
Research Article



ISSN Print 2231 – 3648
 Online 2231 – 3656

Available Online at: www.ijpir.com

**International Journal of
Pharmacy and Industrial
Research**

**MEASURING QUALITY OF DRUG USE IN PRIMARY HEALTH CARE
FACILITIES: A YEAR LONG ASSESSMENT OF WHO PRESCRIBING
INDICATORS, WOLKITE TOWN, SOUTH WEST ETHIOPIA**

^{*1}Bayew Tsega, ²Wubshet Hailu, ³Zeryawkal Ergetie

^{*1}Clinical Pharmacy Unit, School of Pharmacy, University of Gondar, Gondar, Ethiopia.

²Department of Pharmacology, School of Pharmacy, University of Gondar, Gondar, Ethiopia.

³Pharmaceutical Chemistry Unit, School of Pharmacy, University of Gondar, Gondar, Ethiopia.

Abstract

There is no drug use study done in the private health sector in Ethiopia despite the fact that significant section of the population is getting health service in these facilities. Even the drug use studies in the primary public health sector in Ethiopia are rare and out dated. To evaluate the drug prescribing pattern in private and public health facilities in Wolkite town, South West Ethiopia. Total patient records of 600 were evaluated retrospectively using the World health organization drug prescribing indicators from January 1 to December 31, 2011, in 11 private and public health facilities, Wolkite town, South West Ethiopia. One thousand two hundred twenty seven drugs were prescribed for 600 patient encounters making the average number of drugs per encounter 2.05 ± 1.01 (private=2.33, public= 1.89). Percentage of drugs prescribed from the essential drug list of Ethiopia accounted 97% (N= 1189) whereas the percentage of drugs prescribed by generic name was 92% (N= 1130). About 63 % (N=376) and 23 % (N= 137) of encounters received antibiotics and injection, respectively, in the health facilities. Much remains to be done to promote rational prescribing of drugs in primary health care facilities..

Keywords: Prescribing indicators, health facilities, South West Ethiopia.

Introduction

According to World Health Organization (WHO) rational drug use requires that patients receive medications appropriate to their clinical needs, in doses that meet their individual requirements, for an adequate period of time, and at an affordable cost^{1,2}. Unfortunately, more than 50% of all medicines are prescribed, dispensed, or sold

inappropriately on a global basis and 50% of all patients fail to take their medicines correctly^{1, 3, 4}. Inappropriate use of medicines continues to be a widespread problem in developing and transitional countries. Such inappropriate use endangers lives and wastes money⁴. Ethiopia cannot be an exception as availability of essential medicines, trained health care providers, diagnostic laboratory and literacy level of patients is low^{4,5}. Common types of

Author for Correspondence:

Bayew Tsega,
 Clinical Pharmacy Unit, School of Pharmacy
 University of Gondar, College of Medicine and Health,
 P.O Box 196, Gondar, Ethiopia.
 Email: bayewtsega14@gmail.com

inappropriate drugs use include polypharmacy, overuse of injections, inappropriate use of antimicrobials, failure to prescribe in accordance with clinical guidelines, and inappropriate self-medication, often with prescription-only medicines. Inappropriate use of medicines is harmful for patients in terms of poor patient clinical outcomes and adverse drug reactions. Overuse of antimicrobials exerts pressure to increase rates of antimicrobial resistance^{6, 7}. Non-sterile injections contribute to the transmission of hepatitis, HIV/AIDS and blood-borne diseases⁸. The national prevalence of HIV/AIDS (point estimation) in Ethiopia reaches to 2.3 in 2010. Inappropriate use of non-sterile injections will lead to transmission of the deadly disease^{9, 10}.

The indiscriminate use of antibiotics that may result in the emergence of drug resistant bacteria makes the treatment of a patient more expensive, more risky and less rewarding. Resistance of antibiotics in Ethiopia is a wide spread phenomenon¹¹. According to a study done by Food, Medicines and Health Care Administration and Control Authority (FMHACA), bacteria that are commonly involved in causing infections to human beings in Ethiopia (coagulase negative staphylococcus, streptococcus pneumonia and salmonella) showed an increase in 17- 30 % resistance rate to commonly used first line antibacterials (erythromycin, chloramphenicol, and cotrimoxazole) over the five year period from 2004 to 2008¹². Rational drug use is achieved when there are rational prescribing using medicines or drugs from an essential drugs list. Prescription drugs listed as essential are those which fulfill the real needs of majority of the population in diagnostic, prophylactic, therapeutic and rehabilitative services using criteria such as risk-benefit ratio, cost effectiveness, quality, practical administration, patient compliance and acceptance^{13, 14}. To ensure consistent, valid and reliable identification of drug use problems, WHO developed and tested a set of standardized indicators of general out patients care^{3, 13, 15}. Among these WHO indicators are drug prescribing indicators which includes average number of medicines prescribed per patient encounter, percentage of medicines prescribed by generic name, percentage of encounters with an antibiotic prescribed, percentage of encounters with an injection prescribed, and percentage of medicines

prescribed from an essential medicines list or formulary³. Among the uses of these indicators are to describe current treatment practices, compare health facilities and prescribers and allow for identification of potential drug use problems that may affect patient care^{3, 15}. As to the investigator knowledge there is no drug use study done in the private health sector despite the fact that following the privatization policy in Ethiopia a lot of private health facilities have been established and significant section of the population is getting health service in these facilities. Even the drug use study in the primary public health sector in Ethiopia, which covers 43% of the Ethiopian population¹⁶, is very rare and outdated. Wolkite town health facilities are estimated to be attended by more than 100, 000 patients per year. But no drug use study had been done in that town. Therefore the findings of this study may be used as a baseline data. It in general help the health management, in particular those looking after the health institutions in the town understand the extent of the problem in the private and public health facilities and it trigger further studies.

Methods

The study was conducted in public and private primary health care facilities of Wolkite town, South West Ethiopia from February 21 to March 12, 2012. Wolkite town, founded in the 1940s, is the second largest town, next to Jimma, in Southwest Ethiopia^{17, 18}. In the town there were one health center, two clinics, one health post and two pharmacies. Whereas the private health sector had six medium clinics, two lower clinics, and six drug shops¹⁸. The study was a cross-sectional retrospective designed. In order to produce representative and comparable statistics of appropriate prescribing, indicators defined by WHO (prescribing indicators) was employed³.

Patient medical records of one year, from January 1 to December 31, 2011, were reviewed, in order to control seasonal variation in drug use, from 8 private clinics and 3 public health facilities. This information was used to determine the WHO prescribing indicators: average number of drugs per prescription, percentage of medicines prescribed by generic name, percentage of encounters with an antibiotic prescribed, percentage of encounters with an injection prescribed, and percentage of

medicines prescribed from an essential drug list or formulary.

In each health facilities, more than 600 patients were seen in the year 2002 E.C. According to WHO/International Network of Rational Use of Drug (INRUD) recommendation, a total of at least 600 patient records are required for reliable drug prescribing indicators assessments among health facilities³. In the year from September 2010 to August 2011, a total of 65, 456 and 36, 547 patients attended public and private health facilities of the town, respectively. Taking patient load as a basis for sample allocation among health facilities, 213 and 387 patient records from private and public health facilities, respectively, were collected by systematic random sampling method.

Data Analysis

Data was checked for its completeness every day. The data outcome from those evaluations by the aforementioned professionals was entered into a computer using Statistical Package for Social Sciences (SPSS) version-16.0 software to be edited, cleaned and analyzed. The data were summarized and described using cross tabulation and bivariate analysis with 95% confidence interval to infer associations and predictions. Monitoring of drug treatment outcome was excluded from the study as a criterion, because most of the patient

records did not have that type of information. The WHO core medication use indicators were calculated.

Simple bivariate logistic regression analysis was employed to see the association between patients (age, sex, drug, and education.) and health sectors characteristics versus WHO drug prescribing indicators (crude odds ratio was obtained). Then, to control the effect of confounding factors, each variable was entered in to multiple logistic regression models as the independent variable with each drug prescribing indicators being a dependent variable in order to identify independent predictors.

Results

The main patient characteristics attending the private and public health facilities during January to December 2011 are shown in table 1. The mean age was 24.7±3.0 years, for the health facilities as a whole. Male to female ratio was 0.455 indicating female predominance. Thirty (16.4%) private facility patients and 25 (6.5%) public facility patients were below age of five years. Patients of age range of 15- 44 years comprised 121 (48.8%) in the private health facilities whereas 237 (61.3%) patients in public health facilities. Elderly patients (age >64 years) accounted 6 (2.8%) and 18 (4.7%) in private and public health facilities, respectively.

Table No. 01: Socio-demographic characteristics of patients who attended private (N=213) and public (N=387) health facilities, Wolkite town, South West Ethiopia, January 1 to December 31, 2011.

Characteristics	Health facilities		Total N (%)	
	Private N (%)	Public N (%)		
Sex	Male	104 (48.8)	223 (57.6)	327 (54.5)
	Female	109 (51.2)	164 (42.4)	273 (45.5)
Age Ranges	<5	35 (16.4)	25 (6.5)	60 (10.0)
	5-14	23 (10.8)	70 (18.1)	93 (15.5)
	15-30	82 (38.5)	169 (43.7)	251 (41.8)
	31-44	39 (10.3)	68 (17.6)	107 (17.8)
	45-64	28 (13.1)	37 (9.6)	65 (10.8)
	>64	6(2.8)	18(4.7)	24 (4.1)

World Health Organization drug prescribing indicators in private (N= 213) and public (N= 387) health facilities, Wolkite town, South West Ethiopia, January 1 to December 31, 2011. One thousand two hundred twenty seven drugs were prescribed for 600 patient encounters making the average number of drugs per encounter 2.05± 1.01

(private=2.33, public= 1.89). Percentage of drugs prescribed from the essential drug list of Ethiopia accounted 97% (N= 1189); whereas the percentage of drugs prescribed by generic name was 92% (N= 1130). In the health facilities, 63% (N=376) and 23% (N= 137) of encounters received antibiotics and injection, respectively.

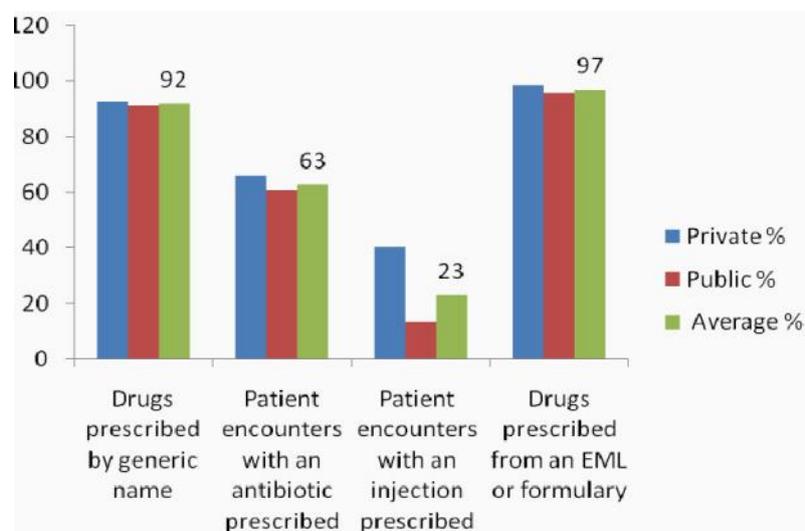


Fig. 01: World Health Organization drug prescribing indicators in private (N= 213) and public (N= 387) health facilities, Wolkite town, South West Ethiopia, January 1 to December 31, 2011.

Prescribing indicators and statistical treatment between private and public health facilities is shown in table 2. Accordingly there was no significant difference between private and public health facilities in terms of prescribing indicators

except the percent of encounters prescribed with injection. The likely hood of prescribing patients with injection in private health facilities was 3.1(95%CI= 2.4-6.1 and P value 0.03) times that in public health facilities.

Table No. 02: Prescribing indicators and statistical treatment between private and public health facilities, Wolkite town, South West Ethiopia, January 1 to December 31, 2011.

Prescribing indicators	Values	OR (95%CI)	P value
Number of drugs per encounter			
Private health facilities	2.33	3.4 (0.3- 5.2)	0.078
Public health facilities	1.89	1.0	
% of patients with antibiotics			
Private health facilities	65.5	1.5 (0.01- 23.0)	0.12
Public health facilities	60.0	1.0	
% of patients with injection			
Public health facilities	40.0	3.1 (2.4-6.1)	0.03
Private health facilities	13.0	1.0	
% of generic drugs			
Public health facilities	92.5	2.7 (0.6- 4.3)	0.58
Private health facilities	91.5	1.0	
% of drugs from EDL			
Private health facilities	98.0	4.5 (.11- 27.9)	0.37
Public health facilities	96.0	1.0	

The frequency of combination drugs is shown in table 3. Nearly 75% (N= 448) of patient encounters received two and less than two drugs in their visit

to the health facilities. Eighteen (3%) patients received five and more than five drugs in health facilities.

Table No. 03: The exposure to drug combinations in private (N= 213) and public (N= 387) health facility patients, Wolkite town, South West Ethiopia, January 1 to December 31, 2011.

Number of Drugs	Health facilities		Total N (%)
	Private N (%)	Public N (%)	
1	59 (27.7)	133 (34.4)	192 (32.0)
2	79 (37.1)	177 (45.7)	256 (42.7)
3	44 (20.7)	67 (17.3)	111 (18.5)
4	15 (7.0)	8 (2.1)	23 (3.8)
5	9 (4.2)	2 (0.5)	11 (1.8)
6	6 (2.8)	0 (0.0)	6 (1.0)
7	1 (0.5)	0 (0.0)	1 (0.2)

Discussion

Polypharmacy, the concurrent use of multiple drugs, is of major concern worldwide for its associations with drug-related adverse events, poor adherence, medication errors, under prescribing and increased healthcare cost^{10, 19, 20}. It is the opinion of the INRUD Research Team members that the prescribing indicator values for the numbers of drugs per encounter fall within a range of 1.4-1.8, prescribing by generics 100%, antibiotics range from 20-27%, injection 13.4-24.1 %, and drug prescribing from the essential drug list 100 %²¹.

In this study the average number of drugs per encounter (2.04 ± 1.01) was slightly higher than the recommended value. Nearly 75% of patient encounters received two and less than two drugs. Only 3% of patients had 5 and above 5 drugs prescribed. The level of polypharmacy was higher than studies done in Ethiopia and Sudan^{22, 23}, but lower than what was demonstrated from Bahrain, Tanzania and China^{24, 25, 26}.

Identifying a limited number of essential medicines leads to a better supply, more rational use, and lower costs. The selection of medicines has a considerable impact on the quality of health care and the cost of treatment. World Health Organization started essential medicines program in 1990 and now it is widely accepted and practiced across the globe, both in developed and developing countries⁴. In this study, the percentage of drugs from the essential drug list (97.0%) was short of meeting the target levels (100.0%). However, when compared to studies done in Bahrain and china, it was low^{24, 26}. Percent of drugs prescribed by generic names was found to be better than what were found in Bahrain, Tanzania and North West Ethiopia^{24, 25, 27}.

Overuse of antimicrobials exerts pressure to increase rates of antimicrobial resistance and harmful in terms of economic cost and avoidable adverse reactions. The World Health Assembly in May 2005 warned that the anti-microbial resistance was rapidly increasing, with resistance of up to 70-90% to original first-line antibiotics (penicillin, ampicillin, cotrimoxazole, and cephalosporins) for dysentery (shigella), pneumonia (pneumococcal), gonorrhoea, and hospital infections (Staphylococcus Aureus)^{28, 29, 30}. In this study percentage of patient encounters with antibiotics were very high (63%). It was shown to be higher than what were found in Tanzania and Bahrain but shown to be relatively better than the nationwide study done in Ethiopia^{24, 25, 23}.

Over use of injections leads to economic cost and health hazards as non sterile injections contribute to the transmission of hepatitis, HIV/AIDS and other blood borne diseases⁶⁻⁸. In this study the percentage of encounters with injection was in the recommended range of WHO (13.4 - 24.1 %). It was lower than to those of Ethiopia nation-wide average value, Bahrain and Sudan^{24, 25, 27}, but higher than the average global finding⁴.

The need and potential for counseling the patients regarding their drug therapy has been an important part of the pharmacy practice and pharmaceutical care. It has been the responsibility of the pharmacist to counsel the patients before dispensing the medication although the prescriber gives some information about drugs prescribed in primary care. Counseling not only enhances compliance, but also reduces complications due to non-compliance to treatments³¹. The quality of labeling applied by dispensers, the time spent informing the patients, and the communication

skills of the dispenser can therefore affect compliance rates³.

Limitation of the study

In the evaluation of the health facilities drug prescribing indicators, patient medical records were used. So it is difficult to be sure whether patients took the drugs as prescribed by the prescribers or not.

Conclusions

Prescribing practices in terms of generic prescribing, use of drugs according to essential drug, and number of drugs per encounter was in the recommended range. It was, however observed over use of antibiotics and shortage of drug information sources compared to similar studies from developing countries.

Acknowledgment

The researchers would like to thank the Gurage Zonal health bureau, Wolkite Town health administration office, the Wolkite town health institutions administrations and professionals for their keen cooperation during the study.

References

1. R. Holland, J. Desborough, L. Goodyer, S. Hall, D. Wright & Y. Loke. Does pharmacist-led medication review help to reduce hospital admissions and deaths in older people? A systematic review and meta-analysis. *BJCP*. 2007; 65(3): 303-316.
2. WHO. Report of the conference of experts. The rational use of drugs, Kenya, Nairobi. November 1985; pp: 17-25.
3. WHO. Action Programme on Essential Drugs. How to investigate drug use in health facilities, Geneva. 1993; pp: 9-31
4. WHO. Medicines use in primary care in developing and transitional countries Fact Book summarizing results from studies reported between 1990 and 2006, Geneva, Switzerland. 2009.
5. International Monetary Fund. World Economic and Financial Surveys, Regional Economic Outlook, Sub-Saharan Africa: Resilience and Risks, Washington D.C. 2010.
6. WHO. The rational use of drugs World Health Assembly Resolution WHA39.27, Geneva. 1985.
7. Hutin YJ, Chen RT. Injection safety: a global challenge. *Bulletin of WHO*, 1999; 77:787-788.
8. Kane A, Lloyd J, Zaffran M, Simonsen L, Kane M. Transmission of hepatitis B and C and human immunodeficiency viruses through unsafe injections in the developing world: model-based estimates. *Bulletin of WHO*, 1999; 77:801-807.
9. Simonsen L, Kane A, Lloyd J, Zaffran M, Kane M. Unsafe injections in the developing world and transmission of blood-borne pathogens: a review. *Bulletin of WHO*, 1999; 77:789-800.
10. Federal Ministry of Health, HAPCO Ethiopia. Health indicators in Ethiopia, Addis Ababa. 2008.
11. ET Adebayo, NA Hussain. Pattern of prescription drug use in Nigerian army hospitals. *Ann Afr Med*. 2010; 9 (3): 152-158.
12. Desta Z, Abula T, G.yohannes A, Worku A. Drug prescribing patterns for out patients in three hospitals in North West Ethiopia. *Ethiop J Health Dev*. 2002; 16(2):183-189.
13. Federal Ministry of Health, Nigeria National Primary Health Care Development Agency (NPHCDA). Moving on: The Bamako Initiative in Nigeria. 1994.
14. <http://www.Dsprud.org/train.htm>. Delhi society for the promotion of rational drug use. Rational drug use: Concepts and perspectives. [accessed on 2010 Oct 20].
15. Hogerzeil HV, Ross-Degnan D, Laing RO, Ofori-Adjei D, Santoso B, et al. Field tests for rational drug use in twelve developing countries. *Lancet*. 1993; 4: 1408-1410.
16. Daniel Zewde, Yohannes Jorge, Tsige Gebre-Mariam. A preliminary assessment of outpatient counselling in four referral hospitals of Addis Ababa. *Ethiop. Pharm. J*. 1999; 17: 44-51.
17. Gurage zone health bureau, Wolkite town health office. Module on private and public health facilities and drug retail outlets. Wolkite town, September, 2010.
18. Federal Democratic Republic of Ethiopia Population Census Commission. Summary and Statistical Report of the 2007 Population and Housing Census Results, Addis Ababa, Ethiopia, 2007.
19. Maisoon Abdullah Ghaleb, Nick Barber, Bryony Dean Franklin, Ian Chi Kei Wong. The

- incidence and nature of prescribing and medication administration errors in paediatric inpatients. *Arch Dis Child* 2010; 95: 113-118.
20. Miriam Zavaleta-Bustos, Lucila Isabel Castro-Pastrana, Ivette Reyes-Hernández, Maria Argelia López-Luna, Isis Beatriz Bermúdez-Camps. Prescription errors in a primary care university unit: urgency of pharmaceutical care in Mexico. *RBCF* 2008; 44(1): 115-125.
 21. World Health Organization, Management Sciences for Health. Drug and therapeutics committees: A practical guide, Geneva, Switzerland, 2004; pp: 23-27.
 22. Awad AI, Himad HA. Drug-use practices in teaching hospitals of Khartoum State, Sudan. *Eur J Clin Pharmacol.* 2006; 62(12):1087–93.
 23. Federal Ministry of Health of Ethiopia. Assessment of the Pharmaceutical Sector in Ethiopia, Addis Ababa, Ethiopia. October 2003.
 24. Federal Democratic Republic of Ethiopia Ministry of Health, WHO. Drug financing in Ethiopia, Addis Ababa, Ethiopia. September 2007.
 25. Lewis PJ, Dorman T, Taylor D, Tully MP, Wass V, Ashcroft DM. Prevalence, incidence and nature of prescribing errors in hospital inpatients: a systematic review. *Drug Saf.* 2009; 32(5):379-89.
 26. Lifang Dong, Hong Yan, Duolao Wang. Polypharmacy and its correlates in village health clinics across 10 provinces of Western China. *J Epidemiol Community Health* 2010; 64:549-553.
 27. Desta Z., Abula T., Beyene L. Assessment of rational drug use and prescribing in primary health care facilities in North West Ethiopia. *East Afr Med J.* 1997; 74(12):758-63.
 28. Schrag S, Beall B, Dowell SF. Resistant pneumococcal infections: the burden of disease and challenges in monitoring and controlling antimicrobial resistance. Geneva, World Health Organization, 2001. WHO/CDS/CSR/DRS/ 2001.6.
 29. Khor, M. Report on Proceedings of the World Health Assembly (May 2005). South-North Development Monitor (SUNS), 27 May 2005.
 30. Tapsall J. Antimicrobial resistance in Neisseria gonorrhoea. Geneva, World Health Organization, 2001. WHO/CDS/CSR/DRS/ 2001.3
 31. Poudel A, Khanal S, Alam K, Palaian S. Perception of Nepalese community pharmacists towards patient counseling and continuing pharmacy education program: a multicentric study. *Journal of Clinical and Diagnostic Research* 2009; 3: 1408-1413.