

# Physicians' drug prescribing patterns at the national health insurance scheme unit of a teaching hospital in the North Eastern Nigeria

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**Key words:** Prescribing indicators,  
prescribing patterns, prescription  
sheets, rational use of drugs

## ABSTRACT

**Objectives:** The aims of the present study were to assess the drug prescribing patterns and rational use of drugs.

**Materials and Methods:** Data were collected through a retrospective method between January and March 2012. The out-patient prescription sheets of 12 months period of 2009 were randomly sampled and assessed using WHO prescribing indicators.

**Results:** The average number of drugs per encounter was  $3.4 \pm 1.4$ ; percentage of drugs prescribed by generic names and percentage of drugs prescribed from NHIS essential drug list were 51.5% and 67.1%, respectively. Percentage of encounters with an antibiotic prescribed and percentage of encounter with an injection prescribed were 56.2% and 5.7%, respectively. The frequency distribution of the commonly prescribed drugs showed that antibiotics, analgesics, and vitamins/minerals were the most frequently prescribed classes of drugs.

**Conclusion:** On one hand, there was under prescribing of injection which is commendable. On the other hand, despite the efforts of WHO and other international organizations in promoting rational use of drugs, irrational prescribing still occurs. There were high tendency of poly pharmacy, overprescribing of antibiotics, lack of compliance with the principles of NHIS essential drugs, and generic prescribing.

## INTRODUCTION

Nigeria is the most populous country in Africa, it accounts for approximately one sixth of African population (or one fifth of Sub-Saharan African population). Approximately 50% of Nigerians are urban dwellers.<sup>[1]</sup> As at July 2012, her estimated population was put at 170,123,740.<sup>[2]</sup>

Healthcare provision in Nigeria is a concurrent responsibility of the three tiers of government in

the country.<sup>[3]</sup> However, because Nigeria operates a mixed economy, private providers of healthcare have a visible role to play in health care delivery. The federal government's role is mostly limited to coordinating the affairs of the university teaching hospitals, Federal Medical Centers (tertiary healthcare), while the state government manages the various general hospitals (secondary healthcare) and the local government focus on dispensaries (primary healthcare),<sup>[4]</sup> which are regulated by the federal government through National Primary Health Care Development Agency (NPHCDA).

The country had been suffering from dwindling funding of healthcare in the face of rising costs and poor integration of private health facilities in the nation's healthcare delivery system. There was a general poor state of the national health services due to excessive dependence and pressure on public health facilities.<sup>[5]</sup>

Access this article online	
<b>Quick Response Code:</b> 	<b>Website:</b> <a href="http://www.archivepp.com">www.archivepp.com</a>
	<b>DOI:</b> 10.4103/2045-080X.111574

In quest to provide an affordable healthcare to her citizens, the federal government created the National Health Insurance Scheme (NHIS) in May 1999; the scheme encompasses government employees, the organized private sector, and the informal sector. Legislative wise, the scheme also covers children under five, permanently disabled persons and prison inmates.<sup>[6]</sup> The scheme was established as a corporate organization under Act 35 of 1999 to provide social health insurance in Nigeria where healthcare services of contributors are paid from the common pool of funds contributed by participants of the scheme.<sup>[5]</sup> Its mission statement was to facilitate fair-financing of healthcare costs through pooling and judicious utilization of financial resources to provide financial risk protection and cost-burden sharing for people, against the high cost of health care, through various prepayment programs/products prior to their falling ill, in addition to providing regulatory oversight on Health Maintenance Organizations (HMOs) and Healthcare Providers (HCPs). The NHIS target is to secure access to adequate health care for all Nigerians at an affordable price, by the year 2015. Other objectives are to<sup>[5]</sup>

- access good healthcare services (physical and financial),
- protect families from the financial hardship of huge medical bills,
- limit the rise in the cost of healthcare services,
- Provide equitable distribution of healthcare costs among different income groups,
- maintain high medical standards; improve and harness private sector participation, and
- provide equitable distribution of health facilities within the federation and equitable patronage of all levels of healthcare and to ensure the availability of funds to the health sector for improved services.

Drugs are pivotal to healthcare delivery and disease prevention. The availability and affordability of good quality drugs, coupled with rational use, is fundamental to effective health care delivery in any country.<sup>[7]</sup> According to World Health Organization (WHO), rational drug use requires that the patients receive drugs appropriate to their clinical needs in doses that meet their individual requirements (right dose, right intervals, and right duration).<sup>[8]</sup> These drugs must be of acceptable quality, and available and affordable, at the lowest cost to patients and the community. Pharmacists are uniquely positioned to promote rational use of drugs.

The pharmacist can participate in arrangement for monitoring the utilization of drugs such as practice

research projects, and schemes to analyze prescriptions for the monitoring of adverse drug reactions.<sup>[9]</sup> Hospital or institutional pharmacists have more opportunity to interact closely with prescribers and educate them about rational prescribing and rational use of drugs. They can easily monitor patterns of drug usage and thus recommend changes when necessary. Pharmacist can also serve as a member of policy-making committees including those concerned with drug selection and the use of antibiotics (Drug Therapeutic Committee), and thereby influencing the preparation and composition of an essential drug list or formulary,<sup>[9]</sup> which forms the bedrock of rational drug prescribing.

Drugs are prescribed using prescription sheets. Prescription sheets are written and duly signed sheets by legally authorized healthcare practitioners indicating the drug items prescribed for a particular patient. Patients take their prescription sheets to the pharmacist who screens the drug items before dispensing in order to ensure rational dispensing. Ideally, when processing a prescription, pharmacist verifies the legality, safety, and appropriateness of the prescription order, checks the patient's medication record before dispensing drugs (when such records are kept in the pharmacy), ensures that the quantities of medications are dispensed accurately, and decides whether the medication(s) should be handed to the patient with appropriate counselling by a pharmacist.<sup>[9]</sup>

In Nigeria, the healthcare delivery system is fragmented; therefore, pharmacist has not been fully integrated into the healthcare team. The pharmacists procure and dispense drugs in the pharmacies. However, the unavailability of patient's medication records in the pharmacies makes it difficult for pharmacists to assess the prescribed drugs for appropriateness. More so, there is shortage of pharmacists in Nigerian hospitals and the few available ones are over laboured. NHIS patients just like other patients consult physicians at various units/clinics. These patients leave the doctors' consulting clinics and any of the other units at various times thus constituting a random arrival rate at the pharmacy where the dispensing activities take place sequentially. Consequently, there is patient congestion when the rate of patient arrival at the pharmacy is greater than the service rate, and this tends to shorten the pharmacist-patient consulting time coupled with the high time spent on handwritten documentation and pressure of work undermines pharmacist's efficiency in dispensing drug rationally which in turn may translate to irrational use of drugs by patients. Nevertheless, Nigerian pharmacists do

all within their ability to screen prescriptions for appropriateness of the prescribed drugs and offer drug counselling to patients as fast as they can to ensure rational dispensing of drugs, but in some cases irrational dispensing does occur.

However, inefficient and irrational use of medicines is a widespread problem at all levels of healthcare.<sup>[10]</sup> Irrational prescribing trends lead to unproductive and risky treatment; such a prescription manifests in either exacerbation/prolongation of illness or higher costs or both. In some cases, irrational prescribing and use of drugs could lead to outright death of patients. Common types of irrational medicine use are: Use of too many medicines per patient (poly-pharmacy); inappropriate use of antimicrobials, often inadequate dosage for non-bacterial infections; overuse of injections when oral formulations would be more appropriate; failure to prescribe in accordance with clinical guidelines; inappropriate self-medication, often of prescription-only medicines.<sup>[11]</sup>

The study that evaluated drug utilization patterns and patient care practices at a tertiary healthcare institution (Federal Medical Center), Lokoja, Nigeria, concluded that pharmaceutical prescribing patterns and patient care practices were found to be inappropriate.<sup>[7]</sup> A similar study on a drug prescription pattern in a general outpatient unit of the Aminu Kano Teaching Hospital (AKTH), Kano, Nigeria, revealed an occurrence of inappropriate prescribing.<sup>[12]</sup> Furthermore, a study that assessed the quality of outpatient prescriptions in the National Health Insurance Scheme of University of Maiduguri Teaching Hospital had been undertaken.<sup>[13]</sup> This study assessed the quality of prescriptions in terms of poly-pharmacy and it concluded that the incidence of the poly-pharmacy was high.<sup>[13]</sup> From the findings of these studies conducted at the tertiary healthcare facilities controlled by the Nigerian federal government through the ministry of health revealed that inappropriate prescribing remains a problem in Nigerian tertiary healthcare institutions.

NHIS was set up to provide universal coverage (providing access to adequate health care for all at an affordable price) for Nigerians. Therefore, irrational prescribing and dispensing by medical doctors and pharmacists respectively will undermine this objective. However, it is against this background that we embarked on this study which to the best of our knowledge is the first of its kind in the NHIS in Nigeria. The objectives of this study, therefore, were to analyze the prescribing patterns and rational use of drugs in the NHIS unit of University of Maiduguri Teaching Hospital (UMTH),

Maiduguri, Nigeria. The findings of this study will help inform the stakeholders how much rationally or irrationally drugs were prescribed for patients and in an event of irrational prescribing the Nigerian federal government through the ministry of health should carry out educational interventions on rational prescribing, dispensing, and use of drugs in order to achieve the desired set goals for the scheme.

## MATERIALS AND METHODS

### Study area

The research was carried out at the National Health Insurance Scheme (NHIS) pharmacy of the University of Maiduguri Teaching Hospital (UMTH), Borno state. UMTH is a reference tertiary hospital with a 530 bed facility spread over 17 wards; providing medical services to the whole of the North-eastern geopolitical zone of Nigeria; it is situated along Bama road in Maiduguri metropolis. Maiduguri is the capital and largest city of Borno state in north-eastern Nigeria bordered by the Sahelian countries of Niger, Chad, and Cameroun,<sup>[14]</sup> the city is along the seasonal Ngada river, it is estimated to have a population of 1,197,497 as at 2007, its residents are mostly Muslims including Kanuri, Shuwa, Bura, Marghi, and Fulani ethnic groups. There is also a considerable Christian population.<sup>[15]</sup> Borno state belongs to the Sahel savannah region in the Nigerian vegetation with proximity to the fringes of the fast-encroaching Sahara desert, here the dry season lasts for up to 9 months and the rainfall is hardly up to 700 mm.

As at the time of this study UMTH has one central pharmacy and six satellite pharmacies, therefore one of the satellite pharmacies was dedicated to NHIS with three pharmacists and one supporting staff. The average number of out-patient prescriptions filled per day by a pharmacist at the NHIS pharmacy unit in 2009 was 23.

### Study population

Outpatient's prescriptions filled and stored at the NHIS pharmacy of UMTH in 2009.

### Data collection and evaluation

Data were collected through a retrospective method between January and March 2012. The out-patient prescription sheets of 12 months period of 2009 were pooled together and one prescription in every 10 prescriptions was randomly selected for the study; the sampled prescriptions amounted to a total of 797 prescription sheets. Data were extracted into the data collecting forms. The information extracted include the name of drugs, class of drugs, formulation type, number

of drugs per prescriptions, and NHIS essential drugs per prescription. Thereafter, the collected data were fed into Statistical Package for Social Sciences (SPSS) version 16 for windows® for analysis.

### Ethical consideration

Ethical approval was obtained from the research and ethics committee of the hospital prior to the commencement of the study.

### Statistical analysis

The data were analyzed with SPSS using the WHO prescribing indicators.

WHO's prescribing indicators:<sup>[16]</sup>

- Average number of drugs per prescription = (Total number of drugs prescribed ÷ Total number of prescriptions {encounters})
- Percentage of drugs prescribed by generic name = (Total number of drugs prescribed by generic name ÷ Total number of prescribed drugs) × 100
- Percentage of drugs prescribed from EDL = (Total number of drugs prescribed from EDL ÷ Total number of prescribed drugs) × 100
- Percentage of encounters with an antibiotic prescribed = (Number of encounters with antibiotic prescribed ÷ Total number of encounters) × 100
- Percentage of encounters with an injection prescribed = (Number of encounters with injections prescribed ÷ Total number of encounters) × 100

## RESULTS

A total number of 792 out of 797 sampled out-patient prescriptions were used for assessment of the physicians' prescribing patterns. The remaining five prescriptions were not used because they contained only surgical items. The average number of drugs per encounter obtained in this study was much higher than WHO reference value. The percentages of drugs prescribed by generic names and from NHIS essential drug list were far lower than the WHO recommended value of 100%, respectively. Furthermore, the frequency distribution of the commonly prescribed drugs showed that antibiotics, analgesics, and vitamins/minerals were the most frequently prescribed classes of drugs in the NHIS of UMTH. Finally, in 14.6% encounter, an anti-malarial drug was prescribed [Table 1].

## DISCUSSION

The average number of drugs per encounter obtained in this study was higher than WHO reference value. It was found that 182 encounters were having 4 drugs per

prescription, 121 encounters had 5 drugs, 39 encounters contained 6 drugs, and 15 encounters had 7 drugs per prescription, respectively. Therefore, there was tendency for poly-pharmacy such as in other parts of Nigeria and some other countries. The value recorded in this study is similar to the ones reported by Pevani *et al.* in Warangal India,<sup>[17]</sup> but slightly higher than the average value obtained in private health facilities in Kano,<sup>[18]</sup> a tertiary hospital in Ibadan<sup>[19]</sup> and Lokoja,<sup>[7]</sup> respectively, public sectors in Mali,<sup>[20]</sup> and much higher than the values got from a tertiary hospital in western Nepal.<sup>[21]</sup> High number of drugs per prescription increases the risk of drug interaction, aggravate side effects, and decreases adherence.

The percentage of injections per encounter obtained from this study was lower than WHO reference values [Table 2]. This low value shows that prescribers were cautious in prescribing injections for patients. Therefore, they prescribed oral drugs when they were more appropriate instead of injections due to the overwhelming risks that are associated with injections. However, the low value obtained from this study is higher than the values obtained in western Nepal,<sup>[21]</sup> and in private hospitals in Kano, Nigeria.<sup>[18]</sup> The relatively low prescription of injections

**Table 1: Frequency distribution of the commonly prescribed drugs**

Drugs	N (%)
Antibiotics	448 (22.7)
Analgesics	376 (19.0)
Anti-hypertensives	83 (4.2)
Anti-malarials	289 (14.6)
Anti-diabetics	25 (1.3)
Vitamins/minerals	336 (17.0)
Anti-allergies	184 (9.3)
Hypnotic/sedatives	35 (1.8)
Antacids	110 (5.1)

**Table 2: Facility drug prescribing practice based on WHO guideline**

Prescribing indicator	NHIS (UMTH)	*Ref. value
Average number of drugs per encounter	3.4±1.4	1.6-1.8
Percentage of drugs prescribed by generic names (%)	51.5	100
Percentage of drugs prescribed from essential drug list (%)	67.1	100
Percentage of encounters with an antibiotic prescribed (%)	56.2	20.0-25.4
Percentage of encounter with an injection prescribed (%)	5.7	10.1-17.0

\*Isah *et al.*, 2008, NHIS=National Health Insurance Scheme, WHO=World Health Organization, UMTH=University of Maiduguri Teaching Hospital

in various countries of the world shows that the efforts of international and national organizations in de-emphasizing the use of injections due to associated dangers and risks when the oral drugs are more appropriate is yielding results.

The WHO expects a 100% prescribing of drugs by generic name. The low percentage of generic prescriptions obtained from this study [Table 2] showed that there was lack of compliance in generic prescribing which is common in most developing nations. However, the values obtained from this study were higher when compared to the ones that were obtained in tertiary hospitals in Lokoja<sup>[7]</sup> and Ibadan<sup>[19]</sup> in Nigeria, respectively, and other countries such as in private sectors in Mali,<sup>[20]</sup> but much lower in public sectors in Mali,<sup>[20]</sup> in hospitals in Dubai, United Arab Emirate,<sup>[22]</sup> and Nepal.<sup>[21]</sup> Generic prescribing is an indicator of prescribing quality.<sup>[12,23]</sup> Low generic prescribing could also add to the confusion of patients who are already faced with the burden of poly-pharmacy. This no doubt could lead to duplication errors where patients may unknowingly take the generic and the branded drugs together.<sup>[24]</sup> Furthermore, for drugs with narrow therapeutic index or formulations with different bio-availabilities which can differ in dosing frequencies, use of propriety names is appropriate.<sup>[25]</sup> The high prescription of drugs in their trade names may be due to the huge number of fixed dose combinations which are available and possibly due to aggressive marketing by pharmaceutical companies through their detailing personnel. Generic prescribing substantially enable physicians to make choice from myriad of generic drugs that are available in the pharmacy thereby encouraging flexibility in prescribing, and increasing the chances of patients getting all their drugs from the NHIS pharmacy at 10% of the total cost.

The WHO expects a 100% prescribing of drugs from essential drug list. There was lack of compliance in prescribing NHIS essential drugs. However, this lack of compliance may be due to the fact that physicians attending to NHIS patients were not having a copy of the NHIS Essential Drug List (NEDL). Moreover, on a more serious note, most of them were not even aware of the existence of the same. The value obtained from this study is slightly lower than the one obtained in a tertiary hospital in Lokoja Nigeria,<sup>[7]</sup> much lower than the one obtained for a tertiary healthcare facility in Ibadan<sup>[19]</sup> and private hospitals in Kano Nigeria,<sup>[18]</sup> but much higher than the one recorded in western Nepal.<sup>[21]</sup> Lack of compliance with NHIS essential list increases the cost of drugs for the patient due to the fact that NHIS non-essential drugs are not stocked in the NHIS

pharmacy, therefore patients would be compelled to source and pay for such drugs out of pocket.

Antibiotic was prescribed in 56.2% of clinical encounters [Table 2]. This percentage is higher than the WHO reference values of 20.0%–25.4%. A study conducted at private health institutions in Edo and Delta states<sup>[26]</sup> revealed an average value which is similar to the one obtained in the present study. The value obtained from this study is higher than the one obtained in private health care facility in Kano, Nigeria<sup>[18]</sup> and western Nepal.<sup>[21]</sup> However, the result of this study on the other hand is lower than the value reported from public health facilities in Kano.<sup>[26]</sup> The implication of the finding of this study is that antibiotics were over-prescribed which may be attributed to prescribers yielding to patients demand. This could be due to the fact that patients pay a meager 10% of the total cost of drugs. Consequently, they take advantage of this lenient financial condition to plead with some of the physicians that are friendly with them to prescribe what they wanted in most cases antibiotics. In Nigeria, it is a common practice that patients' self-medicate antibiotics for virtually all illnesses. As a result of patient's demands, most physicians compromise the ethics of the medical professional by prescribing unnecessary drugs for these patients on demand. Alternatively, physicians may overestimate infections which may compel them to prescribe high number of antibiotics for a patient without a corresponding microscopy culture and sensitivity (MCS) test. Over prescription of antibiotics leads to indiscriminate use of antibiotics and in turn leads to emergence of antibiotic resistant strains of micro-organisms which constitute a public health problem.

High use of antibiotics, analgesics, and vitamins/minerals revealed by this study reflects the common trend in many other healthcare facilities in Nigeria.<sup>[7]</sup>

### Limitations

A few of the sampled prescription sheets contained surgical items only, therefore they were not assessed. Some outpatients prescriptions filled/refilled in 2009 were missing. This is common with the use of retrospective data. Finally, prescribing of drugs does not always reflect the actual use.

### CONCLUSION

It is concluded on one hand that there was under prescription of injections which is commendable. On the other hand, there were high tendency for

poly-pharmacy, overprescribing of antibiotics, lack of compliance with the principles of NHIS essential drug, and generic prescribing. Despite the efforts of WHO and other international organizations/agencies in promoting rational use of drugs, irrational prescribing still occurs. We recommend that federal government of Nigeria through ministry of health in conjunction with the management of UMTH should re-train NHIS health care providers (Medical doctors, Pharmacists, and Nurses) on rational use of drugs in UMTH. Secondly, NHIS essential drug list should be revised (updated) regularly and a copy made available to all the physicians and pharmacists with NHIS in UMTH. Thirdly, NHIS in tertiary hospitals should be computerized to enable pharmacists spend lesser time entering patient's data, thereby making more time available for patient medication counselling. Finally, greater emphasis should be made on rational drug use in the undergraduate curriculum of medical schools in Nigeria.

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**How to cite this article:** Okoro RN, Shekari BG. Physicians' drug prescribing patterns at the national health insurance scheme unit of a teaching hospital in the North Eastern Nigeria. Arch Pharma Pract 2013;4:3-8.

**Source of Support:** Nil. **Conflict of Interest:** None declared.

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