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## A Study on Prescribing Pattern of Drugs in Ophthalmology Outpatient Department of a Tertiary Care Teaching Hospital



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### ABSTRACT

**Objective:** Prescription pattern monitoring studies promote appropriate use of monitored drugs as well as reduction of abuse or misuse of drugs. The goal of prescription pattern is to facilitate the rational use of drugs in a population as irrational use of medicines is a major problem. Hence the aim of present research was to study the prescribing pattern in Ophthalmology outpatient department of a tertiary care teaching hospital.

**Methods:** A prospective observational study was conducted for 6 months in Ophthalmology out-patients department of Navodaya Medical College Hospital and Research Centre, Raichur, Karnataka. Data was collected from the patient card and entered in specially designed data entry form. Data on the demographics, other investigations, diagnosis, prescribed drugs, generic name, etc. were collected. The data from data entry form were analysed using descriptive statistics namely total numbers, mean and percentage. Numbers of drugs prescribed from essential medicine list, use of generic drugs were analysed as per standard treatment guidelines.

**Results:** A total of 304 samples were collected. Majority of patients were female. Patients in Age group 61–70 years were more affected (24.01%). Average 4.75 drugs per prescription were recorded. Prescriptions contained medications between one to eight. Of the 1447 medications prescribed, 537 were antibiotics. Ciprofloxacin was commonly prescribed antibiotic. The most often prescribed dosage form was eye drop. Maximum patients were diagnosed with cataracts (48.68%). 80.64% of prescription medications were from essential medicine list and 14.30% of drugs were prescribed by generic name.

**Conclusion:** WHO core prescribing indicators were satisfactory. The proportion of antibiotics prescribed was high and most medications were from essential medicine list. Many of drugs were prescribed by brand names.



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## INTRODUCTION

World Health Organization (WHO) defines Rational use of drugs as “Medicine use is rational (appropriate, proper, correct) when patients receive the appropriate medicines, in doses that meet their own individual requirements, for an adequate period of time, and at the lowest cost both to them and the community. Irrational (inappropriate, improper, incorrect) use of medicines is when one or more of these conditions are not met. <sup>1</sup> Prescription patterns explain the extent and profile of drug use, trends, quality of drugs, and compliance with regional, state or national guidelines like standard treatment guidelines, usage of drugs from essential medicine list and use of generic drugs. Prescription pattern monitoring studies promote appropriate use of monitored drugs as well as reduction of abuse or misuse of drugs. <sup>2</sup> Prescription pattern monitoring studies also guide and support prescribers, dispensers and the general public on appropriate use of drugs, collaborate and develop working relationship with other key organizations to achieve a rational use of drugs. There is increasing importance of these studies because of a boost in marketing of new drugs, variations in pattern of prescribing and consumption of drugs, growing concern about delayed adverse effects, and cost of drugs and volume of prescription. <sup>3</sup> It is very important that these studies should be consultative and transparent, selection criteria be explicit, selection of the medicines be linked to evidence-based standard clinical guidelines, clinical guidelines and the list be divided into levels of care, and are regularly reviewed and updated. The effectiveness of these studies can be conceptualized in terms of their impact in ensuring the appropriate use of prescription controlled substances, reducing their diversion and abuse, and improving health outcomes, both at the patient and community levels. This impact is maximized when prescription history data are, to the extent technologically feasible, complete and accurate; analyzed appropriately and expeditiously; made available in a proactive and timely manner; disseminated in ways and formats that best serve the purposes of end users; and applied in all relevant domains by all appropriate users. This suggests that these studies can be thought of as information systems with inputs, internal operations, outputs, and customers who make use of their products. <sup>4</sup> The aim of prescription pattern is to facilitate the rational use of drugs in a population as irrational use of medicines is a major problem. <sup>5</sup> Inappropriate use of drugs and dosage forms result in potential health hazard to the patients and causes financial burden. To avoid such problems, every member of the healthcare system should practice rationally. <sup>6</sup>

Ophthalmology may be defined as a branch of medical science dealing with the anatomy, functions and disease of eye. <sup>7</sup> The foremost common ocular diseases are cataract, glaucoma, conjunctivitis, corneal ulcers, blepharitis, refractive errors and pterygium. However, the tendency of ocular diseases varies worldwide and also influenced by racial, geographic, socio-economic and cultural factor. Appropriate medications/ treatment is required for proper eye care. <sup>8</sup> There has been development of many new therapeutic agents which have made it possible to cure or provide the symptomatic control of many clinical disorders of eye. However, in many circumstances drugs are not used rationally for optimal benefits and safety. <sup>9</sup> Antibiotics are widely prescribed for various ophthalmic diseases evidence has shown trends of resistance to a different class of antibiotics often used in ocular therapeutics. Indiscriminate use of topical antibiotics and non-steroidal anti-inflammatory drugs causes histological and structural changes in conjunctiva.

In the recent years as development of antibiotics have been declined there is gradual increased in antibiotic resistance observed. Hence there is urgent need to utilize the available resource carefully. A periodic auditing of drug utilization pattern has become necessary for promoting rational use of drugs by increasing the therapeutic efficacy and cost-effectiveness while decreasing occurrence of unwanted adverse effects. In order to improve the drug therapeutic efficacy to minimize adverse effects and delay development of resistance, drug utilization trends and patterns need to be evaluated periodically. Therefore, this study was undertaken with the aim to investigate prescribing practices of ophthalmologists in a tertiary care teaching hospital.

## **MATERIALS AND METHODS**

A prospective observational study was carried out for a period of 6 months from March to August 2023 in Navodaya Medical College Hospital and Research Centre (NMCH & RC) Raichur, Karnataka, India.

### **Inclusion Criteria**

- Patients attending Ophthalmology outpatient department (OPD) and giving consent to participate in the study.

### **Exclusion Criteria**

- Patients who are seriously sick (Emergency), in-patient department patients with co-morbidities, and those patients who are not willing to participate in the study.

### **Ethical Consideration**

The study was approved by the Research and the Institutional Human Ethics Committee (Study number EC/02/2023) of Navodaya Medical College and Hospital. The data was obtained from the patient medical record taking the consent from participants after explaining the aim and purpose of the study. Anonymity and confidentiality for study participants were upheld at all times. The research was carried out adhering to the norms of Good Clinical Practice.

### **Study Design**

The study design was comparative prospective – observational study carried out for a period of six months from March to August 2023.

### **Designing of Data Entry Form**

A data entry format for incorporating patient details was designed. The format contained provisions to enter the details such as Name, Age, Height & weight, Gender, OP No., Date of admission, any known allergy, patients Address, other investigations, diagnosis, vital signs, prescribed drugs, dose, route of administration, frequency, and lastly duration.

### **Collection of Data**

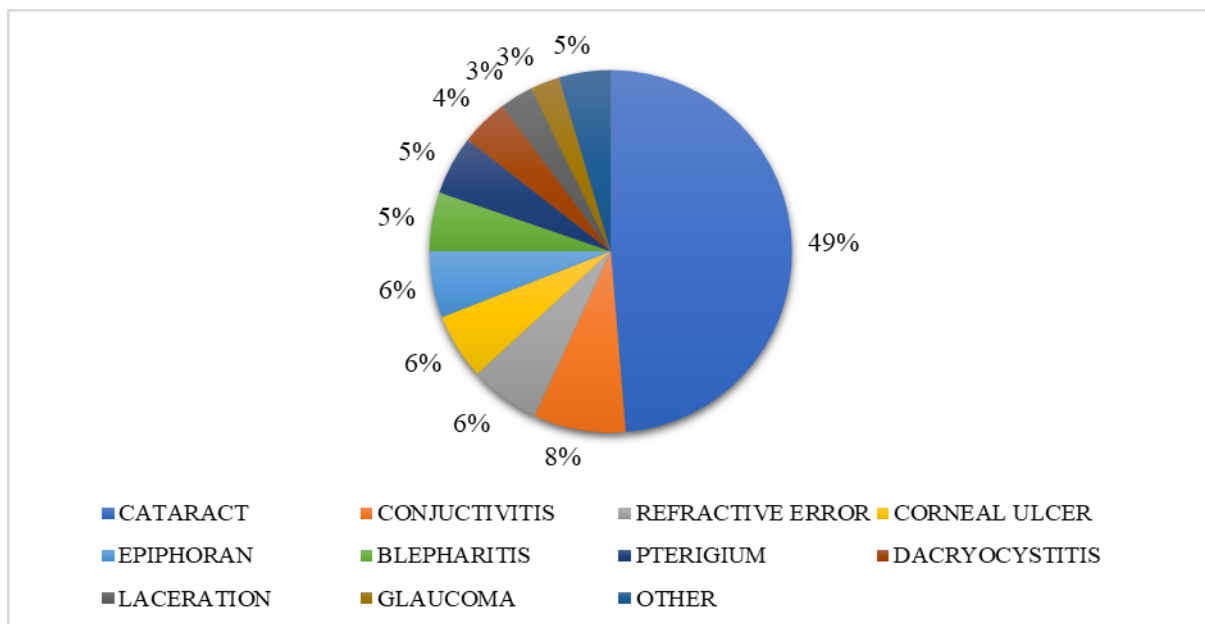
The data was collected from the Outpatient medical record book after obtaining consent from participants and entered in our specially designed data entry form. A total of 304 cases collected and documented.

### **Statistical Analysis**

Descriptive statistics, such as total numbers, mean, frequency, and percentage, were used to analyse the data from the data entry form.

**RESULT & DISCUSSION**

A total of 304 prescriptions which met the inclusion criteria were recruited into the study. Prescribing pattern of drugs was studied with the main focus on prescribing and administering of drugs as per state or national guidelines like standard treatment guidelines, usage of drugs from essential medicine list and use of generic drugs. Prescriptions were analyzed for average number of drugs, number of antibiotics and number of antibiotics per prescription, percentage of drugs prescribed by generic name, dosage forms prescribed, frequency and duration of drug therapy. Numbers of drugs prescribed from essential medicine list. The collected data analyzed using suitable statistics. Foremost the prescriptions were analysed for pattern of diseases in Ophthalmology out-patient department of NMCH & RC. Analysis showed that out of 304 prescriptions, 48.68% patients were diagnosed with cataract, 8.22% patients were diagnosed with conjunctivitis followed by refractive errors 6.25%, corneal ulcer 5.92%, epiphoran 5.92%, blepharitis 5.26%, pterigium 5.26%, dacryocystitis 4.27%, laceration 2.96%, glaucoma 2.63% and others 4.06%. The results observed were similar to the study conducted by **Suman et. al.**<sup>10</sup> The results are shown in Fig. 1.



**Fig. 1: Pattern of disease in Ophthalmology out-patient department (N = 304)**

The high incidence of cataract may be due to the following reasons such as:

Age-related factor, Cumulative damage, Lifestyle factors, Genetics, Trauma and eye conditions: Eye injuries, such as blunt trauma or penetrating injuries, can cause cataracts. Additionally, certain eye conditions, such as chronic inflammation, uveitis, or retinal disorders, can increase the risk of cataract development. <sup>11</sup>

Apart from cataract, the patients visiting the out-patient department also suffered from other eye disease to a lesser extent than cataract. There are common causes for these other diseases like environmental factors (UV ray exposure), trauma (injuries), hypertension, diabetes, infections, age related, genetics, inflammations and autoimmune disease, etc.

The demographic profile of patients was charted according to their ages. It was observed that 73 patients (24.01%) were in the 61–70 age group. The results are shown in Table 1. It was observed that many patients belonged to 60-70 yrs of age group. This might be due to: Age-related changes, Genetics, Environmental factors, Infections and injuries, Systemic health conditions, Lifestyle factors, Medications and side effects: Certain medications, such as corticosteroids, can have side effects that affect the eyes. Prolonged use or misuse of certain medications may increase the risk of developing conditions like glaucoma or cataracts. These results were comparable with the study conducted by **Beg MS et. al.** <sup>12</sup>

**Table 1: Age wise distribution of patients.**

Age	No. of patients (N=304)	Percentage (%)
0-10	10	3.28
11-20	34	11.18
21-30	43	14.14
31-40	33	10.85
41-50	38	12.50
51-60	49	16.11
61-70	73	24.01
71-80	24	7.89

The research populations were classified according to gender and it was clear that 58.88% of the populations were females and 41.12% were men. These results were in contrast to the study conducted by **Suman et. al** <sup>10</sup> and **Paul P et. al.** <sup>13</sup> Ophthalmology diseases and conditions can affect people of all genders. For example, some ophthalmic conditions may have risk factors that are more common in women, such as hormonal changes during pregnancy or menopause. Additionally, women often live longer than men on average, and some eye conditions become more common with age, so this could contribute to higher reported rates of eye diseases in women. <sup>14</sup>

The number of drugs per prescriptions varied from 1-8. Each prescription was examined and it was noted that 47 prescriptions (15.46%) contained 1-2 medications, 70 prescriptions (23.02%) contained 3–4 drugs, 31 prescriptions (10.19%) contained 5–6 medicines, and 156 prescriptions (51.31%) contained 7-8 drugs.

Patients were prescribed different dosage forms. Single dosage form of drug was prescribed in 24.34% (74) prescriptions. Two dosage forms of drugs were prescribed in 72.38% (220) prescriptions and three dosage forms of drugs were prescribed in 3.28% (10) prescriptions. The maximum no of dosage forms prescribed per prescription is 3 and the minimum number of dosage forms prescribed per prescription is a Single dosage form of drug. The results resembled to the study by **Suman et. al.**<sup>10</sup>

A total of 1447 drugs were prescribed out of which 33.93% antibiotics were prescribed followed by Anti-inflammatory 25.2%, Antacids 10.29%, Hypnotics 11.8%, carboxymethylcellulose 7.53%, antifungal 1.72%, anticholinergics 1.65%, steroids 2.4%, antihistamine 2.41%, Antiglaucoma 1.10%, vitamins 0.41% and antibiotic-steroid combination 1.45%. The results were similar to the study conducted by **Beg M et.al.**<sup>12</sup> The observations are shown in Table 2.

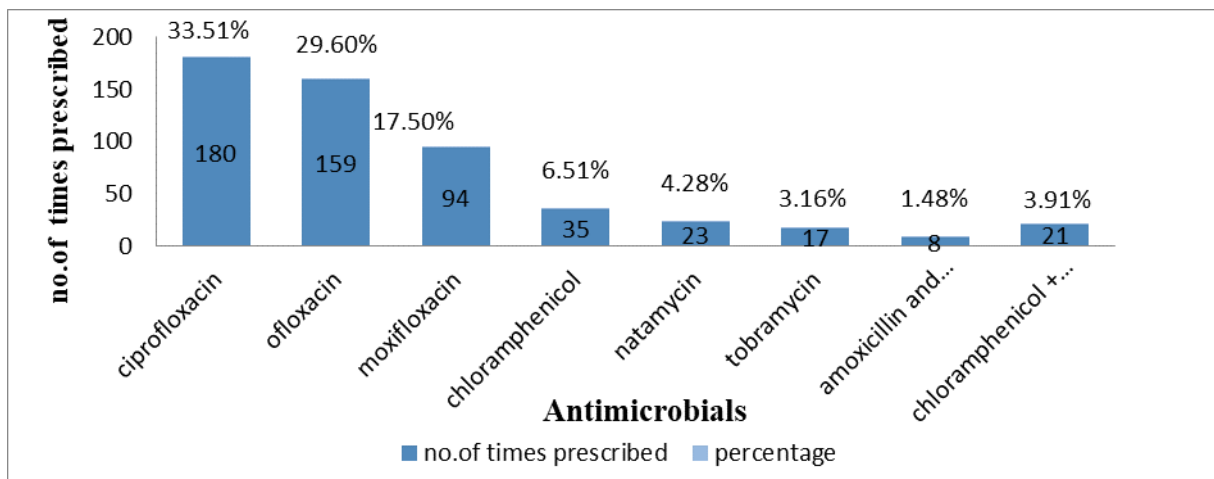
**Table 2: Class of drugs prescribed**

Class of drugs	Number of drugs (N=1447)	Percentage (%)
Antibiotics	491	33.93
Anti –Inflammatory	365	25.22
Hypnotics	171	11.81
Antacid	149	10.29
Carboxymethylcellulose	109	7.53
Antihistamine	35	2.41
Antifungal	25	1.72
Anticholinergics	24	1.65
Antibiotic-steroid combination	21	1.45
Corticosteroids	35	2.41
Vitamins	6	0.41
Anti-glaucomic	16	1.10
TOTAL	1447	100

Analysis of 537 antimicrobials prescribed showed that the antimicrobials from different classes were ciprofloxacin 33.51% (180), Ofloxacin 29.60% (159), Moxifloxacin 17.50% (94), Chloramphenicol 6.51% (35), Natamycin 4.28% (23), Tobramycin 3.16% (17), Amoxicillin and potassium clavulanate 1.48% (8) and Chloramphenicol + polymycin B

3.91% (21). The results were same as the study conducted by **Beg M et. al.** <sup>12</sup> The results are shown in Fig. 2.

According to the study fluoroquinolones was commonly prescribed. It was most commonly prescribed antimicrobials due to its broad-spectrum activity against many bacteria that cause ocular infections. Effective against common ocular pathogens, good penetration into ocular tissues, Topical and systemic administration options, Rapid onset of action, Low resistance rates. <sup>15</sup>



**Fig. 2: Commonly prescribed antimicrobials in Ophthalmology**

Out of 537 antibiotics, 15.46% (47) patients were prescribed monotherapy, 74.01% (225) patients were prescribed combination therapy and fixed drug combinations, and 10.52 % (32) patients were not prescribed any antibiotics. This is depicted in Table 3.



**Table 3: Descriptive analysis of class of antibiotic drug therapy**

Class of drug therapy of antibiotics	Frequency of prescription	Percentage (%)
Prescription containing no Antibiotics	32	10.52
Monotherapy	47	15.46
Combination & Fixed dose combination	225	74.01
Antibiotics	<b>Drugs name</b>	
Monotherapy	Ofloxacin. Moxifloxacin, Tobramycin, Natamycin.	
Combination	Ciprofloxacin,Chloramphenicol, Ofloxacin. Moxifloxacin,Tobramycin, Natamycin.	
Fixed dose combination	Polymycin B sulphate & Chloramphenicol, Amoxicillin Clavulanate	

The prescriptions were analyzed to know the number of drugs prescribed from EML. 80.64% (1167) of drugs were prescribed from the essential medicine list and 19.35% (280) of drugs from the nonessential drug list. The results were identical to the study conducted by **Devi JCH et. al**<sup>16</sup> and **Krishna J et. al.**<sup>17</sup>

The prescriptions were analyzed for generic drugs. 85.69% (1240) of drugs were prescribed by branded names and 14.30% (207) of drugs by generic name. According to WHO prescribing criteria drugs should be 100% prescribed from a generic name. This result was similar to the study conducted by **Bhatt JH et. al**<sup>18</sup> and **Krishna J et. al.**<sup>17</sup>

**WHO core drug indicators used to study prescription**

Average number of drugs per prescription- 4.75%, percentage of encounters with an antibiotic prescription- 37.11%, percentage of drugs prescribed by generic name-14.30%, percentage of drugs prescribed from essential medicine list-80.64%, percentage of encounters with an injection prescribed- 0.62%.

**Drugs utilization parameters used to analyze study prescription**

Dosage form recorded-100%, Frequency of therapy recorded -97.25%, Duration of therapy recorded -64.06%, Diagnosis recorded -100%, Dose recorded-97.3. The study revealed that

common prescription writing errors were minimum. However, duration of treatment was low. The results were in accordance with the study conducted by **Kumari K et. al.**<sup>19</sup> In their study dose and frequency recorded was 100%. Another study conducted by **Maniyar Y et. al.**<sup>20</sup> showed that dosage form, frequency and duration of therapy recorded were 99.88%, 94% and 75% respectively.

## **CONCLUSION**

Based on many parameters and WHO core prescribing indicators the prescribing pattern at the institution is satisfactory especially, with complete drug information for patients in the prescription. This study came across with some errors such as a high percentage of antibiotics, and lower drugs from EML. Moreover, the prescription of drugs by brand name was a matter of concern. This can be addressed through proper sensitization of clinicians in the art of rational prescribing.

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## **CONFLICT OF INTEREST**

The authors declare no conflict of interest.

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