



The Prescribing Trends of Digoxin in the Outpatient Setting

Nehad J. Ahmed^{1*} and Menshawy A. Menshawy²

¹Department of Clinical Pharmacy, College of Pharmacy, Prince Sattam Bin Abdulaziz University, Alkharj, Saudi Arabia.

²Department of Medicinal Chemistry, College of Pharmacy, Prince Sattam Bin Abdulaziz University, Alkharj, Saudi Arabia.

Authors' contributions:

This work was carried out in collaboration between both authors. Author NJA designed the study, performed the statistical analysis, wrote the protocol, and wrote the first draft of the manuscript. Authors NJA and MAM managed the analyses of the study. Author NJA managed the literature searches. All authors read and approved the final manuscript.

Article Information

DOI: 10.9734/JPRI/2020/v32i3931022

Editor(s):

(1) Dr. Mohamed Fawzy Ramadan Hassanien, Zagazig University, Egypt.

Reviewers:

(1) Rungsun Bhurayanontachai, Prince of Songkla University, Thailand.

(2) Mukesh Kumar Chaudhary, Crimson College of Technology, Nepal.

Complete Peer review History: <http://www.sdiarticle4.com/review-history/63915>

Original Research Article

Received 18 October 2020

Accepted 23 December 2020

Published 08 January 2021

ABSTRACT

Objective: The aim of this study was to determine digoxin prescribing pattern in the outpatient setting in Alkharj.

Methods: This retrospective study included a review of outpatient records between in 2017 and 2018. It included the entire outpatient who received digoxin during the study period.

Results: Only 38 patients received digoxin during 2017 and in 2018, 31 patients received digoxin. More than half of the patients receiving digoxin in 2018 were males (58.06%) and about 54.84% of them aged more than 59 years. Most of the prescribers were residents (77.42%). More than 61 % of the prescriptions were written by cardiology department followed by emergency department (22.58%).

Conclusion: The use of digoxin is uncommon in the outpatient department in Alkharj nonetheless it has a narrow therapeutic window and it should be prescribed carefully because of its adverse events. It is also important to increase the awareness of healthcare providers and patients about digoxin use.

*Corresponding author: E-mail: n.ahmed@psau.edu.sa, pharmdnehadjaser@yahoo.com;

Keywords: Cardiac glycoside; digoxin; prescribing pattern; outpatient.

1. INTRODUCTION

Cardiac glycosides are important medications that have positive inotropic, neurohormonal, and electrophysiological actions, which are the basis for its use in the treatment of certain supraventricular tachyarrhythmias and the management of heart failure due to systolic dysfunction [1].

Digoxin is the oldest cardiac drug still in current use. It is a purified cardiac glycoside derived from the foxglove plant [2]. It was initially approved by the FDA in 1954 [3]. It is a common agent used to manage atrial fibrillation and the symptoms of heart failure [4]. The ability of digoxin to decrease sympathetic activation has been documented [1].

A previous study was conducted for elderly patients presenting to an outpatient cardiology clinic and reported that the main reasons for using long-term digoxin were persistent atrial fibrillation (44.4%) and heart failure (41.1%) and that about 40% of them receive digoxin with inappropriate indications [5]. The inappropriate use of digoxin leads to several adverse events such as digoxin toxicity; because digoxin has a narrow therapeutic window [3].

See et al reported that digoxin toxicity accounted for about 1.0% of emergency department visits for all adverse drug events among patients' ≥40 years and about 3.3% among patients' ≥85 years. He also reported that digoxin toxicity is not declining and more careful prescribing and continuous monitoring to patients especially high-risk groups is required in order to decrease mortality and morbidity rate [6].

The correct use of cardiovascular drugs in patients has been shown to decrease the risk associated with cardiovascular morbidity and mortality [7]; especially the use of narrow therapeutic window drugs such as digoxin. The objective of this study was to determine digoxin utilization pattern in the outpatient setting in Alkharj.

2. METHODS

This retrospective study included a review of outpatient records between in 2017 and 2018.

Inclusion criteria include the entire outpatient who received digoxin during the study period. So,

the patients who didn't receive digoxin were excluded from the study.

The data were collected and analyzed using Microsoft Excel 2010 and included patients' gender and age, number of prescribed digoxin, the level of the prescribers and the prescribing departments. The descriptive data were represented as numbers and percentages.

3. RESULTS AND DISCUSSION

Only 38 patients received digoxin during 2017; 26 patients received digoxin 0.125 mg tablet and 12 received digoxin 0.25 mg tablet. In 2018, 31 patients received digoxin; 17 received 0.125 mg tablet and 14 received 0.25 mg tablet. Regarding 2017, the available data included only the number of prescribed digoxin but for 2018 the demographic and digoxin use pattern data were available. Number of patients receiving digoxin in the outpatient setting is shown in Table 1.

More than half of the patients receiving digoxin in 2018 were males (58.06%). About 54.84% of them aged more than 59 years. Table 2 showed the patients' personal data.

Most of the prescribers were residents (77.42%) followed by consultants (16.13%). The level of the prescribers is shown in Table 3.

More than 61 % of the prescriptions were written by cardiology department followed by emergency department (22.58%). The prescribing departments are shown in Table 4.

Table 1. Number of patients receiving Digoxin in the outpatient setting

Year	Number of patients receiving Digoxin
In 2017	38
In 2018	31
Total	69

The use of digoxin is uncommon in the outpatient department in comparison to other studies but still should be prescribe carefully because of its adverse events. Ali et al stated that 62% of the hospitalized heart failure patients were discharged on digoxin, and that about 37% of them had no indication for its use [8]. They also stated that the inappropriate use of digoxin was common; this incorrect use lead to several negative effects such as tachycardia [8].

Table 2. Personal data of patients

Variable	Category	Number	Percentage
Gender	Male	18	58.06
	Female	13	41.94
Age	20-29	3	9.68
	30-39	2	6.45
	40-49	3	9.68
	50-59	6	19.35
	More than 59	17	54.84

Table 3. The level of the prescribers

Level of the prescriber	Number	Percentage
Resident	24	77.42
Consultant	5	16.13
Specialist	2	6.45

Table 4. The prescribing departments

Department	Number	Percentage
Cardiology	19	61.29
Emergency	7	22.58
Internal Medicine	5	16.13

Another study showed that the use of digoxin in Estonia has increased by 35% during the 4-years study [9]. Eze and Olowu conducted a study in elderly outpatients in a tertiary hospital in Nigeria to describe the pattern of prescribing and the inappropriate use of medications in elderly and reported that inappropriate digoxin prescribing made up 7.15 %of the total prescriptions [10].

Food and Drug Administration reported that the overall incidence of adverse reactions with digoxin has been reported as 5-20%, 15-20% of these adverse events are considered serious. These events include cardiac toxicity that accounts for about 50%, gastrointestinal complications for about 25%, and central nervous system and other toxicity for about 25% of these adverse events [3].

Most of the patients who received digoxin aged more than 59 years and this is rational because heart failure patients are mainly elderly patients and heart failure represents the leading cause of hospitalization among older adults [11]. Dhingra R and Vasan reported that increasing age is an independent risk factor for cardiovascular diseases [12]. In addition to that elderly patients are at an increased risk of digoxin adverse events such as digoxin toxicity [13]. Furthermore, Currie et al stated that altered drug response and

increased adverse reactions are common among the elderly [14] and that the narrow therapeutic index of digoxin and pharmacokinetic changes associated with aging increases the risk of toxicity [14].

4. CONCLUSION

The use of digoxin is uncommon in the outpatient department in Alkharj nonetheless it has a narrow therapeutic window and it should be prescribed carefully because of its adverse events; mainly in elderly patients. A continuous assessment of digoxin prescribing is required in addition to that it is important to increase the awareness of healthcare providers and patients about digoxin use.

CONSENT

As per international standard or university standard, patients' written consent has been collected and preserved by the authors.

ETHICAL APPROVAL

The study was approved by ethical committee with an IRB log number 2019-0153E.

LIMITATION

The study didn't include information about the reason of digoxin prescription (diagnosis) and also if any complication of digoxin was recorded.

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 authors and producers of the products because we 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 authors.

ACKNOWLEDGEMENT

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

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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Peer-review history:
The peer review history for this paper can be accessed here:
<http://www.sdiarticle4.com/review-history/63915>