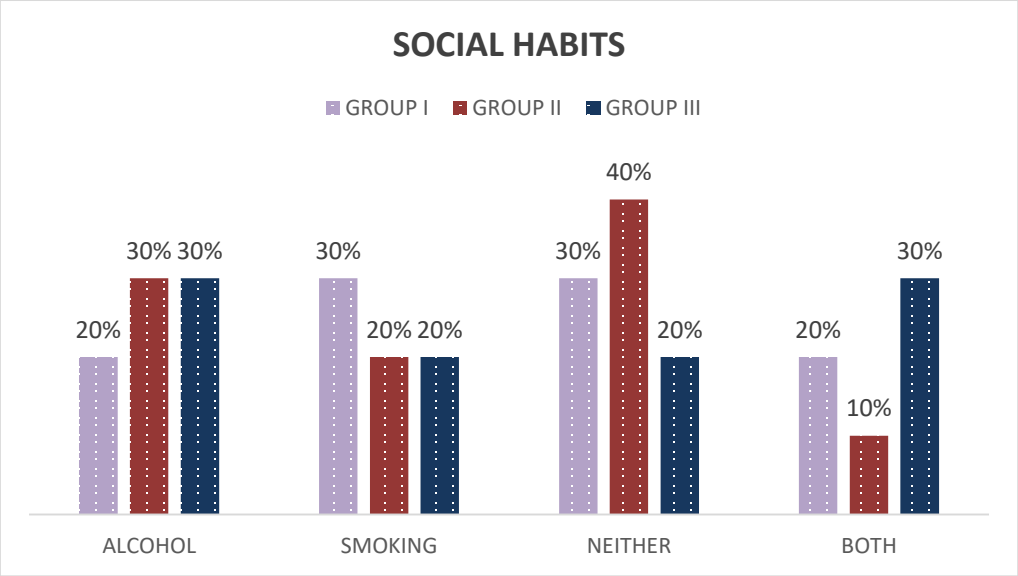

Fig 6: Social Habits

- Out of 10 patients of Group I taking Aspirin, 2(20%) used alcohol, 3(30%) smoked, 2(20%) used both alcohol and smoked, and 3(30%) refrained from alcohol and smoking.
- Out of 10 patients of Group II taking Clopidogrel, 3(30%) alcoholic, 2(20%) smoked, 4(40%) did not engage in either habit, while 1(10%) used both alcohol and smoked.
- Out of 10 patients of Group III taking Aspirin and Clopidogrel, 3(30%) used alcohol, 2(20%) smoked, 3(30%) used both alcohol and smoked, and 2(20%) refrained from both.

A substantial number of patients in all three groups reported social habits such as alcohol consumption, smoking, or both. Those with dual habits are at a heightened risk of poor medication adherence due to irregular routines, reduced health prioritization, and potential pharmacokinetic interactions. These behaviours can compromise drug efficacy—especially for antiplatelet agents—and
worsen clinical outcomes in CKD patients. Accordingly, patients reporting such habits received intensified counselling focused on behavioural change and the negative effects of alcohol and smoking on disease progression and medication outcomes. Better adherence was observed among patients who avoided both habits, indicating a stronger likelihood of healthy behavioural patterns.

3.6 BLEEDING AND THROMBOTIC EVENTS

Table 6: Bleeding and Thrombotic Events

Events	GROUP I (ASPIRIN)		GROUP II (CLOPIDOGREL)		GROUP III (ASPIRIN + CLOPIDOGREL)	
	n=10	%	n=10	%	n=10	%
Bleeding Events	6	60%	0	0	2	20%
Thrombotic events	0	0	4	40%	1	10%
Neither	4	40%	6	60%	7	70%
p-value= 0.0112						

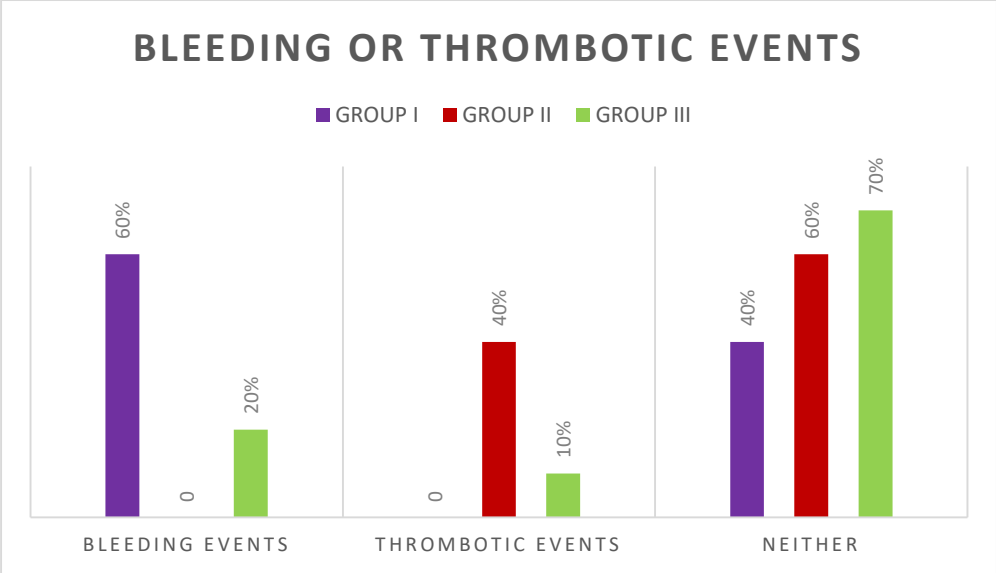

Fig 7: Bleeding and Thrombotic Events

- Out of 10 patients of Group I taking Aspirin, 6 patients (60%) had bleeding events, none had thrombotic events.
- Out of 10 patients of Group II taking Clopidogrel, 4 patients (40%) experienced thrombotic events; no bleeding events were reported.
- Out of 10 patients of Group III taking Aspirin and Clopidogrel, 2 patients (20%) had bleeding events, 1 (10%) experienced thrombotic event.

The p-value of 0.0112 suggests statistically significant differences across groups. Aspirin is associated with a higher bleeding risk but prevents thrombotic events. Clopidogrel appears safer regarding bleeding but showed a greater tendency toward thrombosis. The dual antiplatelet therapy reflects a moderate and balanced risk profile.

I. BLEEDING EVENTS

Table 7: Bleeding Events

Group	GROUP I (ASPIRIN)		GROUP II (CLOPIDOGREL)		GROUP III (ASPIRIN + CLOPIDOGREL)	
	n=10	%	n=10	%	n=10	%
AV Fistula Bleeding	6	60%	0	0	2	20%
Intracerebral Hemorrhage	0	0	0	0	0	0
GI Bleeding	0	0	0	0	0	0
No Bleeding	4	40%	10	100%	8	80%

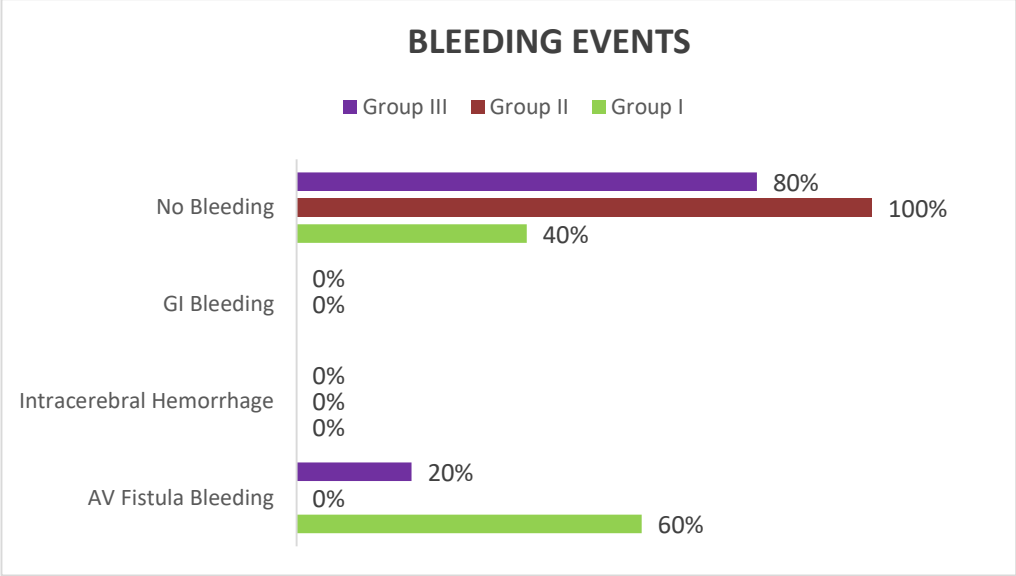

Fig 8: Bleeding Events

- Out of 10 patients of Group I taking Aspirin, 6(60%) of patients experiencing AV fistula bleeding, while no cases of intracerebral hemorrhage or gastrointestinal (GI) bleeding were reported.
- Out of 10 patients of Group II taking Clopidogrel, no bleeding events of any type were observed, indicating a relatively safer bleeding profile.
- Out of 10 patients of Group III taking Aspirin and Clopidogrel, 2(20%) incidence of AV fistula bleeding, but showed no cases of intracerebral or GI bleeding.

These findings suggest that aspirin alone poses a greater risk for AV fistula bleeding in CKD patients on hemodialysis, while combination therapy offers a more moderate risk, and clopidogrel alone appears to be the safest in terms of bleeding complications in this study population

II. THROMBOTIC EVENT

Table 8: Thrombotic Events

Group	GROUP I (ASPIRIN)		GROUP II (CLOPIDOGREL)		GROUP III (ASPIRIN + CLOPIDOGREL)	
	n=10	%	n=10	%	n=10	%
Fistula Thrombosis	0	0	3	30%	1	10%
Newly Diagnosed Acute Coronary Syndrome	0	0	0	0	0	0
Cerebrovascular Accident	0	0	1	10%	0	0
No Thrombosis	10	100%	6	60%	9	90%

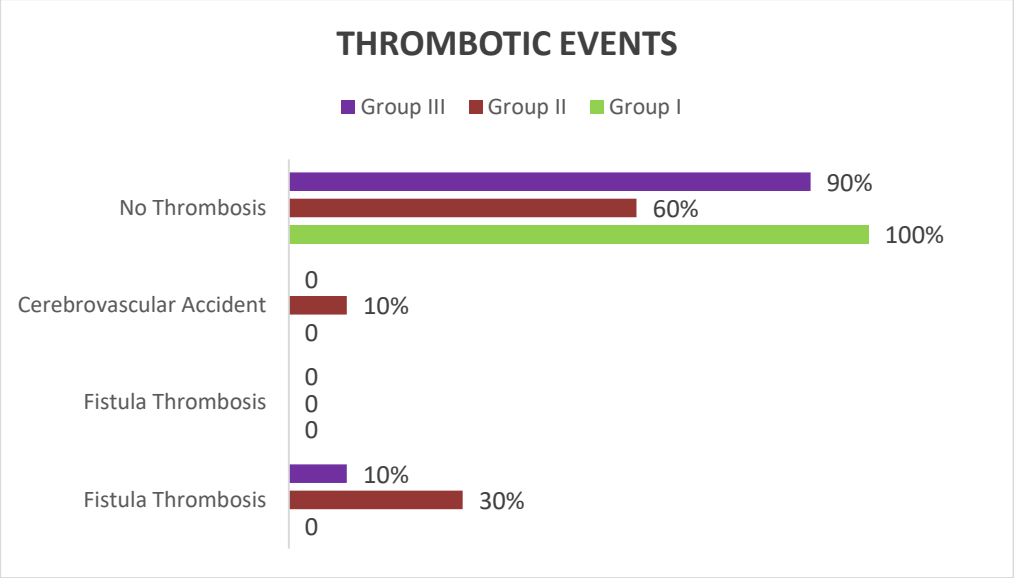

Fig 9: Thrombotic Events

- Out of 10 patients of Group I taking Aspirin, no thrombotic events, supporting its effectiveness in thrombosis prevention.
- Out of 10 patients of Group II taking Clopidogrel, 3(30%) of patients experienced fistula thrombosis and 1(10%) had a cerebrovascular accident, indicating a potentially higher thrombotic risk when using clopidogrel alone.
- Out of 10 patients of Group III taking Aspirin and Clopidogrel, 1(10%) experienced fistula thrombosis, and there were no cerebrovascular or acute coronary events, suggesting that combination therapy may provide a more balanced protection against thrombotic complications.

3.7 HAS-BLED SCORING

Table 9: HAS-BLED scoring

Has-Bled Scoring	GROUP I (ASPIRIN)		GROUP II (CLOPIDOGREL)		GROUP III (ASPIRIN + CLOPIDOGREL)	
	n=10	%	n=10	%	n=10	%
0 to 1	4	40%	7	70%	5	50%
2 to 3	0	0	3	30%	3	30%
≥4	6	60%	0	0	2	20%

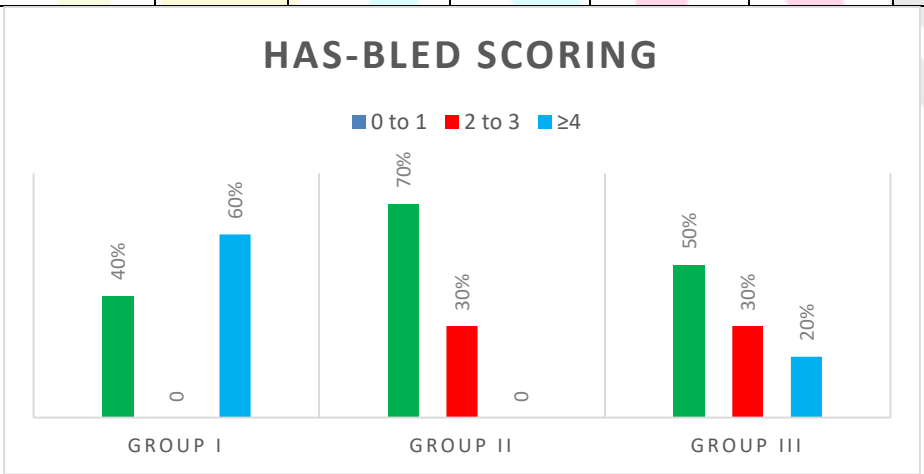

Fig 10: HAS-BLED scoring

The distribution of HAS-BLED bleeding risk scores across different antiplatelet regimens reveals distinct prescribing patterns. Group I demonstrates a polarized risk profile, with 6(60%) of users falling into the high-risk category (≥4) and the remaining 4(40%) in low-risk (0-1), while completely avoiding moderate-risk patients (2-3). This suggests aspirin may be selectively prescribed to either very low-risk patients or those with compelling indications for its use despite high bleeding risk. In contrast, Group II shows a protective distribution, with 7(70%) of users in the low-risk category and the remaining 3(30%) in moderate-risk, with no high-risk patients receiving this monotherapy. Group III presents an intermediate pattern, with half of the patients in low-risk, 3(30%) in moderate-risk, and 2(20%) in high-risk categories, indicating its use in selected cases where the benefits of dual therapy outweigh bleeding concerns. These patterns suggest clinicians are employing risk-adapted prescribing strategies, reserving clopidogrel for lower-risk patients while accepting higher bleeding risks with aspirin or combination therapy when clinically warranted. The absence of high-risk patients receiving clopidogrel monotherapy highlights its perceived safety profile, particularly in populations vulnerable to bleeding complications.

3.8 DRUG UTILISATION PATTERN

A. COMORBID CONDITIONS

I. COMORBID CONDITIONS IN EACH GROUP

Table 10: Comorbid Conditions in each group

CO-MORBIDITIES	GROUP I (ASPIRIN)		GROUP II (CLOPIDOGREL)		GROUP III (ASPIRIN + CLOPIDOGREL)	
	n=10	%	n=10	%	n=10	%
HYPERTENSION	7	70%	5	50%	9	90%
DIABETES MELLITUS	4	40%	6	60%	9	90%
CORONARY ARTERY DISEASE	3	30%	1	10%	5	50%
HYPOTHYROIDISM	3	30%	3	30%	2	20%
IRON DEFICIENCY ANEMIA	1	10%	0	0	0	0
DYSLIPIDAEMIA	8	80%	8	80%	10	100%
UROLITHIASIS	1	10%	0	0	0	0
CHRONIC HEART FAILURE	0	0	2	20%	0	0
ATRIAL FIBRILLATION	0	0	1	10%	0	0
BENGIN PROSTRATE HYPERTROPHY	0	0	1	10%	1	10%
OLD CEREBROVASCULAR ACCIDENT	0	0	1	10%	1	10%

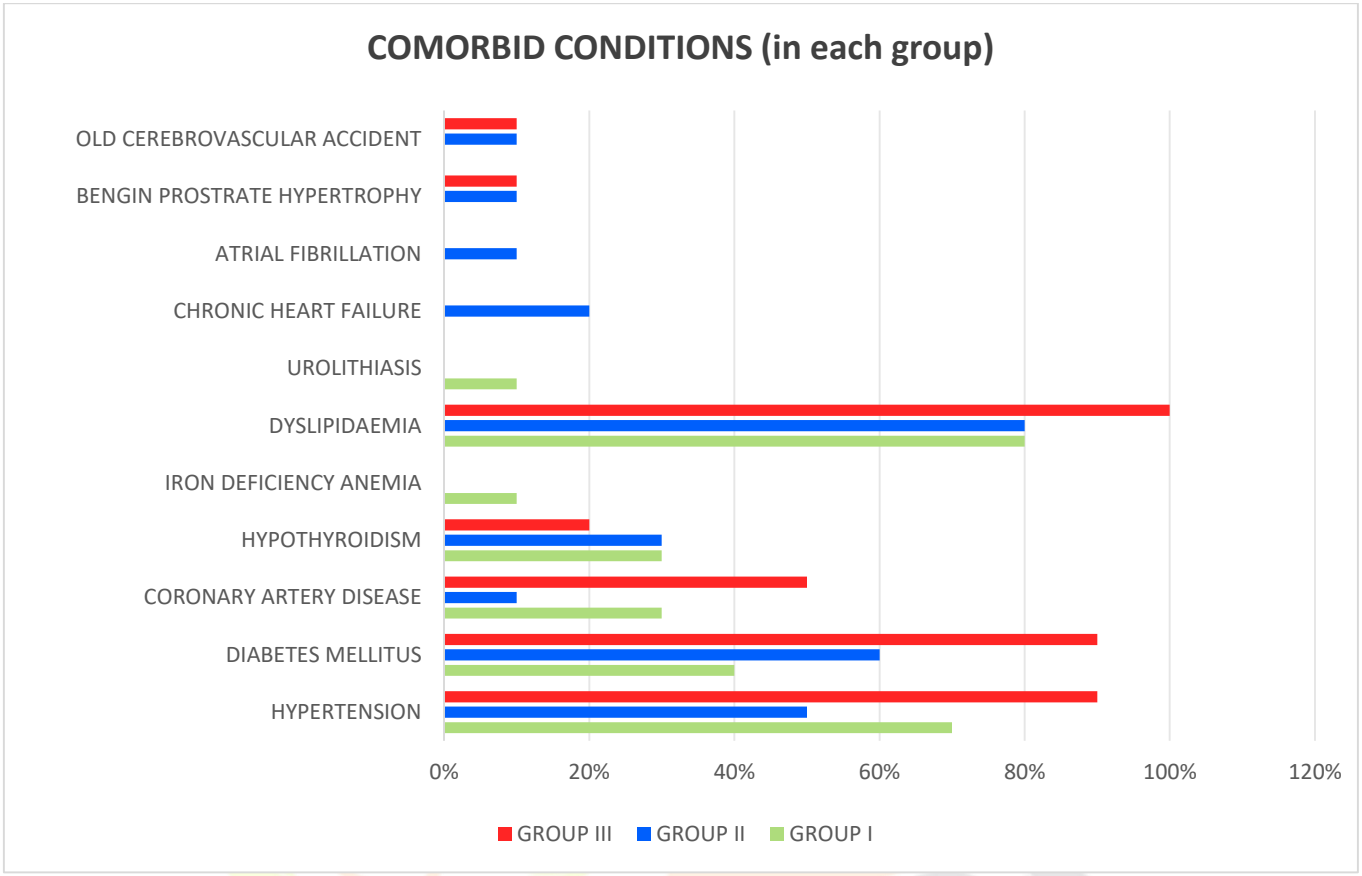

Fig 11: Comorbid Conditions in each group

Group I (Aspirin):

Among the 10 patients in this group, the most common co-morbidity was dyslipidemia, seen in 8 patients (80%). Hypertension was present in 7 patients (70%), followed by diabetes mellitus in 4 patients (40%), and coronary artery disease (CAD) and hypothyroidism in 3 patients each (30%). Less common conditions included iron deficiency anemia and urolithiasis, each reported in 1 patient (10%). There were no cases of chronic heart failure, atrial fibrillation, benign prostatic hypertrophy, or cerebrovascular accident in this group.

Group II (Clopidogrel):

In this group, dyslipidemia was again prominent, present in 8 patients (80%). Diabetes mellitus affected 6 patients (60%), and hypertension was seen in 5 patients (50%). Hypothyroidism was noted in 3 patients (30%), while coronary artery disease was relatively rare, affecting only 1 patient (10%). This group showed some unique co-morbidities not seen in Group I: chronic heart failure in 2 patients (20%), and atrial fibrillation, benign prostatic hypertrophy, and old cerebrovascular accident, each in 1 patient (10%). No patients in this group had iron deficiency anemia or urolithiasis.

Group III (Aspirin + Clopidogrel):

This group had the highest prevalence of co-morbidities overall. All 10 patients (100%) had dyslipidemia, and 9 patients (90%) each had hypertension and diabetes mellitus. Coronary artery disease was present in 5 patients (50%), while hypothyroidism was seen in 2 patients (20%). Like Group II, this group also had benign prostatic hypertrophy and old cerebrovascular accident in 1 patient each (10%). Notably, there were no cases of chronic heart failure, atrial fibrillation, iron deficiency anemia, or urolithiasis in this group.

II. COMORBID CONDITIONS IN TOTAL SAMPLE

Table 11: Comorbid conditions in Total Sample (N=30)

CO-MORBIDITIES	Number of Patients (N=30)	Percentage (%)
HYPERTENSION	21	70%
DIABETES MELLITUS	24	80%
CORONARY ARTERY DISEASE	9	30%
HYPOTHYROIDISM	8	27%
IRON DEFICIENCY ANEMIA	1	3%
DYSLIPIDAEMIA	26	87%
UROLITHIASIS	1	3%
CHRONIC HEART FAILURE	2	7%
ATRIAL FIBRILLATION	1	3%
BENGIN PROSTRATE HYPERTROPHY	2	7%
OLD CEREBROVASCULAR ACCIDENT	2	7%

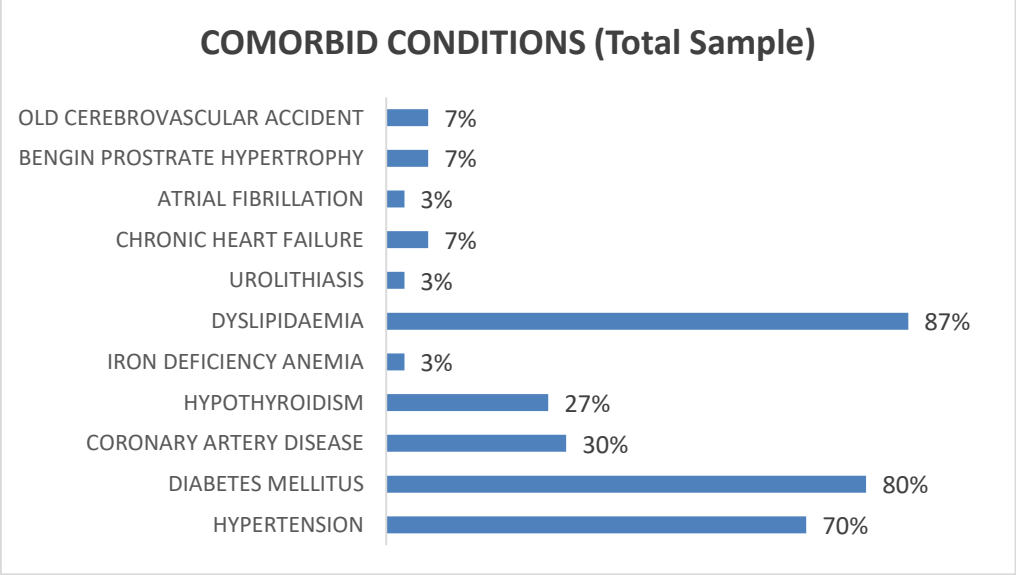

Fig 12: Comorbid conditions in Total Sample (N=30)

Out of 30 chronic kidney disease (CKD) patients undergoing maintenance hemodialysis, **dyslipidemia** was the most prevalent comorbidity, affecting **26(87%)** of patients. This condition significantly increases cardiovascular risk, which is already heightened in CKD. **Diabetes mellitus** followed closely, present in **24(80%)**, highlighting its critical role as both a leading cause and a complicating factor in CKD progression. **Hypertension** was also highly prevalent **21(70%**), often co-existing with diabetes and contributing to kidney damage and cardiovascular complications. **Coronary artery disease 9(30%)** and **hypothyroidism 8(27%)** were also common, indicating the multifactorial burden on cardiovascular and metabolic health in these

patients. Less common but clinically relevant comorbidities included **chronic heart failure 2(7%)**, **benign prostatic hypertrophy 2(7%)**, and a history of **cerebrovascular accident 2(7%)**, all of which can complicate fluid and medication management. Rare comorbidities such as **iron deficiency anemia 1(3%)**, **urolithiasis 1(3%)**, and **atrial fibrillation 1(3%)** were noted.

B. CLASSIFICATION OF DRUGS

I. ANTIHYPERTENSIVE AGENTS

Table 12: Antihypertensive Agents

Antihypertensive class	Drugs	GROUP I (ASPIRIN)		GROUP II (CLOPIDOGREL)		GROUP III (ASPIRIN + CLOPIDOGREL)	
		n=10	%	n=10	%	n=10	%
Beta blockers	Metoprolol	3	30%	2	20%	2	20%
	Carvedilol	2	20%	0	0	0	0
	Atenelol	1	10%	0	0	1	10%
	Bisoprolol	2	20%	5	50%	0	0
	Labetalol	2	20%	0	0	0	0
Calcium channel blockers	Nifedipine	3	30%	1	10%	0	0
	Clilnidipine	0	0	0	0	1	10%
	Amlodipine	0	0	2	20%	0	0
Alpha 2 agonist	Clonidine	5	50%	0	0	4	40%
	Moxonidine	1	10%	0	0	1	10%
Alpha 1 blocker	Prazosin	1	10%	2	20%	1	10%
Diuretics	Furosemide	0	0	4	40%	0	0
	Torsemide	0	0	3	30%	0	0
RAAS Modulator	Sacubitril+ valsartan	0	0	1	10%	0	0

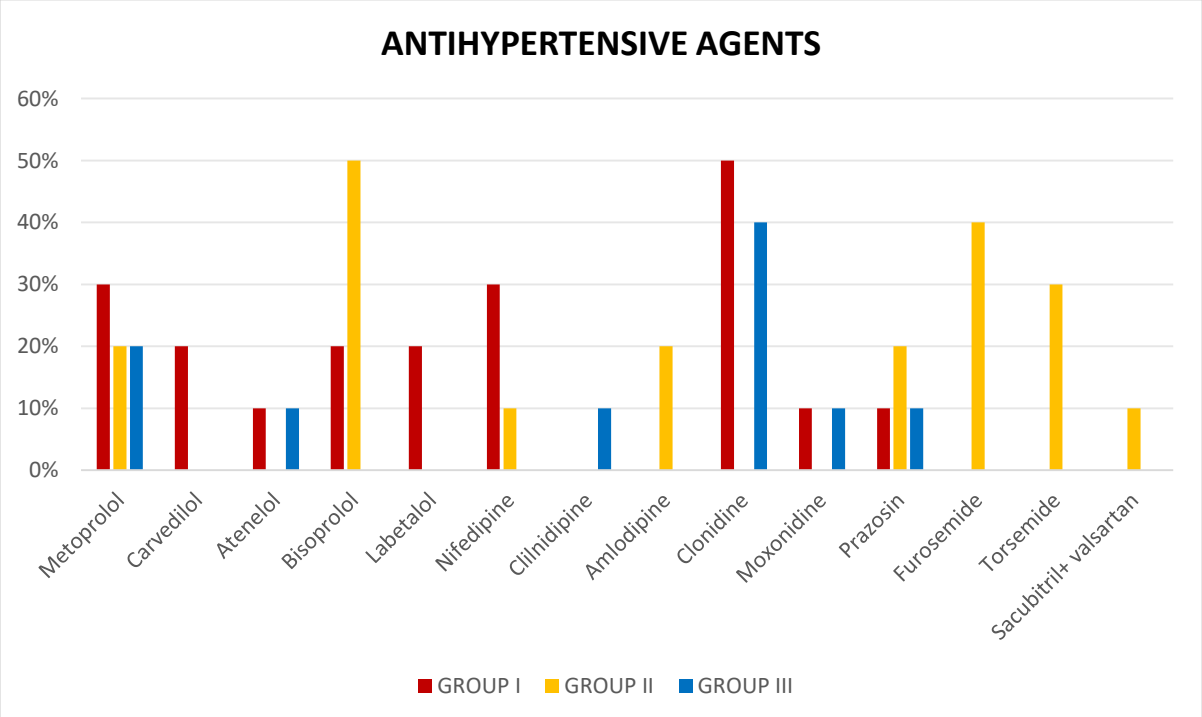

Fig 13: Antihypertensive Agents

The table presents the use of various **antihypertensive agents** among **30 patients** divided into three treatment groups: **Group I, Group II, and Group III**, with **10 patients in each group**. The most frequently prescribed class was **beta blockers**, particularly **metoprolol**, used in **3 patients (30%)** in Group I, **2 patients (20%)** in Group II, and **2 patients (20%)** in Group III. **Bisoprolol** was used predominantly in Group II (**5 patients, 50%**), while other beta blockers like **carvedilol**, **atenolol**, and **labetalol** were limited to Group I.

Among **calcium channel blockers**, **nifedipine** was most common, used in **3 patients (30%)** in Group I, and **1 patient (10%)** in Group II. A**mlodipine** and **Cilnidipine** were used minimally in Group II and Group III, respectively (**1 patient each, 10%**). In the **alpha-2 agonist** category, **clonidine** showed notable use in Group I (**5 patients, 50%**) and Group III (**4 patients, 40%**), indicating preference in patients with more resistant hypertension.

The **alpha-1 blocker prazosin** was prescribed in **1 patient (10%)** in each group. **Diuretics** were exclusively used in Group II: **furosemide** in **4 patients (40%)**, and **torsemide** in **3 patients (30%)**, suggesting a higher prevalence of fluid overload conditions or heart failure in this group. Lastly, a **RAAS modulator (sacubitril + valsartan)** was used in **1 patient (10%)** of Group II, reinforcing its cardiovascular protective role.

In summary, antihypertensive prescriptions varied across groups, with **beta blockers and vasodilators** being more common in Group I and Group III, while **diuretics and bisoprolol** were more prevalent in Group II.

Group I: Aspirin Only

Out of 10 patients of Group I taking Aspirin, hypertension 7(70%) and dyslipidemia 8(80%) were the most prevalent comorbidities, followed by coronary artery disease 3(30%) and hypothyroidism 3(30%). The antihypertensives prescribed included a range of beta blockers such as metoprolol, carvedilol, bisoprolol, atenolol, and labetalol. These are particularly beneficial in managing both hypertension and coronary artery disease. Clonidine, an alpha-2 agonist, was prescribed in 5(50%) of patients, likely due to resistant hypertension, although caution is advised due to its sedative effects. However, no RAAS modulators or diuretics were used in this group, representing a gap in optimal hypertension management, especially for those with cardiac or renal involvement. Overall, metoprolol and vasodilators appear to be the most suitable agents in this group, but the inclusion of a RAAS inhibitor would enhance therapeutic outcomes.

Group II: Clopidogrel Only

Among patients receiving only clopidogrel, diabetes mellitus 6(60%) and dyslipidemia 8(80%) were predominant, along with hypertension 5(50%), chronic heart failure 2(20%), and atrial fibrillation 1(10%). The most frequently used antihypertensive in this group was bisoprolol 5(50%), which is an excellent choice for managing both heart failure and atrial fibrillation. Diuretics such as furosemide and torsemide were also commonly prescribed, crucial for managing fluid overload in heart failure. Sacubitril/valsartan, a combination RAAS modulator, was used in one patient and represents an evidence-based choice for heart failure with reduced ejection fraction. Amlodipine, a calcium channel blocker, was also used in 2(20%) of patients and is considered safe in CKD and diabetic patients. Overall, bisoprolol, diuretics, and sacubitril/valsartan form an

effective combination in this group, appropriately addressing the major cardiovascular and renal comorbidities.

Group III: Dual Therapy (Aspirin + Clopidogrel)

In the dual therapy group, nearly all patients had hypertension 9(90%) and diabetes mellitus 9(90%), with high rates of dyslipidemia 10(100%) and coronary artery disease 5(50%). Beta blockers like metoprolol and atenolol were used in some patients to manage CAD and blood pressure. Clonidine was also used in 4(40%), likely for difficult-to-control hypertension. Clilnidipine, a calcium channel blocker with nephroprotective properties, was used in one patient and is particularly beneficial in diabetic nephropathy due to its ability to reduce proteinuria. However, this group did not receive any RAAS modulators or diuretics, which are key components in the management of diabetes-related hypertension and renal protection. Based on the comorbidities, metoprolol and clilnidipine are appropriate, but the addition of RAAS inhibitors (such as ACE inhibitors or ARBs) would optimize blood pressure control and renal outcomes.

II. SUPPORTIVE DRUGS

Table 13: Supportive Drugs

OTHER CLASSES OF DRUGS	DRUGS	GROUP I (ASPIRIN)		GROUP II (CLOPIDOGREL)		GROUP III (ASPIRIN + CLOPIDOGREL)	
		n=10	%	n=10	%	n=10	%
Calcium	Calcitriol	1	10%	3	30%	0	0
	Vitamin D+ Calcium	2	20%	1	10%	3	30%
	Calcium carbonate	0	0	1	10%	0	0
Phosphate binders	Sevelamer	2	20%	5	50%	3	30%
	Calcium polysterene sulphonate	5	50%	5	50%	4	40%
Iron preparation	Iron Sucrose	6	60%	7	70%	1	10%
Erythropietin	Erythropoietin	7	70%	10	100%	6	60%
Lipid lowering drugs	Atorvastatin	8	80%	6	60%	10	100%
	Rosuvastatin	0	0	2	20%	0	0
	Ezetimibe	2	20%	0	0	0	0
Multivitamin	Multivitamin	9	90%	10	100%	10	100%
	Protein powder	5	50%	9	90%	0	0
Proton pump inhibitors	Pantoprazole	6	60%	4	40%	1	10%
	Rabeprazole	0	0	1	10%	0	0
Insulin preparation	Insulin Detemir	1	10%	0	0	0	0
	Insulin isophane	0	0	3	10%	0	0
	Insulin aspart	0	0	1	10%	0	0
	Insulin glargine	0	0	2	20%	0	0
	Human Insulin	4	40%	6	60%	6	60%
Oral hypoglycemic agents	Linagliptin	1	10%	0	0	4	40%

	Gliclazide	1	10%	1	10%	0	0
Antianginal agents	Nitroglycerine	3	30%	2	20%	3	30%
	Trimetazidine	2	20%	1	10%	0	0
	Isosorbide dinitrate + Hydralazine	0	0	5	50%	0	0
	Nicorandil	3	30%	0	0	0	0
Hypouremic drugs	Febuxostat	0	0	5	50%	0	0
	allopurinol	0	0	1	10%	0	0
Anti-BPH agents	Tamsulosin + Dutasteride	0	0	1	10%	0	0
Thyroid Hormone	Levothyroxine	3	30%	3	30%	2	20%

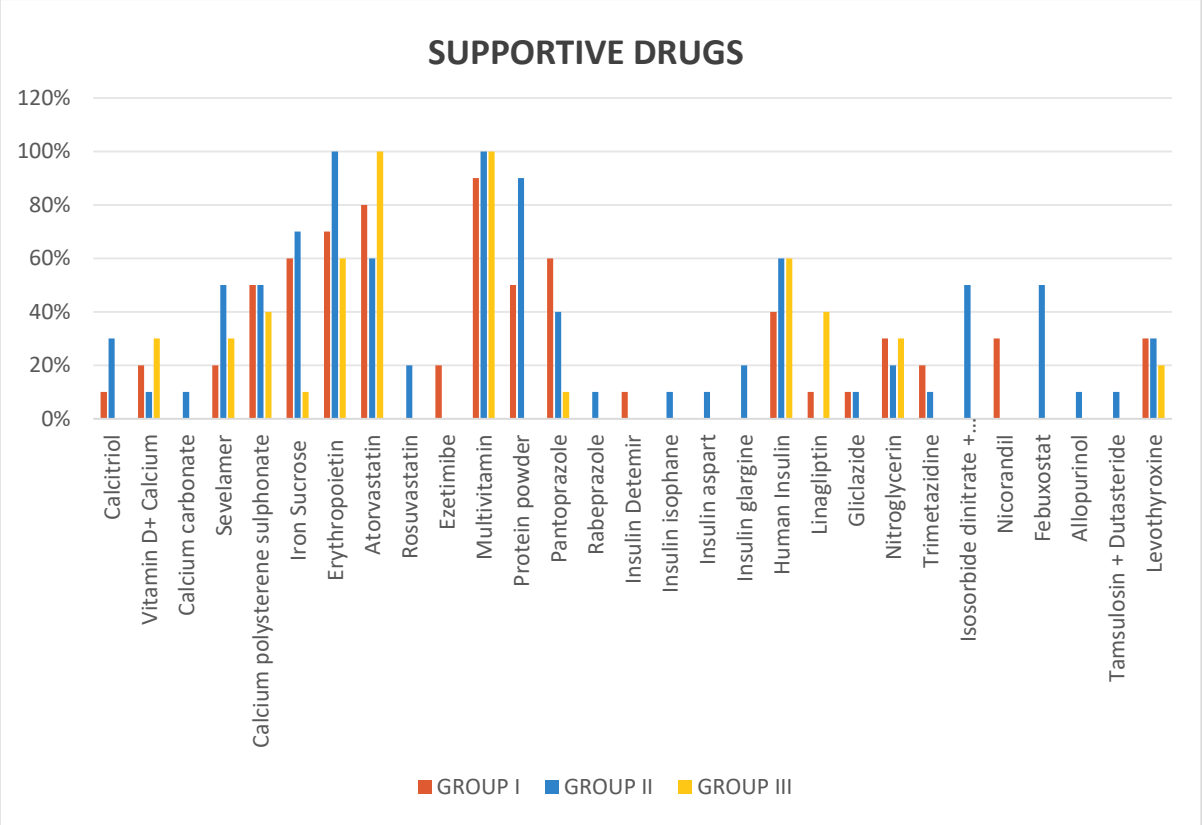

Fig 14: Supportive Drugs

Group I: Aspirin Only

In the aspirin-only group, the most common comorbidities were dyslipidemia 8(80%), hypertension 7(70%), and diabetes mellitus 4(40%). To manage dyslipidemia, atorvastatin was used in 8(80%) of patients, making it the most commonly used lipid-lowering agent in this group. Ezetimibe was also used in 2(20%), which complements statins by inhibiting intestinal cholesterol absorption. For anemia management, erythropoietin was administered to 7(70%), and iron sucrose to 6(60%), aligning with clinical needs in chronic kidney disease (CKD) patients prone to anemia. Multivitamins 9(90%) and protein powders 5(50%) addressed nutritional deficiencies common in dialysis patients. Calcium polystyrene sulphonate 5(50%) and sevelamer 2(20%) were used to manage hyperkalemia and hyperphosphatemia, respectively, both frequent in CKD. Human insulin 4(40%) was used to manage diabetes.

Vasodilators like Nitroglycerine 3(30%), Nicorandil 3(30%) and Trimetazidine 2(20%) were used to manage angina. Levothyroxine was prescribed to 3(30%) of patients with hypothyroidism. Among the calcium supplements, vitamin D with calcium was used more often 2(20%), likely targeting renal bone disease. Overall, atorvastatin, erythropoietin, and iron sucrose stand out as essential and well-aligned with the disease profile in this group.

Group II: Clopidogrel Only

Patients in the clopidogrel group showed high rates of dyslipidemia 8(80%), diabetes mellitus 6(60%), and chronic heart failure 2(20%). The most commonly used supportive medications included erythropoietin 10(100%) and iron sucrose 7(70%), demonstrating appropriate management of CKD-associated anemia. Lipid-lowering therapy was primarily managed with atorvastatin 6(60%) and rosuvastatin 2(20%). Protein powder 9(90%) and multivitamins 10(100%) suggest a strong focus on nutritional support. Sevelamer 5(50%) and calcium polystyrene sulphonate 5(50%) were key in controlling phosphate and potassium levels. Of note, febuxostat 5(50%) and allopurinol 1(10%) were used for managing hyperuricemia, likely linked to reduced renal clearance. Isosorbide dinitrate with hydralazine was prescribed in 5(50%) of patients—an excellent combination for heart failure, especially in those intolerant to RAAS inhibitors. Insulin therapy was widespread, with human insulin 6(60%) and insulin isophane 3(30%) being the most commonly used, matching the high diabetes burden. Overall, this group benefitted most from erythropoietin, iron sucrose, insulin, and phosphate binders—well-matched to their complex cardiovascular and renal comorbidities.

Group III: Dual Therapy (Aspirin + Clopidogrel)

This group had the highest burden of comorbidities, including dyslipidemia 10(100%), hypertension 9(90%), and diabetes mellitus 9(90%). Atorvastatin was used in all patients, making it the cornerstone for managing dyslipidemia. Interestingly, iron sucrose use was low 1(10%) compared to other groups, though 6(60%) received erythropoietin—suggesting that anemia might have been treated more with erythropoietin monotherapy. Calcium polystyrene sulphonate 4(40%) and sevelamer 3(30%) were used for hyperkalemia and hyperphosphatemia, which is essential in dialysis patients. Vitamin D with calcium 3(30%) suggests a focus on renal bone health. Linagliptin 4(40%) was the most common oral hypoglycemic agent used—an appropriate choice due to its renal safety profile. Levothyroxine was given to 2(20%) for hypothyroidism. Human insulin 6(60%) was also widely used to manage diabetes. However, the absence of nutritional supplementation like protein powders may need reassessment, especially given the high diabetes and CKD overlap. The most rational choices in this group were atorvastatin, erythropoietin, linagliptin, and sevelamer, tailored to manage the combined burden of cardiovascular, metabolic, and renal complications.

3.9 MEDICATION ADHERENCE

3.9.1 ADHERENCE OF PATIENTS BEFORE COUNSELLING

Table 14: Adherence of Patients Before Counselling

ARMS Score	GROUP I (ASPIRIN)		GROUP II (CLOPIDOGREL)		GROUP IIII (ASPIRIN + CLOPIDOGREL)	
	n=10	%	n=10	%	n=10	%
12 to 16	0	0%	1	10%	0	0%
17 to 24	1	10%	0	0%	0	0%
>24	9	90%	9	90%	10	100%

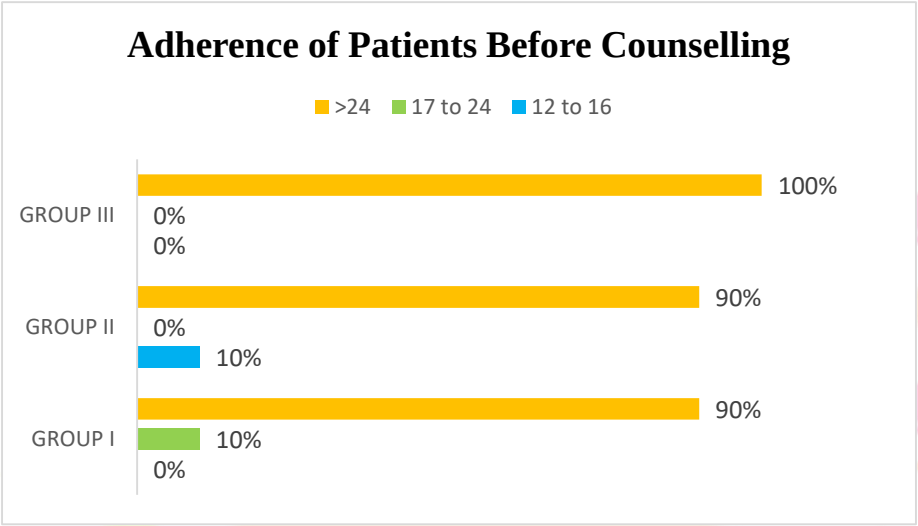

Fig 15: Adherence of Patients Before Counselling

- Out of 10 patients of Group I taking Aspirin, 1(10%) patient had moderate adherence and 9(90%) patients had poor adherence before counselling.
- Out of 10 patients of Group II taking Clopidogrel, 1(10%) patient had good adherence and 9(90%) patients had poor adherence before counselling.
- Out of 10 patients of Group III taking Aspirin and Clopidogrel, 10(100%) patients had poor adherence before counselling.

3.9.2 ADHERENCE OF PATIENTS AFTER COUNSELLING

Table 15: Adherence of Patients After Counselling

ARMS Score	GROUP I (ASPIRIN)		GROUP II (CLOPIDOGREL)		GROUP IIII (ASPIRIN + CLOPIDOGREL)	
	n=10	%	n=10	%	n=10	%
12 to 16	2	20%	1	10%	3	30%
17 to 24	3	30%	4	40%	3	30%
>24	5	50%	5	50%	4	40%

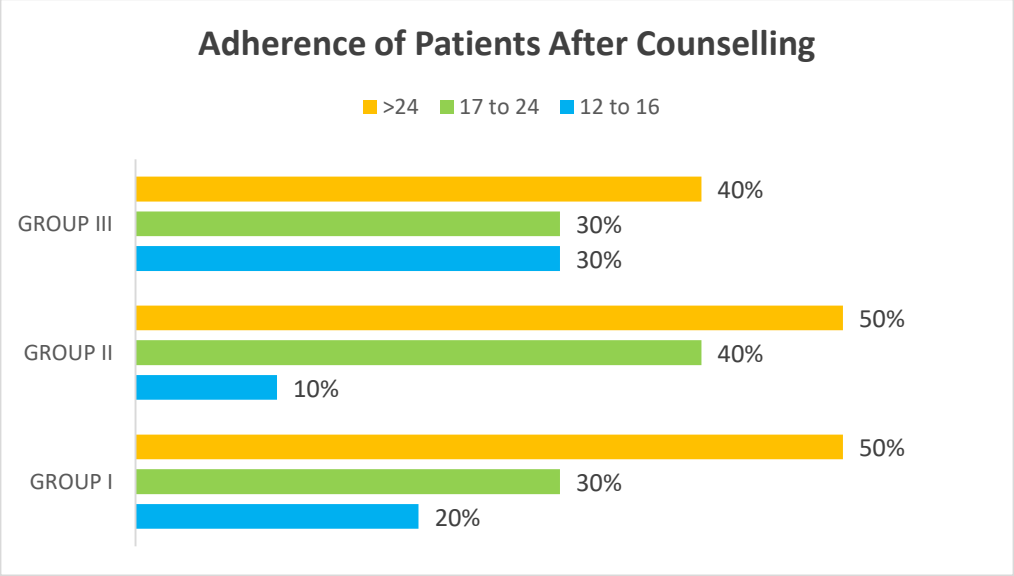

Fig 16: Adherence of Patients After Counselling

- Out of 10 patients of Group I taking Aspirin, 2(20%) patients had good adherence, 3(30%) patients had moderate adherence and 5(50%) patients had poor adherence after counselling followed up after one month.
- Out of 10 patients of Group II taking Clopidogrel, 1(10%) patients had good adherence, 4(40%) patients had moderate adherence and 5(50%) patients had poor adherence after counselling followed up after one month.
- Out of 10 patients of Group III taking Aspirin and Clopidogrel, 3(30%) patients had good adherence, 3(30%) patients had moderate adherence and 4(40%) patients had poor adherence after counselling followed up after one month.

3.9.3 MEDICATION ADHERENCE FOR TOTAL SAMPLE

Table 16: Medication Adherence for Total Sample(n=30)

ARMS Score	BEFORE COUNSELLING		AFTER COUNSELLING	
	n=30	%	n=30	%
12 to 16	1	3%	6	20%
17 to 24	1	3%	10	33%
>24	28	93%	14	47%

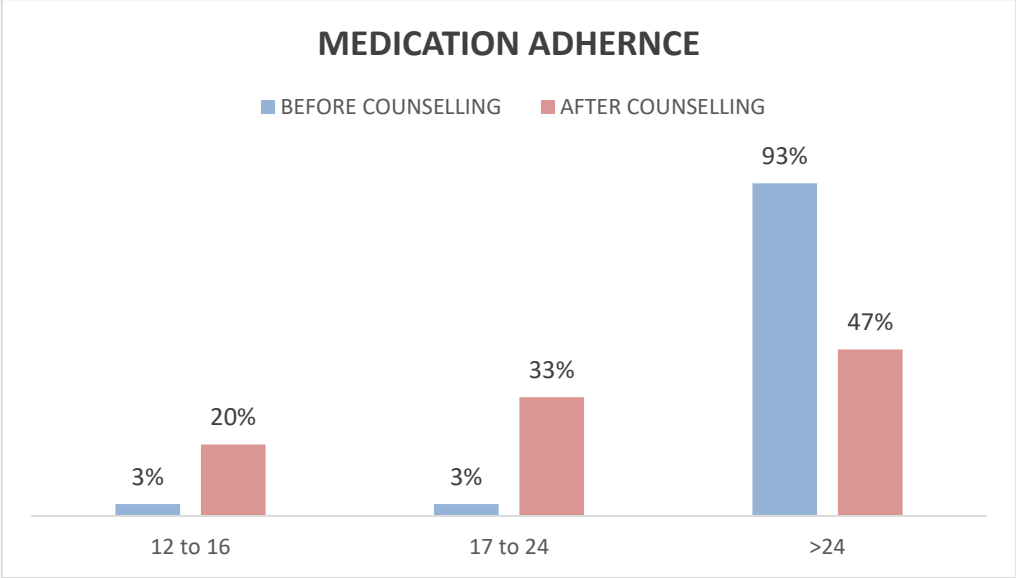

Fig 17: Medication Adherence for Total Sample(n=30)

- This study indicates that the medication adherence of the patients significantly improved after providing counselling using Patient Information Leaflet.
- Some Patients did not show much variation in their adherence. Probable reason would be elderly age leads to reduced cognitive and physical functions. Adherence challenges such as memory issues and dependence on caregivers are more common.

3.11 COMPARISON OF MEDICATION ADHERENCE

I. ASSESSING ADHERENCE OF PATIENTS TAKING ASPIRIN

Table 17: Assessing Adherence of Patients Taking Aspirin

Group I (Aspirin)	Before Counselling	After counselling
Mean Score	33.3	25.3
SD	1.889	8.845
p-value: 0.002		

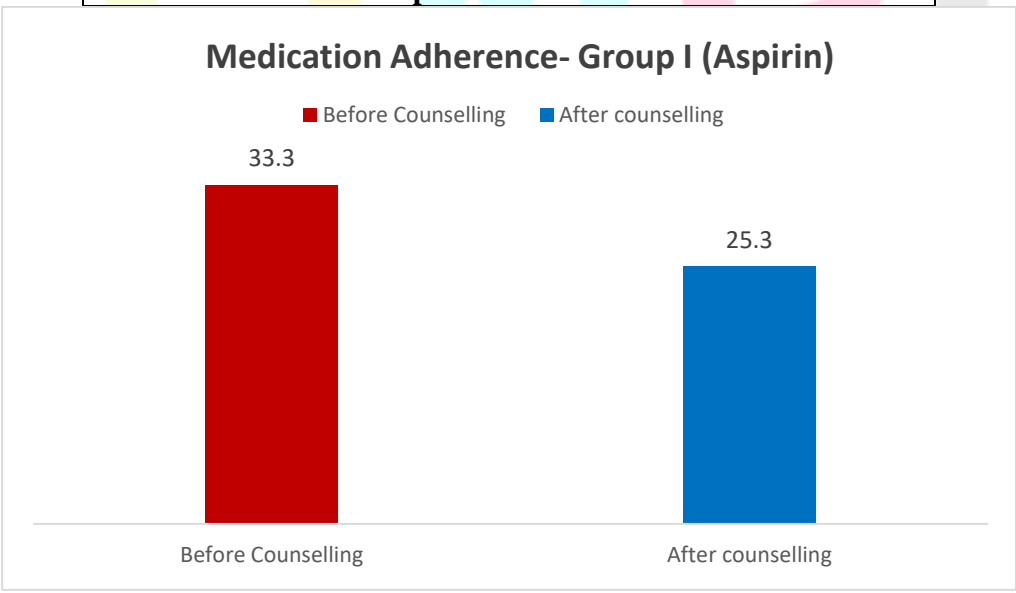

Fig 18: Assessing Adherence of Patients Taking Aspirin

p<0.05

Comparing pre and post score a paired t-test is administered. The result is significant and we reject the null hypothesis that the

scores are equal and conclude that the post score is significant than the pre score.

Since the p-value is statistically significant, we infer that the medication adherence was improved significantly in 10 patients of Group I taking Aspirin.

II. ASSESSING ADHERENCE OF PATIENTS TAKING CLOPIDOGREL

Table 18: Assessing Adherence of Patients Taking Clopidogrel

Group II (Clopidogrel)	Before Counselling	After counselling
Mean Score	33.5	26
SD	2.173	8.563
p-value:0.01		

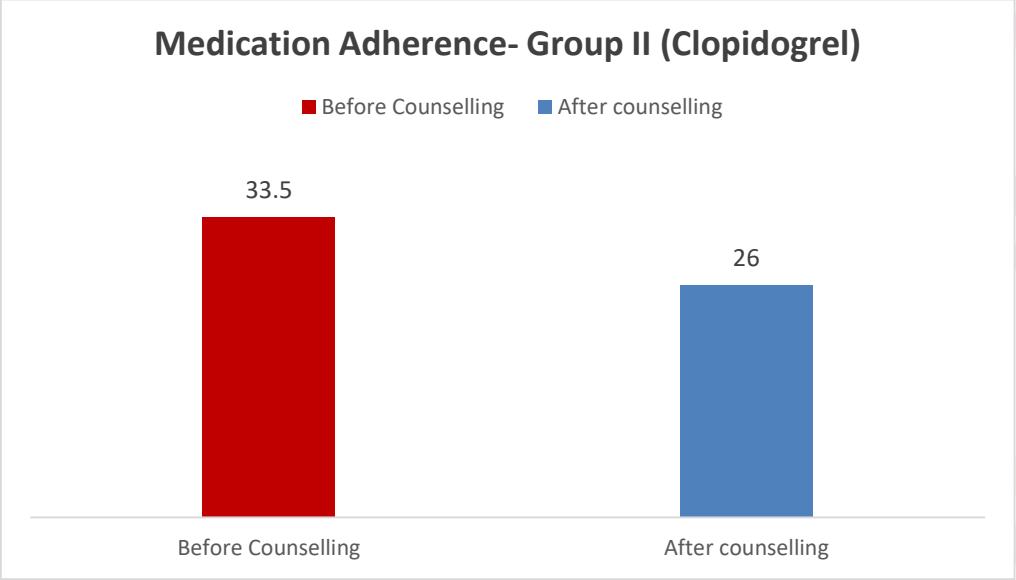

Fig 19: Assessing Adherence of Patients Taking Clopidogrel

p<0.05

Comparing pre and post score a paired t-test is administered. The result is significant and we reject the null hypothesis that the scores are equal and conclude that the post score is significant than the pre score.

Since the p-value is statistically significant, we infer that the medication adherence was improved significantly in 10 patients of Group II taking Clopidogrel.

III. ASSESSING ADHERENCE OF PATIENTS TAKING ASPIRIN + CLOPIDOGREL

Table 19: Assessing Adherence of Patients Taking Aspirin + Clopidogrel

Group III (Aspirin+ Clopidogrel)	Before Counselling	After counselling
Mean Score	33.22	24.44
SD	1.986	8.676
p-value: 0.0123		

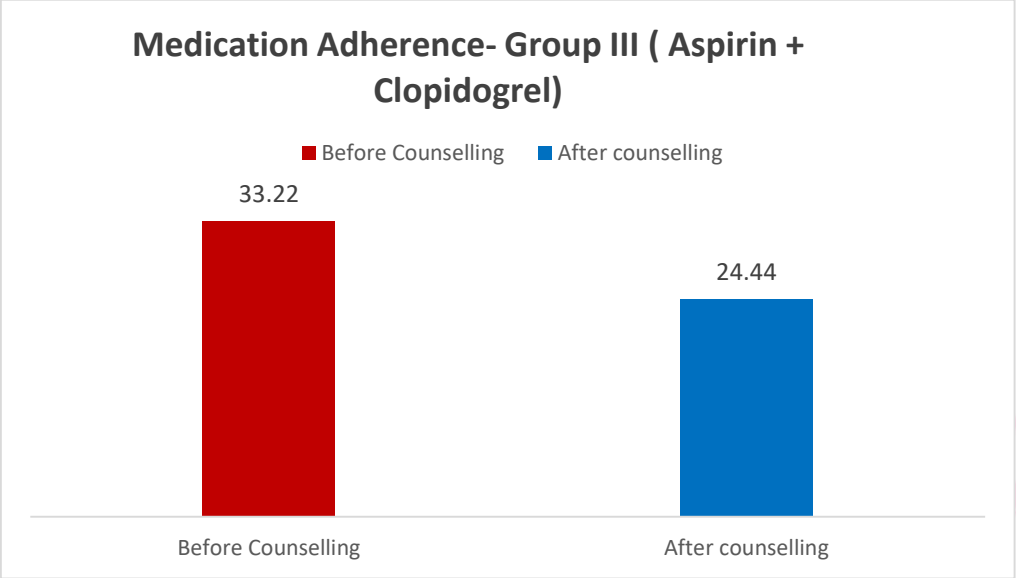

Fig 20: Assessing Adherence of Patients Taking Aspirin + Clopidogrel

p<0.05

Comparing pre and post score a paired t-test is administered. The result is significant and we reject the null hypothesis that the scores are equal and conclude that the post score is significant than the pre score.

Since the p-value is statistically significant, we infer that the medication adherence was improved significantly in 10 patients of Group III taking Aspirin and Clopidogrel.

IV. ASSESSING ADHERENCE OF TOTAL SAMPLE

Table 20: Assessing Adherence of Total Sample

Total sample	Before Counselling	After counselling
Mean Score	33.27	24.63
SD	1.911	8.327
p-value= 0.0109		

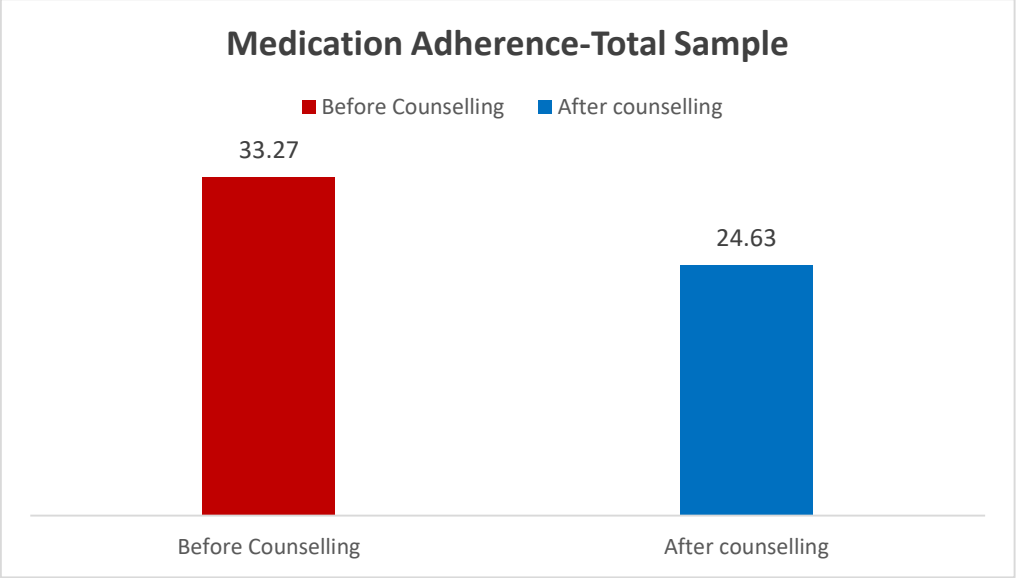

Fig 21: Assessing Adherence of Total Sample

p<0.05

Comparing pre and post score a paired t-test is administered. The result is significant and we reject the null hypothesis that the scores are equal and conclude that the post score is significant than the pre score.

Since the p-value is statistically significant, we infer that the medication adherence was improved significantly in the Total Sample of 30 patients.

4. DISCUSSION

This pilot study examined the effects of Aspirin, Clopidogrel, and their combination in patients with Chronic Kidney Disease (CKD) undergoing maintenance hemodialysis, with a focus on medication adherence, bleeding and thrombotic risks, comorbidities, and concomitant drug use. The study involved 30 patients divided into three treatment groups, each receiving one of the three regimens. The findings revealed significant variations in patient demographics, adherence patterns, clinical outcomes, and prescribing trends for antihypertensive and supportive medications.

4.1 Age-Wise Distribution

The study revealed a clear trend: as age increased, the occurrence of CKD among patients rose across all three groups. Group I (Aspirin) predominantly comprised patients aged 56–70 years 7(70%), while Group II (Clopidogrel) had a significant proportion of elderly patients aged 71–86 years 5(50%). Group III (Aspirin + Clopidogrel) showed a mixed distribution but still leaned heavily toward the older population. This suggests that aging is a strong risk factor for CKD development and progression. Importantly, the age-related adherence challenges, especially among the oldest patients, highlight the need for personalized support strategies.

4.2 Gender-Wise Distribution

Gender-wise analysis showed that males predominated in Group II (Clopidogrel) with 9(90%) representation, whereas Group I (Aspirin) showed a slight male predominance 6(60%). Interestingly, Group III (Aspirin + Clopidogrel) had an equal male-to-female ratio. Overall, CKD with CVD was more common in males,

reflecting known gender differences in cardiovascular and kidney disease risk. The balanced gender representation in Group III also indicates that treatment decisions are driven more by clinical severity than gender.

4.3 Weight-Wise Distribution

Weight-wise distribution emphasized that most patients fell within the 51–70 kg range. Group I (Aspirin) had a higher percentage in the 61–70 kg category, while Group II (Clopidogrel) patients were more evenly split between 51–60 kg and 61–70 kg. In Group III (dual therapy), most patients 6(60%) were within 51–60 kg. These findings suggest that moderate weight groups are predominantly affected by CKD. Notably, higher body weights correlated with increased CKD risk, emphasizing the importance of weight management.

4.4 Literacy-Based Distribution

Literacy level played a crucial role in this study. In all groups, the majority of patients were literates (80–90%). Literate patients tended to have better understanding and adherence after counselling, indicating that health literacy significantly impacts disease management outcomes. It reinforces the need for customized education strategies for those with limited literacy to bridge gaps in understanding and compliance.

4.5 Social Habits

Social habits like smoking and alcohol consumption were common among CKD patients. About 20–30% in all groups reported these habits, with some using both. Patients engaging in both smoking and alcohol use are at heightened risk for poor treatment adherence and worsened disease progression. It highlights the critical role of behaviour modification counselling in improving both health outcomes and medication adherence in this vulnerable population.

4.6 Bleeding and Thrombotic Events

The study revealed aspirin taking patients had higher bleeding risk 6(60%) but no thrombotic events, whereas clopidogrel taking patients had thrombotic events 4(40%) but no bleeding. Dual Antiplatelet Therapy taking patients showed a better balance, with fewer bleeding and thrombotic events. The statistically significant p-value (0.0112) supports that treatment type significantly affects patient safety profiles. These findings highlight the importance of risk-benefit assessment when choosing antiplatelet therapy in CKD patients.

4.7 HAS-BLED Scoring

HAS-BLED scoring further emphasized bleeding risk profiles. Aspirin users had the highest proportion of high-risk (≥4) scores, while clopidogrel users were mostly low-risk. Dual therapy patients had a spread across low, moderate, and high risk. The distribution demonstrates how clinicians tailor therapy based on bleeding risk, using clopidogrel for safer profiles while accepting higher risk in aspirin and combination groups when necessary for cardiovascular protection.

4.8 Drug Utilization Pattern

A. Comorbid Conditions

I. Comorbid Conditions In Each Group

- Group I (Aspirin): Most common comorbidities included dyslipidemia 8(80%) and hypertension 7(70%). Notably, no cases of chronic heart failure or atrial fibrillation were seen.

- Group II (Clopidogrel): Alongside dyslipidemia 8(80%) and diabetes mellitus 6(60%), unique conditions such as chronic heart failure 2(20%) and atrial fibrillation 1(10%) were observed.
- Group III (Dual therapy): Exhibited the highest burden, with 10(100%) having dyslipidemia, and 90% each having diabetes and hypertension.

II. Comorbid Conditions In Total Sample

Across all 30 chronic kidney disease (CKD) patients undergoing maintenance hemodialysis:

- Dyslipidemia was the most prevalent comorbidity, present in 26(87%) of patients.
- Diabetes mellitus affected 24(80%), and hypertension was reported in 21(70%), emphasizing the triad of metabolic disorders commonly complicating CKD progression.
- Coronary artery disease 9(30%) and hypothyroidism 8(27%) were moderately prevalent.
- Less frequent but clinically significant comorbidities included chronic heart failure 2(7%), benign prostatic hypertrophy 2(7%), history of cerebrovascular accident 2(7%), iron deficiency anemia 1(3%), urolithiasis 1(3%), and atrial fibrillation 1(3%).

B. Classification of Drugs

I. Antihypertensive Agents

Beta-blockers were the most frequently prescribed antihypertensives, particularly metoprolol and bisoprolol. Clonidine and vasodilators like nitroglycerine were also commonly used, especially in Group II (Aspirin and Clopidogrel) and Group I (Aspirin), reflecting the need for tight blood pressure control and cardiac protection in CKD patients.

II. Other Classes of Drugs

- Calcium + Vitamin D was most common in Group III 3(30%) and Group I 2(20%), while calcitriol was used primarily in Group II 3(30%), reflecting differences in mineral bone disorder management.
- Phosphate binders (Sevelamer and Calcium polystyrene sulphonate) were most used in Group II 5(50% each), consistent with higher uremic toxin burden.
- Iron sucrose and erythropoietin were frequently administered, particularly in Group II 7(70%) and 10(100%) and Group I 6(60%) and 7(70%), showing attention to anemia correction.
- Atorvastatin was universally prescribed in Group III 10(100%), reflecting aggressive lipid control. Ezetimibe (Group I) and rosuvastatin (Group II) were used sparingly.
- Multivitamins and protein powders were widely used; Group II had the highest protein supplementation 9(90%), addressing higher nutritional deficits.
- Gastroprotection with pantoprazole was prominent in Group I 6(60%), while rabeprazole was used in only one Group II patient.
- Insulin therapy was extensive, with human insulin being the most common 4(40) and 6(60%) across groups). Group II showed the most complex regimens with glargine, isophane, and aspart use.
- Oral antidiabetics such as linagliptin were selectively used in Group III 4(40%), likely due to its safety profile in renal impairment.

- Antianginal agents (nitroglycerine, trimetazidine, isosorbide dinitrate + hydralazine) and hypouricemic drugs (febuxostat, allopurinol) were used only in Group II, indicating greater cardiac and metabolic complications.
- Levothyroxine was used consistently across all groups, reflecting the underlying hypothyroidism prevalence.

4.9 Medication Adherence

4.9.1 Adherence Before Counselling

Before counselling, the majority of patients (90–100%) had poor adherence across all groups. This baseline highlights the significant challenge of medication non-compliance in CKD patients, particularly due to factors like polypharmacy, cognitive decline, and lack of disease understanding.

4.9.2 Adherence After Counselling

Following counselling and provision of a patient information leaflet, medication adherence significantly improved. The proportion of patients achieving good and moderate adherence increased notably, reflecting the success of targeted education and reinforcement strategies. However, a subset still showed poor adherence, likely influenced by age-related cognitive and functional limitations.

4.9.3 Total Sample Adherence

Across the total sample of 30 patients, adherence improved from 3% good adherence (before counselling) to 20% (after counselling), 3% moderate adherence (before counselling) to 33% (after counselling) and decline in poor adherence 94% (before counselling) to 47% after counselling. The significant improvement demonstrates the power of patient education and structured counselling in transforming health behaviours in CKD patients.

4.10 Comparison of Medication Adherence

Paired t-tests confirmed statistically significant improvement in medication adherence post-counseling across all groups, distinctively and in the total sample. Mean ARMS scores improved from around 33 to approximately 24–26, affirming that structured counselling interventions positively impact patient behaviour. Despite challenges, particularly among elderly patients, the results highlight the potential of patient-centered care in chronic disease management.

5. CONCLUSION

This prospective observational study provides valuable insights into the drug utilization patterns, bleeding and thrombotic events, and medication adherence among chronic kidney disease (CKD) patients undergoing maintenance hemodialysis and receiving antiplatelet therapy with aspirin, clopidogrel, or aspirin and clopidogrel.

The findings revealed that the incidence of CKD, as well as the complexity of disease management, increases with advancing age. Male patients were predominantly affected, especially among those receiving clopidogrel, though combination therapy showed an equal gender distribution. Weight analysis showed that

moderate-weight individuals (51–70 kg) were more vulnerable, further highlighting the importance of lifestyle management in CKD.

Literacy level was positively associated with better medication understanding and adherence, demonstrating the pivotal role of health literacy in chronic disease outcomes. Social habits such as alcohol consumption and smoking were found to negatively influence adherence and disease progression, emphasizing the need for focused behavioural counselling.

Bleeding and thrombotic events varied significantly between groups: aspirin monotherapy was associated with higher bleeding risk, clopidogrel monotherapy with higher thrombotic events, and dual antiplatelet therapy achieved a more balanced safety profile. The HAS-BLED scores correspondingly reflected these risks, with clopidogrel demonstrating a safer bleeding risk profile compared to aspirin.

Drug utilization patterns showed that dual therapy patients had a greater burden of comorbidities, particularly hypertension, diabetes mellitus, dyslipidemia, and coronary artery disease, necessitating a broader and more intensive pharmacological approach. A wide range of supportive therapies, including antihypertensives, lipid-lowering agents, phosphate binders, and erythropoietin, highlighted the multifaceted management required in this population.

Most importantly, the study revealed that baseline medication adherence was poor across all groups but showed significant improvement following patient-centered counselling interventions using a patient information leaflet. Paired t-test analysis confirmed that post-counselling adherence scores were statistically and clinically better, emphasizing that simple, empathetic educational efforts can drive meaningful improvements in patient outcomes.

Overall, this study highlights the critical importance of personalized risk assessment, multidisciplinary care, lifestyle modification, and continuous patient education in improving health outcomes among CKD patients on antiplatelet therapy.

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