

## A prospective study of drug utilization in patients attending ophthalmology outpatient department at KBN teaching and general hospital of Gulbarga, India

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### ABSTRACT

**Background:** Drug utilization studies are an important part of rational use of drugs. Assessment of drug use pattern especially in developing countries is becoming increasingly necessary to promote the rational use of drugs. This study was planned to prospectively assess the drug utilization pattern in Ophthalmology outpatient department at KBN teaching and General hospital.

**Methods:** After approval from Ethics Committee, the prescriptions of 1000 outpatients were analyzed using a predesigned form to record information from the OPD prescriptions. Mentioned WHO drug use indicators and additional indices were analyzed: Average number of drugs per prescription, number of encounters with antibiotics, percentage of encounters with injections, percentage of drugs prescribed by their generic names, percentage of drugs prescribed from the National Essential Drug List (NEDL), etc.

**Results:** Prescription analysis showed that the average number of drugs per prescription was 2.6. The drugs were prescribed in the several forms, predominant dosage form been *topical eye drops* (69.58%) followed by *tablets* (11.98%), *ointments* (10.17%) and *capsules* (6.6%). The 'dosage form' was indicated for all of the drugs prescribed, the 'frequency' of drug administration was present in 96.5% of the drugs, and the duration of treatment for 82% of the drugs prescribed. Topical Antimicrobial agents were the most commonly prescribed drugs. followed by anti-inflammatory and anti-allergic, lubricants, anti-glaucoma drugs, etc. Percentage of drugs prescribed by *generic name* and from NEDL was 7.98% and 55 % respectively.

**Conclusions:** The prescription writing errors were less, however, there was very low generic prescribing and inadequate information about the duration of therapy in many prescriptions. Generic prescribing can be improved. Duration of therapy should be mentioned in all prescriptions. It is essential that appropriate guidelines on the use of topical antimicrobials are required to ensure rational prescribing.

**Keywords:** Drug utilization evaluation, Ophthalmology, Prospective study, Rational drug use

### INTRODUCTION

In health care system, use of medicines is considered one of the most cost-effective medical interventions for treatment and prevention of disease and it is important to

realize that inefficient use of medicines might affect the safety and quality of therapeutic care and wastes resources.

The drug utilization studies is defined as "the marketing, distribution, prescription, and use of drugs in a society, with special emphasis on the resulting medical, social, and

economic consequences" (WHO).<sup>1</sup> In the past few decades, marketing of new drugs, variations in the pattern of drug prescribing, concerns about the delayed adverse effects of drugs and the increase in the cost of drugs has increased the importance of drug utilization studies.<sup>2</sup> Drug utilization studies are powerful exploratory tools to ascertain the role of drugs in the society.<sup>3</sup>

Drug utilization research will often point to and profile the discrepancy that persists between true need and therapeutic practice, and perhaps serve as a tool in correcting it.<sup>4</sup>

Topical ophthalmic Non-Steroidal Anti-Inflammatory Drugs (NSAIDs) can not only produce local irritant effects of conjunctival hyperaemia, burning, stinging and corneal anesthesia but also have association with serious complication like indolent corneal ulceration and full thickness corneal melts.<sup>5</sup> Antibiotics are widely prescribed for various ophthalmic diseases. The repeated use of ophthalmic antibiotics leads to resistant strains.<sup>6</sup> Drugs themselves are not as bad as the way in which we use them; a therapeutic audit is required at all levels of the therapeutic chain to ensure safe and effective medical care.<sup>7</sup> Therefore, the present study was undertaken with the aim to investigate drug utilization and prescribing practices of ophthalmologists in KBN teaching and General Hospital.

## METHODS

This study was carried out in Outpatient Ophthalmology Department of KBN teaching and General Hospital from January 2016 to December 2016. Permission was obtained from the Institutional Ethics Committee. This was an open label, cross sectional, prospective, non-interventional, observational study conducted by Department of Pharmacology in association with Department of Ophthalmology, KBN Institute of Medical Sciences.

### Inclusion criteria

Newly registered adult patients of either sex who visited the Ophthalmology Outpatient Department with complaints of red eye, discharge from eyes, itching, redness, foreign body sensation, swelling, raised intraocular pressure, and eye trauma were included.

### Exclusion criteria

Cases of cataract, postoperative follow ups, any diagnostic test/procedure, and repeated follow-up cases were excluded from the study.

Data was collected prospectively from the out-patients unit of the ophthalmology Department between 9 AM and 12 PM, twice a week (Monday and Tuesday) for a period of 12 months. Prescriptions from each patient are taken into consideration for this study and only those medications used for treating ocular disorders were considered.

All drugs prescribed were noted including dose, route, dosage form, frequency of administration, indications for prescription and duration of therapy, numbers of drugs prescribed from Essential Drug list were also noted as per WHO/International Network of Rational Use of Drugs (INRUD) drug use indicators.<sup>8</sup>

Essential medicines as defined by the WHO are those drugs that satisfy the health-care needs of the majority of the population; they should therefore be available at all times in adequate amounts and in appropriate dosage forms, at a price the community can afford.<sup>9</sup> Central Drugs Standard Control Organization, the regulatory body in India, has recently formulated the National list of essential medicines in 2015.

A total of 1000 prescriptions were analyzed following WHO recommendation.<sup>8</sup>

Data was coded and entered with the help of a statistician to minimize the data entry errors. Data analyzed on EPI INFO version 3.5.4 and MS EXCEL. The different variables were expressed as frequencies and percentages.

## RESULTS

A total of 1000 prescriptions were analyzed. The total number of drugs in these prescriptions was 2604. The number of drugs per prescription varied from one to five, with an average of 2.6 per prescription.

Majority prescriptions 46.5% (n=465) had two drugs, followed by three drug prescription in 20.5% (n=205), single drug prescription in 19.6% (n=196), four drug were prescribed in 11.7% (n=117) and five drugs were prescribed in 1.7% (n=17) as seen in Table 1.

**Table 1: Number of drugs prescribed per prescription.**

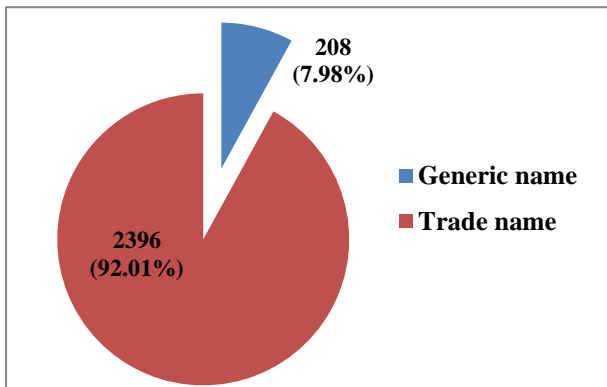
Number of drugs	Number of individual prescription (%)
1	196 (19.6%)
2	465 (46.5 %)
3	205 (20.5 %)
4	117 (11.7 %)
5	17 (1.7%)
Total	1000 (~100%)

**Table 2: The dosage form of various drugs.**

Dosage form	Number of drugs
Topical eye drops	1818 (69.58%)
Tablets	312 (11.98%)
Ointment	265 (10.17%)
Capsule	172 (6.6%)
Injection	37 (1.4%)
Total	2604 (~ 100 %)

Drugs were prescribed in five different dosage forms. Eye drops were the most commonly used dosage form (69.58%) followed by tablets (11.98%), ointments (10.17%) capsules (6.6%) and injections contributed to 1.4% of all the dosage forms prescribed as seen in Table 2.

Study also revealed that 208 (7.98%) drugs were prescribed by generic name and 2396 (92.01%) drugs were prescribed by brand name as seen from Figure 1.



**Figure 1: Drugs prescribed by generic and brand names.**

The percentage of drugs prescribed from essential drug list was 55% (1432/2604) from National List of Essential Medicines, 2015. Dosage forms of the drugs were mentioned for 2498/2604 (95.93%) of the drugs. Frequency of drug administration was mentioned for 2513/2604 (96.5%) of the drugs. Duration of treatment was specified for 2135/2604 (82%) of the prescribed drugs. Drugs as fixed-dose combinations were seen in 573 (22%) and the patient’s knowledge of correct dosage for prescribed drug was 96% as mentioned in Table 3.

**Table 3: Drug utilization based indicators.**

WHO Indicators assessed	Data values
Average number of drugs per prescription	2.6
Percentage of drugs prescribed by generic names	18
Percentage of prescriptions with antibiotics	55
Percentage of drugs prescribed from NLEM*	55%
Dosage forms recorded	95.93%
Frequency of therapy recorded	96.5%
Duration of therapy recorded	82%
Drugs as fixed-dose combination	22%
Patient’s knowledge of the correct dosage	96%

\* NLEM: National List of Essential Medicines

The number of prescriptions with antibiotics were 782/1000 (78.2%) which accounted for 1536/2604 (59%) of the total number of drugs prescribed, this was followed by anti-inflammatory and anti-allergic 338 (13%),

lubricants 234 (9%), Anti glaucoma 156 (6%), ‘Mydriatics and cycloplegics’ 208 (8%), Miotics 78 (3%) and multivitamins 52(2%) as seen in Table 4.

**Table 4: The various classes of drugs used.**

Class of drugs	Number of drugs	Percentage (%)
Antibiotics	1536	59
Anti-inflammatory and anti allergic	338	13
Lubricant	234	9
Anti glaucoma	156	6
Mydriatics and cycloplegics	208	8
Miotics	78	3
Multivitamins	52	2
Total	N = 2604	100

Of the total 1536 antibacterial drugs prescribed, Fluoroquinolones were the most common group of antibiotics 937/1536 (61%) followed by penicillins 184/1536 (12%), Chloramphenicol 169/1536 (11%), Tetracyclines 107/1536 (7%), polypeptides 93/1536 (6%) and Aminoglycosides 46/1536 (3%) as seen in Table 5.

**Table 5: Prescribing frequency of antibacterial classes.**

Antibacterial class	Number of drugs	Percentage (%)
Fluoroquinolones	937	61
Penicillins	184	12
Chloramphenicol	169	11
Tetracyclines	107	7
Polypeptides and others	93	6
Aminoglycosides	46	3
Total	N = 1536	100

**DISCUSSION**

The indicators of prescribing practices measure the performance of health care providers in several key dimensions related to the appropriate use of drugs.<sup>8</sup>

WHO drug use indicators were used in the present studies.

Of the 1000 prescriptions containing 2604 drugs, number of drugs per prescription ranged from one to five. In this study, most commonly two drugs were noted per prescription. Average number of drugs per prescription is an important index as it tends to measure the degree of polypharmacy.<sup>10</sup>

It is preferable to keep the number of drugs per prescription as low as possible since higher Figures lead to increased risk of drug interactions, adverse effects,

development of bacterial resistance and increased cost to the patient.<sup>11</sup>

In this study, most of the drugs were prescribed topically, 69.58% in form of drops and 10.17% in the form of topical eye ointment. Administering the drugs topically for eye diseases minimized their systemic adverse effects.

Generic drug use in India is yet to gain widespread popularity; the economic benefits of generic drug use are however well-known and undisputed.<sup>12</sup> Recently, regulatory authorities of different countries are advocating generic prescribing to cut total health-care cost.

In this regard, the percentage of drugs prescribed by generic names in this study was 7.98%, inadequate sensitization of the clinicians to generic prescribing and the frequent visit of the medical representatives in health facilities may be the probable cause of the under prescribing of the drugs by generic name.

The percentage of drugs prescribed from the National List of Essential Medicines 2015 was 55% which is higher compared to studies conducted in India.<sup>13</sup> The dosage form and the frequency of drug administration have been recorded in 95.93% and 96.5% of the cases respectively.

In 82% of the prescriptions, the duration of therapy was noted. This study showed a need for improvement in prescription writing, as the duration of therapy was missing in 18% of the prescriptions.

In this study, percentage of prescriptions with antibiotics was around 55% (n=550/1000). And thereby antibacterial antibiotics constituted 59% (1536/2604) of the total drugs prescribed. Some of these antibiotics were prescribed along with steroids, while most prescriptions had no such combinations with steroid as a fixed dose combination. Other similar studies in ophthalmology in India have reported 30%-45% encounters with antibiotics which is lower than our study.<sup>14,15</sup>

Fluoroquinolones were the most common group of antibiotics prescribed which were similar to reports of previous studies done in ophthalmology.<sup>13,14,15</sup> Ciprofloxacin 0.3% as drops and ointment is included in National List of Essential Medicines 2015, deemed to be available at Primary, Secondary and Tertiary levels of health care and hence preferred in many prescriptions as patients could use them free of cost.<sup>14</sup>

Newer fluoroquinolones like Moxifloxacin were prescribed in severe cases. The prescribing pattern observed in the current study was in accordance with the accepted norms of treatment for ocular diseases,

The present study revealed certain lacunae in the prescribing practices of the Ophthalmologists in this institute evident by the low generic prescribing, inadequate information about duration of therapy in many

prescriptions. There is margin for betterment. Ophthalmologists should be encouraged to prescribe by generic name and opt for essential drugs from National List of Essential Medicines. The study suggests educational initiative, development of drug policy, and National Essential drug list based hospital formulary to reduce the drug cost and ensure rational use of medicines.

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