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Research Article

ASSESSMENT OF DRUG UTILIZATION PRACTICE IN OPHTHALMOLOGY DEPARTMENT OF UNIVERSITY OF GONDAR REFERRAL AND TEACHING HOSPITAL, NORTH WEST ETHIOPIA

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ABSTRACT

In many circumstances drugs are not used rationally and this will negatively affect the benefits and safety of those pharmacotherapeutic agents. This study is designed to assess the drug utilization practice among outpatients in the ophthalmology department of University of Gondar referral and teaching hospital, North West Ethiopia. A descriptive, prospective, cross-sectional study was conducted on 846 outpatients of Ophthalmic Pharmacy of University of Gondar teaching hospital in Gondar, Ethiopia. Data was collected by interviewing patients and/or caregivers who were visiting the ophthalmic pharmacy unit and from their ophthalmic drug prescription from March to May, 2014. The data was entered and analyzed using SPSS version 21 statistical package. The mean number of drug per prescription was 1.59. Percentage of prescriptions containing ≤2 drugs per prescription was 92.44%. About 86.48% of the drugs were prescribed with their generic name. In more than 50% of cases the dose and duration of therapy supposed to be taken was determined incorrect as per the standard treatment guideline. In this study there was statistically significant association between post-dispensing knowledge of the subjects and age and number of drugs per prescription. Most of the prescribing indicators were below the recommended WHO standards and furthermore the understanding of the subjects on their medications was also poor which seeks immediate amendment due to the more sensitive nature of eye care.

Keywords: Eye care, prescribing practice, Post-dispensing knowledge.

INTRODUCTION

The World Health Organization (WHO) addressed drug utilization as the marketing, distribution, prescription and use of drugs in a society, considering its consequences, medical, social, and economic (WHO, 1977).

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. However in many circumstances drugs are not used rationally for optimal benefits and safety. To describe the extent, nature and determinants of drug exposure there is a need to do drug utilization researches. Consequently, in the promotion of rational drug therapy, international agencies like WHO and International Network of Rational Utilization of Drugs (INRUD) have applied themselves to evolve standard drug use indicators and data collection methods. Auditing prescription also forms part of drug utilization studies (WHO, 1979; Biswas *et al*., 2000).If therapy is determined to be inappropriate, interventions with providers or patients will be necessary to optimize pharmacotherapy (WHO, 2007).

Drug treatment errors are common, some of medical negligence treatment claims arising from incorrect use of prescription drugs, mistakes being not only costly to individuals but also having a financial impact on the National Health Services. Those errors can occur at several stages, including prescribing, transcription, dispensing and administration, effects varying in severity from minimal and thereby unrecognized to fatal (Hogerzeil, 1995; Mein *et al*., 2006).

Irrational use of drugs occurs in almost every nation. Considering the total health budget on drug with their GNP this problem is alarming in developing countries in which less than 40% of patients in the public sector and less than 30% in the private sector being treated according to clinical guidelines (Biswas *et al*., 2000).Not only in ophthalmic disorders generally overuse of broad spectrum and newly developed antibiotics increase antimicrobial resistance. This might be amplified with polypharmacy and with the use of wrong or ineffective medicines. All these health services will negatively affect the quality of medicine therapy, prolong illnesses and hospital stays, raise health care costs, may cause adverse reactions and even death or negative psychosocial effects (WHO, 1987; Likic *et al*., 2007; Admassie *et al*., 2013).

Eye care is one of the most sensitive practices of the health care system. However, this is not well coupled with the proper utilization of the over developing many new ocular therapeutic agents (Leonardi, 2005; Duggirala *et al*., 2007). Other than emergence of resistant microbes to the antibiotics (Asbell *et al*., 2008) the frequent use of topical antibiotics and Non-Steroidal Anti-Inflammatory Drugs (NSAIDs) when clinically not sound cause histological and structural change in conjunctiva (Sood *et al*., 1999; Gaynes and Fiscella, 2002).

Considering all, for the purpose of maintaining the effectiveness of drugs, improving patient’s safety and therapeutic outcome and even avoiding economic

wastage drug utilization trends are better to be evaluated periodically (Krishnaswamy *et al*., 1985). Research on drug utilization practice may provide insights into different pharmaceutical care implementations including the prescribing pattern and appropriateness, rationality of the dispensing procedures and drug use and even outcomes of drug use and quality control cycle (signals of irrational use and interventions to improve drug use) (WHO, 2003). After which it is possible to facilitate the rational use of drugs and generate hypotheses that set the agenda for further investigations and thus avoid prolonged irrational use of drugs (Gangwar *et al*., 2011). Hence, the present study has been contemplated to assess the rationality of ophthalmic drug utilization in University of Gondar referral and teaching hospital.

METHODS AND METHODS

STUDY DESIGN AND METHOD

This was institution based prospective, descriptive, cross-sectional study conducted on outpatient of ophthalmic department of University of Gondar teaching and referral hospital in Gondar, Ethiopia. Approval was obtained to collect data from patients and medical records from the Ophthalmology and pharmacy departments, University of Gondar referral and teaching hospital.

Necessary data were collected prospectively from patients and/or caregivers who were visiting the ophthalmic pharmacy unit and from their ophthalmic drug prescription from March to May, 2014. After obtaining patient's consent all the intended information from the prescription was collected by using check list and soon after dispensing another data collector interviewed the patients/caregivers with semi-structured questionnaire at the exit of the dispensary room. Caregivers were used when the patients were extreme age groups and/or unable to give response. From the prescriptions, the details of prescribed drugs were recorded, including its dosage form, route of administration, frequency of administration, indications, and duration of therapy. Information was also collected from dispensed item packing materials. For the assessment of patients and/or caregivers post dispensing knowledge on the rationality of the supposed use of medication(s) what they have collected from the pharmacy they were interviewed with service exit interview questionnaire. The five important questions used to assess this were way of administration, dose, duration of therapy, frequency of dosing and manner of opening and closing of medication containers.

The recorded data were then analyzed by the WHO/International Network for Rational Use of Drugs (INRUD) core drug use prescribing indicators (WHO, 1993) and additional indices. The total sample size determined and used for data collection was 846 during the course of the study fulfilling the inclusion and exclusion criteria.

DATA PROCESSING AND ANALYSIS

The data from the checklist were collected using modified form of WHO standard data collection formats. The data were entered and analyzed using SPSS version 21 statistical package. Data cleaning was performed to check for accuracy,

consistency and missed values during entry. Frequencies, proportions and summary statistics were used to describe the study population in relation to relevant variables. Bivariate and multivariate analyses were carried out to see the putative associations of each independent variable with the dependent variable. Odds ratio and 95% confidence interval were also used to assess the presence and strength of association between variables. Based on the recommended dose ranges and regimens of the national standard treatment guide line and medicine formulary the doses, frequency and duration supposed to be used by each patients were determined correct and incorrect.

OPERATIONAL DEFINITIONS

Generic drugs: The essential drug list of Ethiopia is used as a basis to determine drugs as generic or brand name.

Antimicrobials/antibiotics: refers all agents that are used to kill or suppress microbes responsible for eye infection (e.g. bacterial, viral).

Combination of drugs: Two or more drugs that were prescribed as a fixed dose combination were taken as a single drug but in determining the quantity of drugs in each pharmacologic class of drugs each item in the combination was considered.

Post-dispensing knowledge on the dispensed drug(s): Using the standard treatment guideline of the hospital, operationally those who were correct on at least four of the interview questions(dose, frequency, duration, handling and way of administration) were taken as patients /or caregivers with good post dispensing knowledge and less than four were designated as poor.

Counseling time: Total time spent for packing and labeling of the issued pharmaceuticals and verbal instruction of the patient and/or care giver.

ETHICAL CONSIDERATION

Ethical approval from the School of pharmacy of the University of Gondar was obtained. Permission to conduct the study was obtained from the medical director's office of the hospital. Each study participant was adequately informed all the necessary informations about the study. Verbal consent was obtained from study participants and anonymity was maintained to ensure confidentiality.

RESULT

In this study most of the patients visiting the ophthalmic pharmacy were males i.e. 494 in total (58.39%) and out of which 390 (46.10%) were in the age of between 16-49 years (Table 1).

Table 1. Socio-demographic characteristics of patients

		N	Per cent (%)
Age	**0-5**	**42**	**4.96**
	6-15	**86**	**10.17**
	16-49	**390**	**46.10**
	≥50	**328**	**38.77**
Sex	**Male**	**494**	**58.39**
	Female	**352**	**41.61**

The mean number of drug per prescription was 1.71 (standard deviation 0.66, minimum 1 and maximum 4 drugs per prescription), percentage of prescription containing ≤2 drugs per prescription was 92.44%. About 86.48% of the drugs were prescribed with their generic name and 97.18% of the drugs were from the hospital essential drug list (table 2).

Table 2. Prescribing indicators in University of Gondar referral hospital, ophthalmic department May, 2014.

Indicators	Frequency	Percent (%)
Generic name	1165	86.48
From EDL	1308	97.18
≤ 2 drug per encounter	782	92.44
Prescriptions with antibiotics	569	67.26
Prescriptions with injections	23	2.72

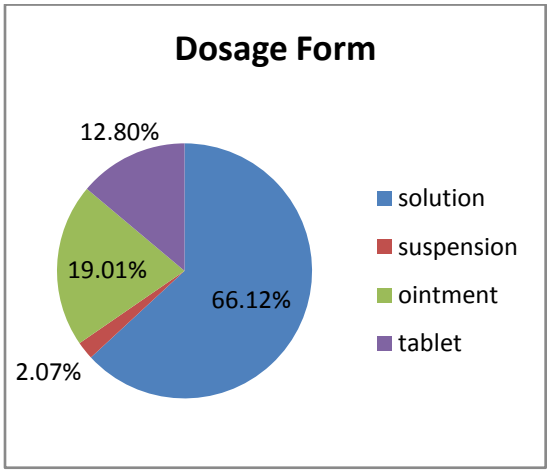

Figure 1. Percentage of dosage forms prescribed in ophthalmic department, University of Gondar referral Hospital, May, 2014.

Table 3. Frequency of class of drugs prescribed in ophthalmic department, University of Gondar referral Hospital, May, 2014.

Class of drugs	Frequency	Percentage (%)
Antimicrobials*	906	62.66
Steroids*	356	24.62
Analgesics	58	4.01
Mydriatics	8	0.55
Lubricants	8	0.55
Antiglaucoma	106	7.33
Vitamins	4	0.28
Total	1446	100

* Fixed dose combinations were present and each item that belonged to different pharmacologic category was counted in their respective class of drugs.

Table 4. Prescription information filled by prescribers in ophthalmic department, University of Gondar Referral Hospital, May, 2014.

Number	Prescription information	Description of Evaluation result	
		Present	Absent
1	Diagnosis	2 (0.2%)	844 (99.76%)
2	Strength	734 (86.76%)	112 (13.24%)
3	Dose	618 (73.05%)	228 (26.95%)
4	Frequency	698 (82.51%)	148 (17.49%)
5	Duration	128 (15.13%)	718 (84.87%)

Out of total 846 prescriptions (table 4), 43.74%, 85.34%, 75.18% and 16.08% of them contain the name, signature, date and qualification of the prescriber, respectively.

From subjects included in this study 480 (56.74%) of them had a past medication history of ophthalmic drug use. In addition, 19.15% of them used the ophthalmic medication(s) for both of their eyes even if only one eye had been diseased. Among those who were using bottled ophthalmic preparation 37.12% of them were informed to close it soon after use and not to touch the tip of the tube. Considering their previous experience, 4.49% of patients shared their ophthalmic medication with their family and 10.40% of them change the frequency and dose by themselves. From the subjects who were collecting ophthalmic drug at the time of data collection 47.05% of them were well informed about the duration of therapy, 57.92% of them had adequate information about the frequency, 44.68% of them correctly knew the dose and 82.51% of them had adequate knowledge on how to administer the medication. Similarly, 48.23% of them were informed from the dispenser to close the tube soon after use (Figure 2).

Factors Associated with post-dispensing knowledge of Subjects

The possible association of some selected socio-demographic and clinical characteristics on post dispensing knowledge status of patients and/or caregivers was estimated using both the bivariate and multivariate logistic regressions. Accordingly, variables considered in the bivariate analysis were: age, sex, and number of medications (fixed dose combinations were taken as if one drug), counseling time and qualification of the dispenser. Explanatory variables with p value up to 0.2 were included in the multiple logistic regressions. Finally, age and counseling time remained to be significantly associated with the post dispensing knowledge of the patients. Explanatory variables with p value up to 0.2 were included in the multiple logistic regressions.

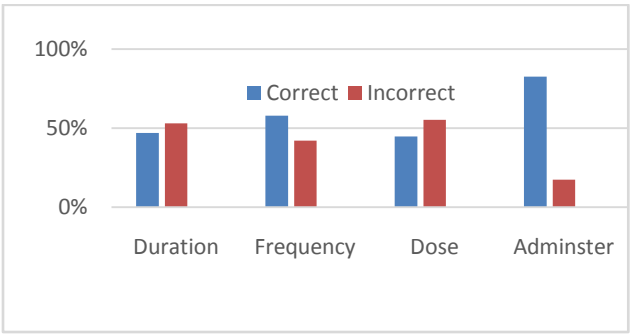

Figure 2. Patients' post dispensing knowledge on the duration, frequency, dose and administration of their ophthalmic medications.

Table 5. Association of sex, age, number of drugs per prescription, and counseling time with subjects' post dispensing knowledge of ophthalmic medication in Ophthalmic Department University of Gondar Referral Hospital, May, 2014.

Variable		Post Dispensing Knowledge of patients		COR(95%CI)	AOR(95%CI)	P value
		Good	poor			
Sex	male	218	276	1.417(0.95, 2.11)	1.414(0.93, 2.15)	.106
	Female	126	226	1	1	
Age						.092
	0-5*	8	34	1	1	
	6-15	32	54	2.52(0.72, 8.81)	2.05(0.56, 7.53)	
	16-49	172	218	3.35(1.09, 10.33)	**3.58(1.12,11.46)***	.031
	≥50	132	196	2.86(0.92, 8.89)	2.81(0.87, 9.08)	
Number of drugs per prescription						.903
	2	178	242	2.21(0.23, 21.57)	1.41(0.13, 14.90)	
	2	146	216	2.03(0.207, 19.88)	1.53(0.15, 16.06)	
	3	18	38	1.42(0.13, 15.64)	1.14(0.10, 13.36)	
	4	2	6	1	1	
Counseling time(seconds)						.003
	<15	36	96	1	1	
	(15-45)	26	32	2.17(0.87, 5.39)	2.39(0.92, 6.21)	
	(45-75)	36	64	1.50(0.68, 3.31)	1.43(0.64, 3.20)	
	(75-105)	68	138	1.31(0.67, 2.59)	1.31(0.66, 2.62)	
	(105-135)	100	120	2.22(1.15, 4.29)	**2.14(1.09, 4.20)***	0.027
	≥135	78	52	4.00(1.92, 8.34)	**4.11(1.92, 8.78)***	0.001

*** This group of patients was totally served by caregivers and accordingly even if the age here presents actual patients' age, the post-dispensing knowledgebeing determined is their caregivers.**

The multivariate logistic regression showed that those patients and/or caregivers who are in the age range of 16-49 are 3.58 times more knowledgeable than ophthalmic patients whose age is in between 0 and 5 years (AOR = 3.58, 95% CI1.12, 11.46). Similarly, the odds of the post dispensing knowledge of the subjects on the received ophthalmic drugs who lasted 105-135 and ≥135seconds of counseling were found 2.14 (AOR=2.14, 95% CI 1.09, 4.20) and 4.11(AOR = 4.11, 95% CI 1.92, 8.78) times higher than those lasting <15seconds, respectively (table 5).

DISSCUSSION

Pharmaceutical preparations play a great role in improving human health and promoting well-beingness. For the achievement of all the possible desired therapeutic advantage of these agents in addition to having certified safety and efficacy, they have to be used rationally. But here in this study considering the completeness of the information which is being available within the prescriptions and the understanding of patients on the dispensed medicine, the ophthalmic drug use practice is surrounded by a number of drawbacks. This will promote the irrational utilization of drug which is a common occurrence throughout the world (Jain *et al*., 2011).

As it is shown in the result section, only 370 (43.74%), 722 (85.34%), 636 (75.18%) and 136 (16.08%) of the prescriptions contain the name, signature, date and qualification of the prescriber in their respective order. This tells us the presence of greatest discrepancy between what is really practiced in this study institution and what is recommended in the WHO action program which is 100% (WHO, 1993).

According to WHO the number of drugs per prescription is recommended to be ≤2 and here in this study the average number of drugs indicated per encounter was found 1.71, indicating the provision of appreciable prescribing practice with this regard. And this is more close to the reports from some other teaching hospitals of the country prescribing practice on general healthcare, 1.59 in Jimma (Abdulahi and Shiferaw,1997) and 1.9 in Hawassa (Desalegn, 2013), Ethiopia. But it has discrepancy compared to the report from India (2.69) (Gangwar *et al*., 2011) and Ghana (3.7) (Afriyie and Raymond, 2013). Clinically, prescribing lowest possible number of drug types is highly important in terms of minimizing risk of drug interaction, untoward drug effects, emergence of resistant microbial strain and pharmacoeconomically to reduce expense for pharmaceutical preparations (Sharma *et al*., 1998).

Regarding the name of drugs which was used for prescribing, in this study 86.48% drugs were prescribed with their generic name. This is found higher than the report from Ghana (62.6%) (Bosu and Ofori-Adjei, 2000) and lower than the report from Hawassa, Ethiopia (98.7%) (Desalegn, 2013).The discrepancy might be largely the specificity of our study only on ophthalmic cases, unlike the aforementioned other reports. Furthermore, in this institution based study 97.18% of the prescribed drugs were from the EDL. Concerning this, WHO recommended that 100% of drugs should be

prescribed using their generic name and from EDL. Increased generic and EDL prescription would rationalize the use and pharmacoeconomically would benefit the patients.

Antibiotics have been prescribed in 569(67.26%) of encounters which is found higher compared to the antibiotic prescribing figure report on the general clinical conditions from Nigeria (34.4%) (Tamuno and Fadare, 2012), and Hawassa, Ethiopia (58.1%) (Desalegn, 2013) but lower than the study done from India (Mondal *et al*, 2011) specifically on ophthalmic prescribing practice which was 100%. These reveals that most of the ophthalmic cases are either infectious conditions or there is irrational prescribing practice of antibiotics on which we need to invest more against emergence of resistant microbial strains.

According to our study only two prescriptions were containing the clinical diagnosis of the patient. That means in 99.76% of the prescriptions diagnosis was omitted. Dispensers who are aware of the clinical condition of the patients can be efficiently and professionally involved in the pharmaceutical care to be delivered to the patients such as on treatment protocols, potential drug interactions and contraindications and even auditing prescriptions. Similarly, prescriptions which were complete in the strength, dose and duration of the drug therapy were 86.76%, 73.05% and 15.1%, respectively. All this except the duration are almost close to the study done on all clinical cases(not only on ophthalmic cases) from the same institution which were found 0.01% in diagnosis, 80% in strength, 81.38% in dose, 76.07% in duration(Admassie *et al*., 2013). This indicates that in both of the two studies there is a great discrepancy in the completeness of a prescription when it is compared with the 100% WHO standard (WHO, 1993).

As usual medication use malpractice will not only arise from prescribers and dispensers mistake but it may also made by the clients themselves. In our study 19.1% of the patients who have received ophthalmic medications previously use the medication for both of their eyes though only one eye was being infected. This malpractice may greatly expose patients for adverse drug effects (like corneal and conjunctiva cell toxicity) without any therapeutic benefit (Sosa *et al*., 2008).

For the purpose of preventing contamination and further complications, there is no reason to touch the tip of the ophthalmic preparation bottles with hand and there is a need to close immediately after use. But in this study only 37.12% and 48.23% were informed among patients who have previous ophthalmic drug use history and received drugs at the time of the study, respectively.

In more than 50% of cases the dose and duration of therapy supposed to be taken was determined incorrect which indicates the existence of prescribing and/or dispensing errors. All these may jeopardize the patient for both adverse drug effects and treatment failure. According to this study the post-dispensing knowledge of the patients or caregivers was found statically associated with age and counseling time and it revealed that patients who are in adult age group were found more knowledgeable

($p<0.031$) compared to those who received the drugs for children less than 5 years old. Similarly patients/caregivers who lasted longer period for counseling were found more knowledgeable than who lasted <15 seconds. Similarly, the odds of the post dispensing knowledge of the subjects on the received ophthalmic drugs who lasted 105-135 and ≥135 seconds of counseling were found 2.14 and 4.11 times higher than those lasting <15 seconds. Obviously as the counseling time is being longer and adequate the likelihood of being briefed on the instruction of the issued pharmaceuticals will increase. Association of age with level of post-dispensing knowledge statistically sound in between the aforementioned groups may be due to the wide range of dosage regimen for this group of patients clinically that could make both the health care providers and caregivers more confused and vulnerable for mistake unlike adult dose regimens. Furthermore, possibly the level of literacy of the caregivers might be also responsible factor.

CONCLUSION

According to this study the most frequently prescribed ophthalmic drugs were found antibiotics and most of the prescribing information was inadequate and incomplete indicatingthe need of improving the prescribing practice. Most of the prescribing indicators were below the recommended WHO standards and seeks immediate amendment due to the more sensitive nature of the eye care. And even the understanding of many of patients on the means of administration of the medications was also determined inadequate and poor. And this necessitates the delivery of more qualified dispensing techniques.

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