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RESEARCH ARTICLE

An analysis of prescription pattern of antibiotics in infectious diseases in the ophthalmology outpatient department at tertiary care hospital

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ABSTRACT

Background: In ophthalmology practice, rational prescribing plays a crucial role in reducing ocular disease burden. There is an increase in resistance and limited availability of newer antimicrobial agents, there is a need of vigilant surveillance. **Aims and Objectives:** This study aims to analyze the prescription of antibiotics used for infectious diseases in ophthalmology outpatient department (OPD). **Materials and Methods:** After taking approval from the Institutional Ethics Committee, a prospective observational study was conducted in the OPD of ophthalmology at tertiary care hospital, Vijaynagar Institute of Medical Sciences, Ballari, for a period of 4 months (October 2018–January 2019). Prescriptions of 900 patients treated during the study period were audited prospectively using a specially designed case recording form and details of prescribed drugs were recorded. Data were analyzed using descriptive statistics. **Results:** Majority of the patients belong to the age group of 31–60 years with male preponderance (58%). Total drugs prescribed were 2360 in that antibiotics were 1400, with an average number of antibiotics per prescription being 1.55. The most common disorders diagnosed were conjunctivitis (34%) followed by dacryocystitis, blepharitis, and others. Eye drops being the most commonly (69%) prescribed dosage form. Prescription of antibiotics showed that fluoroquinolones (87%) were most commonly prescribed followed by aminoglycosides (21%) and β-lactam antibiotics (28%). Among them, gatifloxacin (27%) was most common followed by ciprofloxacin (21%), ofloxacin, moxifloxacin, tobramycin and chloramphenicol, and others. About 70% of antibiotics prescribed from the WHO Essential Medicines List-2017 list and 59% were from National List of Essential Medicines-2015 and two-drug therapy (44%) was used commonly prescribed. **Conclusion:** Although the prescription errors were less, there is a lack of use of generic names. Polypharmacy was not common in the department. In an era of rapidly developing antibiotic resistance, our findings may help to improve the practice of rational drug prescription and patient care.

KEY WORDS: Antibiotics; Prescription Pattern; Ophthalmology; Polypharmacy

INTRODUCTION

Antibiotics are "magic bullets" and lifesaving drugs, especially in treating and combating severe infections, they are one of the major elements in modern pharmacotherapy. However, due to various reasons and different mechanisms, microbes developed resistance to antibiotics. Resistance to antibiotics is now a serious problem as indiscriminate and inappropriate use of these drugs and irrational prescribing of those drugs has been the major culprit for the development of resistance to various antibiotics.[1]

In ophthalmic diseases, indiscriminate use of topical nonsteroidal anti-inflammatory drugs, antibiotics, and other drugs can result in many adverse effects such as local irritant effects, damaging the conjunctiva, cornea, and even severe

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systemic effects.[2] The microbial susceptibility patterns for antibiotics witnessed various changes day by day, especially in the past 20–30 years. Resistance to various antibiotic agents by microorganisms which causing ocular infections is increasingly more prevalent nowadays. Various institutional and national guidelines regarding antibiotic use have been developed, which guide and help to encourage prudent use of appropriate antibiotics in the management of ocular infections and slow the escalation of antibiotic resistance.[3]

The more safer and efficacious antibiotics used in ophthalmology are often confounded appropriate preparation with appropriate dose administration. In turn, which is dependent on proper education by the physician, a rational prescription, and proper information provided to the patient, besides many other factors.[4]

In the present time, as there is an increase in resistance to many antibiotic drugs, it is utmost important that we should prescribe and utilize the available antibiotic drugs very carefully. Hence, there is a need of studies which help in making antibiotic policies at institutional level. Hence, this study was designed which helps in identification the scope of improvement in usage of drugs rationally with the aim to investigate and analyze the antibiotic drug prescription pattern in ophthalmology outpatient practice at tertiary health care center, Vijayanagar Institute of Medical Sciences, Ballari, Karnataka.

Objectives

The objectives of the study were to analyze the pattern of various antibiotics prescribed and used in ophthalmology outpatients for infectious diseases.

MATERIALS AND METHODS

This study was a prospective, observational, and cross-sectional study conducted in the Outpatient Department (OPD) of ophthalmology in Vijaynagar Institute of Medical Sciences (VIMS), Ballari, which is a tertiary care teaching hospital. After the approval of IEC (Institutional Ethics Committee – reference no. – No. VIMS/MED/STAFF/SYN/67/2018-19), the study was conducted for 4 months from October 2018 to January 2019. Written informed consent obtained from all the patients who visiting the ophthalmology OPD from 9.30 am to 1.00 pm, 4 days a week (Monday–Thursday). The adult patients of either sex who registered newly and visiting ophthalmology OPD for curable complaints were included in the study (itching with blurring of vision, cases of red eye with blurring of vision, pain and discharge from eyes, swelling, discomfort, and foreign body sensation were included). Seriously sick patients, cases of refractive errors, trauma cases, cataract cases, follow-ups, any diagnostic procedure, and patients not willing were excluded from the study.

A total of 900 patients who visited ophthalmology OPD and taken treatment during the study period and satisfied inclusion and exclusion criteria were analyzed for their prescription pattern. The required information recorded prospectively in a specially designed performed (case record/report form) from the OPD prescription letter of every patient of the study. Required details of prescribed antibiotic drugs were recorded including its dosage form, time and frequency of drug administration, route of drug administration, and duration of treatment. Data analysis was carried by descriptive statistical methods.

RESULTS

A total of 900 prescriptions were analyzed for the study, the total number of drugs prescribed was 2360 and in that antibiotics was 1400. Most of the patients were belonged to the age of 31–60 years (47%) with male preponderance (58%) [Table 1].

The infective disease pattern in eye OPD was analyzed, majority of the patients had conjunctivitis (34%) followed by dacryocystitis (21%), blepharitis (16%), hordeolum externum (9%), keratitis (8%), and others [Figure 1]. For these diseases, antibiotic prescription was in various dosage forms, in which most common was in the form of eye drops (69%), followed by ointment (15%), oral (12%), and parenteral (4%) [Figure 2].

A total of 1400 antibiotics were prescribed. Among them, most commonly prescribed antibiotic groups were fluoroquinolone

Table 1: Demographic data of the patients

Items	Number/percentage
Age (years)	
<30	360 (40)
31–60	423 (47)
>61	117 (13)
Sex	
Male	522 (58)
Female	378 (42)

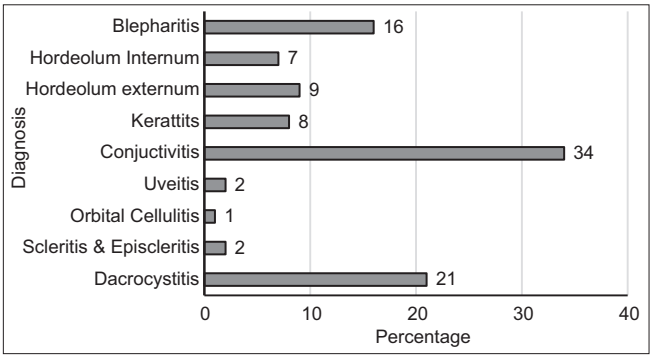

Figure 1: Distribution of diseases

(87%), followed by aminoglycosides (21%), penicillins (14%), cephalosporins (14%), and others. Moreover, among them, gatifloxacin (27%) was the most common followed by ciprofloxacin (21%), ofloxacin (19%), moxifloxacin (18%), amoxyclav (14%), chloramphenicol (14%) and others [Table 2].

The number of drugs prescribed were 2360 with an average of 2.62 per prescription and antibiotics prescription varied from single to multiple drugs with an average number of antibiotics per prescription was 1.55 [Figure 3]. The study also showed that the antibiotics prescribed were more in brand name (88.8%) compared to the generic name (11.2%). The percentage of antibiotics from the WHO Essential Medicines List (EML)-2017 list (according to access and watch group) was 70.6% and from National List of Essential Medicines (NLEM)-2015 was 58.9% [Table 3].

We were able to record antibiotic drug dosage form in 99.2% of the prescriptions. About 95% of prescriptions were showed details about the frequency of drug administration and 86% prescriptions about the duration of treatment given.

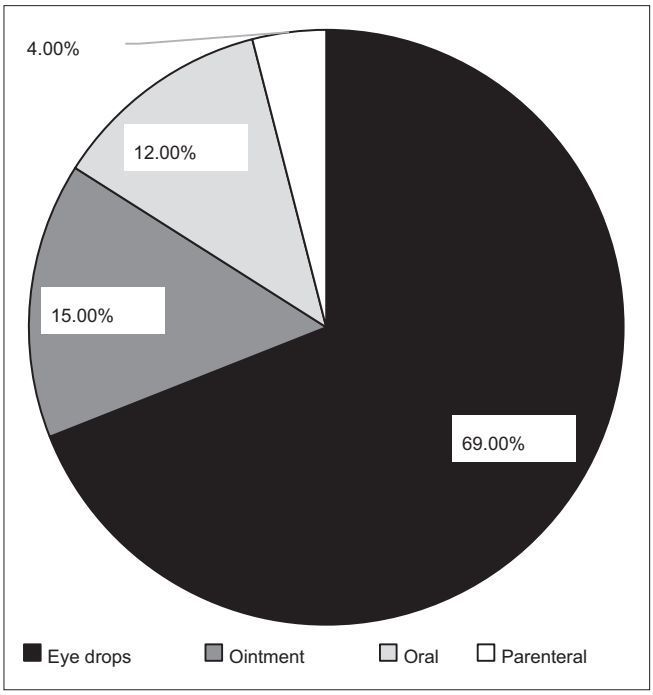

Figure 2: Pattern of dosage form of prescribed drug

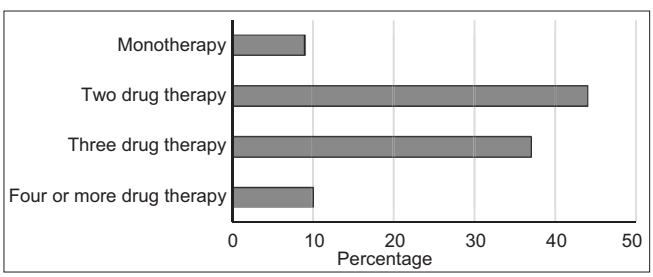

Figure 3: Prescription of antibiotics (per prescription)

DISCUSSION

Accuracy of diagnosis, correct and proper prescribing, adherence by patient, correct dispensing, and suitable packing are the important criteria of rational drug use. Improper utilization of drugs results in economic burden to both patients and society. It also causes potential health hazard. Each and every member of the health-care system need to know about rationality of drug utilization and should prescribe accordingly.[5,6] As the antibiotic guidelines will help physicians and surgeons to prescribe rationally and to choose the best effective and the most appropriate empiric antibiotic for patients. Moreover, for timely updation of guidelines and to check adherence to it, an analysis of utilization of drugs needs to be done.

In our study, most of the patients were fall in age between 31 and 60 years with male preponderance (58%). Total

Table 2: Antibiotic drug utilization pattern

Group (%)	Antibiotic	Number of times prescribed, *n* (%)
Fluoroquinolones (87)	Ciprofloxacin	294 (22)
	Gatifloxacin	378 (27)
	Moxifloxacin	252 (18)
	Ofloxacin	266 (19)
	Levofloxacin	28 (2)
Cephalosporins (14)	Cefazolin	28 (2)
	Cefuroxime	84 (6)
	Cefotaxime	70 (5)
	Ceftazidime	14 (1)
Aminoglycosides (21)	Gentamicin	84 (6)
	Amikacin	28 (2)
	Neomycin	14 (1)
	Tobramycin	168 (12)
Penicillins (14)	Amoxyclav	196 (14)
Others	Vancomycin	28 (2)
	Azithromycin	126 (9)
	Chloramphenicol	168 (12)

Table 3: Drug utilization-based indicators

Indicators assessed	Data value (%)
Average number of drugs per encounter	2.62
Average number of antibiotics per encounter	1.55
Drugs prescribed in generic name	11.2
Drugs prescribed from the WHO Essential Drug List	70.6
Drugs prescribed from National List of Essential Medicines-2015	58.9
Frequency of therapy recorded	95
Duration of therapy recorded/mentioned	86
Patient knowledge of correct dosage form	99.2

drugs prescribed were 2360 in that antibiotics were 1400, and 1.55 being the average antibiotic per prescription. The most common disorders diagnosed were conjunctivitis (34%) followed by dacryocystitis and others. Prescription of antibiotics showed that fluoroquinolones (87%) were most commonly prescribed followed by aminoglycosides (21%). Among them, gatifloxacin (27%) was most commonly prescribed antibiotic. About 70% of antibiotics prescribed from the WHO EML-2017 list.

The present study analyzed in total of 900 patients (n = 900) with 1400 antibiotic prescriptions in the outpatient of our ophthalmology department. The study showed that 47% of the patients were fall in age between 31 and 60 years followed by below 30 years age (40%) with male preponderance (58%). The studies done by Topno *et al*.,[7] Suman *et al*.,[8] and Dutta *et al*.[9] shown similar pattern of demographic data compared to our study.

Total drugs prescribed were 2360 with average of 2.62 drugs per prescription and average number of antibiotics per prescription was 1.55, which is similar to the study conducted by Jadhav *et al*.[10] and Jai *et al*.[11] The degree of polypharmacy is measured by average number of drugs per prescription, it also helps and provides the scope for reviewing the prescription pattern. Polypharmacy is at lower rate in our study.

Among 1400 antibiotics, 88.8% of the drugs were prescribed by brand name compared to 11.2% of generic name. It is lower when compared to other studies by Vaniya *et al*. (42.6%)[12] and by Jai *et al*. (24.8%).[11] This index shows the cost-effectiveness and increases the treatment cost due to higher rate of prescription by brand name. Variability in potency and variability in clinical response may be one of the major contributors to drug resistance, so ophthalmologists are hesitant to prescribe drugs by generic name.

About 70.6% of antibiotics were prescribed according to the WHO EML-2017 and 58.9% of drugs were from NLEM-2015. The previous study shows different patterns, in one study, it is lower Jadhav *et al*. (19.48%)[10] and studies by Jai *et al*. (81.96%)[11] and Vaniya *et al*. (62.2%)[12] showed higher percentage. Unavailability and lack of awareness of the National Essential Drug List/National Formulary of India among ophthalmologists may be related to decreased prescription according to the WHO EML and NLEM. Frequency of therapy recorded 95% of prescriptions, duration of treatment recorded in 86%, and dosage forms in 99.2%. Findings were similar to Vaniya *et al*.[12] [Table 3].

The analyzation of total 900 patients prescription showed that 34% of patients were diagnosed with conjunctivitis, followed by dacryocystitis (21%), blepharitis (16%), keratitis (8%), hordeolum externum (9%), internal hordeolum (7%), scleritis and episcleritis (2%) each, and other diseases. The study conducted by Vaniya *et al*.[12] showed that eyelid diseases (30%) were diagnosed maximum in their study.

Among 1400 antibiotics, two-drug therapy (44%) was the most common pattern used; this shows that ophthalmologist was aware of polypharmacy and avoiding unnecessary drug interactions followed by three-drug antibiotic therapy (37%). Similar pattern was found in a study by Jadhav *et al*.[10] and Vaniya *et al*.[12]

Fluoroquinolones were most commonly used class of antibiotics with 86% followed by aminoglycosides (21%), next is beta-lactam antibiotics (28%), shows similar prescription by Vaniya *et al*. (66.7%)[12] and Jadhav *et al*. (60%)[10] and a study by Jai *et al*. (68%).[11]

Gatifloxacin was the most preferred fluoroquinolone in this study (27%), which is similar to results in a study by Jadhav *et al*.[10] Gatifloxacin was most preferred probably due to minimal adverse effects and broad spectrum of activity. In this study, ciprofloxacin and ofloxacin prescribed in 21% and 19%, respectively, but these two drugs were used most commonly by Vaniya *et al*.[12] and Jai *et al*.,[11] and penicillins and cephalosporins were used about 14% each. Among 1400 drugs, 69% of drugs prescribed in the form of eye drops followed by ointment (15%) and 12% were prescribed in the form of tablet/capsule and parenteral use is 4%. In a study by Vaniya *et al*.,[12] almost same findings were found.

Limitations of the Study

A short study period, small sample size, single-centered study, and antibiotic susceptibility pattern not considered, adverse effects of the drugs not taken in considerations.

CONCLUSION

Drug utilization study is the initial step in defining the proper use of drugs. There are certain lacunae like low rate of generic drug prescription by ophthalmologist of the institute. Errors while prescription of drugs and confusion while dispensing the drugs can occur when prescription with brand name, which can be minimized by prescribing the drugs by generic name. It also helps the patient by making the treatment low cost. Moreover, we found that polypharmacy was low in our institute. This study also helps the ophthalmologists to prescribe by drugs rationally using generic name and helps in selection of appropriate essential antibiotic. There is a need to conduct similar studies with larger population, which helps in timely updation of institutional and national antibiotic policies.

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