

Full Length Research Paper

Evaluation of prescription pattern in Osun State (Southwest) Nigeria

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Drug therapy is the most commonly used method of any disease treatment in general practice. However, the patterns of drug prescription are often inappropriate and the need for registration of these patterns is essential in an effort to improve prescription standards. Retrospective analysis of prescriptions written by various cadres in primary health care department with emphasis on primary health care centers, dispensaries and health posts in four randomly selected local government areas were collected over a period of one year (March 2006 to February 2007). Data was collected using a standardized WHO instrument for studies of rational drug use. The average number of drugs per encounter was 6.11 with 69.81% drugs prescribed by generic names. The use of antibiotics (50.10% of encounters) and injections (72.70% of encounters) was relatively high. About ninety four percent(94%) of drugs prescribed were from the essential drugs list. It is obvious that poly pharmacy is high at the grassroots level coupled with shortage of high skilled manpower. The use of antibiotics and injections is also very high. Recruitment of skilled personnel and continuing educational programs for primary health care workers is recommended.

Key words: Prescription pattern, injections, antibiotics, primary health care.

INTRODUCTION

Drug therapy is the most commonly used method of any disease treatment in general practice. However, the patterns of drug prescription are often inappropriate and the need for registration of these patterns is essential in an effort to improve prescribing standards (Antonakis et al. 2006). Drugs play an important role in the health care delivery system, giving it credibility. Availability of drugs is one factor known to improve utilization of health services. The extent of drug use is directly affected by the prescribing behavior of physicians and other healthcare professionals who sometimes stand in the position of being the issuer of drug prescriptions. This is commonly encountered at the primary health care level. Such other healthcare professionals include nurses, pharmacy technicians, community health workers and health assistants,

who for reasons such as shortage or complete absence of medical doctors find themselves in the capacity of drug prescribers to patients. Drugs are expensive, constitute a large percentage of the costs of health care and therefore require optimal or rational use.

Rational drug use refers to the prescription of the right drug for the right indication in the right dosage and dosing frequency for the correct duration (WHO, 1985, 2002). The best way to investigate drug use in health facilities is usage of indicators created and validated by the World Health Organization (WHO, 1993). Drug use indicators are a set of standardized indices used to measure drug use in outpatient facilities (WHO, 1993). They provide a measure of the optimal use of these resources and can help in correcting deviations from expected standards and in planning (Odunsanya, 2004). Drug use indicators include average number of drugs per patient encounter, percentage of patient encounters with prescribed injection, percentage of patient encounters with a prescribed antibiotic, etc (WHO, 1993). Due to lack of sufficient work

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in this field, and its importance to the socio-economic development of the nation, coupled with the dearth of qualified medical personnel at grassroots level, this study was therefore designed to investigate prescription patterns using WHO standardized drug use indicators at primary health care centers in selected local government areas of Osun State, Nigeria.

MATERIALS AND METHODS

Primary healthcare centers (PHC) are the first point of call within the health delivery strata of the Nigerian health system and workers at the PHC include physicians, pharmacists, nurses (these three categories form the skilled workers), community health workers, pharmacy technicians and health assistants (these are the semi-skilled health workers). This research work reveals the ratio of prescriptions generated by each category of healthcare worker as to what should obtain, as well as volume of antibiotics and injections included in prescriptions.

The study was centered on four randomly selected Local Government Council Areas in Osun State namely Iwo, Osogbo, Isokan and Ayedire local government areas. From each Local Government Area (LGA), five health facilities were randomly chosen and from each of the facilities, thirty prescriptions of patients treated between March 2006 and February 2007 were randomly selected by a simple random sampling method. The health facilities included were primary health care clinics, dispensaries and health posts (all belonging to the primary health care (PHC) department of each of the selected local government areas.

Six hundred prescription encounters were selected from 20 health facilities with about 30 prescriptions encounter per facility as recommended by WHO, and retrospective data collection over a period of one year (March 2006 to February 2007) was used for prescribing indicators. Data were extracted from the patient's previous case notes with no interviews conducted. For the purpose of this study, indicator studies were restricted to a sample of general illness encounters, such as malaria, fever, etc, representing a mix of health problems and ages. In addition to general medical visits for acute or chronic illness, there can be separate clinics such as child welfare visits, pre- and post-natal visits, dental visits, specialist consultation e.t.c. There can also be separate clinics for adults and pediatric cases and sometime new patents are separated from re-attendances. Treatment practices for these types of encounters can be quite different. A study which mixes different types of encounters in an unsystematic way will produce results that are difficult to interpret. Therefore indicator studies are restricted to a sample of general illness encounters, representing a mix of health problems and ages. A standardized drug-use core indicators questionnaire designed and tested by World Health Organization was used (WHO, 2002).

This study was approved by the University of Ibadan/University College Hospital (UI/UCH) ethical review board.

The values of the indicators were calculated as follows:

1. Average number of drugs per encounter = (total number of drugs prescribed) ÷ (total number of encounters surveyed).
2. Percentage of drugs prescribed by generic name = (number of drugs prescribed by generic name) ÷ (total number of drugs prescribed) x 100.
3. Percentage of encounters with an antibiotic prescribed (PEAP) = (number of patient encounters during which an antibiotic was prescribed) ÷ (total number of encounters surveyed) x 100.
4. Percentage of encounters with an injection prescribed = (number of patient encounters during which an injection was prescribed) ÷ (total number of encounters surveyed) x 100.

5. Percentage of drugs prescribed from essential drug list = (number of drugs prescribed from essential drug list) ÷ (total number of prescribed drugs) x 100.

RESULTS

Of the 600 prescriptions employed, a total of 560 prescription records that had complete information were analyzed. 223 (39.8%) were written for male patients and 337 (60.2%) for female patients. The median age of the patients sampled was approximately 19.4 years (Range: 1 month to 80 years)

Table 1 shows the figures with regard to mean number of drugs on prescriptions, percentage antibiotics and injections included, percentage of drugs prescribed by generic name and percentage on the essential drugs list (EDL). Ayedire LGA had the lowest average number of drugs per prescription (5.4), while Iwo LGA recorded the highest average number of drugs per prescription (6.8). The overall mean of drugs per prescription for all the facilities involved was 6.11. Analysis of antibiotics and injections included in the prescriptions showed that 284 (50.10%) of the total prescriptions analyzed contained one or more antibiotics while 412 (72.70%) had one or more injections. Antibiotics were mostly prescribed at health facilities in Osogbo local government (59.34%) while injections were more commonly prescribed at health facilities in Iwo local government health centers (79.22%). The lowest percentage of prescriptions with generic names was found at Osogbo LGA (65.56%), while the highest was at Isokan LGA (74.56%). The overall percentage of drugs prescribed as generic was (69.81%). The lowest percentage of prescriptions with drugs on the essential drug list (EDL) was recorded at Ayedire LGA (93.27%), while the highest was recorded at Iwo LGA (95.31%). The overall percentage of drugs prescribed on the essential drug list (EDL) was 94.16%. The drug indicators had no significant difference across the selected local government areas ($p > 0.05$).

Table 2 reveals the cadre of healthcare workers at the PHC involved in prescription writing and what proportion of prescriptions were issued by each of these cadres. Over half of the prescriptions generated were written by community health workers (67%) and this was distantly followed by nurses (19%). Medical doctors who are sole prescribers of drugs were recorded to have only 2% of the selected prescriptions written by them.

Table 2 further reveals the volume of antibiotics included in the prescriptions written by each cadre of health workers in the selected health facilities. 55.20% of the prescriptions written by nurses contained antibiotics as compared to 50.30% written by community health workers while the least prescribers were the pharmacy technicians, followed by medical doctors. Overall there was no statistically significant difference in the proportions of antibiotics prescribed by different cadres of health workers ($p > 0.05$). However analyses of prescriptions

Table 1. Drug indicators distribution pattern in four selected local government areas (LGA) in Osun State.

Local government area	Number of prescriptions analyzed	Mean number of drug	Antibiotics (%)	Generics (%)	EDL (%)	Injection (%)
Ayedire	143	5.39	41.24	67.15	93.27	65.64
Isokan	137	5.98	49.38	74.56	94.40	65.72
Iwo	135	6.82	49.62	71.97	95.31	79.22
Osogbo	145	6.24	59.34	65.56	93.65	76.38
	$\Sigma = 560$	6.11	49.90	69.81	94.16	71.74

Table 2. Percentage of antibiotics and injections included in prescriptions written by health workers in Osun State, Nigeria.

Category of health worker	[Number of prescriptions written (%)]	Antibiotics			Injections		
		Volume of antibiotics prescribed (%)	χ^2	p-value	Volume of injections prescribed (%)	χ^2	p-value
Community health workers	374 (67)	50.3			75.7		
Physicians	10 (2)	40.0			0.0		
Health assistants	47 (8%)	41.3	4.829	>0.05	82.6	64.923	<0.05
Pharmacy technicians	5 (1%)	20.0			0.0		
Nurses	106 (19%)	55.2			73.3		
Pharmacists	18 (3%)	46.2			15.4		

containing injections when compared to the prescriber showed that prescriptions written by health assistants accounted for 82.6% of the volume of injections. None of the prescriptions containing injections were written by either a physician or a pharmacy technician. There is significant difference in the proportion of injections prescribed by all the cadres of health workers ($p < 0.05$).

DISCUSSION

The average number of drugs prescribed per encounter (6.11) for the 20 health facilities studied was extremely higher than the values obtained in majority of previous studies from developing

countries: Yemen 1.5, Uganda 1.9, Sudan 1.4, Tanzania 2.3, Ghana 4.8 (Odunsanya, 2004), and 1.44 in Bangladesh (Bosu and Ofori-Adjei, 2000). Besides the value is higher than the ones obtained by Chukwuani et al. (2002) for outpatients (3.16) and Nwolisa et al. (2005) (3.13). Thus the higher value in this study is a pointer to the high level of poly pharmacy practice in prescription pattern which in turn may have serious negative effects on the therapeutic outcome in patients. Among the likely negative effects this can pose are increased incidences of side effects, drug-drug interactions, confusion where aged patients are involved, non-compliance by patients to the drug regimen as a result of the large number of drugs to be taken at a time and for prolonged periods in most cases.

The average percentage of drugs prescribed by generic name (69.81%) was higher when compared with results from other studies. For instance, Guvon et al. (1994) reported an average value of 65%, while Nwolisa et al. (2006) reported the average value from review of prescribing indicators from other studies as 63.8%.

The high value of average percentage of drugs prescribed by generic name showed that health workers at the PHC level are conversant with the standard practice of prescribing using generic names. This has an advantage of reduction in cost prices of generic drugs when compared to purchasing innovator drugs. Moreover, at the primary health care level, the drugs available are mostly restricted to the essential drugs which are usually written in generic names and supplied by

the government.

Average percentage of prescription encounters containing antibiotics was 50.10%. This is higher than the average value of 43.1% obtained from previous studies from developing countries like Malawi (34%), Indonesia (43.1%), Bangladesh (25%), and Tanzania (39%) (Slobodan et al., 2006; Massele et al. 2001). Reports from other studies are: 60% (Bosu et al., 2000), 25% (Guvon et al., 1994), 61.9% (Moghadamnia et al., 2002), 72.8% (Hazra et al., 2000) and 60.9% (Otoom et al., 2002). Some of these reports (Bosu et al., 2000; Moghadamnia et al., 2002; Hazra et al., 2000; Otoom et al., 2002) have values higher than the one from this study. The study by Odunsanya et al. (2004) was 50.30% which is very close to the value of 50.10% from this study. This still establishes over-prescribing of antibiotics. Prescribing of antibiotics without laboratory validation for its indication promotes multi-drug resistance of microbes which in turn result in use of highly potent antibiotics for otherwise mild bacterial infections. At such instance these drugs either become unaffordable to most patients and/or encourage poor compliance. Analysis of antibiotics prescription pattern among the prescribers showed that the rate of antibiotics prescription is highest among the nurses (Table 2). The high level of antibiotic prescription among nurses and community health workers may be accounted for by the assumption that every medical condition will very likely present with a bacterial infection.

Our study showed that injections were over prescribed in primary health care centers in Osun State (Table 2). The average injection prescribing pattern within the facilities was 71.74% which was too high when compared with results from previous studies in other countries such as Tanzania 19% (Massele et al., 2001), Iran 58% (Moghadamnia et al., 2002) and India 3.9% (Hazra et al., 2000). However the result is lower than the value of 80% obtained by Bosu et al. (2000) and higher than the average value obtained by Melinda et al. (2003) from review of prescribing indicators from other studies (28.70%). There is therefore an urgent need to reduce injection use at the primary health care level in order to prevent injection-related hazards and infections such as HIV/AIDS, tissue necrosis, hepatitis, and pain.

Prescribing of injection was more common among health assistants, community health workers and nurses. This probably is a reflection of poor levels of training and knowledge about injection safety. Physicians and pharmacists prescribed less of injection, though they are legally and professionally competent to prescribe. Again these cadre of professionals are often too involved in administrative duties and therefore are not seen attending to patients as they should. In the case of nurses, community health workers, and health assistants, nurses are professionally trained to care for patients and not to prescribe; community health workers particularly the senior community health worker (SCHEW) and

community health officers (CHO) are to prescribe with their 'standing order' by their side while the health assistants are not to prescribe at all but to assist the other health cadres in the clinics. Despite the established roles of each cadre in PHC, existing practices reflect actions that are contrary to the laid down rules and this is due to shortage of skilled personnel at these health facilities.

Percentage of drugs prescribed from the essential drug list was higher (94.16%) than the average value of 84.60% recorded by Melinda et al. (2003) from his review of previous studies in developing countries (Table 1). Also, the result is higher than the value from studies by Guvon et al. (1994) (16%) and Hazra et al. (2000) (45.70%) (Guvon et al., 1994; Hazra et al., 2000) but very similar to the result of Otoom et al. (2002) 93% and less than 97% obtained by Bosu et al. (2000). Essential drugs list (EDL) is the list containing drug items essentially used to treat or manage common or readily encountered diseases and/or disorders. Thus the higher the compliance with this list, the more rational the drug prescribing pattern. One major reason for this high percentage of compliance is the availability of an essential drugs list in all the health centers provided by the state's Ministry of Health. Secondly, this is possible because the Osun State government supplies drugs to these PHC centers under a health care scheme. The drugs on the list are almost all in generic names, and are available and affordable to the general public at subsidized costs. Prescribers prescribe from the EDL, hence the high proportion of prescriptions using generic names.

The distribution of all the prescriptions encountered among the various cadres in PHC department at local government level showed that most prescriptions were written by community health workers, nurses, and health assistants in that ranking order. The implication is that community health workers and nurses are the two main cadres that treat most cases of ailments at the local government level, thus calling for the need to broaden their knowledge in order to cope with this enormous task before them.

Conclusion

This study showed that poly pharmacy practice is high at the grassroots in Osun State (Southwest) Nigeria. Also it revealed that there is shortage of highly skilled manpower such as doctors and pharmacists for qualitative healthcare delivery at grassroots. The use of antibiotics and injections are too high and there may therefore be the need to establish protocols on the prescription and administration of both antibiotics and injections. The overall picture of drug use suggests that the indicators at these facilities are not yet at the optimal level and need some interventions. The following are therefore suggested as recommendations: the volume of qualified medical

personnel such as medical doctors and pharmacists should be increased at PHCs in order to provide basic healthcare services at the grass-root level and educational interventions in the form of continuing education (CE) should be introduced for PHC cadres on rational drug use.

REFERENCES

- Antonakis N, Xylouri I, Alexandrakis M, Cavoura C, Lionis C (2006). Seeking prescribing pattern in rural Crete: a pharmacoepidemiological study from a primary care area. (online). *Int. Electron. J. Rural. Remote Health*, 6 (488): 1-10.
- Bosu WK, Ofori-Adjei D (2000). An audit of prescribing practices in Health Care Facilities of the Wassa west district of Ghana. *West Afr. J. Med.*, 19 (4): 298-303.
- Chukwuani CM, Onifade M, Sumonu K (2002). Survey of drug use practices and antibiotic prescribing pattern at a General Hospital in Nigeria. *Pharm. World Sci.*, 24 (5): 185-195.
- Guvon AB, Barman A, Ahmed JU, Ahmed UA, Alam MS (1994). Baseline survey on use of drugs at the primary health care level in Bangallades *Bull World Health Organization*. 72 (2): 265-271.
- Hazra A, Tripathi SK, Alam MS (2000). Prescribing dispensing activities at the health facilities of a non-government organization. *National Med J. India.*, 13 (14): 177-182.
- Massele AY, Nsimbi SED, Rimoy G (2001). Prescribing habits in church-owned primary health care facilities in Dar ES Salaam and other Tanzanian Coast regions. *East. Afr. Med. J.*, 78 (10): 510-514.
- Melinda P, Talgat N, Grace H, Farruh Y, Richard L (2003). Prescribing practices of primary health care physicians in Uzbekistan. *J. Tropical Med. Int. Health*, 8(2): 182-190.
- Moghadamnia AA, Mirbolooki MR, Aghili MB (2002). General Practitioner prescribing patterns in Babul City Islamic Republic of Iran. *East Med. Health. J.*, 8 (4-5): 550-555.
- Nwolisa CE, Erinaugba EU, Ofolata SI (2006). Prescribing practices of doctors attending to under fives in a children's outpatient clinic in Owerri. *Epub 2005 Dec. 9. J. Tropical. Pediatr.*, 52 (3): 197-200.
- Odunsanya OO (2004). Drug use indicators at secondary health care facility in Lagos, Nigeria. *J. Commun. Med. Health Care*, 16 (1): 21-24.
- Otoom S, Batieha A, Hadidi H, Hasan M, Al-Saudi K (2002). Evaluation of drug use in Jordan, using WHO Prescribing indicators. *East Mediter.r Health. J.*, 8(4-5): 537-543.
- Slobodan MJ, Ljiljana MV, Milan RM, Vojislav BC, Irena RK, Zoran NK (2006). An analysis of drug use indicators in primary care health facilities operating in the city of Kragujevac. Prescribing activities in the community in Kragujevac Serbia, (16): 1-16 <http://www.priory.com/farm/kosofa.htm>.
- WHO (1985). *The Rational Use of Drugs*. Report of the Conference of Experts, Geneva.
- WHO (1993). How to investigate drug use in health facilities (selected drug use indicators). Action programme on essential drugs. World Health Organization, Geneva, pp. 1- 87.
- WHO (2002). *Policy perspectives on medicines: Promoting rational use for medicines: core components*.