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**Original Research**

# Prospective Evaluation of Antiplatelet and Anticoagulant Use: Data from a Multidisciplinary Teaching Hospital in the United Arab Emirates

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**Abstract**

**Background:** Antiplatelet and anticoagulant therapies are pivotal in managing cardiovascular and thromboembolic disorders, significantly reducing thrombotic events and improving patient outcomes. Despite their clinical benefits, their use requires careful monitoring to prevent complications such as bleeding and drug interactions, particularly in regions like the Middle East, where the prevalence of atherothrombotic diseases is rising. **Objective:** This study aimed to evaluate the utilization patterns of these therapies in a multidisciplinary teaching hospital in the United Arab Emirates. **Method:** A prospective observational study was conducted at a multidisciplinary teaching hospital in Ajman, United Arab Emirates, over a seven-month period, involving adult inpatients from various specialties who were prescribed antiplatelet, anticoagulant, or combination therapies for treatment or prophylaxis. Data were collected using a structured form, capturing patient demographics, clinical details, laboratory findings, and medication information, with daily monitoring from admission to discharge. **Results:** Approximately 43% of patients received antiplatelet therapy, 22% received anticoagulant therapy, and 35% were prescribed a combination of both. The aspirin-clopidogrel combination was the most commonly prescribed antiplatelet therapy (37%), while enoxaparin was the most frequently used anticoagulant (59%). Aspirin-ticagrelor-enoxaparin was the most prevalent dual-pathway antithrombotic therapy (34%). Antiplatelets and their combinations with anticoagulants were primarily used for ischemic heart disease, while anticoagulants were predominantly prescribed for atrial fibrillation. Most antithrombotic drugs were used for therapeutic purposes, with fewer prescribed for both therapeutic and prophylactic use. Antiplatelets were mainly administered orally (95%) and dosed once daily (79%), while anticoagulants were primarily parenteral (86%) and dosed twice daily (51%). Antiplatelet therapy generally had a longer duration than anticoagulant therapy, and most prescriptions originated from the Cardiology department. **Conclusion:** This study highlights the real-world utilization of antiplatelet and anticoagulant therapies in a multidisciplinary teaching hospital in the United Arab Emirates, revealing diverse prescribing patterns influenced by patient characteristics and clinical indications. By identifying trends and discrepancies, the findings provide valuable insights to enhance patient safety, optimize therapeutic outcomes, and guide future healthcare policies.

**Keywords:** Anticoagulant agents, Antiplatelet agents, Physician prescribing pattern, Thromboembolic management

## INTRODUCTION

Antiplatelet and anticoagulant therapies have become the cornerstone of managing various cardiovascular (CVD) and thromboembolic disorders[1]. According to recent reports by the World Health Organization (WHO), these disorders remain the leading cause of morbidity and mortality worldwide, accounting for approximately 18 million deaths annually[2]. Antiplatelet and anticoagulant therapies play a crucial role in reducing thrombotic events, preventing complications, and improving patient outcomes. These medications work by targeting different pathways of thrombogenesis to reduce the risk of clot formation. Antiplatelet agents, such as aspirin and P2Y12 inhibitors (clopidogrel, prasugrel, and ticagrelor), primarily inhibit platelet aggregation, making them essential in the management and prevention of various CVDs and thromboembolic disorders[1,3]. On the other hand, anticoagulants, including warfarin and direct oral anticoagulants (DOACs) like apixaban, rivaroxaban, and dabigatran, inhibit the coagulation cascade and are vital in preventing stroke and treating deep vein thrombosis (DVT) and pulmonary embolism (PE)[1,4]. Although these medications, particularly anticoagulants, significantly improve patient outcomes, they are among the leading causes of emergency department visits and hospital admissions in older adults. Therefore, the clinical use of anticoagulants and antiplatelets requires personalized decision-making, considering individual risk factors, comorbidities, and treatment objectives[5,6].

In the Middle East, the prevalence of CVDs and thrombotic events has been rising due to the increasing prevalence of lifestyle-related risk factors, accounting for 40% of mortality and creating a significant health burden[7-9]. Despite advancements in clinical guidelines, there remains variability in the real-world utilization of antithrombotic medications, which is influenced by various factors such as patient characteristics, comorbidities, and healthcare practices. Even though these medications help

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reduce the risk of thrombotic events, their use requires careful monitoring to prevent complications such as bleeding or drug interactions[10,11]. In this context, drug utilization evaluation (DUE) studies are particularly important due to the critical role that anticoagulants and antiplatelets play in managing these atherothrombotic diseases. These studies help identify trends and discrepancies in drug prescribing, improving patient outcomes, ensuring medication safety, and updating healthcare policies[12]. Therefore, evaluating the use of antithrombotic agents in a multidisciplinary teaching hospital can provide important insights into current prescribing practices in the United Arab Emirates (UAE). Based on this rationale, this study aimed to assess the drug utilization patterns of anticoagulants and antiplatelets during hospital stays.

## METHODS

### Study setting and period

The study was conducted at a tertiary care private teaching hospital in Ajman, UAE, between January and July 2023. Data were collected from multiple disciplines, including cardiology, general medicine, nephrology, surgery, neurology, orthopedics, pulmonology, and intensive care.

### Study design and population

A prospective observational study was used to assess the utilization patterns of antiplatelets and anticoagulants. All adult patients aged 18 years or above, of either gender, admitted to the aforementioned disciplines with various underlying conditions, and receiving at least one anticoagulant, antiplatelet, or a combination of both for treatment or prophylaxis during hospitalization, were included in the study. Outpatients, patients with end-stage renal disease on dialysis receiving antithrombotics, pregnant or lactating women, and children or adolescents under 18 years of age were excluded from the study.

### Sample size calculation and sampling method

The sample size was calculated using the Raosoft software, yielding a required sample of 125 participants with a 95% confidence interval, a 5% margin of error, and a 15% contingency. A convenience sampling method was employed to select participants based on their availability during the study period.

### Study instrument

Data collection was conducted using a comprehensive form developed after an extensive review of relevant literature on antithrombotic utilization. The form captured details such as patient demographics, clinical and surgical characteristics, laboratory and radiological findings, and medication information, including drug names, indications, doses, dosage forms, and administration sites.

### Data collection procedure

Patient enrollment numbers were identified via prescription records, and their clinical, laboratory, and treatment-related information were gathered from various sources, including case notes, treatment charts, laboratory reports, and medical and prescription records. Patients were followed and monitored extensively from the first day of admission until discharge, with daily reviews of records throughout their hospital stay to capture all relevant information, including any modifications made to their treatment during the study period.

Sociodemographic data, such as sex, age, admitted department, and health insurance status, were obtained from the hospital's electronic medical records. Clinical data included body mass index (BMI), past medical history, reasons for admission, final diagnosis, duration of hospital stay, Charlson Comorbidity Index (CCI) scores, and diagnostic values related to antithrombotic therapy (e.g., PT, APTT, INR, D-dimer, kidney and liver function markers). Medication details, including generic names, indications, prescribed dosages, pharmaceutical formulations, frequency, site of administration, duration of therapy, and rationale for anticoagulant or antiplatelet use, were meticulously documented.

### Ethical considerations

The study protocol was reviewed and approved by the Institutional Review Board (IRB) (Reference number: IRB/COP/STD/30/OCT-2022), ensuring compliance with data protection policies, prioritization of patient safety, and adherence to ethical standards. As a non-interventional study, no modifications or interventions were made to patients' treatment based on the study protocol. Patient identities, including names and personal identification numbers, remained confidential and were not disclosed to any third parties, ensuring privacy and anonymity in accordance with ethical guidelines.

### Statistical analysis

Data were transferred from Microsoft Excel to SPSS version 29.0 (IBM Corp, Armonk, NY, USA) for analysis. Continuous variables, such as age, hospital stay duration, and BMI, were summarized using measures like mean, standard deviation, median, and interquartile range. Categorical variables, such as race, gender, and health insurance status, were presented as frequencies and percentages.

## RESULTS

Figure 1 illustrates the process of patient selection and follow-up during the study. Of the 130 patients admitted during the study period and prescribed antithrombotic therapy, 100 met the study criteria and were included in the analysis. These patients were followed up during their hospitalization, and a comprehensive review of their medical records was conducted to collect relevant data.

### General sociodemographic and clinical characteristics of the study population

The sociodemographic characteristics of patients receiving antithrombotic therapy at the study hospital are presented in Table 1. The majority of patients (82%) who received therapy were male, with females comprising the remaining 18%. Patient

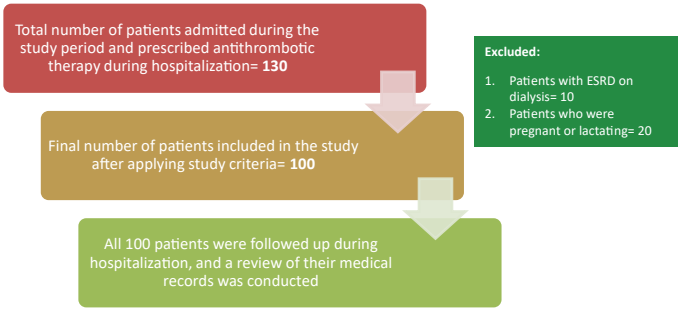



**Figure 1.** CONSORT diagram: Patient selection and follow up process

**Table 1.** Sociodemographic characteristics of the study population who received antithrombotic therapy

| Variables | Categories | Number of patients (%) |
|---|---|---|
| Gender | Male | 82 (82.00) |
| | Female | 18 (18.00) |
| Age group (in years) | ≤30 | 3 (3.00) |
| | 31-40 | 11 (11.00) |
| | 41-50 | 34 (34.00) |
| | 51-60 | 30 (30.00) |
| | 61-70 | 13 (13.00) |
| | >70 | 9 (9.00) |
| | Mean±SD | 52.39±11.91 |
| | Median (IQR) | 51 (14) |
| | Range | 28-86 |
| Department | Cardiology | 59 (59.00) |
| | General medicine | 17 (17.00) |
| | General surgery | 1 (1.00) |
| | Nephrology | 1 (1.00) |
| | Neurology | 9 (9.00) |
| | Orthopaedic | 4 (4.00) |
| | Pulmonology | 6 (6.00) |
| | ICU | 3 (3.00) |
| Health insurance coverage | Yes | 82 (82.00) |
| | No | 18 (18.00) |

Abbreviations: SD: Standard deviation, ICU: Intensive care unit, IQR: Interquartile range

ages ranged from 28 to 86 years, with a mean of 52.39 years. Patients aged 30 years or younger represented the smallest group (3%), while those aged 41-50 years had the highest representation at 34%. Therapy was provided across various departments, with the majority (59%) under the care of the cardiology department, followed by general medicine (17%) and neurology (9%). Regarding health insurance coverage, most patients (82%) were insured, while 18% were not.

Table 2 presents the clinical characteristics of patients receiving antithrombotic therapy. Analysis of BMI showed that overweight and obese patients were equally represented, each constituting 40% of the sample, while the remaining 20% fell into the normal weight category. The mean BMI was 29.16, ranging from 20.80 to 67.20 kg/m$^2$. Approximately 88% of patients had a history of medical conditions. The distribution of current disease counts revealed that most patients (53%) had 4-6 diseases, while only 12% had 7-9 diseases. A detailed distribution of patient diagnosis as per the International

**Table 2.** Clinical characteristics of the study population who received antithrombotic therapy

| Variables | Categories | Number of patients (%) |
|---|---|---|
| BMI (in kg/m$^2$) | <18.5 | 0 (0.00) |
| | 18.5-24.9 | 20 (20.00) |
| | 25.0-29.9 | 40 (40.00) |
| | 30.0-39.9 | 35 (35.00) |
| | ≥40.0 | 5 (5.00) |
| | Mean±SD | 29.16±6.02 |
| | Median (IQR) | 27.68 (6.09) |
| | Range | 20.80-67.20 |
| Past medical history | Yes | 88 (88.00) |
| | No | 12 (12.00) |
| Number of current active diagnosis | ≤3 | 35 (35.00) |
| | 4-6 | 53 (53.00) |
| | ≥7 | 12 (12.00) |
| | Mean±SD | 4.24±1.73 |
| | Median (IQR) | 4 (2) |
| | Range | 1-9 |
| CCI score | 0 (No comorbidities) | 3 (3.00) |
| | Mild (1-2) | 50 (50.00) |
| | Moderate (3-4) | 35 (35.00) |
| | Severe (≥5) | 12 (12.00) |
| | Mean±SD | 2.72±1.61 |
| | Median (IQR) | 2 (2) |
| | Range | 0-9 |
| Duration of hospital stay (in days) | ≤3 | 60 (60.00) |
| | 4-6 | 31 (31.00) |
| | 7-9 | 8 (8.00) |
| | ≥10 | 1 (1.00) |
| | Mean±SD | 3.60±1.82 |
| | Median (IQR) | 3 (2) |
| | Range | 1-10 |
| Total number of medications prescribed per patient | <5 | 8 (8.00) |
| | 5-9 | 50 (50.00) |
| | ≥10 | 42 (42.00) |
| | Mean±SD | 9.11±3.60 |
| | Median (IQR) | 9 (5) |
| | Range | 3-19 |

Abbreviations: BMI: Body mass index, CCI: Charlson comorbidity index, SD: Standard deviation, IQR: Interquartile range

Classification of Diseases (ICD), 10th Revision, is given in Supplementary Table 1. The CCI indicated that 53% of patients had a mild CCI score (1-2), while 12% had a severe CCI score (≥5). Regarding the duration of hospital stay, the majority (60%) had a relatively short stay of three days or less, while only 1% stayed for 10 days or more. The mean hospital stay was 3.60 days, ranging from 1 to 10 days. In terms of the total number of medications prescribed per patient, 50% received between 5 and 9 medications, 42% received 10 or more, and 8% received fewer than 5. The mean number of medications was 9.11, ranging from 3 to 19. The number and pattern of co-administered medications (besides antithrombotics) are given in Supplementary Tables 2 and 3.

**Anticoagulant and antiplatelet utilization patterns during hospital stays**

Table 3 shows the distribution of antiplatelets and anticoagulants prescribed per patient. Among the study sample, 36% of patients were prescribed one antithrombotic, and another 36% were prescribed two, with an average of 2.09 antithrombotics per patient. Of the 43 patients prescribed antiplatelets, the majority (58%) received two, 40% received one, and 2% received three, resulting in a mean of 1.63 drugs. Among the 22 patients prescribed only anticoagulants, 86% received one anticoagulant, and 9% received two, with a mean of 1.14 drugs. For combined antiplatelet and anticoagulant therapy, 35 patients were treated with the combination, with 49% prescribed three combined medications, resulting in a mean of 3.26 drugs.

**Table 3.** Frequency of antithrombotics prescribed per patient

| Variables | Categories | Number of patients (%) |
|---|---|---|
| Total antithrombotic burden per patient | 1 | 36 (36.00) |
| | 2 | 36 (36.00) |
| | 3 | 18 (18.00) |
| | 4 | 4 (4.00) |
| | 5 | 5 (5.00) |
| | 6 | 1 (1.00) |
| | Mean±SD | 2.09±1.15 |
| | Range | 1-6 |
| | Median (IQR) | 2 (2) |
| Antiplatelet-only burden per patient (N=43) | 1 | 17 (39.53) |
| | 2 | 25 (58.14) |
| | 3 | 1 (2.32) |
| | Mean±SD | 1.63±0.95 |
| | Range | 1-3 |
| | Median (IQR) | 2 (1) |
| Anticoagulant-only burden per patient (N=22) | 1 | 19 (86.36) |
| | 2 | 3 (9.09) |
| | Mean±SD | 1.14±0.69 |
| | Range | 0-2 |
| | Median (IQR) | 1 (1) |
| Combined antithrombotic burden per patient (N=35) | 2 | 8 (22.86) |
| | 3 | 17 (48.57) |
| | 4 | 4 (11.43) |
| | 5 | 5 (14.29) |
| | 6 | 1 (2.86) |
| | Mean±SD | 3.26±1.17 |
| | Range | 2-6 |
| | Median (IQR) | 2 (2) |

Abbreviations: IQR: Interquartile range, SD: Standard deviation

Table 4 presents the prescription patterns of antithrombotic therapy among the study population. The data show that 43% of patients were prescribed antiplatelet therapy, 22% received anticoagulant therapy, and 35% were on a combination of both. In the antiplatelet category, the aspirin and clopidogrel combination was the most frequently prescribed (37%), followed by aspirin monotherapy (28%). Among anticoagulants, enoxaparin monotherapy was the most commonly prescribed, accounting for 59% of prescriptions, followed by enoxaparin and rivaroxaban combination (14%). Dual-pathway/combination antithrombotic therapies were also prevalent, with aspirin-ticagrelor-enoxaparin prescribed to 34% of patients, followed by aspirin-enoxaparin and aspirin-clopidogrel-enoxaparin combinations (17% each).

Figure 2 illustrates the distribution of antithrombotic medications prescribed for various clinical indications. Antiplatelets were predominantly used for the management of ischemic heart disease (IHD) (18 cases), followed by ST-elevation myocardial infarction (STEMI) (6 cases), unstable angina (5 cases), and cerebral infarction (5 cases). Monotherapy with aspirin and clopidogrel was primarily used for IHD, while ticagrelor was frequently prescribed for unstable angina. Aspirin-clopidogrel combination therapy was extensively used for IHD, while aspirin-ticagrelor and aspirin-ticagrelor-tirofiban were primarily utilized for managing STEMI. Anticoagulants were primarily utilized for atrial fibrillation (AF) (6 cases), followed by prophylaxis for PE (5 cases), venous thromboembolism (VTE) (3 cases), and IHD (3 cases). Apixaban monotherapy was commonly prescribed for IHD and PE prophylaxis, while enoxaparin was frequently used for PE prophylaxis. Rivaroxaban monotherapy was predominantly prescribed for AF and cerebral venous thrombosis, whereas warfarin was commonly used for AF. Additionally, the enoxaparin-rivaroxaban combination was extensively utilized for PE prophylaxis. Antiplatelet-anticoagulant combinations were primarily utilized in the management of IHD (14 cases) and acute cerebrovascular disease (11 cases).

Figure 3 illustrates the prescribing pattern of antithrombotic medications for therapeutic and prophylactic purposes. Most drugs were prescribed for therapeutic indications, with fewer used for both. Antiplatelets and their combinations were primarily prescribed for therapeutic use (35 cases), while a smaller number were for prophylaxis (8 cases). Aspirin had the highest overall usage, prescribed for both prophylactic (7 cases) and therapeutic (5 cases) purposes. Clopidogrel and

**Table 4.** Types of antithrombotics prescribed among the study population

| Variables | Categories | Number of patients (%) |
|---|---|---|
| Pattern of antithrombotic therapy | Antiplatelet only | 43 (43.00) |
| | Anticoagulant only | 22 (22.00) |
| | Both antiplatelets and anticoagulants | 35 (35.00) |
| Type of antiplatelet therapy prescribed (N=43) | | |
| Platelet aggregation inhibitors | Aspirin | 12 (27.91) |
| | Clopidogrel | 4 (9.30) |
| | Ticagrelor | 1 (2.33) |
| | Aspirin+Clopidogrel | 16 (37.21) |
| | Aspirin+Ticagrelor | 9 (20.93) |
| | Aspirin+Ticagrelor+Tirofiban | 1 (2.33) |
| Type of anticoagulant therapy prescribed (N=22) | | |
| Vitamin K antagonists | Warfarin | 2 (9.09) |
| Heparin group | Enoxaparin | 13 (59.09) |
| Direct factor Xa inhibitors | Apixaban | 2 (9.09) |
| | Rivaroxaban | 2 (9.09) |
| Heparin group + Direct factor Xa inhibitors | Enoxaparin+Rivaroxaban | 3 (13.64) |
| Type of combination therapy prescribed (N=35) | | |
| Platelet aggregation inhibitors + Heparin group | Aspirin+Enoxaparin | 6 (17.14) |
| | Clopidogrel+Enoxaparin | 1 (2.86) |
| | Aspirin+Clopidogrel+Enoxaparin | 6 (17.14) |
| | Aspirin+Ticagrelor+Enoxaparin | 12 (34.29) |
| | Aspirin+Clopidogrel+Ticagrelor+Enoxaparin | 1 (2.86) |
| | Aspirin+Clopidogrel+Enoxaparin+Heparin | 1 (2.86) |
| | Aspirin+Ticagrelor+Enoxaparin+Heparin | 2 (5.71) |
| | Aspirin+Ticagrelor+Tirofiban+Enoxaparin+Heparin | 5 (14.29) |
| Platelet aggregation inhibitors + Heparin group + Direct factor Xa inhibitors | Aspirin+Clopidogrel+Ticagrelor+Tirofiban+Heparin+Rivaroxaban | 1 (2.86) |

ticagrelor were used exclusively for therapeutic indications. The aspirin-clopidogrel combination was prescribed for both prophylactic (1 case) and therapeutic (15 cases) purposes, while aspirin-ticagrelor and aspirin-ticagrelor-tirofiban combinations were used only for therapeutic purposes. Anticoagulants and their combinations were used for therapeutic (12 cases) and prophylactic (10 cases) purposes. Enoxaparin was the most prescribed anticoagulant, with 7 cases for prophylaxis and 6 for therapy. Apixaban was prescribed for both indications (1 case each), while rivaroxaban and warfarin were used solely for therapeutic purposes. The enoxaparin-rivaroxaban combination was prescribed for both therapeutic (1 case) and prophylactic (2 cases) purposes. Antiplatelet-anticoagulant combinations were mainly used for therapy (30 cases), with only aspirin-enoxaparin and aspirin-clopidogrel-enoxaparin prescribed for both therapeutic and prophylactic purposes.

Table 5 summarizes the formulation, dosing pattern, and duration of antithrombotic therapy administration in the study population. Most antiplatelets were administered as oral formulations (95%), while anticoagulants were primarily given as parenteral preparations (86%). Among antiplatelet therapies, aspirin was the most frequently prescribed oral agent, given to 51% of patients, followed by ticagrelor (23%) and clopidogrel (21%). Parenteral tirofiban was prescribed for 5% of patients. For anticoagulant therapies, enoxaparin (parenteral) was the most commonly used, prescribed to 72% of patients, followed by heparin (13%). Among oral anticoagulants, rivaroxaban was the most frequently used, prescribed to 9% of patients. Regarding dosing frequency, antiplatelets were mostly prescribed once daily (79%), whereas anticoagulants were more often administered twice daily (51%). Aspirin was predominantly administered once daily (51%), while ticagrelor was given twice daily in 21% of cases. Among anticoagulants, enoxaparin was administered once daily in 28% of patients and twice daily in 45%. In terms of duration, antiplatelet therapy (weighted mean: 3.33±1.73 days) was generally longer than anticoagulant therapy (weighted mean: 2.74±1.23 days). Aspirin was most commonly administered for 1-3 days in 34% of

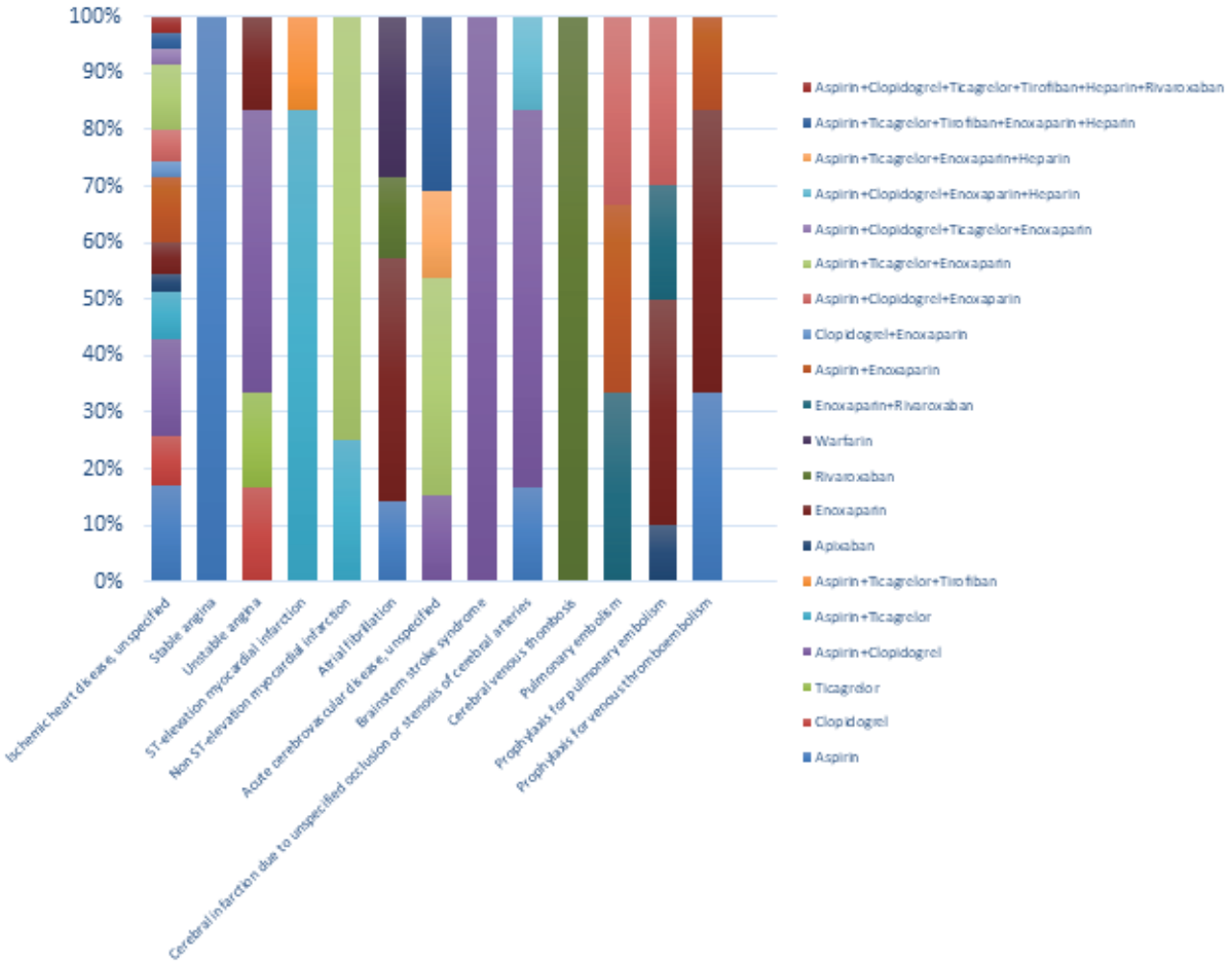



**Figure 2.** Prescription of antithrombotic medications across various medical indications

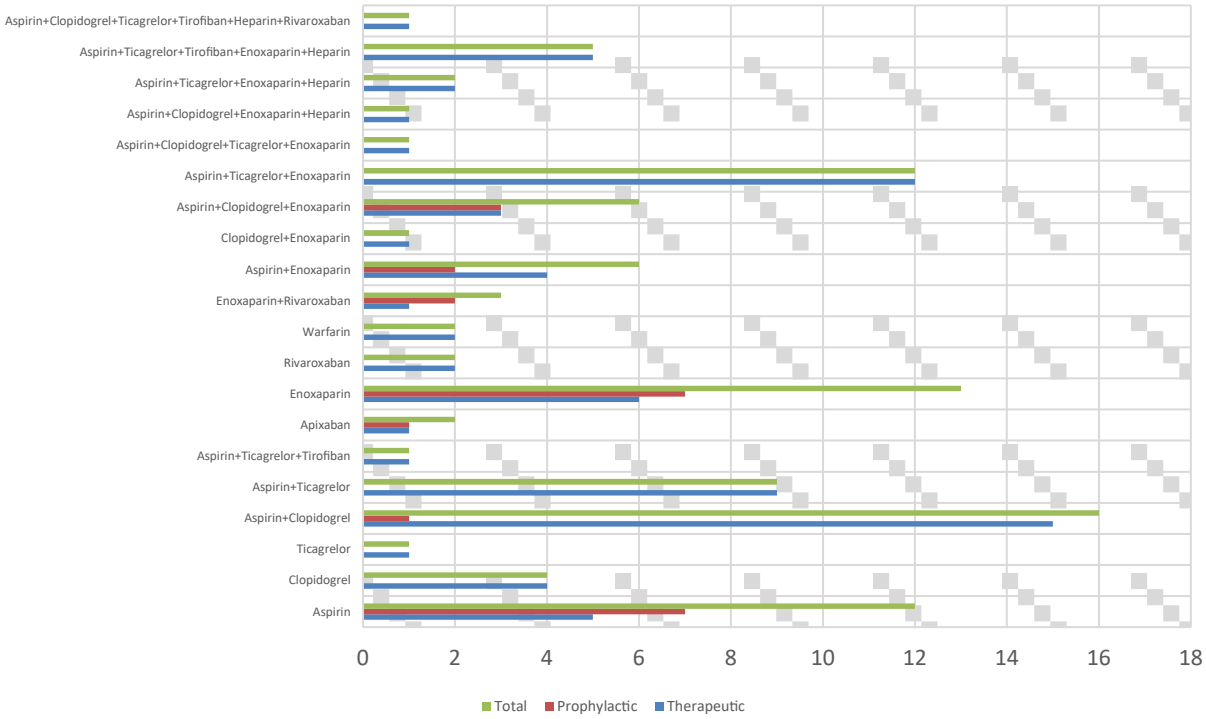



**Figure 3.** Prescribing pattern of antithrombotics based on the purpose of therapy (therapeutic vs. prophylactic)

patients, with a mean duration of 3.51 days (range: 1-10 days). For anticoagulants, enoxaparin was most frequently prescribed for 1-3 days in 62% of patients, with a mean duration of 2.92 days (range: 1-6 days).

Figure 4 details the prescribing patterns of various antithrombotic medications across multiple hospital departments. The cardiology department accounted for the majority of antithrombotic prescriptions, while other departments had comparatively lower prescription counts.

## DISCUSSION

This prospective observational study conducted at a multidisciplinary teaching hospital in the UAE provides a comprehensive assessment of real-world prescribing practices for antiplatelet and anticoagulant medications. The findings highlight both adherence to guideline-recommended practices and areas where clinical optimization is needed to improve patient management.

In this study, most patients were prescribed either one or two antithrombotic medications (36% each), reflecting a balanced use of monotherapy and dual therapy that aligns with guidelines by balancing efficacy with bleeding risk[3,11,13]. A similar trend was observed in other studies[11,14]. In particular, a recent study from the UAE Healthy Future cohort noted balanced utilization patterns in antithrombotic prescriptions, aligning with guideline adherence and highlighting comparable trends in the Gulf region[7]. The mean number of antithrombotic agents prescribed per patient in our study was 2.09, ranging from one to six agents, suggesting that many patients required combination therapy to effectively manage their conditions, with notable variability in prescribing practices. This variability is particularly relevant in the context of polypharmacy, defined as the use of five or more medications. Additionally, 92% of our patients received five or more medications and 42% received ten or more, indicating a substantial burden of polypharmacy that may complicate antithrombotic therapy and increase the risk of safety concerns such as adverse drug events (ADEs) and drug interactions (DIs).

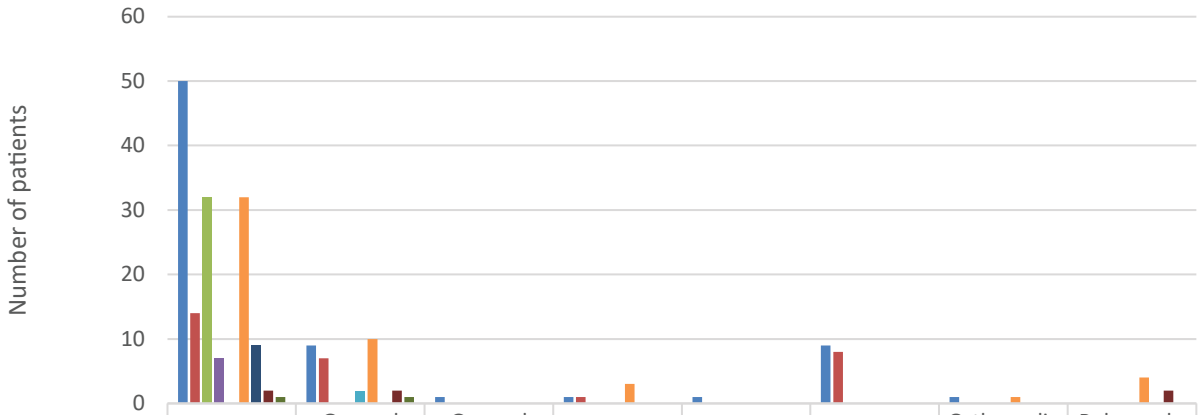
Antiplatelet-only therapy was the most commonly prescribed regimen (43%), likely due to its efficacy and convenience in both acute and chronic management. The majority (58%) of these patients were prescribed dual antiplatelet therapy (DAPT), with a mean of 1.63 drugs per patient, reflecting the standard practices for conditions such as acute coronary syndrome (ACS) and post-percutaneous coronary interventions[3,13]. The aspirin-clopidogrel combination was the most frequently prescribed, aligning with DAPT guidelines[3]. Monotherapy with aspirin (28%) was more common than with clopidogrel (9%) or ticagrelor (2%), reflecting its cost-effectiveness and well-established role in secondary prevention. Similar trends were observed in other studies, where aspirin remained the most common single antiplatelet agent, and DAPT, particularly aspirin plus clopidogrel, was widely used[11,15]. Additionally, a South Asian study from India reported comparable antiplatelet usage patterns, emphasizing aspirin's continued dominance due to its affordability and accessibility[14].

**Table 5.** Formulation, dosing pattern, and duration of antithrombotic therapy administration

| Variables | Categories | Number of patients (%) | Total (%) |
|---|---|---|---|
| **Formulation** | | | |
| Antiplatelet therapy (N=141) | | | |
| Oral | Aspirin | 72 (51.06) | 134 (95.04) |
| | Clopidogrel | 30 (21.28) | |
| | Ticagrelor | 32 (22.70) | |
| Parenteral | Tirofiban | 7 (4.96) | 7 (4.96) |
| Anticoagulant therapy (N=69) | | | |
| Oral | Apixaban | 2 (2.90) | 10 (14.49) |
| | Rivaroxaban | 6 (8.70) | |
| | Warfarin | 2 (2.90) | |
| Parenteral | Enoxaparin | 50 (72.46) | 59 (85.51) |
| | Heparin | 9 (13.04) | |
| **Frequency of administration** | | | |
| Antiplatelet therapy (N=141) | | | |
| Once daily | Aspirin | 72 (51.06) | 112 (79.43) |
| | Clopidogrel | 30 (21.28) | |
| | Ticagrelor | 3 (2.13) | |
| | Tirofiban | 7 (4.96) | |
| Twice daily | Ticagrelor | 29 (20.57) | 29 (20.57) |
| Anticoagulant therapy (N=69) | | | |
| Once daily | Apixaban | 1 (1.44) | 34 (49.28) |
| | Enoxaparin | 19 (27.54) | |
| | Heparin | 9 (13.04) | |
| | Rivaroxaban | 3 (4.35) | |
| | Warfarin | 2 (2.90) | |
| Twice daily | Apixaban | 1 (1.44) | 35 (50.72) |
| | Enoxaparin | 31 (44.93) | |
| | Rivaroxaban | 3 (4.35) | |
| **Duration of administration** | | | |
| Antiplatelet therapy (N=141) | | | |
| 1-3 days | Aspirin | 48 (34.04) | 99 (70.21) |
| | Clopidogrel | 18 (12.77) | |
| | Ticagrelor | 26 (18.44) | |
| | Tirofiban | 7 (4.96) | |
| 4-6 days | Aspirin | 20 (14.18) | 35 (24.82) |
| | Clopidogrel | 9 (6.38) | |
| | Ticagrelor | 6 (4.26) | |
| 7-9 days | Aspirin | 3 (2.13) | 5 (3.55) |
| | Clopidogrel | 2 (1.42) | |
| ≥10 days | Aspirin | 1 (0.71) | 2 (1.42) |
| | Clopidogrel | 1 (0.71) | |
| Aspirin | Mean±SD: 3.51±1.72 | Median (IQR): 3 (2) | Range: 1-10 |
| Clopidogrel | Mean±SD: 3.56±2.11 | Median (IQR): 3 (2.75) | Range: 1-10 |

| | | | |
|---|---|---|---|
| Ticagrelor | Mean±SD: 3.22±1.01 | Median (IQR): 3 (0) | Range: 1-5 |
| Tirofiban | Mean±SD: 1±0 | | Range: 1 |
| Anticoagulant therapy (N=69) | | | |
| 1-3 days | Apixaban | 1 (1.45) | 59 (85.51) |
| | Enoxaparin | 43 (62.32) | |
| | Heparin | 9 (13.04) | |
| | Rivaroxaban | 4 (5.80) | |
| | Warfarin | 2 (2.90) | |
| 4-6 days | Apixaban | 1 (1.45) | 10 (14.49) |
| | Enoxaparin | 7 (10.14) | |
| | Rivaroxaban | 2 (2.90) | |
| Apixaban | Mean±SD: 4±1.41 | Median (IQR): 4 (1) | Range: 3-5 |
| Enoxaparin | Mean±SD: 2.92±0.97 | Median (IQR): 3 (0.75) | Range: 1-6 |
| Heparin | Mean±SD: 1.11±0.33 | | Range: 1-2 |
| Rivaroxaban | Mean±SD: 3.16±1.94 | Median (IQR): 2.5 (2.5) | Range: 1-6 |
| Warfarin | Mean±SD: 3±0 | | Range: 3 |

Abbreviations: IQR: Interquartile range, SD: Standard deviation




| | Cardiology | General medicine | General surgery | ICU | Nephrology | Neurology | Orthopedics | Pulmonology |
|---|---|---|---|---|---|---|---|---|
| Aspirin | 50 | 9 | 1 | 1 | 1 | 9 | 1 | 0 |
| Clopidogrel | 14 | 7 | 0 | 1 | 0 | 8 | 0 | 0 |
| Ticagrelor | 32 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Tirofiban | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Apixaban | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| Enoxaparin | 32 | 10 | 0 | 3 | 0 | 0 | 1 | 4 |
| Heparin | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Rivaroxaban | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 2 |
| Warfarin | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |

**Figure 4.** Distribution of antithrombotic usage across various hospital departments

Anticoagulant-only therapy accounted for 22% of prescriptions, with 86% of these patients receiving monotherapy and a mean of 1.14 drugs per patient, indicating a preference for single-agent anticoagulation, likely due to bleeding risks outweighing the benefits of additional agents. Enoxaparin (59%) was the most frequently prescribed anticoagulant, likely due to its ease of administration and favorable pharmacokinetic profile, including subcutaneous administration, predictable anticoagulant effects, and reduced need for laboratory monitoring[16]. Other anticoagulants, such as rivaroxaban and apixaban (9% each), were also used in this study, primarily as alternatives to warfarin due to their fixed dosing, predictable effects, and lower bleeding risk[17]. A local study from the UAE also echoed high enoxaparin usage, citing limited access to DOACs in certain facilities as a contributing factor[7]. International studies from Italy and India found similar patterns, though preferences for specific DOACs varied, rivaroxaban being more common in our study and the Indian study, and apixaban in the Italian study[11,14].

Combination therapy involving both antiplatelets and anticoagulants was prescribed to 35% of the study population, with a mean of 3.26 agents per patient. Aspirin-ticagrelor-enoxaparin was the most common combination (34%), reflecting its utility in high-risk thrombotic cases requiring aggressive prevention. While Abrignani et al. provided evidence of increasing use of triple antithrombotic therapy[11], our study found such regimens to be limited to select patients. According to the 2020 ACC Expert Consensus Decision Pathway, routine triple therapy (DAPT plus anticoagulation) is generally discouraged due to the increased risk of bleeding, and if used, should be limited to short durations (e.g., no more than 30 days)[18]. When combining antithrombotic agents, clopidogrel is typically the preferred P2Y12 inhibitor, and aspirin, if used, should be limited to a daily dose of less than 100 mg. However, the optimal combination of aspirin, P2Y12 inhibitors, and anticoagulants remains unclear, and a one-size-fits-all approach is unlikely. In this study, the use of three to five antithrombotic combinations suggests a more aggressive approach than generally recommended by the ACC guidelines. This deviation may be attributed to several factors: high thrombotic risk profiles, limited specialist follow-up, absence of localized protocols, and reliance on clinical judgment. Additionally, overlapping indications and complex comorbidities often necessitate individualized regimens, while delays in de-escalation and gaps in guideline awareness may further contribute to intensified therapy. A study conducted by Dr. Mould and colleagues in the United Kingdom suggested that rigorous thromboprophylaxis can reduce the risk of hospital-acquired thrombosis[19], though such aggressive strategies must be carefully balanced against the risks of polypharmacy, particularly in patients with multiple comorbidities.

In our study, antiplatelet therapy was most prescribed for IHD, followed by STEMI, unstable angina, and cerebral infarction. Aspirin and clopidogrel, whether as monotherapy or combination therapy, were widely used for IHD, reflecting their established role in secondary prevention. Similar patterns have been reported in other studies where coronary artery disease (CAD) was the most common indication for these medications[14,15,20]. In this DUE study, anticoagulants were predominantly prescribed for AF, PE prophylaxis, VTE, and IHD. Enoxaparin was frequently used for PE prophylaxis, highlighting its role in acute settings. Studies from different regions have reported variations in anticoagulant indications. For instance, a study from Ethiopia found that lower-leg DVT was the most common indication, followed by PE and stroke[21]. Meanwhile, a study from India found that most patients receiving anticoagulants had ACS, including anterior STEMI and inferior STEMI[22]. These differences in indications across studies may be attributed to variations in study settings. While most studies focus solely on cardiology units, our study assessed the utilization patterns of these medications across all hospital departments. Antithrombotic use aligns with current guidelines, with the 2020 ACC Expert Consensus recommending anticoagulant and antiplatelet therapy for patients with AF or VTE undergoing PCI or those with atherosclerotic cardiovascular disease[18]. Combination therapy with antiplatelets and anticoagulants was primarily used for IHD and acute cerebrovascular disease. A review of clinical trials and guidelines suggests that while anticoagulation and antiplatelet therapy are often recommended for AF and CAD, their combination is increasingly minimized due to bleeding risks[1].

Most antithrombotic medications were prescribed for therapeutic rather than prophylactic purposes. With the aging population and rising CVD cases, the number of CVD-related deaths and disability-adjusted life years is expected to increase, placing additional strain on public health. Effective preventive and therapeutic strategies are essential to address this burden. Aspirin and enoxaparin were the most commonly used single agents for prophylaxis due to their proven effectiveness in preventing thrombotic events like stroke and DVT. The use of combinations such as aspirin-enoxaparin, enoxaparin-rivaroxaban, and aspirin-clopidogrel-enoxaparin was observed in a few cases. While these combinations may not align with typical guidelines, they may reflect personalized treatment strategies for high-risk patients requiring enhanced thrombotic event prevention beyond anticoagulation alone.

Regarding formulations, antiplatelets were predominantly oral (95%), with tirofiban being the only parenteral agent, prescribed in 5% of patients. Anticoagulants were primarily administered parenterally. The preference for oral formulations in antiplatelet therapy and parenteral formulations in anticoagulant therapy aligns with the pharmacological properties and indications of these drugs. Other studies have also shown similar preferences for oral antiplatelets and parenteral anticoagulants during hospitalization[11,14]. Variations in dosing frequency were also observed. Antiplatelets were predominantly prescribed once daily, with ticagrelor being the only antiplatelet administered twice daily (21%). Aspirin's once-daily regimen in 51% of cases aligns with its pharmacokinetic profile and guideline recommendations. Anticoagulants, on the other hand, were almost equally administered once daily (49%) and twice daily (51%), reflecting their pharmacokinetics, safety profiles, and clinical indications. Once-daily dosing

reflects their use in patients requiring a lower dose or those at higher bleeding risk, while twice-daily dosing reflects their use in high-intensity regimens for acute conditions. Enoxaparin was the most frequently prescribed anticoagulant for both once-daily (28%) and twice-daily (45%) regimens, aligning with recommendations for acute and chronic settings[23,24].

The mean duration of antiplatelet therapy (3.33 days) was longer than anticoagulant therapy (2.74 days). The shorter mean duration for anticoagulant therapy may reflect its use in bridging therapy or perioperative management. Aspirin, clopidogrel, and ticagrelor had almost similar mean durations (3.51 days, 3.56 days, and 3.22 days, respectively). Among anticoagulants, apixaban had the longest mean duration (4 days), followed by rivaroxaban (3.16 days), warfarin (3 days), and enoxaparin (2.92 days). These prescribing durations highlight adherence to guidelines while acknowledging evolving practices influenced by patient-specific factors and clinical settings.

Based on the findings of this study, we propose the following actionable strategies to optimize antithrombotic prescribing practices in hospital settings: (1) Pharmacist-led interventions to regularly review complex medication regimens, reduce unnecessary duplication, and ensure appropriate therapeutic selection to enhance patient safety; (2) Implementation of digital decision support tools and electronic medication alert systems within the hospital electronic prescribing infrastructure to proactively identify and prevent any safety concerns; (3) Targeted prescriber education and training on evidence-based antithrombotic use, emphasizing high-risk scenarios and guideline updates; and (4) Improved formulary access and procurement strategies to ensure availability of all recommended first-line agents across hospital departments. These steps will support safer, more effective, and patient-centered antithrombotic prescribing practices.

## LIMITATIONS

This study was conducted with a small sample size of 100 patients, which may limit the generalizability of the findings. The use of a convenience sampling approach may have impacted on the representativeness of the study population. Additionally, the lack of randomization introduces the potential for selection bias, which could affect the validity of the results.

## CONCLUSION

The findings reveal diverse prescribing patterns influenced by patient characteristics, clinical indications, and institutional practices, reflecting adherence to evidence-based guidelines while also identifying areas for optimization. The high prevalence of combination therapy highlights the need for a careful risk-benefit assessment to balance thrombotic prevention and bleeding risks. Variations in dosing patterns, administration routes, and therapy duration emphasize the importance of individualized treatment strategies tailored to patient-specific needs. By identifying trends and discrepancies in prescribing practices, this study provides valuable insights to enhance patient safety, optimize therapeutic outcomes, and inform future healthcare policies.

## AUTHOR CONTRIBUTIONS

Conceptualization, V.M.; Data collection, A.M.E.; Data curation and formal analysis, V.M. A.M.E.; Writing- Original draft preparation, J.M.L., V.M., A.M.E.; Writing- Review and editing, J.M.L., V.M.; Supervision, V.M. All authors have read and agreed to the published version of the manuscript.

## COMPETING INTERESTS

The authors declare that the research was carried out without any commercial or financial ties that could be interpreted as a potential conflict of interest.

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**Supplementary Table 1.** Detailed distribution of diagnoses based on ICD-10 categories

| **Diagnosis (as per ICD-10 code)** | | **Frequency (%)** |
|---|---|---|
| Certain infectious and parasitic diseases | Infectious gastroenteritis and colitis, unspecified | 1 (0.24) |
| | Varicella without complication | 1 (0.24) |
| | Dengue hemorrhagic fever | 1 (0.24) |
| | Sepsis, unspecified organism | 2 (0.48) |
| Endocrine, nutritional, and metabolic diseases | Thyrotoxicosis with toxic single thyroid nodule without thyrotoxic crisis | 1 (0.24) |
| | Type 2 diabetes mellitus | 53 (12.59) |
| | Hyperlipidemia | 32 (7.60) |
| | Hyperuricemia without signs of inflammatory arthritis and tophaceous disease | 2 (0.48) |
| | Hypothyroidism | 4 (0.95) |
| | Hypomagnesemia | 1 (0.24) |
| | Hypo-osmolality and hyponatremia | 1 (0.24) |
| | Dehydration | 1 (0.24) |
| Mental, behavioral, and neurodevelopmental disorders | Anxiety disorder | 2 (0.48) |
| | Depression, unspecified | 1 (0.24) |
| Diseases of the nervous system | Bell's palsy | 1 (0.24) |
| | Brain stem stroke syndrome | 1 (0.24) |
| | Disorder of facial nerve, unspecified | 1 (0.24) |
| | Glossopharyngeal neuralgia | 1 (0.24) |
| | Transient cerebral ischemic attack, unspecified | 2 (0.48) |
| | Insomnia, unspecified | 1 (0.24) |
| | Quadriplegia, unspecified | 1 (0.24) |
| | Obstructive sleep apnea | 1 (0.24) |
| H00-H59 Diseases of the eye and adnexa | Unspecified subjective visual disturbances | 1 (0.24) |
| H60-H95 Diseases of the ear and mastoid process | Vertigo | 1 (0.24) |
| I00-I99 Diseases of the circulatory system | Atrial fibrillation | 5 (1.19) |
| | Acute coronary thrombosis not resulting in myocardial infarct | 1 (0.24) |
| | Acute ischemic heart disease, unspecified | 17 (4.04) |
| | Acute myocardial infarction, unspecified | 3 (0.71) |
| | Atherosclerotic heart disease of a native coronary artery with angina pectoris with documented spasm | 1 (0.24) |
| | Cerebral infarction, unspecified | 6 (1.43) |
| | Chronic ischemic heart disease | 17 (4.04) |
| | Pulmonary embolism | 2 (0.48) |
| | Disease of pulmonary vessels, unspecified | 1 (0.24) |
| | Essential hypertension | 53 (12.59) |
| | Hypotension, unspecified | 1 (0.24) |
| | Cardiomyopathy, unspecified | 2 (0.48) |
| | Non-ST elevation myocardial infarction | 4 (0.95) |
| | ST elevation myocardial infarction | 18 (4.28) |
| | Unstable angina | 6 (1.43) |
| | Acute cerebrovascular insufficiency | 2 (0.48) |
| | Dysarthria following unspecified cerebrovascular disease | 1 (0.24) |
| | Heart failure, unspecified | 7 (1.66) |

| | | |
|---|---|---|
| | Nonrheumatic aortic valve disorder, unspecified | 1 (0.24) |
| | Supraventricular tachycardia | 2 (0.48) |
| | Acute pericarditis, unspecified | 1 (0.24) |
| | Angina pectoris, unspecified | 1 (0.24) |
| | Atherosclerotic heart disease of native coronary artery without angina pectoris | 1 (0.24) |
| | Cerebral venous thrombosis | 1 (0.24) |
| | Secondary pulmonary arterial hypertension | 1 (0.24) |
| | Acute coronary thrombosis not resulting in myocardial infarct | 1 (0.24) |
| | Hypertensive emergency | 1 (0.24) |
| | Myocarditis, unspecified | 1 (0.24) |
| | Nonrheumatic aortic (valve) stenosis with insufficiency | 1 (0.24) |
| | Hypertensive urgency | 1 (0.24) |
| | Left bundle-branch block, unspecified | 1 (0.24) |
| | Acute diastolic (congestive) heart failure | 1 (0.24) |
| J00-J99 Diseases of the respiratory system | Acute lower respiratory infection | 13 (3.09) |
| | Pulmonary fibrosis, unspecified | 3 (0.71) |
| | Unspecified bacterial pneumonia | 2 (0.48) |
| | Moderate persistent asthma with (acute) exacerbation | 1 (0.24) |
| | Chronic obstructive pulmonary disease | 3 (0.71) |
| | Acute bronchitis, unspecified | 1 (0.24) |
| | Mild intermittent asthma, uncomplicated | 1 (0.24) |
| | Pulmonary edema | 4 (0.95) |
| | Acute tonsillitis, unspecified | 1 (0.24) |
| | Acute bronchitis due to Mycoplasma pneumonia | 1 (0.24) |
| | Acute pharyngitis, unspecified | 1 (0.24) |
| | Acute respiratory distress syndrome | 1 (0.24) |
| | Acute upper respiratory infection, unspecified | 1 (0.24) |
| | Pleural effusion, not elsewhere classified | 1 (0.24) |
| | Unspecified chronic bronchitis | 1 (0.24) |
| | Respiratory failure, unspecified with hypoxia | 1 (0.24) |
| K00-K95 Diseases of the digestive system | Constipation, unspecified | 2 (0.48) |
| | Gastro-esophageal reflux disease without esophagitis | 2 (0.48) |
| | Anal fissure, unspecified | 1 (0.24) |
| | Acute gastritis without bleeding | 2 (0.48) |
| | Anorectal abscess | 1 (0.24) |
| | Melena | 1 (0.24) |
| | Other partial intestinal obstruction | 1 (0.24) |
| | Unspecified chronic gastritis without bleeding | 1 (0.24) |
| L00-L99 Diseases of the skin and subcutaneous tissue | Cellulitis of left lower limb | 1 (0.24) |
| M00-M99 Diseases of the musculoskeletal system and connective tissue | Reactive arthropathy, unspecified | 1 (0.24) |
| | Myalgia | 3 (0.71) |
| | Pain in the right ankle | 1 (0.24) |
| | Polyarthritis, unspecified | 1 (0.24) |
| | Muscle spasm of calf | 1 (0.24) |
| | Other spondylosis with myelopathy, cervical region | 1 (0.24) |

| | | |
|---|---|---|
| | Pain in the right leg | 1 (0.24) |
| | Spondylolysis, cervical region | 1 (0.24) |
| | Muscle weakness (generalized) | 1 (0.24) |
| N00-N99 Diseases of the genitourinary system | Benign prostatic hyperplasia | 3 (0.71) |
| | Urinary tract infection, site not specified | 3 (0.71) |
| | End-stage renal disease | 1 (0.24) |
| | Acute kidney failure | 2 (0.48) |
| | Chronic kidney disease, unspecified | 1 (0.24) |
| | Hydronephrosis with renal and ureteral calculous obstruction | 1 (0.24) |
| | Calculus of kidney with calculus of ureter | 1 (0.24) |
| R00-R99 Symptoms, signs, and abnormal clinical and laboratory findings, not elsewhere classified | Chest pain, unspecified | 24 (5.70) |
| | Palpitations | 2 (0.48) |
| | Severe sepsis without septic shock | 2 (0.48) |
| | Dysphagia, unspecified | 1 (0.24) |
| | Chest pain in breathing | 3 (0.71) |
| | Cough | 3 (0.71) |
| | Dizziness and giddiness | 3 (0.71) |
| | Dysuria | 1 (0.24) |
| | Fever, unspecified | 8 (1.90) |
| | Prediabetes | 1 (0.24) |
| | Tachycardia, unspecified | 1 (0.24) |
| | Abnormal electrocardiogram | 3 (0.71) |
| | Dyspnea, unspecified | 2 (0.48) |
| | Epigastric abdominal tenderness | 1 (0.24) |
| | Intracranial space-occupying lesion found on diagnostic imaging of central nervous system lesion | 1 (0.24) |
| | Nausea with vomiting, unspecified | 1 (0.24) |
| | Abnormal results of liver function studies | 1 (0.24) |
| | Elevated C-reactive protein | 2 (0.48) |
| | Headache | 2 (0.48) |
| | Abdominal distension (gaseous) | 1 (0.24) |
| S00-T88 Injury, poisoning, and certain other consequences of external causes | Displaced pilon fracture of left tibia, initial encounter for open fracture type I or II | 1 (0.24) |
| | Displaced fracture of lateral malleolus of right fibula, 7thD | 1 (0.24) |
| | Unspecified injury of right Achilles tendon, initial encounter | 1 (0.24) |
| | Unspecified fracture of shaft of left tibia, initial encounter for open fracture type I or II | 1 (0.24) |
| | Pain due to internal orthopedic prosthetic device/graft, initial encounter | 1 (0.24) |
| | Unspecified fracture of shaft of left fibula, initial encounter for open fracture type I or II | 1 (0.24) |
| Z00-Z99 Factors influencing health status and contact with health services | Encounter for preprocedural laboratory examination | 1 (0.24) |
| | Personal history of transient ischemic attack, and cerebral infarction without residual deficits | 1 (0.24) |
| | Encounter for issue of repeat prescription | 1 (0.24) |
| | Presence of prosthetic heart valve | 1 (0.24) |
| | Long-term (current) use of anticoagulants | 1 (0.24) |

* Regarding the diagnosis some patients have presented multiple conditions, hence the total percentage is more that 100%

**Supplementary Table 2.** Number of co-administered medications (Excluding antithrombotic therapy)

| Variables | Categories | Number of patients (%) |
|---|---|---|
| Number of other co-administered medications prescribed per patient (besides antithrombotic therapy) | < 5 | 26 (26.00) |
| | 5-9 | 57 (57.00) |
| | ≥10 | 17 (17.00) |
| | Mean±SD | 6.98±3.20 |
| | Range | 2-16 |

**Supplementary Table 3.** Pattern of co-administered medications (besides antithrombotics) as per the ATC code

| Variables | Categories | Number of patients (%) |
|---|---|---|
| Alimentary tract and metabolism | Alpha lipoic acid | 1 (0.15) |
| | Calcium/Vitamin D | 1 (0.15) |
| | Dapagliflozin | 3 (0.44) |
| | Dexlansoprazole | 1 (0.15) |
| | Empagliflozin | 21 (3.06) |
| | Empagliflozin/Metformin | 4 (0.58) |
| | Esomeprazole | 14 (2.04) |
| | Gliclazide | 3 (0.44) |
| | Glimepiride | 2 (0.29) |
| | Insulin (human) | 25 (3.64) |
| | Insulin aspart | 2 (0.29) |
| | Insulin degludec | 1 (0.15) |
| | Insulin glargine | 8 (1.17) |
| | Insulin lispro | 3 (0.44) |
| | Itopride | 1 (0.15) |
| | Lactulose | 4 (0.58) |
| | Linagliptin | 5 (0.73) |
| | Liraglutide | 2 (0.29) |
| | Macrogol, combinations | 1 (0.15) |
| | Magnesium | 2 (0.29) |
| | Metformin/Linagliptin | 1 (0.15) |
| | Metformin | 10 (1.46) |
| | Metoclopramide | 2 (0.29) |
| | Multivitamin | 1 (0.15) |
| | Ondansetron | 9 (1.31) |
| | Pantoprazole | 72 (10.5) |
| | Pioglitazone | 4 (0.58) |
| | Rifaximin | 1 (0.15) |
| | Semaglutide | 2 (0.29) |
| | Senna glycosides | 1 (0.15) |
| | Simethicone | 1 (0.15) |
| | Sitagliptin | 1 (0.15) |
| | Sitagliptin/Metformin HCl | 6 (0.87) |
| | Sodium picosulfate/Magnesium carbonate | 1 (0.15) |
| | Thioctic acid | 1 (0.15) |

| | | |
|---|---|---|
| | Ursodeoxycholic acid | 3 (0.44) |
| | Vildagliptin 50mg/Metformin 500mg | 1 (0.15) |
| | Vitamin D | 1 (0.15) |
| Cardiovascular system | Propafenone | 1 (0.15) |
| | Amiodarone | 13 (1.90) |
| | Norepinephrine | 1 (0.15) |
| | Dobutamine | 2 (0.29) |
| | Glyceryl trinitrate | 13 (1.90) |
| | Isosorbide dinitrate | 1 (0.15) |
| | Adenosine | 1 (0.15) |
| | Trimetazidine | 13 (1.90) |
| | Ivabradine | 11 (1.60) |
| | Ranolazine | 10 (1.46) |
| | Moxonidine | 4 (0.58) |
| | Hydrochlorothiazide | 2 (0.29) |
| | Indapamide | 4 (0.58) |
| | Furosemide | 19 (2.77) |
| | Spironolactone | 11 (1.60) |
| | Pentoxifylline | 1 (0.15) |
| | Propranolol | 1 (0.15) |
| | Metoprolol | 3 (0.44) |
| | Bisoprolol | 34 (4.96) |
| | Nebivolol | 4 (0.58) |
| | Labetalol | 2 (0.29) |
| | Carvedilol | 2 (0.29) |
| | Amlodipine | 10 (1.46) |
| | Lercanidipine hydrochloride | 2 (0.29) |
| | Perindopril | 3 (0.44) |
| | Perindopril/Indapamide | 1 (0.15) |
| | Perindopril/Amlodipine | 4 (0.58) |
| | Ramipril | 5 (0.73) |
| | Losartan | 3 (0.44) |
| | Valsartan | 3 (0.44) |
| | Candesartan cilexetil/Hydrochlorothiazide | 1 (0.15) |
| | Telmisartan | 3 (0.44) |
| | Olmesartan medoxomil | 4 (0.58) |
| | Irbesartan | 4 (0.58) |
| | Valsartan/Amlodipine | 5 (0.73) |
| | Olmesartan medoxomil/Amlodipine | 2 (0.29) |
| | Valsartan/Amlodipine/Hydrochlorothiazide | 3 (0.44) |
| | Sacubitril valsartan | 6 (0.87) |
| | Atorvastatin | 39 (5.69) |
| | Rosuvastatin | 15 (2.19) |
| | Fenofibrate | 2 (0.29) |
| | Omega-3 acid ethyl esters | 3 (0.44) |
| | Ezetimibe | 4 (0.58) |

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|---|---|---|
| | Atorvastatin/Ezetimibe | 3 (0.44) |
| | Rosuvastatin/Ezetimibe | 1 (0.15) |
| Dermatologicals | Povidone-iodine MW | 1 (0.15) |
| | Calcium gluconate | 1 (0.15) |
| Genito urinary system and sex hormones | Fenoterol | 1 (0.15) |
| | Solifenacin | 1 (0.15) |
| | Tamsulosin | 3 (0.44) |
| | Dutasteride | 1 (0.15) |
| Systemic hormonal preparations, excluding sex hormones and insulins | Prednisolone | 2 (0.29) |
| | Hydrocortisone | 3 (0.44) |
| | Levothyroxine | 4 (0.58) |
| | Carbimazole | 1 (0.15) |
| Antiinfectives for systemic use | Doxycycline | 2 (0.29) |
| | Piperacillin/Tazobactam | 1 (0.15) |
| | Cefuroxime | 1 (0.15) |
| | Ceftriaxone | 18 (2.62) |
| | Cefepime | 1 (0.15) |
| | Meropenem | 8 (1.17) |
| | Clarithromycin | 2 (0.29) |
| | Azithromycin | 1 (0.15) |
| | Amikacin | 2 (0.29) |
| | Ciprofloxacin | 3 (0.44) |
| | Levofloxacin | 6 (0.87) |
| | Vancomycin | 1 (0.15) |
| | Teicoplanin | 3 (0.44) |
| | Metronidazole | 4 (0.58) |
| | Acyclovir | 1 (0.15) |
| | Valaciclovir | 1 (0.15) |
| Musculoskeletal system | Dexketoprofen | 8 (1.17) |
| | Diclofenac sodium | 1 (0.15) |
| | Loxoprofen sodium | 3 (0.44) |
| | Allopurinol | 2 (0.29) |
| | Colchicine | 5 (0.73) |
| Nervous system | Morphine | 1 (0.15) |
| | Paracetamol | 37 (5.39) |
| | Pregabalin | 1 (0.15) |
| | Bromazepam | 1 (0.15) |
| | Citicoline | 7 (1.02) |
| | Betahistine | 3 (0.44) |
| Respiratory system | Xylometazoline | 2 (0.29) |
| | Indacaterol | 1 (0.15) |
| | Ipratropium/albuterol | 2 (0.29) |
| | Budesonide | 7 (1.02) |
| | Tiotropium bromide | 1 (0.15) |
| | Revefenacin | 1 (0.15) |
| | Salbutamol/Ipratropium bromide | 2 (0.29) |

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| | Montelukast | 4 (0.58) |
| | Prospan syrup (Hederae helicis folium) | 1 (0.15) |
| | Acetylcysteine | 5 (0.73) |
| | Butamirate citrate | 1 (0.15) |
| | Diphenhydramine | 1 (0.15) |
| | Chlorpheniramine | 2 (0.29) |
| | Cetirizine | 1 (0.15) |
| | Loratadine | 4 (0.58) |
| | Fexofenadine | 1 (0.15) |
| | Desloratadine | 3 (0.44) |
| Sensory organs | Atropine | 1 (0.15) |
| | Prednisolone | 2 (0.29) |
| Various | Sevelamer | 1 (0.15) |

*Some patients may administer multiple medications; hence the percentage is more than 100%.