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Drug Utilization Study in Ophthalmology Outpatient Department of a Tertiary Care Hospital in West Africa

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Abstract: The World Health Organization (WHO) addressed drug utilization as the marketing, distribution, prescription and use of drugs in a society, considering its consequences, either medical, social, (and) or economic. The increasing importance of drug utilization studies as a valuable investigative resource in pharmacoepidemiology has bridged it with other health related areas, such as public health. Surveillance of drug use by the doctors within the institution as well as in the community is assuming an increasingly key role in therapeutics. This was a cross-sectional study of prescription pattern and drug utilization trends at the Lions International Eye Centre (LIEC) of the Korle Bu Teaching Hospital and adherence to the standard prescription form at the Eye Centre. Prescriptions that were presented to the LIEC pharmacy unit within the period from October 2015 to March 2016 were captured and reviewed. The total number of drugs in the 588 prescriptions was 1265. The average number of drugs per prescription was 2.1. Drug dosage, route of administration, frequency, and duration of treatment record were mentioned in 95.01% (1202/1265), 97% (1227/1265), 98.46% (1240/1265) 96.05% (1215/1265) of the prescriptions respectively. Anti-glaucoma medicines were the most prescribed 21.8% (276/1265), Prescribing by generic name slightly dominated with 51.1% (645/1265) of the total number of drugs prescribed. Use of Ophthalmic antibiotics alone and the use of ophthalmic antibiotics in combination with other medicines were 13.5% (171/1265) and 11.9% (142/1265) respectively.: The findings of this study revealed that the drug utilization pattern was not in line with the recommended standard values of WHO prescribing indicators even though the level of compliance to the requirements on the standard prescription form of the hospital for drug prescribers was remarkably high. The availability of key medicines should be improved whilst generic prescribing from EDL should also be encouraged.

Keywords: Drug Utilization, Ophthalmology, Prescription, Korle Bu, West Africa

1. Introduction

The World Health Organization (WHO) addressed drug utilization as the marketing, distribution, prescription and use of drugs in a society, considering its consequences, either medical, social, or economic [1-3]. The studies on the process of drug utilization focus on the factors related to the prescribing, dispensing, administering, and taking of medication, and its associated events, covering the medical and non-medical determinants of drug utilization, the effects of drug utilization, as well as studies of how drug utilization relates to the effects of drug use, beneficial or adverse [4-6].

The increasing importance of drug utilization studies as a valuable investigative resource in pharmacoepidemiology has bridged it with other health related areas, such as public health, pharmacovigilance, pharmacoeconomics, eco-pharmacovigilance or pharmacokinetics [5, 7].

Drug utilization studies commonly employ case history analysis with the average number of drugs per case as the most frequently used measure [8].

A prescription is an instruction from a prescriber to a dispenser. The prescription order is an important transaction between the doctor and the patient. Prescription of drug plays a significant role in the management and care of patients [9].

Rational use of drugs is based on use of right drug, right dosage at right cost which is well reflected in the world health organization (WHO) definition: "Rational use of drugs requires that patients receive medications appropriate to their clinical needs, in doses that meet their own individual requirements for an adequate period of time, at the lowest cost to them and their community" [10].

Irrational use of medicines is a major problem worldwide. WHO estimates that more than half of all medicines are prescribed, dispensed, or sold inappropriately, and that half of all patients fail to take them correctly. The overuse, underuse or misuse of medicines results in wastage of scarce resources and widespread health hazards [11].

Standard Prescription forms presents with basic information such as name, age, sex, drug dosage, prescriber's name, signature, and status which guides the appropriate and judicious use of drugs [12]. These important parameters if not clearly recorded, can result in indiscriminate and injudicious use of drugs coupled with adverse effects of drug reactions. Hence adherence to such standards plays a key role in improving patient care and quality of life.

Surveillance of drug use by the doctors, within the institution as well as in the community is assuming an increasingly key role in therapeutics. Hence adequate prescribing information to the patient is imperative with drugs [13], erratic usage of drugs by the physicians exposes their patients unduly to unjustifiable risk. The continuous monitoring of prescriptions may help to identify the problems involved in therapeutic decisions and promote rational prescribing [14].

The WHO drug use indicators are highly standardized and are recommended for inclusion in drug utilization studies [1, 2].

The aim of this study therefore is to investigate drug utilization trends and to describe prescription patterns by prescribers (adherence to the standard prescription forms) using the WHO core prescribing indicators at the Lions International Eye Centre (LIEC) of the Korle Bu Teaching Hospital.

2. Methods

2.1. Study Settings and Period

The LIEC is the Ophthalmic department of the Korle bu Teaching Hospital, the LIEC Pharmacy Unit was establish to provide ophthalmic pharmaceutical needs of eye patients at the facility and clients from elsewhere who require services from the Unit. As a result, most of the prescriptions served at the Pharmacy Unit of LIEC are generated from patients and clients' attendance at the LIEC. The Korle Bu Teaching Hospital has a standardized form for the prescription of drugs.

Prescriptions that were presented to the pharmacy unit within the period from October 2015 to March 2016 were captured and reviewed for this study All prescriptions that had at least one medicine served was captured at the unit. A copy of the prescription was obtained with the help of a pre-inserted carbon paper, in a special format. Copy was kept at the pharmacy unit together with a copy of the point of sales receipt which generates the names and cost of drugs purchased.

Study Design

This was a cross-sectional study of prescription pattern and drug utilization trends, and adherence to the standard prescription form at the LIEC of the Korle Bu Teaching Hospital.

The present study was carried out with the following objectives.

To obtain data on the prescribing pattern and the drug utilization of various drugs by the various prescribers at the LIEC Centre of excellence.

To obtain information on demographic characteristics of the patients on the prescription form.

To obtain prescription information of the prescriber e.g., name of prescriber, signature, and status of prescriber.

To collect information on number of drugs prescribed, classification of the drugs, their prescribing patterns and calculate the mean number of drugs per prescription.

To calculate the percentage of prescription with complete prescriber's name, prescriber's signature and prescriber's status as required on the hospital's standard prescription forms.

To analyze the prescriptions for basic information of patient, name, age, sex, and completeness of prescriptions in terms of dose, strength, route, frequency, duration, and dosage forms of prescribed drugs.

Key medicines availability was calculated by dividing the number of specified products in stock to the total number of medicines on the checklist and multiplied by 100.

Number (percentage) of encounters with antibiotics.

Percentage of medicines properly labeled.

Percentage of drugs prescribed by generic name, percentage of drugs with antibiotics prescribed, percentage of drugs prescribed from the National Essential Drug List (EDL)/National Formulary of Ghana and the standard treatment guidelines STG.

2.2. Data Extraction and Analysis

Two (2) staffs were trained to extract data from the prescription's forms. A specialist pharmacist and a pharmacy technician reviewed the classifications of all the medicines captured on the prescriptions.

Data extracted were entered into Microsoft Excel and subsequently exported into SPSS Version 20 for analysis. Descriptive statistics of patients' demographics were computed and presented as counts and proportions. The hypothesis was that there is no mean difference between the number of medicines prescribed per prescription and the

number of medicines served (available) Paired T Test was used to find the difference in mean between the number of medicine (s) per prescription and medicine (s) on prescription that was served (availability). Continuous variables such as age were transformed in to categorical variables (age groups).

P-values less than 0.05 were considered statistically significant.

2.3. Ethical Consideration

Collection of prescriptions of patients is a routine process and practice in the hospital. Patient Confidentials were maintained so there was no threat to patients involved and per the Standard Operating Procedure of the Ghana Health Service Ethics Review Committee, ethical approval is not deemed necessary for this study [15].

3. Results

A total of 1374 patients presented their prescriptions as captured by the computer software. Out of this number 588 (42.8%) were only captured in the study because of the availability of the duplicate carbon prescription forms. The total number of drugs in the 588 prescriptions was 1265. he average number of drugs per prescription was 2.1. The highest total number of drugs per prescription was 7 with lowest total number of drugs per prescription was 1. See Table 1.

Table 1. *Number of drugs per prescription.*

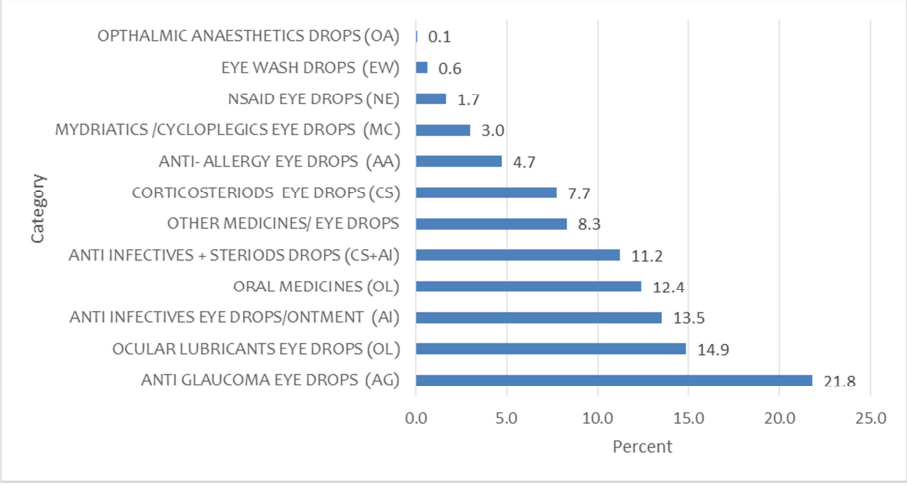
Prescriptions containing number of drugs	Number of prescriptions	Percentage (%)
1	211	16.7
2	446	35.3
3	330	26.1
4	124	9.80
5	135	10.7
6	12	0.90
7	7	0.6
Total	1265	100.

Demographics of patients such as sex, date and name of supervising consultant respectively were all provided on the prescriptions (100%). the mean age of patients was 41.7 (2.8 SD) years but 63.1% (371/588) of the various ages of patients on the prescription were not mentioned or missing.

The number of males, 49.8% (293/588), was lower than females 50.2% (295/588).

Prescriber's name, Prescriber's signature, Prescriber's status was mentioned in 96.1% (566/588), 94.2% (555/588), 63.5% (374/588) of the prescriptions respectively Drug dosage, route of administration, frequency, and duration of treatment record were mentioned in 95.01% (1202/1265), 97% (1227/1265), 98.46% (1240/1265) 96.05% (1215/1265) of the prescriptions, respectively.

Anti-glaucoma (AG) medicines were the most prescribed 21.8% (276/1265), followed by Ocular Lubricants (OL) medicines 14.9% (188/1265). Anesthetic Ophthalmic drugs was the least used accounting for only 0.1% (1/1265) of the total number of prescriptions captured. The oral medicines that accounted for 12, 4% (157/1265) were mainly made of oral prednisolone, omeprazole, NSAIDS / paracetamol, cetirizine and oral antibiotics. See Figure 1.



NSAIDS: Non-steroidal anti-inflammatory drugs.

Figure 1. *Different types of drugs prescribed.*

Prescribing by generic slightly dominated with 51.1% (645/1265) of the total number of drugs prescribed. Use of Ophthalmic antibiotics alone and the use with ophthalmic antibiotics combination were 13.5% (171/1265) and 11.9%

(142/1265) respectively. The percentage of drugs prescribed from Essential Drug List (EDL) was 92% (1248/1265). Only 72% (897/1265) of medicines were actually dispensed. Most of the medicines were properly labeled accounting for 97% (1227/1265) of the total number of prescriptions served.

The mean difference between number of drugs on prescription and number of drugs available prescription was 78.56, CI (0.53 – 0.66) p=.001.

Table 2 summarizes WHO/INRUD Drug Utilization Core drug use indicators.

Table 2. *Study performance compared with WHO/INRUD Core Drug Utilization indicators.*

Indicators assessed	Data values	WHO Values
Average number of drugs prescribed per patient encounter	2.1	1.6–1.8
Percent medicines prescribed by generic name	51.5%	100
Percent encounters with an antibiotic prescribed (Eye Only)	24.7%	20-26
Percent medicines prescribed from essential medicines formulary	92%	100
Percent medicines dispensed	72%	100
Percent medicines adequately labelled	97%	100
Availability of essential medicines list or formulary to practitioners	100%	100
Percent key medicines available	78.4%	100

4. Discussion

In our study the total numbers of drugs in the 588 prescriptions analyzed were 1265.

The average number of drugs per prescriptions was 2.1. The average number of drugs per prescription is also an important index as it tends to measure the degree of polypharmacy and a key indicator measurement for Drug utilization studies [2, 16]. Our results are very close to the recommended limit of two (2) set by the WHO [2], an indication of a borderline restraint on over prescribing, over invoicing and poly pharmacy In comparison, other hospital based studies in ophthalmology mainly in India reported figures of 3–5 drugs per prescription; this is comparatively higher than what we recorded in our study [16-18] It is preferable therefore to keep the number of drugs per prescription as low as possible since higher figures are known to lead to increased risk of drug interactions and also increases the prescribing and dispensing errors [16, 19] as demonstrated in our study. Further, the more the number of medicines prescribed the higher the chances of an adverse event.

Three hospital based ophthalmic settings studies reported an average drug per prescription lower than our study of 2.1 per prescription which demonstrated a restraint on over prescribing and polypharmacy to avoid risk of drug interactions [20-22].

Basic information of patients like name, sex and date was written (100%) in all the prescriptions studied in that period except for the ages of the patients that were largely missing. The evaluation of indicator by *age* can be very useful in targeting interventions for managing the *rational use of medicines* [23].

Completeness in terms of dose, route, strength, frequency and dosage forms were all not done in full (less than 100%). It is always preferred to have complete prescription. It should include name, age, sex, diagnosis, rational drug treatment with a smaller number of drugs, proper dosage form, frequency of administration and duration of therapy if not clearly recorded, can result in indiscriminate and injudicious use of drugs [24].

Therefore, proper training and education of prescribers is necessary regarding legibility and completeness of prescriptions in all aspects especially the writing of ages of the patients as required by the standard prescription form of the hospital.

There was restraint on poly pharmacy in our study, even though there was a maximum of seven (7) drugs per prescription, this can also be attributed to the category of drugs prescribed. Anti-Glaucoma drugs accounted for 21.8% (218/1265} of the total amount of the classification of the medication. Glaucoma causes blindness; and many patients do not reach target intra ocular pressure (IOP) with one medication. Combination therapy or adjunctive therapy is recommended to achieve the desired IOP target [25].

Prescriptions of cyclopentolate, tropicamide eye drop with or without phenylephrine, atropine which are mydriatic-cycloplegic agents accounted for 3% in our study, such drugs are used as diagnostics or dilators which is done indoor and hardly are they written on prescriptions. Ophthalmic anesthetics drops accounted for only 0.1%. Ocular lubricants were the second most prescribed accounting for 32% of the total amount of drugs prescribed. This is like other study that reported in similar ophthalmology hospital settings in India [26].

The percentage of drugs dispensed is a WHO facility indicator [1] which checks the percentage of key medicines available in facilities around the world. Our results fell short of the actual values recommended by the WHO. Low availability of medicines in the public sector means that many patients are forced to purchase medicines from the private sector, often at prices they cannot afford and hence they default in treatment which can lead to worsening of the clinical condition.

Antibiotics prescription is key WHO indicator for drug utilization in all healthcare facilities.

In our study the usage of ophthalmic eye drops was 13.5% and the use of antibiotics in combination with other eye drops was 11.9%. The percentages when added or used alone is far below other drug utilization studies in ophthalmic settings that had higher values [26, 27] but similar to another study

with the same setting that had 17.5% of ophthalmic antibiotic usage. [22]

Many drugs were prescribed by generic names 51.1% (646/1265) in our study. This is higher than in other studies that reported 35% [21], 2.35% [24], and less than 1% [22]. Prescribing under generic name is strongly recommended by the World Health Organization for better case management [28]. This study also revealed that the percentage of drugs prescribed from Ghana's EDL fell short of the WHO recommendation of 100% [29] which could be either due to lack of awareness of essential drug concept or unavailability of the EDL among prescribers.

5. Conclusion

The findings of this study revealed that the drug utilization pattern was not in line with the recommended standard values of WHO prescribing indicators even though the level of compliance to the requirements on the standard prescription form of the hospital for drug prescribers was remarkably high. The availability of key medicines should be improved whilst Generic prescribing from the EDL should also be encouraged.

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