



## **The Outpatient Prescribing Pattern of Cefuroxime in Al-Kharj**

**Nehad J. Ahmed<sup>1\*</sup>**

<sup>1</sup>*Department of Clinical Pharmacy, College of Pharmacy, Prince Sattam Bin Abdulaziz University, Al-Kharj, Saudi Arabia.*

### **Author's contribution**

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

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### **ABSTRACT**

**Introduction:** Several previous studies reported a high prescribing rate of cephalosporin antibiotics such as cefuroxime. The inappropriate outpatients prescribing of cefuroxime leads to the development of bacterial resistance.

**Aim:** This study was conducted to demonstrate the prescribing pattern of cefuroxime in the outpatient setting in Alkharj.

**Methodology:** This retrospective study was conducted to know the prescribing pattern of cefuroxime. The data were collected from electronic prescriptions in a public hospital in Alkharj in 2018. The data were collected and analyzed using Excel software and represented as frequencies and percentages.

**Results:** In 2018, there were 316 prescriptions containing cefuroxime. The majority of the patient was males (56.01%). The majority of cefuroxime prescriptions include tablet dosage form (81.96%). About 62.03% of the outpatient prescriptions were prescribed by the emergency department.

**Conclusion:** Cephalosporin group (including cefuroxime) was one of the most commonly prescribed antibiotic groups to treat several infections. A high percentage of antibiotic prescriptions were prescribed inappropriately. It is important to increase the awareness about the wise use of antibiotics and to start the implementation of antimicrobial stewardship programs.

\*Corresponding author: E-mail: [n.ahmed@psau.edu.sa](mailto:n.ahmed@psau.edu.sa), [pharmdnehadjaser@yahoo.com](mailto:pharmdnehadjaser@yahoo.com);

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## 1. INTRODUCTION

In 2014, about 266.1 million antibiotics courses are dispensed in U.S. community pharmacies to outpatients. This means that for every 6 people in the United States, more than 5 prescriptions were written yearly [1]. Generally, at least 30% of antibiotics that prescribed in the outpatient setting are inessential, meaning that no antibiotic was needed at all [2].

The inappropriate outpatients prescribing of antibiotic leads to the development of antibiotic resistance, which is now one of the greatest public health threats globally [3]. It is important to optimize the usage of antibiotic in order to improve patient safety [4].

A study in Japan reported that antibiotics are prescribed in 36.6-40% of cases in outpatient clinics [5]. Another study conducted in Germany and Europe and founded that about 85% of the antibiotics used in humans are prescribed in the outpatient setting [6].

Several previous studies reported a high prescribing rate of cephalosporin antibiotics such as cefuroxime [7,8]. Bätzing-Feigenbau et al. [9] reported that the comparative usage of second-generation cephalosporins such as cefuroxime largely increased as compared to that of first-generation and third-generation cephalosporins.

In order to improve the prescription quality and to promote the rational prescription pattern, there is an essential need to investigate the different factors that affect clinicians' prescription patterns. This study was conducted to demonstrate the prescribing pattern of cefuroxime in the outpatient setting in Alkharj.

## 2. METHODOLOGY

This retrospective study was conducted to know the prescribing pattern of cefuroxime. The data were collected from the electronic prescriptions in a public hospital in Alkharj in 2018.

The electronic prescriptions that included cefuroxime in 2018 were included. The prescriptions before or after 2018 and the prescriptions that didn't include cefuroxime were excluded.

The data were collected after the approval of the study by Institutional Review Board committee. These data include demographic data, the level of the prescribers and the prescribing departments.

The data were collected and analyzed using Excel software and represented as frequencies and percentages.

## 3. RESULTS

In 2018, there were 316 prescriptions containing cefuroxime. The majority of the patient was males (56.01%). Table 1 shows the personal data of the patients.

About 20.25% of the patients were in the age range between 30-39 and about 19.3% were in the age range of 1-9 years old. Table 2 shows the age of the patients.

The majority of cefuroxime prescriptions include tablet dosage form (81.96%). The dosage forms of the prescribed cefuroxime are shown in Table 3.

The majority of the prescriptions were written by resident physicians (75.32%). Table 4 shows the level of the physicians.

About 62.03% of the outpatient prescriptions were prescribed from emergency department. The prescribing departments were shown in Table 5.

## 4. DISCUSSION

Cefuroxime is one of the most commonly prescribed antibiotics in the outpatient settings. In 2018, cefuroxime is the 6<sup>th</sup> most commonly prescribed antibiotics in the present study.

**Table 1. Personal data**

Variable	Category	Number	Percentage
Gender	Male	177	56.01
	Female	139	43.99
Nationality	Saudi	247	78.16
	Non Saudi	69	21.84

**Table 2. Patients' age**

Age	Number	Percentage
1-9	61	19.30
10-19	47	14.87
20-29	60	18.99
30-39	64	20.25
40-49	32	10.13
50-59	26	8.23
60 -69	12	3.80
70-79	9	2.85
80 or more than 80	5	1.58

**Table 3. Dosage forms of the prescribed cefuroxime**

Dosage form	Number	Percentage
Tablet	259	81.96
Suspension	56	17.72
Vial	1	0.32

**Table 4. The level of the prescribers**

Prescribers level	Number	Percentage
Consultant	49	15.50
Resident	238	75.32
Specialist	29	9.18

**Table 5. The prescribing departments**

Departments	Number	Percentage
Cardiology	2	0.63
Chest	12	3.80
Dermatology	10	3.16
Ear, Nose, Throat	16	5.06
Emergency	196	62.03
General surgery	12	3.80
Internal medicine	4	1.27
Nephrology	4	1.27
Neuro Surgery	2	0.63
Obstetrics & Gynecology	15	4.75
Orthopedic	16	5.06
Pediatric surgery	3	0.95
Pediatrics	14	4.43
Urology	10	3.16

Ata and Biswas [10] reported that cefuroxime was the most commonly prescribed antibiotics (22.5%) followed by azythromycin (11.6%) cefixime (11.5%) ciprofloxacin (10.9%) flucloxacillin (10.9%) and metronidazole (8.7%). Coenen et al. [11] reported that there is an increase of second and third-generation use, mainly cefuroxime, cefpodoxime and cefixime.

Oqal et al. [12] reported that co-amoxiclav made up more than 20% of the prescriptions from the

outpatient departments. Next were ciprofloxacin and cefuroxime.

In contrast to the present study, Shanmugapriya et al. [13] stated that the highest prescribed antibiotic was levofloxacin followed by co-trimoxazole with azithromycin, amoxicillin-clavulanate and cefpodoximeproxetil.

The majority of the patient was males and the majority of prescriptions were for patients aged less than 40 years old. Most of cefuroxime

prescriptions include tablet dosage form; this is rational because the majority of the patients were adults. Similarly, Ahmed et al reported that 54% of the antibiotics were prescribed in solid dosage forms [14].

The majority of the prescriptions were written by resident physicians. Generally, the residents have insufficient experience and it is important for them to prescribe antibiotics under the supervision of consultants or specialists.

Most of the prescriptions in the outpatient settings were prescribed from emergency department specially residents. Generally, numerous prescriptions in the emergency setting are unnecessary specially in the case of upper respiratory tract infections, many of these infections either mild bacterial infections or viral infections and no need to prescribe antibiotics for the patient in these situations.

Previous studies reported that there was a high prescribing rate in the emergency departments and that these prescriptions were commonly inappropriate. Oqal et al. [12] stated that about 47% of emergency prescriptions contained at least one antibiotic. Denny et al. [15] reported that 13.6% of patient presentations in the emergency departments involved the prescription of at least one antibiotic.

A recent study by the Centers for Disease Control and Prevention and the Pew Charitable Trusts found that nearly 1 in 3 antibiotics prescribed at outpatient facilities—including physician's offices, emergency departments, and hospital-based outpatient clinics—is unnecessary [2]. Furthermore, Jenkins et al. [16] reported that around half of the antibiotic prescriptions in the emergency department (ED) are either unnecessary or inappropriate.

## 5. CONCLUSION

Antibiotics were prescribed commonly in the outpatient settings specially in the emergency departments. Cephalosporin group (including cefuroxime) was one of the most commonly prescribed antibiotic groups to treat several infections. A high percentage of antibiotic prescriptions were prescribed inappropriately, either unnecessary such as in the case of viral infections and mild bacterial infections or given incorrectly. This inappropriate use increases the side effects and decreases the efficacy of antibiotics by increasing bacterial resistance rate.

It is important to increase the awareness of health care professionals and the patients about the wise use of antibiotics and it is important to start the implementation of antimicrobial stewardship programs in the hospitals.

## CONSENT

It is not applicable.

## ETHICAL APPROVAL

It is not applicable.

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## COMPETING INTERESTS

Author has declared that no competing interests exist.

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