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Utilization patterns, cost analysis, and monitoring burden of warfarin and rivaroxaban in Oman: a retrospective study (2019–2024)

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ABSTRACT

Background: Warfarin and Rivaroxaban are common anticoagulants with distinct profiles. Warfarin, a vitamin K antagonist, requires frequent international normalized ratio (INR) monitoring and dose adjustments. Rivaroxaban, a direct oral anticoagulant (DOAC), allows fixed dosing with minimal monitoring but is more expensive. *Aim:* To compare prescribing trends, patient demographics, and cost implications of warfarin and rivaroxaban in Oman from January 2019 to May 2024. *Methodology:* Prescription data were reviewed for drug utilization, number of patients, prescriptions, tablets dispensed, and related costs. INR test counts for warfarin were also analyzed. Costs were reported in Omani Rial (R.O). *Results:* Warfarin was prescribed to 238 patients, totaling 6,813 prescriptions and 292,812 tablets. Rivaroxaban was prescribed to 28 patients, with 445 prescriptions and 11,491 tablets. Total cost: warfarin (12,143.28 R.O), rivaroxaban (7,554.38 R.O). Switching all warfarin users to rivaroxaban would cost 30,184.56 R.O. INR monitoring for warfarin users involved 1,626 tests. *Conclusion:* Warfarin remains widely used in Oman due to lower cost, despite rivaroxaban's ease of use. High expense limits rivaroxaban adoption. Future studies should explore long-term outcomes and cost-effectiveness of broader DOAC use.

KEYWORDS

warfarin, rivaroxaban, cost analysis, prescription trends, Oman

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1. INTRODUCTION

Anticoagulants are essential for the prevention and management of thromboembolic disorders. Warfarin and rivaroxaban represent two key options with distinct characteristics. Warfarin, a vitamin K antagonist, has been widely used due to its affordability and long-standing clinical acceptance. However, it requires continuous monitoring of the INR and frequent dose adjustments. In contrast, rivaroxaban is a DOAC that offers a fixed-dose regimen with minimal monitoring requirements,

improving patient convenience and adherence. Despite these advantages, the higher cost of rivaroxaban remains a major limitation. This study analyzes and compares the utilization, demographics, and cost of warfarin and rivaroxaban in Oman. It also evaluates the number of INR tests conducted and explores the financial implications of switching patients from warfarin to rivaroxaban. The data offer insights into current prescribing practices and help identify economic and clinical factors influencing drug selection within the Omani healthcare system.

2. METHODOLOGY

2.1 Study design and data collection

This was a retrospective observational study conducted using prescription data collected between January 2019 and May 2024 from a government healthcare institution in Oman. Data were obtained from the pharmacy and health information systems. The analysis focused on the number of patients, gender distribution, age groups, number of prescriptions, total tablets dispensed, and drug costs for both warfarin and rivaroxaban.

2.2 Licensing and ethical approval

All necessary institutional permissions were secured prior to data access. The study received approval from the institutional review board. Patient identities were anonymized to ensure confidentiality. No direct patient contact occurred during the study.

2.3 Parameters and outcomes measured

The study evaluated drug utilization trends, patient demographics, and financial expenditure. INR monitoring data were also collected for warfarin patients. A hypothetical cost analysis was performed to estimate the financial burden of converting all warfarin patients to rivaroxaban.

2.4 Statistical analysis

Descriptive statistics were used. Frequencies and percentages were reported for categorical data. Continuous variables, such as total prescriptions and cost, were presented using sums and averages. Microsoft Excel was used for data entry and analysis. No inferential statistics were applied, as the study aimed to provide a descriptive overview of usage and cost trends.

3. RESULTS

A total of 238 patients were prescribed warfarin, with 107 males and 131 females. Rivaroxaban was prescribed to 28 patients, including 15 males and 13 females. Warfarin use was highest among patients aged 70–79 years (26.1%), followed by those aged 60–69 (22.7%) and 80–89 (21.8%). Rivaroxaban followed a similar trend, with the largest group also in the 70–79 age range (39.3%), and 21.4% in the 60–69 age range (Table 1).
Warfarin prescriptions totaled 6,813, with 292,812 tablets dispensed. In contrast, rivaroxaban accounted for 445 prescriptions and 11,491 tablets. Although rivaroxaban was used by far fewer patients, the drug's cost was substantially higher per unit. Total expenditure for warfarin was 12,143.28 R.O, while rivaroxaban cost 7,554.38 R.O. If all warfarin patients were hypothetically transitioned to rivaroxaban, the projected cost would reach 30,184.56 R.O, highlighting a significant financial burden (Table 1).
INR monitoring was conducted for all warfarin patients, totaling 1,626 tests, with 979 performed for females and 647 for males. These costs were not included in the total expenditure for warfarin, indicating an additional economic impact not immediately visible in direct drug costs (Table 1).

Table 1. Comparison of Warfarin and Rivaroxaban Utilization.

Parameter	Warfarin	Rivaroxaban
Total patients	238	28
Male patients	107	15
Female patients	131	13
Total prescriptions	6813	445
Total tablets used	292,812	11,491
Total cost (R.O)	12,143.28	7,554.384
INR tests conducted	1,626	Not required

4. DISCUSSION

Warfarin remains the dominant anticoagulant due to its low cost and clinical familiarity. However, the need for routine INR monitoring imposes logistical and economic burdens [1, 2]. The 1,626 INR tests recorded represent ongoing demands on healthcare staff, resources, and patient time.

Rivaroxaban offers clinical advantages - predictable pharmacokinetics, fixed dosing, and no INR requirement - but its high-cost limits adoption [3, 4]. The estimated cost of converting warfarin users to rivaroxaban more than doubles total spending, reinforcing concerns about affordability in resource-constrained settings [5].

The age and gender distribution patterns observed align with other international reports, where older adults remain the primary users of warfarin [6]. While rivaroxaban shows gradual uptake in Oman, its use remains limited to a small group of patients reflecting the cautious approach in shifting to newer anticoagulants due to cost constraints and limited long-term data in certain populations [7]. Policymakers and healthcare providers should consider strategies such as price negotiation or insurance coverage to improve DOAC access. Real world data on outcomes and adverse events can further support informed decision-making [8].

5. CONCLUSION

Warfarin continues to be widely prescribed due to its lower cost, despite rivaroxaban's clinical benefits. High acquisition costs and budget impact hinder broader DOAC use in Oman. Future research should explore long-term clinical outcomes and conduct cost-effectiveness studies to guide national anticoagulation strategies.

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CONFLICT OF INTEREST STATEMENT

The author declares no conflicts of interest.

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