



ISSN: 2231-3354  
Received on: 17-08-2011  
Revised on: 25-08-2011  
Accepted on: 08-09-2011

## Assessment of Patterns of Drug use by using World Health Organization's Prescribing, Patient Care and Health facility indicators in Selected Health Facilities in Southwest Ethiopia

Mulugeta T Angamo, Nasir T Wabe and N. J. Raju

### ABSTRACT

The objective of the study was to assessing patterns of drug use by using World Health Organization prescribing, patient care and health facility indicators in Southwest Ethiopia. A cross sectional study was carried out in four randomly selected health facilities. Retrospectively the prescription papers analyzed according to WHO guideline. Prospectively 35 patients from each of the four health facilities were interviewed at the outpatient pharmacy while drugs were dispensed to assess the patient care indicators. The average number of drugs per prescription ranging from 1.98 to 2.24. The mean consultation time spent between the prescriber and patient were range from 5.47 to 6.50. The mean pharmacy dispensing time was 1.23 minutes to 1.25minutes. The average number of drugs prescribed was in the range of 1.80 to 2.88. Two of the health facilities had a copy of Ethiopian essential drug list (EDL), 2(50%) had a copy of standard treatment guideline for health centers and only 1 (25%) of the health facility had a copy of drug formulary. The pattern of prescription in terms of generic name and polypharmacy was near to optimal. The pattern of antibiotics and injection prescribing appears appropriate when compared with the world health organization guideline. However, there is a need to improve patients' knowledge on dispensed drugs.

**Key words:** WHO guideline, Prescribing indicators, Patient care indicators, Health facility indicators, Ethiopia.

### INTRODUCTION

Drug use evaluation is a system of ongoing, systematic, criteria-based drug evaluation that ensures the appropriate use of drugs (WHO, rational drug use, 1995). Drug use is complex subject involving the physician, the patient and the dispenser. Each of these is influenced by many factors that are often difficult to measure and quantify. Despite complexity of drug use, a number of indicators have been developed, standardized and evaluated by World Health Organization (WHO). These indicators are grouped in to three categories namely: prescribing indicators, patient care indicators and facility indicators (WHO, How to investigate drug use in health facilities, 1993). Drugs are important components of health care system and play a crucial role in saving life. The limited information on drug use through out the world indicates that drugs are not optimally used. This inappropriate use has serious health and economic consequences for the success of national health care system. The irrational use of drugs becomes the world wide problem than the absence of drugs information. Even drug experts (pharmacists) have contributed to the irrational use of drugs in a world wide scale, encompassing developing and developed countries, developing countries have rather worsened condition (Management Science for Health, Managing drug

**Mulugeta T Angamo,**  
*Pharmacology and Therapeutics  
department, Pharmacy School, Jimma  
University, Jimma, Oromia, Ethiopia.*

**Nasir T Wabe**  
*Pharmacology and Therapeutics  
department, Pharmacy School, Jimma  
University, Jimma, Oromia, Ethiopia.*

**N.J. Raju**  
*Pharmacognocny department, Pharmacy  
School, Jimma University, Jimma,  
Oromia, Ethiopia.*

**For Correspondence:**  
**Nasir T Wabe,**  
*Jimma University  
P.O.BOX 251 1480  
Jimma, Ethiopia  
Tel. no: 251 911 68 0576*

supply, 1997). The label on dispensed medicines should provide the patient with all the information necessary so that the medication can be taken or used appropriately, as result therapeutic effectiveness of the drug will be improved and toxicity and adverse drug reaction will be reduced (Aulton E.M. and Collet M.D, 1990). Globally, more than 50 % of all medicines are prescribed, dispensed or sold inappropriately, while 50 % of patients fail to take the prescribed drugs correctly. More over about one third of the world population lacks access to essential medicines (WHO, Policy Perspective on Medicines, 2002).

Studies done in different areas of the world reveal different drug use patterns (Desta et al 1997, Dikaso et al 1998, Mallet et al 2001, and Otoom et al 2002). Irrational over use of medicines can stimulate inappropriate patient demand and lead to reduced access and attendance rates due to medicine stock outs and loss of patient confidence in health (WHO, Policy Perspective on Medicines, 2002). Essential drug ones selected to fulfill the real need of the majority of the population in diagnostic, prophylactic, therapeutic and rehabilitative services using criteria of risk benefit-ratio, cost effectiveness, quality practical administration as well as patient compliance and acceptance (Hogerzeil 1995).

Generally, irrational drug use are numerous and complex involving the health system, prescriber, dispenser, patient and the community. Due to such worsened condition, it is now felt that the overall drug use situation needs to be assessed, problems identified and remedial intervention strategies to be implemented so as to check dangerous trends in drug utilization in Ethiopia. The current study is, therefore, aimed at assessing patterns of drug use by using WHO prescribing, patient care and health facility indicators in selected health facilities in Southwest Ethiopia.

## METHODS AND MATERIALS

A cross sectional study was carried out retrospectively and prospectively in four randomly selected health facilities in southwest Ethiopia January 15 to February 26, 2009. Retrospectively the prescription papers were systematically selected from drug prescriptions retained at the dispensary of each facility, according to WHO/ INRUD guideline (WHO, Policy Perspective on Medicines, 2002). Prospectively 35 patients from each of the four health facilities were interviewed at the outpatient pharmacy while drugs were dispensed to assess the patient care indicators. For health facility indicators observation was performed to ensure the availability of essential guidelines and key drugs in the stock.

Data was collected by using pretested questionnaires for prospective study and WHO designed criteria based data collection formats for retrospective study. According to WHO drug use evaluation guideline, outpatient prescribing indicators used includes average number of drugs per encounter, percentage of drugs prescribed in generics, percentage of prescriptions with antibiotics, percentage of prescriptions with injections and percentage of prescribed drugs from Essential Drug List (EDL). Percentage of drugs prescribed in generics was calculated by dividing the number of drugs prescribed by generic name by the

total number of drugs prescribed, multiplied by 100. Percentage of prescriptions with antibiotics was calculated by dividing number of patient encounters with an antibiotic prescribed by the total number of encounters surveyed, multiplied by 100. Percentage of prescriptions with injections was calculated by dividing the number of patient encounters with an injection by the total number of encounters surveyed, multiplied by 100.

Patient care indicators were average consultation time, average dispensing time, percentage of drugs actually dispensed, percentage of drugs adequately labeled, patient's knowledge of correct dosage. Average consultation time was calculated by dividing total time for a series of consultations, by the number of consultations. Average dispensing time was calculated by dividing the total time for dispensing drugs to a series of patients, by the number of encounters. Percentage of drugs actually dispensed was calculated by dividing the number of drugs actually dispensed at the health facility by the total number of drugs prescribed, multiplied by 100. Percentage of drugs adequately labeled was calculated by dividing the number of drug packages containing at least drug name and strength and How frequent and length the drug should be taken, by the total number of drug packages dispensed, multiplied by 100. Patient's knowledge of correct dosage was calculated by dividing the number of patients who can adequately report the dosage schedule for all drugs, by the total number of patients interviewed, multiplied by 100.

Facility indicators were EDL Availability, formulary availability, STG availability, key drugs availability. Essential drug list (EDL) or Formulary or Standard Treatment Guideline (STG) availability was checked by saying yes or no, per facility after observation. Key drugs availability was calculated by dividing the number of specified products actually in stock by the total number of drugs on the checklist, multiplied by 100.

The independent variables of this study were; age of the patient, education status of the patient, type of professional involved in dispensing drugs, sex of the patients. The dependent variables were percent of drug actually dispensed drug, average dispensing time, average consultation time, patient knowledge, labeling pattern of drugs.

Data were coded, checked for completeness and consistency. Then the data were entered and analyzed using SPSS for windows version 16.0 statistical soft ware program. For descriptive statistics, results were expressed in terms of percentages and presented using tables according to the types of tool used.

The study was cleared by Jimma University Ethics committee. Verbal consent was obtained from patients and health professionals before starting interview.

## RESULTS

A total of four health facilities and 140 patients from outpatient pharmacies, i.e. 35 patients from each facility, were selected according to the WHO drug use evaluation guideline using core indicators, were included in this study. According to the data collected, the age composition of the study population revealed that

31 (22.14%) were between the age 12-18 years old, 67 (47.85%) were between the age 19-35 years, 39 (27.85%) were between the age 36-65 years, the rest 3(11.14%) contributes for age >65 years old. From those 140 patients, 63 (45%) were females and 77 (55%) were males. With regard to educational status of out patients, 20 (14.28%) of the respondents were illiterate, 62 (44.28%) of respondents were completed primary school, 31 (22.14%) of the respondents were completed secondary level of education and 27 (19.28%) were colleges and above. Concerning the educational status of dispensers in pharmacy, 3 were druggists, and only 1 were pharmacist (Table 1).

**Table 1:** Socio demographic characteristics of patients served in four health facilities out patient pharmacies in south west Ethiopia, January 2009.

Socio-economic characteristics	Number	%
Age		
12-18	31	22.14
19-35	67	47.85
36-65	39	27.85
>65	3	2.14
Sex		
Male	77	55
Female	63	45
Educational status of patients		
Illiterate	20	14.28
Primary School	62	44.28
Secondary school	31	22.14
College and above	27	19.28
Educational level of pharmacy personnel	3	75
Druggist		25
Pharmacist	1	

The study was conducted on 140 out patients and 4 health facilities including outpatient pharmacies, patient consultation times, and last year prescription records review of each facility based on WHO drug evaluation criteria in the outpatient departments. According to the WHO drug use evaluation criteria, 3058 last year (2008) prescription papers (891, from SHHC, 669 from YHC, 757 from SHC and 742 from JHC) were reviewed and analyzed as per to WHO standard method. Regarding the prescribing indicators, the average number of drugs per prescription was 1.98, 2.20, 2.25, and 2.24 in SHHC, YHC, SHC and JHC respectively. Prescriptions with one drug were 32.99%, 26.90%, 20.60%, and 23.45% while prescriptions with four drugs were 6.29%, 12.25%, 8.10% and 7.01% in SHHC, YHC, SHC and JHC respectively. The percentage of drugs prescribed by generic name among the 4 health facilities were 1490 (84.22%), 1132(76.84%), 1378 (80.77%), 1259 (75.61%) in SHHC, YHC, SHC and JHC respectively. The percentage of drugs encountered with antibiotics were 452 (25.55%), 363 (24.64%), 440 (25.79%), 390 (23.42%) in SHHC, YHC, SHC and JHC respectively. The percentage of drugs encountered with an injection were 196 (11.07%), 171 (11.60%), 166 (9.73%), 165 (9.91%) in SHHC, YHC, SHC and JHC respectively. The percentage of drugs prescribed from Ethiopian essential drug list were 1581 (89.37%), 1353 (91.85%), 1520 (89.09%), 1512 (90.81%) in SHHC, YHC, SHC and JHC respectively (Table 2).

**Table 2:** Distribution of drug prescription indicators in four health facilities in south west Ethiopia, January 2009.

Prescribing indicators	SHHC No (%)	YHC No (%)	SHC No (%)	JHC No (%)
Number of drugs per prescription				
One	294(32.99%)	180(26.90%)	156(20.60%)	174(23.45%)
Two	372 (41.75%)	263 (39.31%)	319 (42.14%)	345(46.49%)
Three	168(18.85%)	144(21.52%)	218(28.79%)	171(23.04%)
Four	57(6.29%)	82(12.25%)	64(8.10%)	52 (7.01%)
Average number of drugs per encounter	1.98	2.20	2.25	2.24
Percentage of drugs prescribed by generic	1490 (84.22%)	1132(76.84%)	1378(80.77%)	1259(75.61)
Percentage of drug encounter with antibiotics	452(25.55%)	363(24.64%)	440(25.79%)	390(23.42%)
Percentage of drug encounter with injection	196(11.07%)	171(11.60%)	166(9.73%)	165(9.91%)
Percentage of drugs prescribed from EDL	1581(89.37%)	1353(91.85%)	1520(89.09%)	1512(90.81%)

SHH; Shebe Health centre; YHC, Yebu Health centre; SHC, Serbo Health Centre; JHC, Jimma Health Centre

On evaluation of patient care, using WHO patient care indicators; this study showed that; the mean consultation time spent between the prescriber and patient were 6.50 minute which was the longest at SHHC and 5.47 minutes which was the shortest time spent at YHC. The mean pharmacy dispensing time was 1.23minutes, 1.30minutes, 1.35 minutes and 1.25minutes in SHHC, YHC, SHC and JHC respectively. The average number of drugs prescribed was 2.88 in SHHC which was the highest while 1.80 in JHC which was the lowest compared to other two health centers. The percentage of drugs actually dispensed were 77.22%, 89.04%, 89.55% and 77.77% while the percentages of drugs adequately labeled were 71.40%, 73.33%, 67.27% and 68.33% in SHHC, YHC, SHC and JHC respectively. The percentage of patients who knew the dosage of their dispensed medication was 71.40%, 77.14%, 68.50% and 74.28% respectively (Table 3).

**Table 3:** Distribution of patient care indicators in four health facilities in south west Ethiopia, January 2009

Patient care indicators	SHHC No (%)	Health Facility YHC No (%)	SHC No (%)	JHC No (%)
Average consultation times (minutes)	6.50	5.47	6.25	6.39
Average dispensing time (minutes)	1.23	1.30	1.35	1.25
Average number of drugs prescribed	2.88	2.10	1.91	1.80
% of drugs actually dispensed	78(77.22%)	65(89.04%) 60(89.55%)		49 (77.77%)
% of drugs adequately labeled.	50(71.40%)	44(73.33%)	37(67.27%)	41(68.33%)
% of patients who knew the dosage	25(71.40)	27(77.14%)	24(68.50%)	26(74.28%)

SHH; Shebe Health centre; YHC, Yebu Health centre; SHC, Serbo Health Centre; JHC, Jimma Health Centre

Regarding health facility indicators, the result of the study revealed that 2 (50%) of health facilities had a copy of Ethiopian

essential drug list (EDL), 2(50%) had a copy of standard treatment guideline for health centers and only 1 (25%) of the health facility had a copy of drug formulary; however others have not any essential reading materials listed above during the study period. Besides these health facility indicators, some very essential medicines like ferrous salts with folic acids, mebendazole tablets, quinine sulfate, and tetracycline eye ointments were not available in SHC during the study period (Table 4). Regarding the knowledge of patients on dispensed drugs in outpatient's pharmacy with respect to educational status showed that better understanding was seen with increasing educational level from illiterate to colleges and above (Table 6).

**Table 4:** Health facility indicator results in 4 health facilities in south west Ethiopia, January 2009

Health facility indicators	SHHC	YHC	SHC	JHC
Availability of copy of EDL Yes / No*	0	0	1	1
Availability of copy of STG Yes/No*	1	0	0	1
Availability of copy of formulary Yes/No*	0	1	0	0
% of availability of key drugs in stock	66.67	60.00	53.33	80.00

Yes/No\*, Yes=1, No=0. SHH; Shebe Health centre; YHC, Yebu Health centre; SHC, Serbo Health Centre; JHC, Jimma Health Centre

**Table 5:** Distribution of availability of key drugs in four health facilities in south west Ethiopia, January 2009.

Key drugs in the stock	SHHC	YHC	SHC	JHC
Oral rehydration salts	1	1	1	1
Cotrimoxazole tablets	0	1	1	1
Procaine penicillin injection	1	0	0	1
Amoxicillin(capsule, suspension)	1	0	1	0
Ampicillin (capsule, suspension)	0	1	0	1
Chloroquine tablet	1	1	1	1
Arthemether-lumefantrine	1	1	1	1
Quinine sulfate	0	0	1	0
Ferrous salt+ Folic acid tablet	0	1	0	1
Mebendazole tablet	1	1	0	1
Tetracycline ointment	1	0	0	1
Iodine/gentian violet	1	0	0	1
Benzoic acid +salicylic acid ointment	1	1	0	1
Acetyl salicylic acid/ paracetamol tablet	1	1	1	0
Vitamin A(retinol)	0	0	0	1

1= Yes, 0=No. SHH; Shebe Health centre; YHC, Yebu Health centre; SHC, Serbo Health Centre; JHC, Jimma Health Centre

## DISCUSSION

World Health Organization developed a core prescribing indicators to measure the degree of polypharmacy, the tendency to prescribe drugs by generic name and the overall level of use of antibiotics and injections. The degree to which the prescribing practice conformed to the essential drug list, formulary or standard treatment guideline were also measured by searching for the number of drugs prescribed from essential drug list available

**Table 6:** Distribution of patients' response on knowledge of outpatient pharmacy dispensed drugs with respect to educational status in four health facilities in south west Ethiopia, January 2009.

Knowledge question on dispensed drugs	Illiterate		Primary school		Secondary school		College and above	
	Yes	No	Yes	No	Yes	No	Yes	No
Do you remind the name of drug (s)?	3 (2.1)	17 (12.1)	32 (22.8)	30 (21.4)	25 (17.8)	6 (4.3)	25 (17.8)	2 (1.42)
Do you know the dose of the drug(s)?	10 (7.1)	10 (7.1)	38 (27.1)	24 (17.1)	27 (19.2)	4 (2.8)	27 (19.2)	0
Do you know the duration of treatment?	16 (11.4)	4 (2.8)	36 (25.7)	26 (18.6)	28 (20.0)	3 (2.1)	26 (18.6)	1 (0.71)
Do you know the frequency of admin?	13 (9.2)	7 (5.0)	40 (28.6)	22 (15.7)	17 (12.1)	4 (2.8)	27 (19.2)	0
Do you know the possible side effect?	4 (2.8)	16 (11.4)	41 (29.3)	21 (15.0)	26 (18.6)	5 (3.6)	26 (18.6)	1 (0.71)

(WHO, Policy Perspective on Medicines, 2002). Accordingly, the result of this study revealed that the average number of drugs per encounter was 1.98 in SHHC, which falls within the range of WHO standards that is less than or equal to two (Mallet et al 2001). The rest were 2.2 in YHC, 2.25 in SHC and 2.24 in JHC that showed over usage of drugs per prescription. The value from this study was comparable with the study conducted in South Ethiopian hospitals revealed that the average number of drugs per prescription were 2.7 in Hossana hospital, 2.6 in Attati hospital, 2.4 in Soddo hospital (Mallet et al 2001) and 2.36 in Western China (Lifang et al 2011),  $3.1 \pm 1.6$  in Lucknow District India (Kumari et al 2008)

Regarding the generic prescribing, the percentage of drug prescribed by generic name was 84.22%, 76.80%, 80.77% and 75.60% in SHHC, YHC, SHC and JHC respectively; from which the value in JHC and YHC was larger than study done in India 27.1% (Kumari et al 2008). Among the four health facilities, result of JHC and YHC showed less fit to the WHO standard values which was 100% and there is a likely increased confusion of health professionals with the increased brand prescribing.

Regarding antibiotics prescribing, in all health facilities the antibiotics were prescribed in less than 30% which fit to the WHO international net working for rational use of drugs (INRUD) that reduces the chance of bacterial resistance, thus encourageable. Accordingly, 25.50% in SHHC, 25.79% in SHC, 24.64% in YHC and 23.43% in JHC which was almost one third of the result from study at Debretabor Hospital in Ethiopia 69% (Desta et al 2002), in Yemen 66.2% (Bashrahil et al 2010) and Western China 48.43% (Lifang et al, 2011).

The use of injection for treatment accompanied with variety of disadvantages including sepsis at administration, the risk of tissue toxicity from local irritation, costly, difficulties in

correcting the error; thus WHO recommended that less than 10% prescription should include one or more injections (WHO/INRUD indicators) (Mallet et al 2001). All health facilities were using injection in a comparable fashion with WHO/INRUD recommendation which is encourageable. However; other studies, Tanzania 19% (Massele et al 2001), in Yemen 46.0% (Bashrahil et al 2010) and Western China 22.93% (Lifang et al 2011), report higher figures.

According to the result of this study, majority of the drugs 91.55% in YHC, 90.81% in JHC, 89.39% in SHHC and 89.09% in SHC were prescribed from Ethiopian EDL compared with the ideal value of 100% unlike other study (64.12% ) (Lifang et al 2011).

In this study the average consultation and dispensing time in facilities was 6.14 minute and 1.28 minutes, which was similar with the study conducted in North West of Ethiopia 5.8 minute and 1.9 minute respectively. However; this result was more different than the study in Niger which was 5.75 minutes and 3.25 minutes in average (Massele et al 2001) and in Jordan which was 3.90 minutes and 28.80 seconds (Otoom et al 2002) respectively. The probable reason for this variation may be due to differences in man power, set up of dispensary area and ease access for essential materials like drugs, medical equipments among health facilities.

The study result revealed that averagely 70.05% of dispensed drugs were adequately labeled which was better than the study conducted in Islamic republic of Iran which was 60% (Cheraghali et al 2004). The study also showed that 72.80% of patients were able to repeat the correct dosage schedule of the drug they had received which is relatively low when compared with other study (Anacleto et al 2005). The probable reason this difference may be due to over- load of patient in dispensary areas made communication problem between dispensers and patients, even the dispensary area were not conducive to give full information to the patient. Like (Otoom et al 2002) none of the facilities have their own essential drug list or formulary or standard treatment guideline

## CONCLUSION

The pattern of prescription in terms of generic name and polypharmacy was near to optimal which was encourageable. The pattern of antibiotics and injection prescribing appears appropriate when compared with the world health organization guideline. There is a need to improve patients' knowledge on dispensed drugs and availability of essential guidelines and key drugs in the stock. Baseline data gathered by this study can be used by researchers and policymakers to monitor and improve pharmaceutical prescribing and consumption practices in southwest Ethiopia.

## ACKNOWLEDGMENT

The author would also like to express appreciation to all patients and health professionals, who participated in the study, for their time to participate in the study. Special thanks are due for research staff participated in data collection and write up.

## REFERENCES

- Anacleto TA, Perini E, Rosa MB, César CC. Medication errors and drug-dispensing systems in a hospital pharmacy. *Clinics (Sao Paulo)*. 2005; 60(4):325-32.
- Aulton E.M. and Collet M.D., *Pharmaceutical practice*, United Kingdom; Churchill Livingstone; 1990: 73-74.
- Bashrahil K.A., indicators of rational drug use and health services in Hadramout, Yemen. *East Mediterr Health J*. 2010 Feb;16(2):151-5.
- Cheraghali A.M., Nikfar S., Behmanesh Y., Rahimi V., Habibipour F., Tirdad R., Asadi and Bahrami A. Evaluation of availability, accessibility and prescribing pattern of medicines in the Islamic Republic of Iran. *Eastern Mediterranean Health Journal* 2004; 10(3):406-415
- Dest a Z et al. Assessment of rational drug use and prescribing in primary health care facilities in north west Ethiopia. *East African medical journal*, 1997, 74:758-63..
- Dest a Z, Abula T, Ganes A, and worku A: prescribing pattern drugs for outpatient in three hospitals in north West Ethiopia, *J. health Dev* 2002; 16 (2): 183-189.
- Dikaso D, Gobe Z, Teklemariam S. A base line survey on prescribing indicators and underlying factors influencing prescribing in southern Ethiopia, *Ethiopia J. health Dev*, 1998;12 (2) 87-93
- Hogerzeil HV. Promoting rational prescribing: an international perspective. *Br J Clin Pharmacol*. 1995; 39(1): 1-6
- Kumari R, Idris MZ, Bhushan V, Khanna A, Agrawal M., Singh S.K. Assessment of prescription pattern at the public health facilities of Lucknow district, *Indian J Pharmacol*. 2008; 40 (6):243-7
- Lifang D, Hong Y and Duolao W. Drug prescribing indicators in village health clinics across 10 provinces, of Western China. *Family Practice* 2011; 28:63-67
- Mallet H.P., Njikam A., and Scouflaire S.M., evaluation of prescription practices and the rational use of medicines in Niger, *Niger pharmaceutical Journal* ; 2001; 11 (3); 185- 96.
- Management Science for Health, *Managing drug supply*, 2<sup>nd</sup> edition, West Hariford, Connecticut, Kumar press, 1997, PP: 138-479.
- Massele A.Y., Nsimba S.E., Rimoy G. Prescribing habits in church-owned primary health care facilities in Dar Es Salaam and other Tanzanian coast regions, *East Afr Med J*. 2001;78(10):510-4.
- Otoom S et al. Evaluation of drug use in Jordan using World Health Organization prescribing indicators. *Eastern Mediterranean health journal*, 2002, 8:000-000.
- WHO, rational drug use, dispensing, prescribing, counseling and adherence in ART programs, Conference express in Nairobi, 1995.
- WHO, How to investigate drug use in health facilities in selected drug use indicator, EDM Research series, No 07, 1993.
- WHO, Policy Perspective on Medicines; Promoting rational use of medicines; Core components, September 2002, Geneva.