



Original Article

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A Study of Drug Utilization Pattern in the Ophthalmology Outpatient Department at Tertiary Care Teaching Hospital

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ABSTRACT

Research in ophthalmology in India has raised concerns about the improper selection and prescription of essential and generic medicines. To address this, the current study analyzed drug usage patterns in the ophthalmology department of a tertiary care hospital. This study was prospective and observational, conducted from January to December 2021. It included patients visiting the ophthalmology OPD but excluded those with glaucoma, cataracts, and hospitalized cases. Patient information was documented in a Case Record Form, and data was analyzed using MS Excel 2019 with descriptive statistics. Over one year, 119 patients were included in the study, with an average of 1.83 drugs per patient. Lubricants (35.45%) and antimicrobials were the most frequently prescribed drug categories, with 78% of antimicrobial prescriptions belonging to the fluoroquinolone group. Of the 217 drugs prescribed, 96% were by brand name, and 86% were not listed in the WHO Essential Drug List. Additionally, 95% of prescriptions did not contain any fixed-dose combinations (FDCs). The majority of drugs were administered topically (74%), while the remaining 26% were given orally. The study shows that the average number of drugs per prescription matches WHO standards, with most prescriptions not including FDCs. However, only a few drugs were prescribed as generics or from the essential drug list. Greater awareness among prescribers regarding the benefits of essential and generic drug prescribing is necessary to optimize drug utilization in ophthalmology practice.

Key words: Drug utilization study, Ophthalmology, Essential medicines, WHO core indicators

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INTRODUCTION

Drug utilization study, according to the World Health Organisation (WHO), involves "the marketing, distribution, prescription, and use of drugs in a society, with special emphasis on the resulting medical, social, and economic consequences" [1]. Pharmaceutical products are available under numerous brand names, often making them expensive for prescribers and patients [2]. Globally, the irrational and inappropriate use of drugs remains a major concern in healthcare [3].

Drug utilization research is a key aspect of pharmacoepidemiology, as it examines the extent, patterns, and factors influencing drug use. Over time, the distinction between these two terms has become less sharp, and they are sometimes used interchangeably. However, while drug utilization studies often employ various sources of information that focus on drugs the term epidemiology implies defined populations in which drug use can be expressed in terms of incidence and prevalence [4]. Drug utilization research is crucial for both national policy

decisions and individual patient care. However, many developing countries lack sufficient data on drug consumption [5].

Evaluating drug use patterns with WHO indicators is essential for ensuring proper medication use. One common method is conducting prescribing and patient care surveys using WHO drug use indicators. These standardized indicators are globally recognized and have been applied in over 30 developing countries [6].

Antibiotic use is very high in ophthalmology, and they are among the most commonly prescribed drugs in hospitals. Analyzing prescription patterns can help minimize issues caused by excessive antibiotic use [7, 8].

In ophthalmology, antimicrobials are mainly used for prevention since culture analysis data is often unavailable. However, excessive use can cause resistance in ocular flora, making infections harder to treat and increasing the risk of severe eye damage and vision loss [9].

Research in Indian ophthalmology has highlighted concerns about the poor selection and prescribing of essential and generic medicines [1]. Considering this, the study was conducted to analyze the current prescribing patterns and drug utilization trends in the ophthalmology department of a tertiary care hospital. The aim was to understand drug usage among ophthalmology outpatients in a teaching hospital.

MATERIALS AND METHODS

A prospective, observational study, carried out in the Department of Pharmacology in collaboration with the Department of Ophthalmology of tertiary care teaching hospital, Gujarat, India. The study was conducted between January 2021 to December 2021. A total of 119 patients who met the inclusion criteria were included in the study. The patients were assigned to the study only if they fulfilled the inclusion criteria.

Inclusion criteria

Patients visiting the ophthalmology outpatient department (OPD).

Exclusion criteria

Patients with glaucoma, cataracts, and those admitted to the ophthalmology ward.

Case records of OPD patients who visited OPD for any indications, of their details were recorded in the Case Record Form. The case record form consisted of a demographic profile (Name initials, Age, Gender), record information (OPD number), the chief complaints for which the patient visited OPD, the diagnosis, and data regarding the prescribing pattern of drugs.

Data analysis

After one year of data collection, all information was entered into MS Excel 2019 and analyzed using descriptive statistics.

Demographical characteristics included Age and Gender distribution of patients, New and follow-up patients, and most frequent clinical presentation.

Drug use pattern (WHO Core indicators) included the Average number of drugs per prescription, Most frequent route of drug administration, Percentage of drugs prescribed by generic and brand names, Percentage of encounters with an antibiotic prescribed, Percentage of encounters with an injection prescribed, Percentage of drugs prescribed from Essential Drug List(EDL).

RESULTS AND DISCUSSION

A total of 119 patients were included in the study conducted from January to December 2021. The data collected has been analyzed and presented below the **Figure 1**.

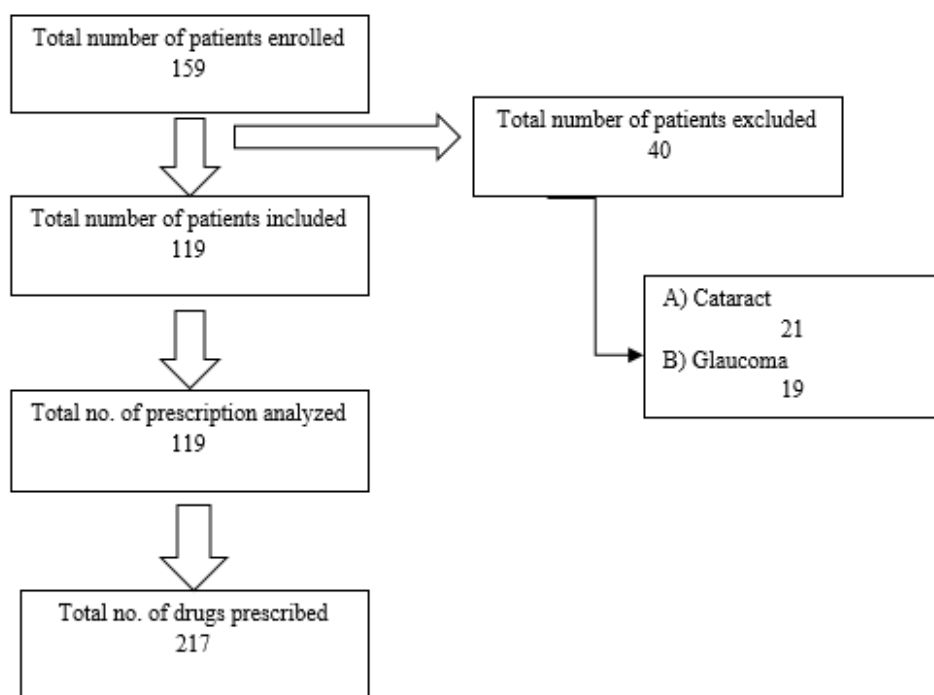


Figure 1. Patient and prescription data

- *Demographic profile*

A total of 119 patients participated in the study, with 73 (61%) males and 46 (39%) females.

Patients were of different ages starting from 1 year to 75 years. Maximum patients were between 46 – 60 years (27%), followed by age group 31 to 45 years (24%). Out of 119 patients majority of the patients visited Ophthalmology OPD as new patients 96 (81%) and 23 (19%) were followed up patients. The most frequent clinical presentation in Ophthalmology OPD was refractive error 33(27.73%).

- *Analysis of drug prescribed*

A total of 119 prescriptions were analyzed, containing 217 prescribed drugs. **Table 1** shows the analysis of drugs prescribed according to WHO core prescribing indicators.

Table 1. Assessment of WHO core prescribing indicators

Parameters assessed	N=119
Average number of drugs per encounter	1.83
Number of drugs prescribed by generic name [n (%)]	08 (4%)
Number of drugs prescribed by brand name [n (%)]	209 (96%)
Number of encounters resulting in the prescription of an antimicrobial [n (%)]	73 (33.64%)
Number of encounters resulting in the prescription of an injection [n (%)]	00(0%)
Number of drugs prescribed from WHO Essential Drug List [n (%)]	19(8.75%)

Most common groups of drugs were prescribed from the lubricant and antimicrobial groups. The frequency of groups of drugs prescribed was outlined in **Table 2**.

Table 2. Percentage of groups of drugs prescribed in ophthalmology OPD

Group of drugs	Number (217)	Percentage (%)
Lubricant	78	35.45%
Antimicrobials	72	32.73%
Micronutrients	16	7.27%
Antihistaminic	13	5.91%

Corticosteroids	9	4.55%
Anticholinergic	7	3.64%
NSIADS	8	3.64%
PPI	8	3.64%
β blocker	4	1.82%
α 1 agonist	1	0.90%
Carbonic anhydrase inhibitor	1	0.45%

The majority (51.26%) of prescriptions do not contain any antimicrobials. The distribution of individual antimicrobial groups is illustrated in **Figure 2**. **Figure 2** shows that the majority (78%) of drugs prescribed were from the Fluoroquinolones group. Out of Fluoroquinolones, the most common was moxifloxacin (74%) followed by cefixime.

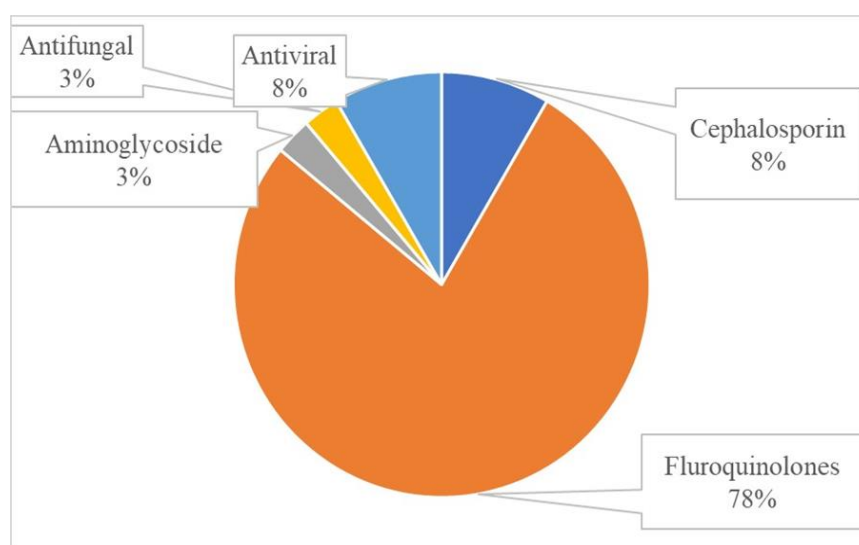


Figure 2. Groups of antimicrobials

In total, 217 drugs were prescribed in the ophthalmology OPD, with the majority (96%) prescribed by brand name. (**Figure 3**).

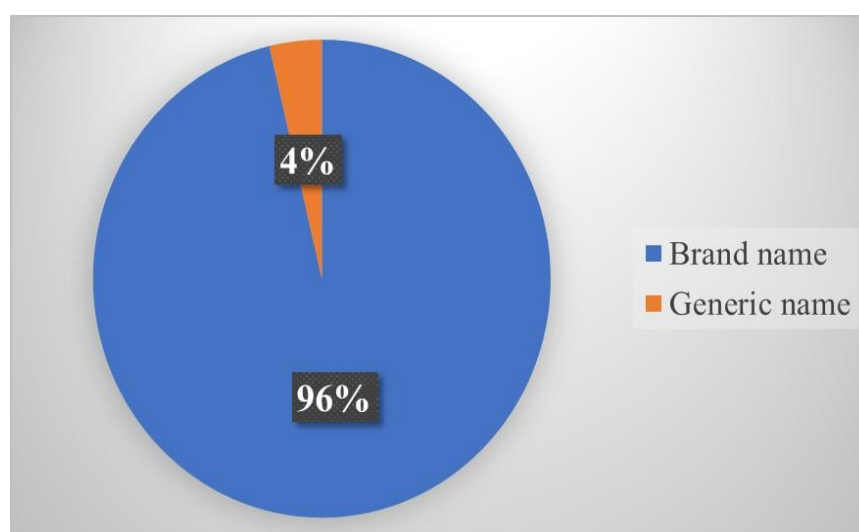


Figure 3. Drugs prescribed by Generic and Brand name

It was observed that the primary method of drug administration in the ophthalmology OPD was topical route 88(74%) followed by oral 31(26%) and there were no drugs were given by the parenteral route.

Figure 4 shows that 86% of drugs were not prescribed from the WHO Essential drug list.

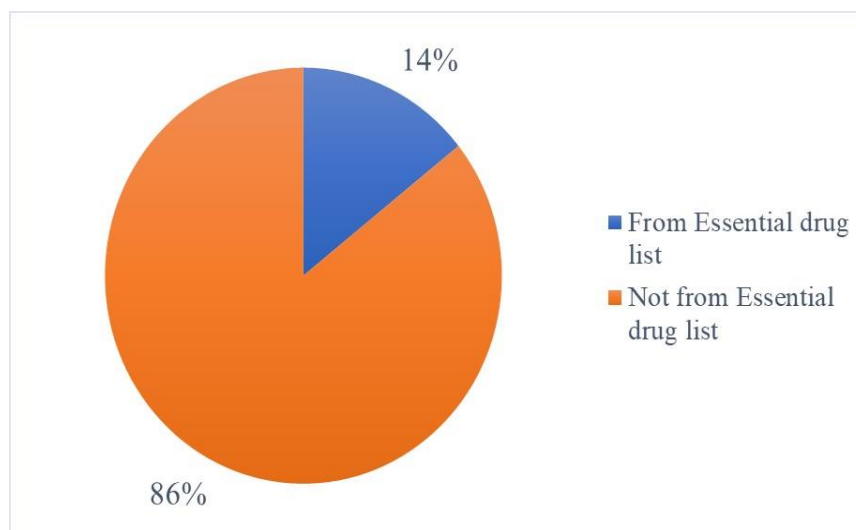


Figure 4. Percentage of drugs prescribed from Essential drug list

The majority 95% of drugs did not contain any FDC. All prescribed FDCs were non-essential. The most commonly prescribed FDC found was Naphazoline + Phenylephrine + Carboxymethylcellulose.

Drug Utilization Study (DUS) helps evaluate the prescribing, dispensing, and distribution of medicines. Its primary goal is to promote the rational use of drugs (RUM) [5].

In this study, the majority of patients were male (61%), which aligns with Banerjee *et al.*'s findings (67.3%) [10]. The highest number of patients (27%) belonged to the 46-60 age group, indicating a higher risk among middle-aged and older adults. This finding aligns with the study by Suman RK *et al.* (34.14%) [11]. Patients came with various clinical presentations. The most common clinical presentation was refractive errors (27.73%) which aligns with Banerjee *et al.* (31.6%) [10].

Most commonly prescribed antimicrobial group in the present study was fluoroquinolones (78%), among them most commonly drug prescribed was moxifloxacin, a similar result was also observed in another study conducted by Jarinabanu *et al.* (42.99%) [12]. Moxifloxacin, a newer fluoroquinolone, is effective against both types of bacteria: Gram-negative and Gram-positive. Additionally, its preference may be attributed to its comparatively lower incidence of side effects and the growing concerns regarding resistance to other ocular antibiotics. These factors likely contribute to its widespread use in clinical practice [12].

The average number of drugs per prescription is a crucial indicator of polypharmacy, as it reflects prescribing patterns and the potential risk of drug interactions. In the present study, the average number of drugs per prescription was 1.83, suggesting a cautious approach to prescribing and a restraint on polypharmacy. This finding indicates an effort to minimize excessive medication usage and reduce the risk of adverse interactions. Comparatively, other studies in ophthalmology have reported a higher average (3.03), highlighting variations in prescribing trends across different settings [13, 14].

In this study, 4% of drugs were prescribed by their generic name, similar to Pradeep *et al.*'s findings (2.35%) [15]. Prescribing by generic names promotes cost-effective and rational treatment by reducing the financial burden on patients. Additionally, it helps prevent prescription errors and minimizes the risk of confusion arising from brand names that sound or appear similar. Despite these advantages, the low percentage observed in this study suggests a need for greater emphasis on generic prescribing to enhance accessibility and safety in medication use [15].

The low rate of generic drug prescriptions may be due to the unavailability of affordable generics, prescribers' lack of confidence, or patients' preference for branded medicines. However, promoting generic prescribing can help reduce irrational use, improve access to essential medicines, and support cost-effective treatment.

Most drugs were administered topically (74%), followed by oral use (26%). Similar results were reported in Biswas NR *et al.*'s study (76%, 10.9%) [13]. The preference for topical formulations is justified by their site-specific action, which enhances therapeutic efficacy while minimizing systemic side effects. This reinforces the rationale for their widespread use in ophthalmic practice, ensuring targeted drug delivery with better patient safety.

Injections should be used cautiously as they may lead to local toxicity and higher costs. There were no drugs given by the parenteral route in the present study, similar findings were observed in another study conducted by

Jarinabanu *et al.* (0.20%) [12]. This highlights a preference for safer and more cost-effective routes of administration, reinforcing the rationale for avoiding unnecessary injections in ophthalmic practice.

Misuse of antimicrobials can lead to resistance. In this study, 49% of prescriptions included antimicrobials, similar to Prajwal *et al.*'s findings (38.26%) [16]. This indicates a significant reliance on antimicrobial therapy in ophthalmic practice. While their use is often necessary, judicious prescribing is essential to minimize the risk of antimicrobial resistance and ensure long-term treatment efficacy.

The most frequently prescribed group of drugs in the present study was lubricant (35.45%), among them most commonly drug prescribed was carboxymethylcellulose (CMC), similar findings were observed by Mohammed *et al.* (34.92%) [17]. CMC is the most commonly prescribed drug as it aids in treating dry eyes by boosting tear production, protecting the ocular surface from dryness, extending retention time, and enhancing eye moisture [17]. These benefits justify its frequent prescription in ophthalmic practice.

Only 14% of drugs were prescribed from the WHO Essential Drug List, which is lower compared to Mohammed *et al.*'s report (50.09%) [17]. The limited use of medicines from the Essential Medicines List (EML) may be due to prescribers' unawareness of their cost-effectiveness or non-compliance with prescribing guidelines. There is a need to educate and encourage medical practitioners to prescribe only essential medicines to the extent possible to ensure the rational use of medicines.

In the present study, the majority of 95% of drugs did not contain any FDC, which was in contrast to the study conducted by Jarinabanu *et al.* (32.97%) [12]. The limited use of FDCs in this study reflects a cautious prescribing approach, as misuse of such combinations may raise the risk of adverse drug reactions and increase patients' financial burden.

CONCLUSION

The present study shows that the average number of drugs per prescription was close to the WHO reference value, and the majority of medications did not contain any FDC, so less chance for adverse drug reactions. There were only a few drugs prescribed as generic drugs as well from the essential drug list. Prescribers have to be made aware of the essential drug list and generic drugs and the benefits of prescribing from them. Educational interventions in the form of Conferences and CMEs have to be organized to keep up to date with current guidelines and for rational prescribing.

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ETHICS STATEMENT: The study was initiated only after written approval from the Institutional Ethics Committee (IEC) (CUSMC/IEC(HR)/DI-45/2021/Approval-D/45/1573).

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