



Age-and Gender-Related Differences in Anticoagulant Drugs Use Patterns

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Author's contribution

The sole author designed, analysed, interpreted and prepared the manuscript.

Article Information

DOI: 10.9734/JPRI/2020/v32i2030731

Editor(s):

(1) Dr. Rahul S. Khupse, University of Findlay (UF), United States of America.

Reviewers:

(1) Josiah Ocheja, Federal University of Technology Akure, Nigeria.

(2) V. Jaisankar, Presidency College, India.

(3) Sujeet Poudyal, Tribhuvan University, Nepal.

Complete Peer review History: <http://www.sdiarticle4.com/review-history/59161>

Original Research Article

Received 15 May 2020
Accepted 22 July 2020
Published 28 August 2020

ABSTRACT

Aim: Drug utilization study is considered a powerful exploratory tool to assess the present trends of drug prescribing and appropriateness of prescription and to analyze the differences in drugs utilization with respect to several factors such as age and gender. This study aims to describe the age-and gender-related differences in anticoagulant drugs use patterns.

Methodology: The present study included the review of outpatient electronic prescriptions that include an anticoagulant drug in 2018 in a public hospital in Al-karj, Saudi Arabia.

Results: Enoxaparin was prescribed mainly for patients between 20-39 years old (63.48%). Warfarin was prescribed mainly for patient more than 50 years old (59.38%). Enoxaparin was prescribed mainly for female patients (86.09%). Rivaroxaban and warfarin were prescribed mainly for female patients, 64.71% and 59.38% respectively.

Conclusion: There are differences in prescribing anticoagulant according to gender and age. It is important to know the differences in prescribing anticoagulants according to age and gender and if the treatment is inappropriate, it is important to identify and address reasons for treatment disparities in anticoagulation prescription.

Keywords: *Age related; anticoagulants; gender related; use patterns.*

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1. INTRODUCTION

Cardiovascular diseases (CVDs) are considered the leading cause of deaths worldwide. Low-and middle-income countries account for more than 80% of the global burden of these diseases [1]. Cardiovascular diseases (CVD), including heart diseases and stroke, account for one-third of deaths throughout the world in 2015, according to a scientific study that examined every country over the past 25 years [2]. It was estimated that CVD is still the greater etiological and pathological factor for increasing the mortality rate. CVDs are the greater causative conditions for the mortality when compared with all other communicable, neonatal, nutritional and maternal disorders combined, and twice the number of deaths that are caused by cancers [3,4].

Thromboembolic events are major causes of morbidity and mortality in the United States. Atrial fibrillation, which is associated with a 5-fold increase in the risk of cardio-embolic stroke, is a leading cause of death and permanent disability [5-7]. Venous thromboembolism including pulmonary embolism and deep vein thrombosis are likewise a significant cause of mortality, with an estimated prevalence of over 100,000 annually [8].

Historically, anticoagulant therapy with warfarin has been considered the standard of care for prevention of thromboembolic events associated with Venous thromboembolism and atrial fibrillation [7,9] but nowadays several anticoagulant agents such as dabigatran, rivaroxaban, and apixaban are used instead of warfarin. There are numerous advantages for these newer agents compared to warfarin including fewer drug-drug and drug-food interactions, no routine monitoring of anticoagulant effect due to more predictable pharmacological profiles and bridge therapy during brief interruptions isn't required due to rapid onset and offset of action [10-12].

Drug utilization study is considered a powerful exploratory tool to assess the present trends of drug prescribing and appropriateness of prescription. So it is important to analyze the differences in drugs utilization with respect to several factors such as age and gender [13]. This study aims to describe the age-and gender-related differences in anticoagulant drugs use patterns in a public hospital in Al-karj, Saudi Arabia.

2. METHODOLOGY

The present study was a retrospective study including the review of outpatient electronic prescriptions that include an anticoagulant drug in 2018 in a public hospital in Al-karj, Saudi Arabia. So the prescriptions before or after 2018, prescriptions in the inpatient setting and the prescriptions that don't contain an anticoagulant drug were excluded. The sample size not calculated because the duration of the study was 1 year in 2018, so all of the outpatient prescriptions that contain an anticoagulant was included.

Participant ages ranged from 20 to more than 60 years. Each participant was assigned to one of the age categories. Use of an anticoagulant drug was defined as filling at least 1 prescription for a medication in that category during the study year. Each participant was also assigned according to gender to male and female to find the differences in prescribing pattern according to age and gender.

The data were collected using Excel sheet. The number and percentage of males and females and the number and percentages of patients with each age category that used each drug were established. This study was approved by the Institutional Review Board with IRB log number 2019-0153E.

3. RESULTS AND DISCUSSION

In 2018, 165 patients receive their anticoagulant medications from outpatient pharmacy. About 60 % of the patients were less than 40 years old. Age of the participants who received anticoagulant is shown in Table 1.

Table 1. Age of the participants who received anticoagulant

Age	Number	Percentage
20-29	32	19.39%
30-39	67	40.61%
40-49	31	18.79%
50-59	14	8.48%
≥ 60	21	12.73%

Enoxaparin was prescribed mainly for patients between 20-39 years old (63.48%). Warfarin was prescribed mainly for patient more than 50 years old (59.38%). Age-related differences in anticoagulant drugs prescribing is shown in Table 2.

Bai et al stated that warfarin use was superior to warfarin non-use, aspirin and no antithrombotic therapy in reducing the risk of stroke/ thromboembolism in older atrial fibrillation patients, but with a possible increase in major bleeding [14]. Deitelzweig *et al* reported that among Older Nonvalvular Atrial Fibrillation Patients, non-vitamin K antagonist oral anticoagulants were associated with lower rates of stroke/ systemic embolism and varying rates of major bleeding compared with warfarin [15].

Cavallari and Patti stated that in the past, the fear of bleeding has led to underuse of anticoagulation in older populations, but the introduction of Direct oral anticoagulants may offer a safer alternative to warfarin, particularly in this setting of patients [16]. Abohelaika *et al* stated that Anticoagulation control shows a biphasic relationship with age, peaking at 67 years, is poorer in females than in males [17].

Regarding Relationship between aging and dosage of warfarin, Miura et al stated that both age and the controlled international normalized ratio value are factors responsible for the increasing sensitivity to warfarin among Japanese patients under optimal anticoagulant therapy. Since elderly Japanese patients with low international normalized ratio values are particularly sensitive to warfarin, greater caution should be applied while determining the dosage schedule in such patients [18].

Most of the patients were female (78.18%). Table 3 shows the gender of the patients who received anticoagulant drugs.

Enoxaparin was prescribed mainly for female patients (86.09%). Additionally, rivaroxaban and warfarin were prescribed mainly for female patients, 64.71% and 59.38%

respectively. Gender-related differences in anticoagulant drugs prescribing were shown in Table 4.

In general, anticoagulant agents were prescribed mainly for females. In contrast to that, Kassim et al reported that among atrial fibrillation patients, females have higher mortality and ischemic strokes and are less often prescribed anticoagulation therapy despite higher risk of stroke than males and that these data have important clinical implications [19]. Lee et al stated that in general females used anticoagulant more than male patients and that female patients with AF were treated using Non-Vitamin K antagonist oral anticoagulants. They also reported that male patients were treated more by warfarin and while insufficient Non-Vitamin K antagonist oral anticoagulants dosing was common in both sex, it was significantly more frequent in women [20].

Thompson et al stated that females with non-valvular atrial fibrillation are considerably less likely to receive oral anticoagulation compared to males at all levels of thromboembolic risk and that non-vitamin K oral anticoagulation use has increased in females at a faintly faster pace than in males, nevertheless females remained considerably less likely to receive any oral anticoagulation over time [21]. Moreover, Grifoni et al stated that gender differences exist in the efficacy and safety on antithrombotic treatment and that these differences could have implications for future sex-specific treatment and prevention strategies for atherothrombotic diseases [22]. Schnabel et al reported that among atrial fibrillation patients, Prescription of oral anticoagulation was similar, with an increase of non-vitamin K antagonist oral anticoagulants from 5.9% to 12.6% in women and from 6.2% to 12.6% in men [23].

Table 2. Age-related differences in anticoagulant drugs prescribing

Medication	20-29	30-39	40-49	50-59	≥ 60	Total
Enoxaparin	29	53	28	4	1	115
Dabigatran	0	1	0	0	0	1
Rivaroxaban	1	4	1	5	6	17
Warfarin	2	9	2	5	14	32

Table 3. Gender of the patients who received anticoagulant agent

Gender	Number	Percentage
Male	36	21.82%
Female	129	78.18%

Table 4. Gender-related differences in anticoagulant drugs prescribing

Medication	Male	Female	Total
Enoxaparin	16 (13.91%)	99 (86.09%)	115
Dabigatran	1 (100.00%)	0 (0.00%)	1
Rivaroxaban	6 (35.29%)	11 (64.71%)	17
Warfarin	13 (40.62%)	19 (59.38%)	32

The indications for use of anticoagulants (the diagnosis) were not available in the collected data, so it is considered a major limitation for the present study because the availability of the indications provide key information why there are differences in prescription patterns of anticoagulants based on age and sex.

4. CONCLUSION

There are differences in prescribing anticoagulant according to gender and age. Rivaroxaban and warfarin were prescribed mainly to older patients but enoxaparin was prescribed mainly to younger patients because it is the safest anticoagulant in pregnancy. Regarding gender, anticoagulants were prescribed mainly to females. It is important to know the differences in prescribing anticoagulants according to age and gender and if the treatment is inappropriate, it is important to identify and address reasons for treatment disparities in anticoagulation prescription.

DISCLAIMER

The products used for this research are commonly and predominantly use products in our area of research and country. There is absolutely no conflict of interest between the author and producers of the products because I do not intend to use these products as an avenue for any litigation but for the advancement of knowledge. Also, the research was not funded by the producing company rather it was funded by personal efforts of the author.

CONSENT

As per international standard or university standard guideline participant consent has been collected and preserved by the authors.

ETHICAL APPROVAL

It is not applicable.

ACKNOWLEDGEMENT

This Publication was supported by the Deanship of Scientific Research at Prince Sattam bin Abdulaziz University.

COMPETING INTERESTS

Author has declared that no competing interests exist.

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Peer-review history:
The peer review history for this paper can be accessed here:
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