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Study on Drug use Pattern in the Management of the Cardiovascular Diseases and with Comorbidities

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ABSTRACT

Cardiovascular diseases (CVDs) remain a major cause of morbidity and mortality worldwide. Drug utilization studies provide valuable information regarding prescribing practices, rational drug use, and medication adherence. Comorbidities such as diabetes mellitus and hypertension often complicate cardiovascular disease management and may influence prescribing patterns. To evaluate drug utilization patterns and medication adherence among cardiovascular disease patients with associated comorbidities receiving treatment in a private hospital in Tiruvannamalai, Tamil Nadu, India. A prospective observational study was conducted over six months (February-July 2026) involving 65 adult patients diagnosed with cardiovascular diseases. Data regarding demographics, diagnosis, comorbidities, prescribed medications, dosage regimen, route of administration, laboratory parameters, and medication adherence were collected using a structured case record form. Descriptive statistical methods were used for analysis. Patient adherence was assessed before and after counseling interventions. Results of the 65 patients enrolled, 61.5% were male and 38.5% were female. The majority belonged to the 61-70 years age group. Acute coronary syndrome (41.5%) was the most common cardiovascular condition. Telmisartan (36.9%) was the most frequently prescribed antihypertensive drug, atorvastatin (58.5%) the most commonly prescribed hypolipidemic agent, and clopidogrel (49.2%) the leading antiplatelet medication. Digoxin (41.5%) was the most utilized ionotropic drug, while vildagliptin (30.7%) was the predominant antidiabetic agent among patients with diabetes. Medication adherence improved substantially following counseling, increasing from 59.3% to 84.6%. The study demonstrated the predominance of atorvastatin, clopidogrel, and telmisartan in cardiovascular disease management. Acute coronary syndrome was the most frequently encountered diagnosis. Patient counseling significantly improved medication adherence, emphasizing the importance of pharmacist involvement and rational prescribing in optimizing treatment outcomes among cardiovascular disease patients with comorbidities.

Keywords: Cardiovascular diseases, Drug utilization, Comorbidities, Adherence, Rational prescribing, Pharmacist intervention

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INTRODUCTION

Cardiovascular diseases (CVDs) remain the leading cause of morbidity and mortality worldwide and constitute a major public health concern. The increasing prevalence of CVD is attributed to population ageing, rapid urbanization, sedentary lifestyles, unhealthy dietary habits, tobacco consumption, and the growing burden of metabolic disorders. Despite remarkable advances in diagnosis and treatment, cardiovascular diseases continue to impose substantial clinical and economic burdens, particularly in low- and middle-income countries.[1]

Cardiovascular diseases comprise a broad range of disorders, including coronary artery disease, systemic hypertension, myocardial infarction, heart failure, cerebrovascular disease, peripheral arterial disease, and congenital heart diseases. These conditions frequently coexist with chronic illnesses such as diabetes mellitus, chronic kidney disease, dyslipidaemia, obesity, and chronic respiratory diseases, making clinical management more complex and increasing the risk of adverse cardiovascular outcomes. [2,3]

Evidence-based pharmacotherapy has significantly improved the prognosis of patients with cardiovascular diseases. Current treatment recommendations emphasize individualized therapy using antihypertensive agents, antiplatelet drugs, anticoagulants, lipid-lowering medications, beta-blockers, angiotensin-converting enzyme (ACE) inhibitors, angiotensin receptor blockers (ARBs), calcium channel blockers, diuretics, and sodium-glucose cotransporter-2 (SGLT2) inhibitors where indicated. Appropriate drug selection depends on disease severity, associated comorbidities, patient characteristics, and current clinical practice guidelines.[4,5]

Patients with cardiovascular diseases commonly require multiple medications for the management of both primary cardiac conditions and associated comorbidities. Although polypharmacy is often unavoidable, it increases the likelihood of adverse drug reactions, drug–drug interactions, medication errors, poor treatment adherence, and increased healthcare expenditure. Therefore, regular evaluation of prescribing practices is essential to promote rational drug use and optimize therapeutic outcomes.[6]

Drug utilization studies provide valuable information regarding prescribing behavior, medication use patterns, and adherence to standard treatment guidelines in routine clinical practice. Such studies assist healthcare professionals in identifying inappropriate prescribing, improving medication safety, promoting evidence-based therapy, and enhancing the overall quality of patient care. They also provide useful evidence for developing institutional drug policies and strengthening pharmacovigilance activities. [7,8]

The present study was designed to evaluate prescribing trends in the treatment of cardiovascular diseases (CVDs) among patients with associated comorbid conditions. Eligible participants included adult patients diagnosed with cardiovascular disorders such as coronary artery disease, hypertension, myocardial infarction, cerebrovascular disease, and stroke, irrespective of gender. Both hospitalized patients and those attending the outpatient department at a private hospital in Tiruvannamalai were screened for eligibility during the study period. Patients who fulfilled the predefined inclusion and exclusion criteria and provided informed consent were enrolled consecutively for analysis. Demographic details, clinical characteristics, comorbidities, and medication profiles were collected using a structured data collection form to assess drug utilization patterns and prescribing practices.

MATERIALS AND METHOD

Study Design and Setting

A prospective, observational study was conducted over a period of six months, from February 2026 to July 2026, at a private hospital in Tiruvannamalai, Tamil Nadu, India. The study aimed to evaluate drug utilization patterns in the management of cardiovascular diseases (CVDs) among patients with associated comorbidities receiving routine clinical care.

Study Population

The study included adult patients (≥20 years) diagnosed with cardiovascular diseases, including coronary artery disease, systemic hypertension, myocardial infarction, cerebrovascular disease, and stroke. Both hospitalized patients and those attending the outpatient department during the study period were screened for eligibility. Patients fulfilling the inclusion criteria and providing written informed consent were enrolled consecutively.

Inclusion Criteria

Patients aged 20 years and above with a confirmed diagnosis of one or more cardiovascular diseases who received pharmacological treatment during the study period and were willing to participate were included in the study.

Exclusion Criteria

Patients younger than 20 years of age, pregnant or lactating women, individuals unwilling to participate, patients with incomplete medical records, and those unable to provide informed consent were excluded from the study.

Data Collection

Data were collected prospectively using a structured and predesigned case record form. Information regarding demographic characteristics, clinical diagnosis, associated comorbidities,

medication history, prescribed drugs, dosage, route and frequency of administration, duration of treatment, laboratory investigations, and clinical outcomes was obtained from patients' medical records and treatment charts. Relevant laboratory parameters, including hemoglobin, blood glucose, serum creatinine, liver function tests, renal function tests, lipid profile, and blood pressure measurements, were documented wherever available.

Statistical Analysis

The data was collected and entered in Microsoft excel software 2007 and interpreted by descriptive statistics that was presented to analyze and express the report as counts and percentages in the form of the tables, charts and graphs.

RESULTS

Sample for research included 65 patients who visited both inpatient and outpatient service with CVDs and with comorbidities in private Hospital. The research was conducted over a period of 6 months from February 2026 to July 2026.

Totally 65 patients of both the gender with CVDs and with comorbidities were recruited for the present study. Among them 61.5% patients were male and 38.5% patients were female. CVDs are more common in people between 61-70 years of age (Table 1).

Table 1: Age wise distribution

Characteristic	Variables	Percentage(%)
Age	20-40	3
	41-50	18.5
	51-60	24.6
	61- 70	38.5
	71- 80	15.4

Table 2: Disease wise distribution

Characteristic	Variables	Percentage(%)
Disease	Systemic hypertension	38.4
	Acute coronary syndrome	41.5
	Atrial fibrillation	9.2
	Ischemic heart disease	10.7

In total 65 patient's majority of patients were diseased with acute coronary syndrome nearly 41.5 % as shown in the Table 2.

Table 3: Antihypertensive Drugs

Category	Drugs	Percentage (%)
Anti Hypertensive Drugs	Telmisartan	36.9
	Metoprolol	27.6
	Amlodipine	16.9
	Atenolol	10.7
	Enalapril	6.2
	Carvedilol	1.5

Among cardiovascular drugs Telmisartan (36.9%) were prescribed more in antihypertensive drugs as shown in the Table 3.

Table 4: Anginal, Hypolipidemic, Antiplatelet drugs

Category	Drugs	Percentage (%)
Antianginal Drugs	Nitroglycerin	4.6
	Isosorbide dinitrate	18.4
Hypolipidemic drugs	Atorvastatin	58.5
	Rosuvastatin	18.4
Antiplatelet drugs	Aspirin	38.5
	Clopidogrel	49.2
	Aspirin + Clopidogrel	10.7

Isosorbide dinitrate (18.4%) were prescribed more in antianginal drugs, atorvastatin (58.5%) was prescribed more in hypolipidemic agents, clopidogrel (49.2%) were prescribed in the antiplatelet drugs as shown in the Table 4.

Table 5: Inotropic, anticoagulant, diuretic drugs.

Category	Drugs	Percentage (%)
Ionotropic	Digoxin	41.5
Anticoagulant	Heparin	10.7
	Enoxaparin	3.07
Diuretics drugs	Furosemide	16.9
	Spironolactone	12.3
	Furosemide + Spironolactone	15.4

Digoxin (41.5%) were prescribed more in ionotropic drugs, heparin (10.7%) was prescribed more in anticoagulant drugs, furosemide (16.9%) was prescribed more in diuretics drugs table 5.

Table 6: Co-morbidities drugs.

Category	Drugs	Percentage (%)
Diabetic drugs	Vildagliptin	30.7
	Metformin	18.4
	Gliclazide	9.2

In co-morbidities patients vildagliptin (30.7%) were prescribed more in diabetic drugs (Table 6).

Table 7: Adherence rate.

Adherence	Pre-patient counselling, (%)	Post-patient counselling, (%)
Non-adherence	6	0
Partial adherence	35.3	15.3
Adherence	59.3	84.6

In total 65 patients, on pre-patient counselling medically adhered patients were (59.3%) and non-adhered patients were (6%). On post-patient counseling non-adhered patients were 0 and medically adhered patients were (84.6%) (Table 7).

DISCUSSION

This study provides important insights into the prescribing trends and rational drug use among patients with cardiovascular diseases (CVDs) and associated comorbidities. Out of 65 participants, men accounted for 61.5%, which may be linked to lifestyle factors such as smoking and alcohol consumption. The majority of patients were between 61–70 years of age, reflecting the age group most vulnerable to CVD due to reduced physical activity and socioeconomic challenges. Acute coronary syndrome (41.5%) and systemic hypertension (38.4%) were the most prevalent conditions, consistent with global epidemiological data. The average number of drugs prescribed per patient was 10, indicating polypharmacy, which is often necessary in managing CVD with comorbidities but requires careful monitoring to avoid drug interactions. Prescriptions largely adhered to WHO guidelines, demonstrating rational prescribing practices. Importantly, no adverse drug reactions were reported, though minor drug interactions were observed in a few cases, suggesting cautious drug selection by physicians.

Drug utilization analysis revealed telmisartan as the most frequently prescribed antihypertensive, atorvastatin as the predominant hypolipidemic agent, and clopidogrel as the leading antiplatelet drug. Digoxin was commonly used among inotropic agents, while vildagliptin was the most prescribed antidiabetic drug in patients with comorbid diabetes. These findings align with standard therapeutic approaches and reinforce the importance of evidence-based prescribing.

A significant outcome of the study was the improvement in medication adherence following patient counseling. Adherence rates increased from 59.3% to 84.6%, underscoring the role of clinical pharmacists in enhancing compliance and reducing treatment costs. Rational prescribing combined with structured counseling not only improved adherence but also contributed to better patient outcomes, particularly in resource-limited settings.

The study was limited by the exclusion of ICU patients, those with mental illness, and younger individuals (<54 years), which may restrict generalizability. Future studies should expand to include these populations for a more comprehensive understanding of prescribing practices and adherence outcomes.

CONCLUSION

The present study concludes that cardiovascular drugs were prescribed rationally in accordance with current guidelines. Beyond pharmacological management, patient education on risk factors and lifestyle modifications is essential to prevent disease progression. Cost-analysis demonstrated that less expensive drugs often provide comparable efficacy, supporting rational prescribing practices for economically constrained patients.

Antihypertensive agents such as beta-blockers, calcium channel blockers, diuretics, ACE inhibitors, and vasodilators were frequently prescribed, reflecting standard treatment protocols. Regular monitoring and structured patient counseling significantly improved adherence, highlighting the importance of pharmacist involvement in optimizing therapy.

Overall, rational drug use, cost-effective prescribing, and adherence promotion are critical strategies to reduce morbidity and mortality in CVD patients with comorbidities. Future research should focus on integrating pharmacist-led interventions and expanding study populations to strengthen evidence for rational prescribing in diverse clinical settings.

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