

Drug Utilization Study in Ophthalmology Outpatients in a Tertiary Care Hospital

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Abstract Aims: The present study was carried out to describe the patterns of prescription and drug use in Ophthalmology outpatients at GG hospital, Jamnagar, Gujarat, India. Methods: Total of 600 patients were included during 3 months duration and average number of drugs per encounter, percentage of drugs prescribed by generic name, percentage of encounters with antibiotics prescribed, percentage of encounters with an injection prescribed, percentage of drugs prescribed from the WHO Essential Drug List 2015, number of fixed dose combinations prescribed and percentage of antimicrobial agents prescribed were analyzed. Results: Prescription analysis showed that the average number of drugs per prescription was 3.20%. Eye drops were the most commonly prescribed (66.8%) dosage form, followed by ointment (18.4%), capsules (8.66%) and tablets (6%). Dosage forms were recorded in 99.2% drugs, information about the frequency of drug administration was present in 96% of the drugs and duration of therapy was recorded in 84.7% of the drugs prescribed. The drug classes that were used most frequently were Antibiotics (45%), Ocular lubricants (24.7%), NSAIDS (17.4%) and Anti-allergy medications (8.1%). Conclusion: Common prescription errors were minimum. However polypharmacy was common.

Keywords Drug Utilization Study, Ophthalmology, Outpatients, Polypharmacy

1. Introduction

The World Health Organization (WHO) has defined drug utilization research as the marketing, distribution, prescription, and use of drugs in a society, with special emphasis on the resulting medical, social and economic consequences.[1] Drug utilization studies are good tools to ascertain the role of drugs in the society. They provide a socio-medical and economic basis for making healthcare

decisions. [2]

Drug therapy is an important component of patient care management in health care settings. Many pharmaceutical products are available in the market often having unaffordable cost. [3] Irrational use of drugs and dosage forms result in potential adverse effects to the patients and cause financial burden. To avoid such problems, every member of the healthcare system should practice rational use of drugs.

Important criteria for rational drug use are accurate diagnosis, proper prescribing, correct dispensing, suitable packing and patient adherence. [4] To improve the overall drug use, especially in developing countries, international agencies like World Health Organization (WHO) have given standard drug use indicators. [5] These indicators help doctors to know the shortcomings in prescription writing and allow to improve performance from time to time.

Recently in Ophthalmology, there have been many drug developments and introduction of new ocular therapeutic agents.[6,7] The efficacy and safety of drugs used in ophthalmology is often confounded by the accuracy of dose administration of the ophthalmic preparation by the patients which in turn is dependent on proper education by the Ophthalmologist, a rational prescription and proper comprehension of the information provided to the patient, besides many other factors.[8] Indiscriminate use of topical ophthalmic non-steroidal anti-inflammatory drugs and antibiotics can result in many adverse effects like local irritant effects, histological and structural changes in conjunctiva, indolent corneal ulcers and even severe systemic effects such as exacerbation of bronchial asthma.[9,10] In order to improve drugs therapeutic efficacy, minimize adverse effects, and delay development of resistance, drug utilization trends and patterns need to be evaluated periodically. [11]

Although rational use of drugs is quite a usual practice, monitoring of prescriptions and drug utilization studies can identify the associated problems and provide feedback to prescribers. Developing countries have limited resources for

healthcare and drugs and it becomes very important to prescribe drug rationally so that the available resources can be utilized optimally. Present study will give insight about the prevalence of various ophthalmic diseases and drug utilization pattern and current prescribing practices of the ophthalmologists of Guru Gobindsingh Government Hospital, Jamnagar which is a tertiary care centre located in the city of Jamnagar and serves urban population of the city as well as the rural population which is referred from primary and secondary centres from the nearby villages. The outpatient care is a walk in care facility which provides all type of care to the patients. There is also an inpatient department for indoor admission for the patients.

2. Materials and Methods

2.1. Study Design & Method

This was an open label, prospective, non-interventional, observational study conducted by Department Of Pharmacology in association with Department Of Ophthalmology, Shri M.P. Shah Medical College & Guru Gobind Singh Hospital, Jamnagar. Diagnosis and line of treatment were decided by the Ophthalmologist, Department of ophthalmology, G. G. Hospital. No additional drugs or investigations were advised by us during study period. The study was conducted from between August 2015 to October 2015 after approval from ethics committee. Consecutive patients attending morning Ophthalmology OPD of G. G. Hospital Jamnagar were included in our study and from these, patients presenting with refractive errors, patients managed non-pharmacologically and patients who declined to provide consent were excluded. Data like age, sex, diagnosis, ongoing treatment were recorded from case record of patients. Total of 600 patients were included and informed consent of the patient for the study was taken. Identity of patients was kept confidential.

2.2. Data analysis

2.2.1. WHO core Drug Use Indicators [1]

Average number of drugs per encounter, percentage of drugs prescribed by generic name, percentage of encounters with antibiotics prescribed, percentage of encounters with an injection prescribed, percentage of drugs prescribed from the WHO Essential Drug List 2015[12] were analyzed.

2.2.2. Additional Indices

Number of fixed dose combinations prescribed and percentage of antimicrobial agents prescribed were analyzed.

2.2.3. Statistical Analysis

Descriptive statistics were performed. Data was entered and analyzed with Microsoft Excel 2013. Values were

expressed as actual numbers, percentage and mean.

2.3. Ethical considerations

The study was commenced after obtaining approval from institutional ethics committee.

3. Results

Total 600 prescriptions were analyzed for study and total number of drugs in 600 prescriptions was 1925. Number of drugs per prescription varied from one to five with average of 3.20 [Table 1]. The mean age of the study sample was 40.1 ± 22.2 years. 53.16% of the patients were females.

Table 1. Number of drugs prescribed per prescription

Number of drugs per prescription	Number of prescriptions n (%)
One	23 (4%)
Two	263 (44%)
Three	81 (13%)
Four	32 (5%)
Five	201 (34%)
Total	600 (100%)

Majority of the patients attending ophthalmology OPD had eyelid diseases (34%), foreign body in eye (22%), conjunctivitis (20.3%) or trauma (9.8%). [Figure 1] For these diseases, drugs were prescribed in five different dosage forms. [Table 2] Eye drops were the most commonly prescribed (66.8%) dosage form, followed by ointment (18.4%), capsules (8.6%) and tablets (6%).

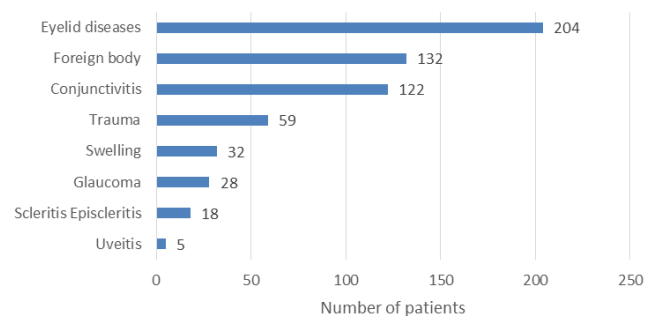


Figure 1. Morbidity pattern

Table 2. Dosage forms of drugs used

Dosage forms	Number of drugs prescribed n (%)
Drops	1286(66.8%)
Ointment	354(18.4%)
Capsule	166(8.6%)
Tablet	115(6%)
Parenteral	4(0.2%)

Study also revealed that the drugs were prescribed both by generic name (42.6%) and brand name (57.4%). The percentage of drugs prescribed from essential drug list was

24% (462/1925). [Table 3]

Dosage forms were recorded in 99.2% drugs, information about the frequency of drug administration was present in 96% of the drugs and duration of therapy was recorded in 84.7% of the drugs prescribed.

The most frequently drug class that were used were Antibiotics (45%), Ocular lubricants (24.7%), NSAIDS (17.4%) and Antiallergy medications (8.1%). [Figure 2]

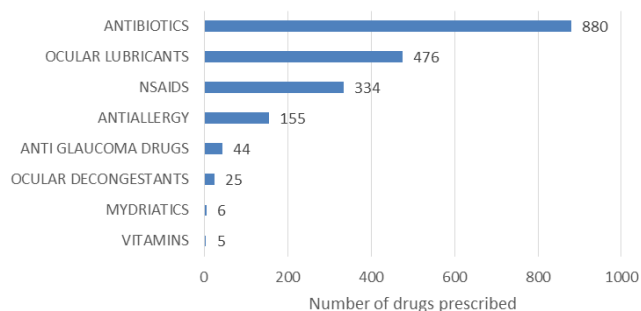


Figure 2. Drugs used

Table 3. Drug utilization based indicators

Indicators assessed	Data value
Average number of drugs per encounter	3.2
Percentage of drugs prescribed by generic name	42.6%
Percentage of encounters with an antibiotic prescribed	62.2%
Percentage of encounters with an injection prescribed	0.7%
Percentage of drugs prescribed from WHO essential drug list	24%
Dosage forms recorded	99.2%
Frequency of therapy recorded	96%
Duration of therapy recorded	84.7%

Among the prescriptions 240 drugs were prescribed as fixed dose combinations (FDC) that accounted for 12.46% of the total drugs prescribed. Commonly used FDCs were Chloramphenicol + polymyxin B, Moxifloxacin + Dexamethasone, Gatifloxacin + dexamethasone, Tobramycin + Fluorometholone, Brimonidine + Timolol. FDC are commonly prescribed for Glaucoma patients and allergic conditions of eye. Antibiotics and lubricating eye drops are commonly prescribed in non FDC polypharmacy.

The number of encounters with antibiotics was 373/600 (62.2%) which constituted 45.7% (880/1925) of the total number of drugs prescribed. Antibiotics were the most commonly prescribed drugs either as single antibiotic or fixed-dose combination (FDC) with nonsteroidal anti-inflammatory drugs and FDC-antibiotic combination with steroids. Fluoroquinolones were the most commonly prescribed antimicrobial class of which ciprofloxacin, ofloxacin and moxifloxacin were the most frequently prescribed among the fluoroquinolones.[Table 4]

Antiallergy medications commonly used were Olapatidine, Sodium cromoglycate, Steroids like Fluorometholone, and NSAIDSs like Ketorolac, Flurbiprofen.

Subgroup analysis of prescription patterns stratified by morbidity pattern is shown in Table 5. For Eyelid diseases Antibiotic drops, antibiotic ointments, lubricating drops and oral antibiotics were commonly prescribed. For Foreign body in eye and conjunctivitis usually antibiotic drops and lubricant drops were prescribed. For Trauma patients local and oral antibiotics were commonly prescribed drugs. Commonly used antiglaucoma drugs were Timolol, Brimonidine, Latanoprost, Pilocarpine, Acetazolamide, Mannitol and Glycerol. For treatment of Scleritis and Episcleritis antibiotic drops, lubricating drops, Flurbiprofen drops and oral NSAIDs were prescribed. For Uveitis Steroids and topical atropine were prescribed commonly.

Table 4. Antimicrobial drug utilization pattern

Dosage form N (%)	Major Antibiotic	Number of times prescribed n (%)
Drops 589/880 (66.93%)	Ciprofloxacin	194 (32.94%)
	Ofloxacin	146 (24.79%)
	Moxifloxacin	73 (12.39%)
	Tobramycin	58 (9.85%)
	Azithromycin	47 (7.98%)
	Natamycin	39 (6.62%)
Ointment 162/880 (18.41%)	Fluconazole	29 (4.92%)
	Moxifloxacin	79 (48.77%)
	Chloramphenicol	51 (31.48%)
	Azithromycin	20 (12.35%)
Oral 129/880 (14.66%)	Acyclovir	10 (6.17%)
	Ciprofloxacin	60 (37.04%)
	Doxycycline	38 (23.46%)
	Amoxicillin+ Clavulanate	29 (17.90%)

Table 5. Subgroup analysis of prescription patterns

Morbidity	No. of prescriptions	No of drugs prescribed	No of drugs prescribed/ prescription
Eyelid diseases	204	961	4.7
Foreign body	132	274	2.1
Conjunctivitis	122	253	2.1
Trauma	59	223	3.8
Swelling	32	110	3.4
Glaucoma	28	43	1.5
Scleritis/episcleritis	18	52	2.9
Uveitis	5	9	1.8

4. Discussion

By conducting Drug utilization studies we obtain data about the patterns and quality of use, the determinants of drug use, and the outcomes of use. The WHO drug use indicators are highly standardized and are recommended for inclusion in drug utilization studies. [13] Our study was an attempt to describe the ophthalmic drug prescribing pattern in a tertiary care teaching hospital in Western India. The WHO core drug use indicators were used to primarily describe the drug use, particularly the prescribing indicators.

The indicators of prescribing practices measure the performance of health care providers in several key dimensions related to the appropriate use of drugs.

Of the 600 prescriptions containing 1925 drugs studied, number of drugs per prescription ranged from one to five. Average number of drugs per prescription was 3.2%. Other hospital based studies in India also reported 1.49-3.03 drugs per prescription. [14-18] This serves as a measure of degree of polypharmacy. It is preferable to keep the number of drugs per prescription as low as possible, to reduce the risk of adverse effects drug interactions, development of bacterial resistance and to decrease cost of therapy to the patient.[19] Most of the drugs have been prescribed topically, 1286 (66.8%) in form of drops and 354 (18.4%) in the form of ointment. Thus by giving the drugs topically for eye diseases has minimized their adverse effects.

In our study, prescriptions with generic name were just 42.6%, which suggests popularity of brand names. The likely reason could have been the predictable response based on earlier clinical experience with a particular brand product and lack of the same confidence in generic drugs. Lack of confidence in generic drugs is not uncommon considering the evidence that in the absence of a strong regulatory control some of the marketed drug formulations might not be adhering to the standards prescribed.[20,21] Prescriptions of generic drugs could facilitate cheaper treatment for the patient.

The frequency of drug administration and drug therapy are the two most important parameters which, if not clearly recorded, can result in indiscriminate and injudicious use of drugs. The present study showed that the information about the frequency of drug administration was present in 96% of the drugs and duration of therapy was recorded in 84.7% of the drugs prescribed. In a small percentage of prescription without frequency or duration of therapy recorded usually Pharmacist told the patient dose and frequency. If there was any query by pharmacist patient was sent back to the ophthalmologist.

Antibiotics were frequent and number of encounters with antibiotics was 62.2%. Antimicrobial agents constituted 45.7% (880/1925) of the total drugs prescribed and were the most commonly prescribed drugs either as single antibiotic or fixed-dose combination (FDC) with nonsteroidal anti-inflammatory drugs and FDC-antibiotic combination with steroids. Other similar studies in ophthalmology in India have reported 30%–45% encounters with antibiotics lower than our study [14-17]. Dry environment, poor education, less awareness and poor sanitation leads to more infective conditions which is represented by higher than average number of antibiotic usage. In our study most of antimicrobials were given topically as drops and ointment thus minimizing adverse effects.

Fluoroquinolones were the most common group of antibiotics prescribed which were similar to reports of previous studies done in ophthalmology [14-18]. Ciprofloxacin and ofloxacin were preferred in many prescriptions because they were available in the Hospital

supply and patients could use them free of cost. Newer fluoroquinolones like Moxifloxacin were prescribed in severe cases.

There is a need to conduct many such studies in other departments as well, to audit large number of prescriptions and educate the prescribers on rational drug therapy for benefits and safety to the patient.

Limitation of the Study. It was a quantitative type of drug utilization study with the WHO/INRUD core prescribing indicators and therefore determining the quality of diagnosis and the appropriateness of drug choices was beyond the scope of prescribing indicators.

5. Conclusions

Polypharmacy was high in our study sample. Although the prescriptions were complete in terms of dose, duration and formulation, lack of use of generic names in the prescriptions needs to be addressed. High incidence of infective conditions necessitates consideration of the local drug sensitivity pattern and patient adherence to prescribed drug regimen.

Conflict of Interest

The authors have no funding sources or conflict of interest to report.

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