

<https://doi.org/10.56770/jcp20261011>**A PROSPECTIVE CROSS-SECTIONAL STUDY ON DRUG UTILIZATION EVALUATION DRUGS IN A CARDIAC SPECIALIZED HOSPITAL****Rana Dawood Naseer^{1*} , Febrina Mahmudah Darwis², Maryam Farrukh³ **¹Department of Pharmacy, Faculty of Health and Pharmaceutical Sciences, University of Agriculture Faisalabad, Punjab, Pakistan.²Clinical Pharmacy Department, Faculty of Pharmacy, Mulawarman University Samarinda City, East Kalimantan, Indonesia.³Department of Pharmacology, Faculty of Pharmaceutical Sciences, Government College University Faisalabad, Punjab, Pakistan.

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ABSTRACT

A variety of illnesses that impact the heart and blood arteries are referred to as cardiovascular diseases. Patients with myocardial infarction (heart attack), angina pectoris, coronary heart disease, and stroke are often prescribed anticoagulant and antiplatelet drugs. Improving patient outcomes and reducing related risks require optimizing the use of these drugs. The purpose of this study was to assess the safety profiles and prescription trends of anticoagulant and antiplatelet medications for patients admitted to a tertiary care hospital's cardiology department. 125 patients who were prescribed these drugs for cardiovascular conditions participated in a prospective cross-sectional study that was carried out over the course of a year at the Peshawar Institute of Cardiology in Peshawar, KPK. Cardiovascular illness was more common in men (71%) than in women (29%) among the 125 cases, and the majority of afflicted patients were between the ages of 55 and 65. 38.7% of the patients were treated with antiplatelet drugs, 5.42% with anticoagulants, and 55.88% with both. Heparin was the most widely used anticoagulant, and aspirin was the most often prescribed antiplatelet. Our research finds that both anticoagulants and antiplatelet medications are essential for controlling cardiovascular illnesses and minimizing complications, with antiplatelet medications being prescribed more frequently than anticoagulants and combination therapy being preferable.

Keywords: Cross-sectional study, Drug utilization, Cardiac hospital, Anticoagulants.*Corresponding Author. E-mail: drdawood.naseer@uaf.edu.pk**INTRODUCTION**

The World Health Organization (WHO) defines cardiovascular disease (CVD) as a collection of disorders that affect the heart and blood vessels, including coronary heart disease, myocardial infarction, angina, stroke, and congenital heart disease. CVD is the leading cause of death globally, and its burden has been steadily increasing over the years. Since 1990, global deaths attributed to cardiovascular diseases have risen from 14.4 million to 17.5 million. In India, annual cardiovascular-related deaths increased from 2.20 million in 1990 to 4.77 million in 2020 [1-3]. According to WHO, drug utilization encompasses the marketing, distribution, prescription, and use of drugs within a society, emphasizing the medical, social, and economic factors that influence medication use. Understanding drug utilization is essential for interpreting and improving the prescription, administration, and use of medicines, ultimately enhancing patient therapeutic outcomes.

Anticoagulants are drugs that prevent or reduce the formation of blood clots in the circulatory system. While they do not dissolve existing clots, they help prevent the formation of new ones and inhibit the growth of existing clots.

Anticoagulants are primarily used to manage serious conditions such as myocardial infarction, angina, stroke, pulmonary embolism, and rheumatic heart disease. Common parenteral anticoagulants include low molecular weight heparin, unfractionated heparin, fondaparinux, and warfarin. Recently, several oral anticoagulants have been introduced, such as direct thrombin inhibitors (e.g., dabigatran) and factor a inhibitors like apixaban, edoxaban, and rivaroxaban [4, 5]. Antiplatelet drugs inhibit platelet function to prevent blood clot formation and are commonly used to reduce the risk of cardiac events. The most frequently used antiplatelet drugs include aspirin, clopidogrel, ticagrelor, and prasugrel. Aspirin



irreversibly inhibits cyclooxygenase (COX) activity, preventing platelet activation. Clopidogrel blocks the binding of adenosine diphosphate (ADP) to the P2Y₁₂ receptor on platelets, thus inhibiting ADP-mediated activation of the GP IIb/IIIa complex.

Combining antiplatelet and anticoagulant therapy is more effective than using either treatment alone in managing cardiac events. However, both anticoagulants and antiplatelet agents carry a risk of increased bleeding. Laboratory tests such as INR (International Normalized Ratio), PT (Prothrombin Time), and aPTT (Activated Partial Prothrombin Time) are primarily used to monitor bleeding risks [6-8].

This study aims to assess the utilization patterns of anticoagulant and antiplatelet drugs in treating cardiovascular diseases, with the goal of optimizing their use and minimizing bleeding risks.

The study is significant to: 1. evaluate the use of anticoagulant and antiplatelet drugs in managing cardiovascular diseases; 2. enhance patient care and reduce the risk of complications; and 3. assess the safety profiles of various anticoagulant and antiplatelet drugs administered to cardiac patients.

MATERIALS AND METHODS

A prospective cross-sectional study was conducted at the Peshawar Institute of Cardiology, a medical facility located in Hayatabad, Peshawar, over a year from March 2024 to February 2025. Data were collected from patient case sheets. The study included patients over 18 years of age who were prescribed anticoagulant and antiplatelet medications in the Cardiology Department. Patients with non-cardiovascular comorbidities or those who did not provide informed consent were excluded. The study employed a patient informed consent form, a participant information sheet, patient case sheets, and a data collection form [9, 10].

A study protocol was developed based on a review of relevant literature, and ethical approval was obtained prior to the commencement of data collection. Patients were enrolled according to predefined inclusion and exclusion criteria. Information regarding anticoagulant and antiplatelet prescriptions for managing cardiovascular disease was extracted from inpatient case sheets. The collected data were assessed to evaluate the utilization patterns of these medications in cardiac patients. Data were systematically organized and presented using graphs and tables in Microsoft Excel, and a final report was compiled and submitted. Data were

analyzed using IBM SPSS 16 software, with descriptive statistics including proportions/percentages and frequencies calculated. An appropriate statistical test of significance will be applied when necessary, with a p-value of < 0.05 considered statistically significant [11-14].

Inclusion criteria were: 1. Male and female patients aged over 18 years; and 2. Patients who were prescribed anticoagulant or antiplatelet medications. Exclusion criteria were: 1. Patients with non-cardiovascular comorbidities; and 2. Patients who did not provide informed consent [15].

RESULTS

Gender Distribution

A total of 115 patients were included during the study period. The data show the gender distribution of the patients, with a higher number of male patients at 71%, compared to female patients at 29%.

Categorization Based on Age

In our study, the largest group of patients was aged 55–65, comprising 41.24% of the total. This was followed by the 45–55 age group at 23.78%, the 35–45 group at 18.66%, and those under 35 at 16.32%.

Distribution of Patients Based on Diagnosis

Various types of cardiovascular diseases (CVDs) were observed during the study. The most frequently reported condition was coronary artery disease with acute coronary syndrome and anterior wall myocardial infarction, followed by coronary artery disease with acute coronary syndrome and inferior wall myocardial infarction. Other diagnoses included congestive cardiac failure, coronary artery disease with acute coronary syndrome, ischemic heart disease, and hypertension. Less common conditions included ischemic heart disease with cerebrovascular accident, hypertension with congenital heart disease, and acute pulmonary edema. The least frequently diagnosed conditions were atrial fibrillation and cardiogenic shock.

Prescribing Pattern

In terms of treatment, 38.7% of patients received antiplatelet medications, 5.42% were given anticoagulants, and 55.88% were treated with a combination of both.

Categorization of Anticoagulant Utilization

The most commonly prescribed individual anticoagulant was heparin (72.83%), followed by enoxaparin, nicoumalone and rivaroxaban.

Categorization of Antiplatelet Utilization

The most commonly prescribed individual antiplatelet drug was aspirin (81.57%), followed by ticagrelor, clopidogrel, tirofiban.

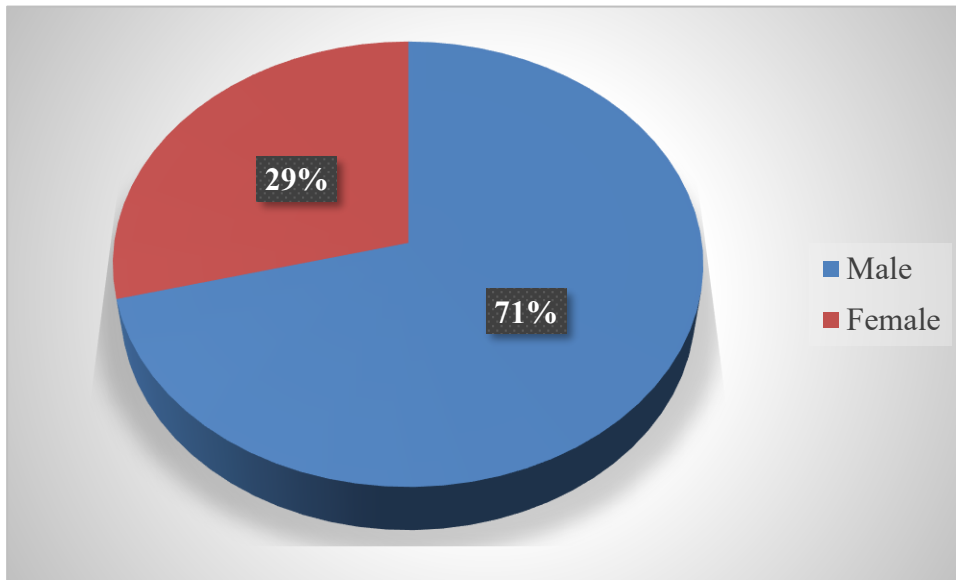


Figure 1: Distribution based on gender.

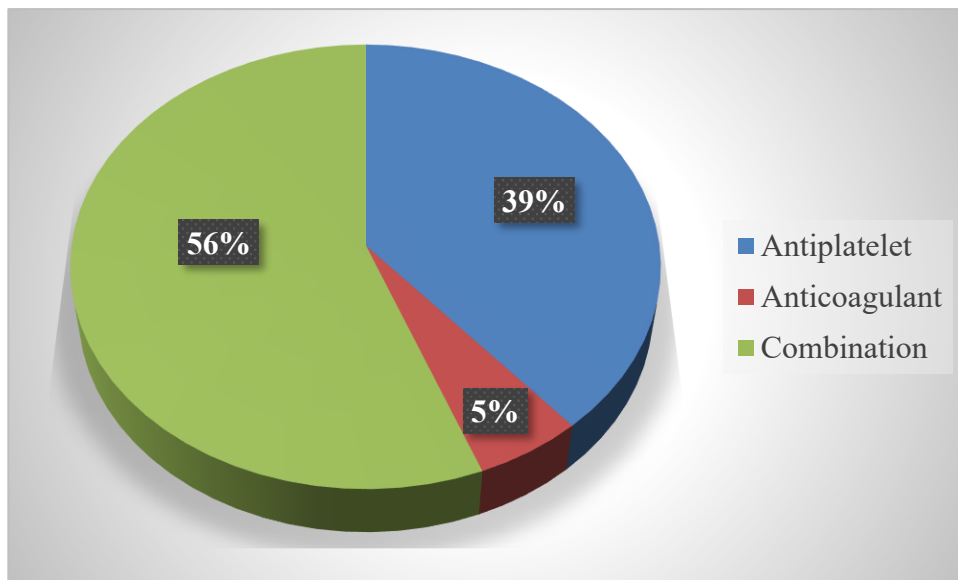


Figure 1: Prescription pattern.

DISCUSSION

The use of antiplatelets was highest among patients with hypertension and lowest in those experiencing a cerebrovascular accident combined with hypertension and cardiogenic shock. Anticoagulants were most frequently prescribed for patients with coronary artery disease, particularly those with acute coronary syndrome and inferior wall myocardial infarction, while they were least frequently prescribed for patients with hypertension and congestive heart failure [16].

The combination of anticoagulants and antiplatelets was most commonly prescribed for patients with coronary artery disease and acute coronary syndrome, specifically in cases of anterior wall

myocardial infarction, followed by inferior wall myocardial infarction, congestive heart failure, acute coronary syndrome, ischemic heart disease, and ischemic heart disease with congenital heart defects and acute pulmonary edema. This combination was also noted in patients with ischemic heart disease and congestive heart failure, but least frequently in those with atrial fibrillation.

The study presents a comparison of drug usage based on specific cardiovascular conditions, evaluating the utilization patterns of anticoagulant and antiplatelet agents within the cardiology department. It assesses the prevalence and treatment of common cardiovascular diseases and was conducted on a defined age group within a specific

department for focused analysis [17, 18]. A prospective observational study was conducted over one year among participants aged 18 and older who were prescribed anticoagulant and antiplatelet drugs for managing cardiovascular diseases at the Peshawar Institute of Cardiology, Peshawar, KPK. Following participant feedback, necessary corrections were made.

Our study provides additional insights into the utilization patterns of anticoagulants and antiplatelets in cardiovascular diseases. Antiplatelet use was most prevalent among patients with hypertension, while it was least common in those with cerebrovascular events complicated by hypertension and cardiogenic shock. Anticoagulants were primarily used in patients with coronary artery disease and acute coronary syndrome, particularly in cases of inferior wall myocardial infarction, and were less common in patients with hypertension complicated by heart failure. The combined use of both medications was particularly high in anterior and inferior wall myocardial infarctions, while it was less common in heart failure, acute coronary syndromes, ischemic heart disease, and least common in atrial fibrillation [19].

Coronary artery disease, especially acute coronary syndrome (ACS) and anterior wall myocardial infarction, was the most prevalent cardiovascular condition in our cohort. Aspirin was the most frequently prescribed antiplatelet agent, while heparin was the most commonly used anticoagulant. This treatment pattern may indicate undertreatment, as current clinical guidelines recommend dual antiplatelet therapy (DAPT) in combination with anticoagulation for patients with ACS-STEMI. Combining DAPT with anticoagulants is known to enhance clinical outcomes in ACS patients, particularly those undergoing percutaneous coronary intervention (PCI), by reducing thrombotic events while managing bleeding risk [20-22].

The frequent use of antiplatelets among patients with hypertension may suggest overtreatment, as only well-stratified high-risk individuals with hypertension are likely to benefit from single antiplatelet therapy. The inappropriate use of aspirin in low-risk cases may increase the likelihood of adverse effects, such as bleeding, highlighting the need for more personalized and evidence-based prescribing practices [23]. Future studies should be conducted across multiple healthcare centres rather than being confined to a single tertiary care hospital. Additionally, research could specifically focus on geriatric patients, compare newly prescribed patients

with those already undergoing treatment, or centre on a specific drug for a more detailed analysis.

Pharmacists are specially trained to assess kidney and liver function, evaluate drug interactions, consider body weight, and interpret other clinical parameters that influence safe and effective dosing. They also ensure adherence to current clinical guidelines, adjust doses based on laboratory values (such as INR or renal clearance), and provide patient counselling to help prevent adverse events. In many healthcare settings—especially hospitals and anticoagulation clinics—pharmacists collaborate closely with physicians to optimize therapy. This partnership allows physicians to focus on diagnosis and overall patient management while pharmacists ensure the safe and effective use of high-risk medications like anticoagulants and antiplatelets.

CONCLUSION

A prospective cross-sectional study assessed the utilization patterns of anticoagulant and antiplatelet drugs in the cardiology department. A total of 125 cases were included based on predefined inclusion criteria. Demographic details, including age, sex, and treatment specifics, were recorded using a standardized patient profile form. The most prevalent cardiovascular condition identified was coronary artery disease, particularly acute coronary syndrome with anterior wall myocardial infarction. Drug utilization patterns indicated that combination therapy with antiplatelet and anticoagulant agents was frequently prescribed. Among antiplatelet medications, aspirin was the most commonly used, while heparin was the leading anticoagulant. While medical doctors primarily diagnose conditions and initiate treatment plans, pharmacists play a crucial role in selecting and dosing anticoagulant and antiplatelet therapies due to their specialized expertise in pharmacology, drug interactions, and patient-specific factors. These medications have narrow therapeutic windows, complex dosing requirements, and significant risks of bleeding or clotting if not managed properly.

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REFERENCES

1. World Health Organization. Non-Communicable Diseases Country Profiles. Geneva: World Health Organization; 2014. [Last accessed on 2014 Oct 24]. Available from: http://apps.who.int/iris/bitstream/10665/128038/1/9789241507509_eng.pdf. [Google Scholar]
2. Xavier D, Pais P, Devereaux PJ, Xie C,

- Prabhakaran D, Reddy KS, et al. Treatment and outcomes of acute coronary syndromes in India (CREATE): A prospective analysis of registry data. *Lancet*. 2008;371:1435–42. doi: 10.1016/S0140-6736(08)60623-6.
3. Pagidipati NJ, Huffman MD, Jeemon P, Gupta R, Negi P, Jaison TM, et al. Association between gender, process of care measures, and outcomes in ACS in India: Results from the detection and management of coronary heart disease (DEMAT) registry. *PLoS One*. 2013;8:e62061. doi: 10.1371/journal.pone.0062061.
4. John LJ, Devi P, Guido S. Cardiovascular medications among the critically ill patients of a tertiary care hospital: A drug utilization study. *J Pharmacol Pharmacother*. 2013;4:285–7. doi: 10.4103/0976-500X.119717.
5. Goodman SG, Huang W, Yan AT, Budaj A, Kennelly BM, Gore JM, et al. The expanded global registry of acute coronary events: Baseline characteristics, management practices, and hospital outcomes of patients with acute coronary syndromes. *Am Heart J*. 2009;158:193–2010. doi: 10.1016/j.ahj.2009.06.003.
6. Mandelzweig L, Battler A, Boyko V, Bueno H, Danchin N, Filippatos G, et al. The second euro heart survey on acute coronary syndromes: Characteristics, treatment, and outcome of patients with ACS in Europe and the Mediterranean basin in 2004. *Eur Heart J*. 2006;27:2285–93. doi: 10.1093/eurheartj/ehl196.
7. Ali A, Shoaib, Hanadi Shad, Jehanzeb Khan, Abdur Rehman, Arooj Khan, Shaista Azeem Khan, Shams ul Arifeen. Frequency of heart complication in beta thalassemia major children at tertiary care hospital. *JCP*, 2024;8(2):107-10. <https://doi.org/10.56770/jcp2024826>
8. Byrne, R. A., Rossello, X., Coughlan, J. J., Barbato, E., Berry, C., Chieffo, A., et al. (2023). 2023 ESC guidelines for the management of acute coronary syndromes: Developed by the task force on the management of acute coronary syndromes of the European Society of Cardiology (ESC). *European Heart Journal*, 44(38), 3720–3826. <https://doi.org/10.1093/eurheartj/ehad191>
9. Del Pinto, R., Pietropaoli, D., Desideri, G., & Ferri, C. (2022). Analysis of aspirin use and cardiovascular events and mortality among adults with hypertension and controlled systolic blood pressure. *JAMA Network Open*, 5(4), e226952. <https://doi.org/10.1001/jamanetworkopen.2022.6952>
10. Dorgalaleh, A., Favaloro, E. J., Bahraini, M., & Rad, F. (2020). Standardization of Prothrombin Time/International Normalized Ratio (PT/INR). *International Journal of Laboratory Hematology*, 43(1), 21–28. <https://doi.org/10.1111/ijlh.13349>
11. Eikelboom, J. W., & Hirsh, J. (2007). Combined antiplatelet and anticoagulant therapy: clinical benefits and risks. *Journal of Thrombosis and Haemostasis*, 5(1), 255–263. <https://doi.org/10.1111/j.1538-7836.2007.02499.x>
12. Gao, L., & Li, S.-C. (2014). Adding a new anticoagulant or antiplatelet agent for patient receiving aspirin after an acute coronary syndrome: Results from a pairwise and network meta-analysis of randomized-controlled trials. *Journal of Advances in Medicine and Medical Research*, 6(2),173–199. <https://journaljammr.com/index.php/JAMMR/article/view/1235>
13. Liaqat Ali, Ahmad Javaid Khan, Muhammad Sohail, Hira Muzammil, Rana Shakeel Ahmad. Case series: Moxifloxacin induced hypotension in ischemic heart patients. *JCP*, 2018;2(1):18-21.
14. Holmes, D. R., Kereiakes, D. J., Kleiman, N. S., Moliterno, D. J., Patti, G., & Grines, C. L., et al. (2009). Combining antiplatelet and anticoagulant therapies. *Journal of the American College of Cardiology*, 54(2), 95–109. <https://doi.org/10.1016/j.jacc.2009.02.068>
15. Jokandan, S. S., Jha, D. K., & Swamy, T. N. (2019). To evaluate the use and safety of blood thinning agents in tertiary care hospital. *International Journal of Pharmaceutical Sciences and Research*, 10(7), 3332–3339. [http://doi.org/10.13040/IJPSR.0975-8232.10\(7\).3332-39](http://doi.org/10.13040/IJPSR.0975-8232.10(7).3332-39)
16. Passacquale, G., Sharma, P., Perera, D., & Ferro, A. (2022). Antiplatelet therapy in cardiovascular disease: Current status and future directions. *British Journal of Clinical Pharmacology*, 88(6), 2686–2699. <https://doi.org/10.1111/bcp.15221>
17. Raouf, S., Namdarifar, F., Shahraki, E. M., & Murthy, S. (2021). A study of using anticoagulants in a tertiary care hospital in Bangalore: A prospective study. *Journal of Health Sciences Surveillance System*, 9(4), 286–290. <https://doi.org/10.30476/jhsss.2021.91553>
18. Schömig, A., Neumann, F.-J., Kastrati, A., Schühlen, H., Blasini, R., & Hadamitzky, M., et al. (2006). A randomized comparison of antiplatelet and anticoagulant therapy after the placement of coronary-artery stents. *The New England Journal of Medicine*, 334(17), 1084–

1089.
<https://doi.org/10.1056/NEJM199604253341702>
19. Sen, S., Mahadevamma, L., & Nair, M. A. (2022). A study on antiplatelet medication used in cardiovascular disease. *WJPMR*, 8(5), 150–155.
 20. Stewart, J., Manmathan, G., & Wilkinson, P. (2017). Primary prevention of cardiovascular disease: A review of contemporary guidance and literature. *JRSM Cardiovascular Disease*, 6, 1–9.
<https://doi.org/10.1177/2048004016687211>
 21. Szapáry, L., Tornyos, D., Kupó, P., Lukács, R., El Alaoui El Abdallaoui, O., & Komócsi, A., et al. (2022). Combination of antiplatelet and anticoagulant therapy: Component network meta-analysis of randomized controlled trials. *Frontiers in Cardiovascular Medicine*, 9, 1036609, 1–12.
<https://doi.org/10.3389/fcvm.2022.1036609>
 22. Wallentin, L., Becker, R. C., Budaj, A., et al. (2009). Ticagrelor versus clopidogrel in patients with acute coronary syndromes. *New England Journal of Medicine*, 361(11), 1045–1057. <https://doi.org/10.1056/NEJMoa0904327>
 23. Woods, E. A., Ackman, M. L., Graham, M. M., Koshman, S. L., Boswell, R. M., & Barry, A. R., et al. (2016). Anticoagulant and antiplatelet prescribing patterns for patients with atrial fibrillation after percutaneous coronary intervention. *The Canadian Journal of Hospital Pharmacy*, 69(4), 280–285.
<https://doi.org/10.4212/cjhp.v69i4.1574>