

World Health Organization Indicators for Rational Use of Drugs in a Nigerian Secondary Hospital

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ABSTRACT

Purpose: Prevention of irrational drug use may reduce healthcare costs and potentially save lives. In line with the World Health Organization (WHO) recommendation, retrospective, prospective and cross sectional descriptive studies were conducted to obtain information on patient care, prescribing, and facility indicators in the Outpatient Department of General Hospital, Offa, Kwara State, Nigeria. **Methodology:** A sample of 1,416 prescriptions was randomly selected to determine the prescribing indicators. A total of 472 patients were interviewed to collect information on the drugs being used by the patients. Information on health facility indicators were obtained by assessing sufficient supply of vital drugs, and access to information about these drugs in the hospital. **Findings:** Majority of the patients were females with mean age of 56.2 ± 7.1 years. The average number of drugs per prescription (2.6) was higher than WHO recommendation (1.6-1.8), and most (58.1%) of the drugs prescribed were branded rather than 100% generics. Percentages of antibiotics (23.8%) and injectable drugs (3.4%) prescribed were within WHO cut-off values of 20.0-26.8% and <10.0%, respectively. The Nigerian Essential Drugs List was available in the facility, and a high percentage (99.7%) of drugs was prescribed from the list. The average time used in dispensing drugs (5.26 ± 2.33 minutes) was also adequate and within WHO recommendation (>3 minutes). Appropriate drugs dispensed and adequate labeling were 87.4% and 81.9%, respectively. Hypertension (28.8%) was the most prevalent disease in the community. **Conclusion:** The study concluded that most of the prescribing indicators did not meet WHO standard criteria. **Social Value:** The health facility and patient care indicators are rational. Data obtained in this study can be used to monitor and improve drug prescribing habits of physicians in this facility.

Key words: Irrational drug, Indicators, Antibiotics, World Health Organization.

INTRODUCTION

Irrational use of drugs is a global challenge. The rational use of drugs is defined as patients receiving medication clinical needs in appropriate dosage that meet individual requirements at a low price in an adequate period of time within their community. The use of several drugs per patient (polypharmacy), inappropriate use of antimicrobials, over use of injections, self-medication and prescribing the drug that is inappropriate to clinical guidelines.¹ These requirements would be fulfilled provided the prescribing process are covered by the following steps:

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- (a) defining the patient's problems (diagnosis);
- (b) defining the effective and the safe treatments (non-drug and drug treatments);
- (c) selecting the appropriate drugs, duration and dosage.
- (d) writing a very clear prescription;
- (e) giving the patients appropriate information and counselling as well as planning to evaluate treatment responses.

This is simplified as five rights – the appropriate drug at the appropriate dose by the appropriate route at the appropriate time for the appropriate patient.² Unfortunately, the global trend in the prescribing patterns not always conform with these ideals, and what usually prevails is irrational prescribing.

The irrational use of medicines is widespread and very harmful to individual and that of the population, particularly in chronic disease conditions such as hypertension, mental disorder, diabetes and epilepsy. Other serious challenges involve with irrational drug use are interruption of therapy, development of drug resistance, increase in drug toxicities, organ failure, increase in healthcare costs and sudden death among the patients. Therefore, preventing irrational drug use may influence healthcare costs and potentially save lives.³ Rational use of drugs is one essential element in achieving quality of health and medical care for patients and the community as a whole.⁴ The essence of rational drug use is to avoid inappropriate prescription, problems of under- and over-prescribing, and the use of new, expensive drugs when equally effective, well-tried, safe and cheaper alternatives are available. The misuse, overuse or underuse of medicines usually results to wastage of resources and prevalent health hazards.⁵

Presently, no study has been conducted to measure the use of rational drugs in General Hospital, Offa, to the researchers' knowledge. Hence, the need arise to foster this study to obtain information that will improve drug prescribing habits of physicians and encourage the practice of pharmaceutical care in the facility of study.

METHODS

Setting

General Hospital Offa is a secondary health care facility owned by the State government and run by Kwara State Ministry of Health Hospital in Offa Local Government area of the State. It is located at resource-limited settings of North-Central senatorial district of Nigeria. The facility is a 50-bed hospital and provides in-patient and out-patient health care. The physicians in the facility are general practitioners. The healthcare facility has been providing health services to indigenous people of Offa

and the general public as a whole. The hospital has four pharmacists as well as two pharmacy technicians.

Three hundred and three prescriptions issued to patients attending out-patients' clinics in the facility over a period of three months were examined. Data collection form was designed and used by trained pharmacy technicians to record data and information on the prescribed drugs in the health facility.

Study Design

The study design included a retrospective study of patient medical records and prescription forms for prescribing practice indicators and a prospective, cross-sectional study designed to describe the current WHO drug use Indicators for patient and facility care of General Hospital, Offa.

Data collection

(a) The Prescribing indicators

This study was carried out in the Outpatient Department of General Hospital, Offa, from 17th April, 2015 to 2nd March, 2016. Prescriptions for the patients were spread throughout the year to reduce bias due to seasonal changes. Thirty two was the mean number of prescriptions per day in the facility. A sample of 1,416 prescriptions for the treatment of various diseases both acute and chronic was selected using systematic random sampling to evaluate the prescribing pattern of the facility. Five was the sampling interval used to select the prescriptions for the study.

Prescribing indicator form

Survey form 1 was used to capture information on prescribing manner of the physicians in the facility. The WHO indicators for evaluation of prescribing practices in a healthcare system were used and these include;

Indicator 1: This is average number of drugs per prescription and measured the degree of polypharmacy. It was obtained by dividing the total number of drugs prescribed by the number of prescriptions examined regardless of whether or not the patient received the drug.

Indicator 2: It shows the percentage of drugs prescribed by generic name. This is to assess the tendency to prescribe by generic name. This was obtained mathematically, by dividing the number of drugs prescribed by generic name by the total number of drugs prescribed, multiplied by 100.

Indicator 3: This indicator captured the percentage of prescriptions with an antibiotic prescribed. The essence is to evaluate the overall level of misused of antibiotic. It was calculated by dividing the number of prescriptions

in which antibiotics were prescribed by the total number of prescriptions studied, multiplied by 100.

Indicator 4: This was to determine the percentage of prescriptions with an injection prescribed. It examined the level of overused of injectable. It was achieved by dividing the number of prescriptions in which injections were prescribed by the total number of prescriptions studied, multiplied by 100.

Indicator 5: This determined percentage of drugs that were prescribed from the formulary or the Essential Drug List. It measured the degree to which prescribing practices in the hospital studied conformed with Nigerian Essential Drug List or formulary. It was calculated by dividing the number of drugs prescribed which are listed on the essential drugs list or local formulary by the total number of drugs prescribed multiplied by 100.

(b) The Patient care indicators

This study on patient care indicators was conducted prospectively. Patient care indicator form (Survey form 2) was used to collect information on the drugs being used by the patients. A total of 472 patients were interviewed using Patient Care Form. Patients enrolled into the study were those who attended the General Out-patient Department of the Hospital, those who received treatment, patients who refill their prescriptions in the hospital pharmacy and those who consented to participate in the study. The socio-demographic data of the patients were also recorded. These indicators were as follows:

Indicator 1: This shows the average dispensing time. The average time was attained by dividing the total time taken to dispense drugs to series of patients by the number of patients.

Indicator 2: This measured the percentage of drugs dispensed and computed by dividing number of drugs dispensed by the number of prescribed drugs presented for dispensing.

Indicator 3: The indicator determined the percentage of drugs adequately labelled. This was to measure the degree to which pharmacists provide vital information on the drug packages they dispense. This was achieved by dividing the number of drug packages containing at least patients' name, generic name of the drug, strength, quantity of drugs dispensed and when the drug should be taken were written on the label by the total number of drug packages dispensed, and multiplied by 100.

Indicator 4: This is to assess patient knowledge of correct dosage and measured the effectiveness of information provided to the patients on e dosage schedule of drugs they received from the pharmacists. It also involved discussion with patients on route of administration, duration of drug therapy, intended use of the

drug, expected action, drug interactions, common side-effects or adverse effects, techniques for self-monitoring of drug therapy, proper storage, warnings to keep all medicines out of the reach of children, expiry date, prescription refill information and actions to be taken in the event of a missed dose. Also, the patients knowledge of when, and in what quantity each dispensed drug should be taken as well as instruction on food restriction were examined. Failure of patients to understand this information would result to patients' knowledge being scored as inadequate. It was determined by dividing number of patients effectively reporting the dosage regimen for all drugs, by the total number of patients that were interviewed and multiplied by 100.

(c) The Facility indicators

Information on health facility indicators (Survey form 3) were derived by assessing adequate supply of essential drugs as well as access to information about these drugs in the hospital of study. The five pharmacists in the facility of study were included into the study. The study involved assessment of;

Indicator 1: Availability of copy of Essential Drugs List (EDL). This assessed the extent to which the Nigerian EDL is obtainable at a health facility. It is usually expressed as YES or NO, for such healthcare facility. Essential Drugs have been defined as those drugs that satisfied health care needs of majority of a population. These drugs should therefore be available at all times in adequate amounts and in appropriate dosage forms at all levels of the health care delivery system of the country.

Indicator 2: Availability of essential drugs: This was to measure the availability of key drugs usually recommended for treatment of specific diseases in the hospital. It was computed by the number of drugs actually available in the pharmacy store room divided by the total number of drugs on the EDL list, multiplied by 100.

Ethical consideration

The research was approved by the Institutional Review Board, Kwara State Ministry of Health, Ilorin, Nigeria.

Statistical analysis

The data collected were checked and analyzed using the SAS software program version 9.2.⁶ Descriptive statistics were used in the form of frequency, percentage, mean and standard deviation.

RESULTS

The age composition of the study revealed that 22 (4.7%) were between 14 and 20 years old, 160 (33.9%) were between the age of 21 and 40 years while 290 (61.4%)

Survey form 1: Public Health Facility: Rational Drug Use - Prescribing Indicator Form

Indicators:	Average number of drugs	% patients receiving injection
	% drugs on EDL	% patients receiving antibiotics
Public Health Facility		
Facility # ____ (1-30)		
Facility _____	Date _____	
Location _____	Investigator _____	

Seq. Patient No.	Type (R/P) [A]	Date of Rx	No. of drugs [B]	Antibiotics (yes=1, no=0) [C]	Injections (yes=1, no=0) [D]	No. of drugs on EDL [E]
1.						
2.						
3.						
4.						
5.						
6.						
7.						
8.						
9.						
10.						
11.						
12.						
13.						
14.						
15.						
16.						
17.						
18.						
19.						
20.						
21.						
22.						
23.						
24.						
25.						
26.						
27.						
28.						
29.						
30.						
Total			[B ¹] =	[C ¹] =	[D ¹] =	[E ¹] =
Average			[B ²] =			
Percentage				[C ²] = [C ¹]/No. of cases x 100 =	[D ²] = [D ¹]/No. of cases x 100 =	[E ²] = E ¹ /[B ¹] x 100 =

Notes

- [A] Select 30 outpatients seen within a 12 month period (R=retrospective [from records], P= prospective [those currently being treated]). Sample of cases can be a combination of P and R
- [B] Count number of drugs prescribed for each case ([B¹]=Total no. of drugs). Count as 1 a drug given in different preparations, e.g. paracetamol tablet and injection, two brands of a similar chemical entity/INN/generic name
- [B²] Average no. of drugs prescribed = [B¹]/Number of cases
- [C] Indicate 0 if no antibiotic prescribed and 1 if one or more types of antibiotics were given. [C¹] = Total cases with antibiotics.
- [D] Indicate 0 if no injection given and 1 if one or more injections were given. [D¹]= Total cases with injection
- [E] From the number of drugs prescribed for the case, count those included on the EDL. [E¹] = total number of drugs listed in EDL

Survey form 2: Public Health Facility Rational Drug Use - Patient Care Form				
Indicators:		% of drugs dispensed		
		% drugs with adequate label		
		% of patients who know how to take drugs		
Public Health Facility Facility # ____ (1-30)				
Facility _____		Date _____		
Location _____		Investigator _____		
Seq. No.	No. of drugs prescribed [A]	No. of drugs dispensed [B]	No. of drugs adequately labelled [C]	Patient has adequate knowledge (yes=1, no =0) [D]
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
13.				
14.				
15.				
16.				
17.				
18.				
19.				
20.				
21.				
22.				
23.				
24.				
25.				
26.				
27.				
28.				
29.				
30.				
Total		Total B =	Total C =	Total D =
Average Percentage		[B']=% dispensed = Total [B]/No. prescribed x100 = _____	[C']=% w/adequate label = Total [C]/Total [B] x 100 = _____	[D']=% of patients with adequate knowledge = Total [D]/cases asked x 100 = _____

Notes

[A] Interview 30 patients leaving the dispensing area/pharmacy

[B] Check how many drugs (chemical entity/INN/generic) were given to each patient

[C] Check which are adequately labelled (name of drug, dosage and duration plus any additional criteria specified by country). A drug is adequately labelled only if all criteria are met.

[D] Determine if patient has adequate knowledge about the drugs dispensed. Ask patient if he/she knows how to take each drug. Indicate:
 (1) If patient can correctly give the name of all drugs or state what the drugs are for and how they should be taken plus any additional criteria specified by country.
 (0) If the patient cannot give the name of even one drug, cannot state what a drug is for, does not know how to take one of the drugs given, or does not meet any additional criteria specified by country.

Survey form 3: Public Health Facility - Standard Treatment Guidelines/EDL

Indicator: Availability of STG for common local conditions
 Availability of Essential Drug List (EDL) at the facility

Public Health Facility
 Facility # ____ (1-30)

Facility _____ Date _____
 Location _____ Investigator _____

Tick box with correct answer

Standard treatment guidelines available	Yes ¹	No
National STG	<input type="checkbox"/>	<input type="checkbox"/>
STG for URTI	<input type="checkbox"/>	<input type="checkbox"/>
STG for Diarrhoea	<input type="checkbox"/>	<input type="checkbox"/>
STG for Pneumonia	<input type="checkbox"/>	<input type="checkbox"/>
STG for Malaria	<input type="checkbox"/>	<input type="checkbox"/>
STG for Tuberculosis	<input type="checkbox"/>	<input type="checkbox"/>
Others:	<input type="checkbox"/>	<input type="checkbox"/>

EDL available	Yes ¹	No
National EDL	<input type="checkbox"/>	<input type="checkbox"/>
Provincial/District	<input type="checkbox"/>	<input type="checkbox"/>
Primary EDL	<input type="checkbox"/>	<input type="checkbox"/>
Others:	<input type="checkbox"/>	<input type="checkbox"/>

STG is available in this facility ²	<input type="checkbox"/>	<input type="checkbox"/>
	Yes ¹	No
EDL is available in this facility ³	<input type="checkbox"/>	<input type="checkbox"/>
	Yes ¹	No

Notes

1. Mark "yes" only if the facility is able to show you the document.
2. The facility is considered to have an STG if any one of the above STGs is available provided it was developed by an independent group and is not associated with promoting pharmaceutical products.
3. Before the survey, the most up-to-date version of EDL must be identified. The facility is considered to have an EDL if any one of the above EDLs is available.

were for age above 40 years old. The mean age of patients was 56.2 ± 7.1 years. In reference to gender, 322 (68.3%) were females and 150 (31.7%) were males. The occupational status of the patients showed that 314 (66.5%) were traders, public servants 36 (7.6%) and 122 (25.9%) were unemployed (engaged only in activities of daily living such as eating, sleeping and bathing). With regard to educational level of the patients, 225 (47.7%) had no formal education, 53 (11.2%) had primary school certificate, 111 (23.6%) of the patients completed secondary level of education and 83 (17.5%) were graduates (Table 1).

The average number of drugs per prescription was 2.6. Most (58.1%) of the drugs prescribed were branded rather than generics (41.9%). The percentages of antibiotic and injectable prescribed were within WHO cut-off values. Almost all (99.7%) the drugs were prescribed from Nigerian EDL. All the prescriptions, 1,416 (100.0%) were from physicians.(Table 2).

The study revealed that the pharmacists dispensed almost all the drugs prescribed to patients and labeled 81.9% of the prescriptions adequately. Also, majority (91.1%) of the patients had correct knowledge on the drug dosage, time of administration, frequency of administration, food restriction, side effects and duration of treatment.(Table 3).

As shown in Table 4, a copy of EDL was available in the health facility of study to assess information on drugs supplied to patients. Most (99.7%) of the key drugs were available in the pharmacy.

Table 5 presents the morbidity profile in the hospital. Hypertension was the most prevalent disease identified in outpatient department of the hospital accounting for 28.8% of the diseases identified. Co-morbidity with arthritis and infections accounted for 25.1% and 23.8% respectively.

DISCUSSION

In the present study, the average number of drugs per prescription was 2.6, which was higher than WHO standard range of 1.6-1.8. This finding is similar to that of ⁷ in India and ⁸ in Iran with 2.7 and 3.07, respectively. Polypharmacy is a common problem of prescription in Nigeria like many other developing countries. The percentage of generic drugs prescribed in the present study was 41.9%. This is very low as compared with WHO standard (100%).This corroborates with the findings of⁹ in Nigeria (42.9%). Previous study by ¹⁰ in Tanzania found prescribing of generic drugs to be 33%. These findings revealed that prescription of generic drugs is yet to be acknowledged as a routine in African countries as recommended by WHO. The rationale for low

generic drug prescribing in Nigeria might be related to promotion of branded drugs by prescribers for Pharmaceutical representatives as well as the prescribers' believe that branded drugs are more efficacious than generics. This practice is detrimental to the health and pocket of the patients as most of the patients could not afford the exorbitantly priced branded drugs for their long-term disease conditions and eventually leading to non-compliance, irrational drug use and death among others.

The report of this study revealed that the percentage of antibiotics prescribed was 23.8%. This finding is good as compared with WHO standard (20.0-26.8%). The present result was inconsistent with the values obtained in Nigeria by¹¹ who reported 48% and Ethiopia by ¹² (58.1%) prescriptions of antibiotics. The results of this study implied that antibiotics were not misused or over-used by the physicians in this facility as study showed that antibiotics are the most frequently prescribed drugs among patients and there are reported concerns about the continuous indiscriminate and excessive use of antimicrobial agents that promote the emergence of antibiotic-resistant organisms.¹³ Rational antibiotic prescription as shown in the present study is the first step for optimum antibiotic use and has the potential impact of reducing resistant micro-organisms generated by excessive use.¹⁴

In this study, the percentage of injectable prescribed was 3.4% and fell within WHO cut-off values of less than 10%. This result was higher than the study of⁷ who reported that the percentage of injections prescribed was found to be 1.6% and lower (41%) as compared to the study of⁸ in Iran. Irrational prescription of injections should be avoided as injections are costly compared to other dosage forms and administration of injection also becomes expensive as well as pose health hazards. It required trained personnel because unhygienic usage of injections can enhance high risk of communicable diseases transmission such as HIV/AIDS, tuberculosis and hepatitis.

Almost all (99.7%) of the drugs were prescribed from Nigerian EDL, which is almost equal with the WHO standard (100%). The result of this study is similar to the findings of⁷ who reported that the percentage of drugs prescribed from EDL was found to be 95.6%. In this study, the average dispensing time was good (5.25 ± 2.33 minutes) as compared to the WHO recommended value of greater than three minutes. These results were higher than the study of¹⁵ in Ethiopia with 1.9 minutes but similar to the study of ¹⁶ in India (4 minutes 4 seconds). The present study revealed that the Pharmacists spent more time in interacting with their patients. This was supported by the findings of¹

Table 1: Demographic Profile of Patients for Prospective Study (n=472)

Variables	Frequency	Percentage (%)
Age (Year)		
14-20	22	4.7
21-40	160	33.9
Above 40	290	61.4
Gender		
Female	322	68.3
Male	150	31.7
Educational Level		
No formal Education	225	47.7
Primary Education	53	11.2
Secondary Education	111	23.6
Tertiary Education	83	17.5
Occupation		
Traders	314	66.5
Public Servants	36	7.6
Unemployed	122	25.9

Table 2: WHO Prescribing Indicators

WHO Prescribing Indicators	Current study values	WHO reference values	P-value
Percentage of drugs prescribed in generic	41.9	100%	0.634
Percentage of drugs prescribed from EDL	99.7	100%	0.625
Average number of drugs per prescription	2.6	1.6-1.8	0.958
Percentage of antibiotic prescribed	23.8	20.0-26.8%	0.939
Percentage of injectable prescribed	3.4	<10.0%	0.179

P>0.05 indicates not significantly different at 0.05 level of significance.

Table 3: WHO Patient Care Indicators

WHO Patient Care Indicators	Current study value	WHO value	P-value
Average dispensing time (Minutes)	5.25 ± 2.33	>3.0	0.913
Percentage of drugs actually dispensed	87.4%	100%	0.625
Percentage of drugs adequately labelled	81.9%	100%	0.634
Patient knowledge of correct dosage	91.1%	100%	0.179

P>0.05 indicates not significantly different at 0.05 level of significance.

Table 4: WHO Facility Indicators

WHO Facility Indicators	Current study value	WHO reference value	P-value
Availability of copy of EDL or formulary	(1) Yes	(1) Yes	
Availability of key drugs	100%	99.7%	0.143

P > 0.05 indicates not significantly different at 0.05 level of significance.

Table 5: Morbidity profile in the community studied

Disease	Frequency (n=3, 711)	Percentage (%)
Hypertension	1069	28.8
Arthritis	931	25.1
Infection	883	23.8
Anaemia	301	8.1%
Malaria	267	7.2%

who reported that the Pharmacists should spend some time with their patients by explaining the appropriate use of dispensed drugs.

The labeling of drugs (81.9%) in the present study was good as compared to recommended value of 100% by WHO. This is consistent with the result of¹⁷ in Tanzania who reported 87% but higher than the study conducted by¹⁸ where 67% of the drugs were adequately labelled. The adequate labeling of drugs (writing the generic name and strength of the drug, total quantity of drug dispensed, frequency of administration, before/after meals, date medication was dispensed, the name of the patient, the name and address of the pharmacy from which the medication was dispensed and other relevant information/warning such as keep out of reach of children should be indicated) found in this facility will encourage drug adherence and prevent irrational use of drugs. Furthermore, the study shows that 91.1% of patients were able to reiterate the correct dosage regimen of the drugs and pharmaceutical care counseling received; which is comparable with the WHO recommended value of 100%. The rationale for this could be due to availability of pharmacists, pharmaceutical care concept being practiced in the setting of the study, as well as good structural layout of the hospital pharmacy for easy flow of work.

Also, the facility of study had the latest edition of EDL, used as standard treatment guideline. According to the result of present study, most 3,699 (99.7%) of the drugs were prescribed from the latest version of Nigerian EDL. This is in line with the study of¹⁹ with 80.7% and improved as compared to the findings of²⁰ with 64.12%. This uninterrupted supply of drugs in the hospital showed improvement in the quality of health care services rendered to the citizens of Offa and environs. This could be attributed to functional Drug Revolving Fund scheme operating in all State Government hospitals in Kwara State and the appropriate policy about the priorities in supplying drugs by its Project Manager. Globally, more than 50% of all drugs are dispensed wrongly, while 50% of the patients failed to administer them appropriately. Furthermore, one-third of the population in world cannot afford essential medicine. Because of irrational use of drugs, effective drugs

of yesterday becoming ineffective today. Despite accessibility, availability and affordability of essential drugs; it is equally necessary to use the drugs rationally.¹

According to the result of this study, hypertension was however, the most prevalent disease identified in this study. This might be due to the fact that majority of the patients were older (greater than 40), an age category implicated for hypertension. Also, these patients are living a sedentary life style (petty trading and minor household chores with no basic education as to enlighten them on risk factors of hypertension. The study of²¹ was in support of present study that predictors of hypertension include family history, age, race, obesity, physical inactivity, lack of exercise and excessive salt intake.

CONCLUSION

Based on the above findings, most of the prescribing indicators in this health facility are not conforming to the WHO standard criteria. Health facility and patient care indicators are rational. More studies on these indicators are required to identify factors responsible for irrational drug prescription patterns of prescribers in this health facility.

RECOMMENDATION

Public enlightenment of Offa Community on dietary approach to stop hypertension would reduce the scourge in the area of study.

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CONFLICT OF INTEREST

The authors are hereby declaring no conflict of interest of this study.

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