



## **An Evaluation of Acyclovir Prescribing Patterns in a Public Hospital in AlKharj**

**Nehad Ahmed<sup>1\*</sup>, Abdulrahman Alharbi<sup>2</sup>, Ziyad S. Almalki<sup>1\*</sup>  
and Mohammed Alhajri<sup>3</sup>**

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

<sup>2</sup>Pharmacy Department, AlKharj Maternity and Children Hospital, Alkharj, Saudi Arabia.

<sup>3</sup>Department of Pharmacy, King Abdulaziz Medical City, Riyadh, Saudi Arabia.

### **Authors' contributions**

*This work was carried out in collaboration among all authors. Authors NA, AA and ZSA designed the study, performed the statistical analysis, wrote the protocol, wrote the first draft of the manuscript and managed the analyses of the study. Author MA managed the literature searches. All authors read and approved the final manuscript.*

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### **ABSTRACT**

**Aim:** This study aimed to analyze acyclovir prescription patterns in a public hospital in AlKharj.

**Methodology:** Cross-sectional study, via hospital pharmacy services that included collecting data on acyclovir utilization from de-identified pharmacy records in maternity and children hospital in Alkharj from 1 Jan 2018 until 31 Aug 2020.

**Results:** A total of 1059 prescriptions contained acyclovir were dispensed between 1 Jan 2018 till 31 Aug 2020. In the present study, acyclovir was prescribed mainly as an intravenous (45.89%) or oral (34.09%) treatment. It is prescribed mainly as a vial (45.89%) followed by suspension (31.63%). Inpatient Ward prescribed 52.60% of the prescriptions and emergency department prescribed 25.87% of the prescriptions.

**Conclusion:** It can be concluded that acyclovir was prescribed commonly in the hospital and that it's using should be monitored to ensure that it is prescribed and dispensed appropriately.

**Keywords:** Acyclovir; antimicrobial; antiviral; prescription patterns.

## 1. INTRODUCTION

Drug utilization was defined as the processes of prescribing, dispensing, and ingesting of drugs. Drug utilization studies are most interesting if focused on the most commonly used drugs [1]. Acyclovir is one of the most commonly used antiviral drugs for treating chickenpox-zoster and herpes simplex infections [2]. It is a synthetic acyclic purine nucleoside analog that is used for the treatment of initial episodes of herpes genitalis, suppression of remarkably frequent recurrences of herpes genitalis, and the acute treatment of varicella and herpes zoster [3]. Acyclovir is available in intravenous, oral, topical, or ophthalmic (not currently approved in the USA) treatments. Topical acyclovir is prepared as a 5% cream and ointment [4].

Several studies have shown that acyclovir was effective in treating many conditions. For example, a systematic review found that topical acyclovir was very effective in the treatment of acute herpes simplex virus epithelial keratitis [5]. According to the Herpetic Eye Disease Study, oral acyclovir was associated with a noteworthy reduction in the recurrence of keratitis during the study period [6]. Additionally, Mayer et al reported a decrease in recurrences of Herpes simplex virus following keratoplasty among patients with herpetic eye disease who received a longer course of therapy [7].

Rooij et al reported that during a 2-year follow-up period, oral acyclovir was associated with a reduction in herpetic eye disease recurrence in patients undergoing penetrating keratoplasty for herpes simplex virus [8]. Other systematic review showed the efficacy of three topical antiherpetics which are penciclovir, acyclovir and docosanol for the treatment of Herpes Simplex Labialis compared to placebo and stated that the three topical drugs are safe to use and have no serious adverse reactions [9].

But it should be used appropriately and only when needed because the inappropriate use of it increases the adverse effects, increases the resistance to the drug, and decrease its efficacy as shown in several studies [10-12]. Cunningham et al reported that the rate of resistance to acyclovir was less than 1% [10]. A second study conducted by Hlinomazová et al and reported that the prevalence of acyclovir resistance was 14 % among 212 patients with keratouveitis or

keratitis who were treated systemically or locally [11]. Furthermore, a report in 1994 showed that using oral acyclovir as OTC for the treatment of genital herpes was rejected on the grounds due to the development of viral and accelerated microbial resistance that was caused by its overuse [12].

World Health Organization reported that drug utilization studies can contribute to national health policies that are designed to increase the availability of effective and safe medications and reported that drug utilization studies can support the concepts of therapeutic formularies and essential drugs [13]. This study aimed to analyze acyclovir prescription patterns in a public hospital in AlKharj, Saudi Arabia.

## 2. METHODOLOGY

A retrospective review of acyclovir drugs prescribed was conducted in maternity and children hospital in AlKharj from 1 Jan 2018 until 31 Aug 2020. The hospital is one of 17 maternity and children hospitals in Saudi Arabia and included 200 beds [14].

The study included the patients for whom acyclovir was prescribed by the attending or resident physician and dispensed by the pharmacy. A total of 1059 patients' medical records were extracted during the period studies. The exclusion criteria included the patients who didn't receive acyclovir or who received it before or after the study period.

The choice of the acyclovir regimen was at the discretion of the doctor in charge. Antivirals had been always given free of charge at the hospital's pharmacy, where each prescription was computerized into a medical record, containing drugs and doses, dosage form (dose per pill and per day), amount of tablets delivered and date of dispensing. The descriptive data was extracted from de-identified pharmacy records and was represented as numbers and frequencies. All data were analyzed using the SPSS v13.0 software (SPSS Inc., Chicago, IL, USA).

## 3. RESULTS AND DISCUSSION

A total of 1059 prescriptions contained acyclovir were dispensed between 1 Jan 2018 till 31 Aug 2020. Sarnoff reported that acyclovir is given as

an intravenous, oral, topical, or ophthalmic treatment [4]. All of these treatments are approved in the USA except for ophthalmic treatment. Table 1 shows the type of acyclovir treatments that were prescribed during the study period.

**Table 1. Type of acyclovir treatments**

Type of treatment	Number N=	Percentage
Intravenous	486	45.89%
Oral	361	34.09%
Topical	184	17.37%
Ophthalmic	28	2.64%
Total	1059	100%

As shown in the results of the present study, acyclovir was prescribed mainly as an intravenous (45.89%) or oral (34.09%) treatment. It is prescribed mainly as a vial (45.89%) followed by suspension (31.63%). Table 2 shows the different dosage forms of acyclovir that were prescribed.

**Table 2. Dosage forms of acyclovir**

Dosage form of Acyclovir	Number N=	Percentage
Suspension	335	31.63%
Tablet	26	2.46%
Vial	486	45.89%
Ointment	28	2.64%
Cream	184	17.37%
Total	1059	100%

Regarding the departments that prescribed acyclovir, Inpatient Ward prescribed 52.60% of the prescriptions and the emergency department prescribed 25.87% of the prescriptions as shown in Table 3.

**Table 3. Departments that prescribed acyclovir**

Department	Number N=	Percentage
Outpatient Department (OPD)	68	6.42%
Inpatient Ward (IPD)	557	52.60%
Critical Care Unit (CCU)	160	15.11%
Emergency Department (ER)	274	25.87%
Total	1059	100%

One of the most remarkable milestones in modern medical history has been the accomplishment of successful therapy for viral infections. This refers not only to the number of lives saved but also to the amount of research knowledge produced in connection with the day to day care of people with viral infections. Analyzes of patterns in antiviral prescribing medications are a valuable way to explore how medical procedure and research can improve the treatment of viral-infected patients on a continuous basis. Here, we showed that acyclovir was prescribed commonly. Similarly, previous studies showed a high percentage of acyclovir prescribing more than other antivirals. Forbes et al stated that 58.1% of the herpes zoster cases received an antiviral prescription. The most common prescribed antiviral was acyclovir (69.0%) [15]. In a study about patterns of use of acyclovir in a health maintenance organization population, Johnson et al stated that there were 6182 prescriptions for acyclovir during the study period of two years; about 47 percent of these prescriptions were oral acyclovir treatments [16].

Chaplin conducted a study about the current prescribing patterns for topical antiviral and antibacterial preparations in primary care in 2015 in England and reported that regarding the use of antivirals for skin infections, 98.64% of the prescriptions contained acyclovir and only 1.36% contained penciclovir [17]. He also reported that regarding the use of antivirals for eye infections, 40.62% of the prescriptions contained acyclovir and 59.38% contained ganciclovir [17].

FDA determines 2 warnings and precautions for Acyclovir. The first warning was for the topical use of recurrent HSV lesions on the external aspect of lips and the face. They said that Zovirax cream should not be applied on mucous membranes inside the mouth or nose or in the eye and the second warning was that there is a potential for irritation and contact sensitization [18].

Some limitations of our study should be acknowledged. First, associated factors not collected in the current, such as virus subtype, patients' characteristics, prior treatment history, and clinician's knowledge of emerging resistance, might have led to the patterns observed. Second, there has been no evaluation of combinations of different antivirals, helping to better explain the causes behind certain shifts in prescribing patterns.

#### 4. CONCLUSION

The finding of this study suggests that acyclovir was prescribed commonly in the hospital and that most of the prescriptions were for systemic use as an intravenous or oral route. The use of it should be monitored because the unsuitable use increases adverse effects, increases drug interactions, increases the treatment cost, and decreases the efficacy of the drug.

#### 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.

#### CONSENT

As per university standard guideline, participant consent have been collected and preserved by the authors

#### ETHICAL APPROVAL

The study was approved by the central IRB Committee with an IRB log Number: 20-011E.

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#### COMPETING INTERESTS

Authors have declared that no competing interests exist.

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