

## Research Article

# Drug Prescription Pattern in a Nigerian Tertiary Hospital

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## Abstract

**Purpose:** To evaluate the prescribing pattern of clinicians in the general outpatient unit of the Aminu Kano Teaching Hospital, Kano (AKTH),.

**Methods:** This was a descriptive retrospective study conducted using 500 prescriptions made at the general outpatient unit of AKTH between April and July 2009.

**Results:** A total of 497 prescriptions were successfully analyzed. The average number of drugs per encounter in the facility was 3.04. Generic prescribing was low at 42.7 % while antibiotic prescription was high at 34.4 %. Injections were prescribed in 4 % of encounters while 36.2, 19.1, 25.8 and 1 % of encounters had analgesics, antimalarials, antihypertensives and anxiolytics prescribed, respectively. Vitamins were prescribed in 9.7 % of encounters.

**Conclusion:** Polypharmacy, low rate of generic prescriptions and overuse of antibiotics still remain a problem in health care facilities in Nigeria.. This calls for sustained interventional strategies and periodic audit at all levels of health care to avoid the negative consequences of inappropriate prescriptions.

**Keywords:** Prescribing pattern, Generic drugs, Tertiary hospital, Essential drugs, Nigeria

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## INTRODUCTION

Appropriate drug utilization has a huge contribution to global reduction in morbidity and mortality with its consequent medical, social and economic benefits [1]. Inappropriate prescribing is known all over the world as a major problem of health care delivery [2]. This is more so in developing countries where health budgets are small and 30 – 40 % of the total health budget is spent on drugs [3]. A quarter of the world's population is concentrated in developing countries and has access to only a small proportion of the world's drug production [1]. In spite of the above stated facts, irrational prescriptions and use of drugs has for long been known to be a feature of health care settings of developing countries, and is characterized by polypharmacy, excessive use of antibiotics and injections and use of drugs of doubtful efficacy [4,5]. This practice undermines the articulate efforts of drug supply systems and the provision of good quality health care with the meagre resources allocated to the health care sector in these countries.

The introduction of the manual "How to investigate drug use in Health facilities (WHO, 1993)", following the collaboration of the International Network for the Rational Use of Drugs (INRUD) and the WHO Essential drugs and medicines policy department (WHO – EDM) provided a methodology for obtaining objective and reproducible measures of the effectiveness and efficiency of drug use[6]. Furthermore, the WHO – EDM/INRUD supported study which developed reference values for the WHO health facility core prescribing indicators in Nigeria[7], has helped to provide potential tools for audit supervision and monitoring of drug use practices when used in conjunction with the provisions of the WHO indicators as provided in the manual.

Several studies within and outside Nigeria have shown varying degrees of inappropriate prescriptions and use of drugs in public

sector health facilities [1,7-9]. Reports by WHO indicated that about 60% of antibiotics in Nigeria were prescribed unnecessarily and doctors have been shown to prescribe drugs when they are not indicated. Periodic assessment of the prescribing practices in a health facility will help to identify specific drug use problems, sensitize practitioners on rational drug prescription and provide policy makers with relevant information that could be useful in review of drug procurement policies and implementation of policies on drug prescribing practices in the affected institutions and regions.

This descriptive cross-sectional retrospective study was therefore designed to evaluate the prescription pattern of clinicians at the Aminu Kano Teaching Hospital, Kano

## METHODS

### Setting

This descriptive retrospective study was conducted at the general outpatient unit of the Aminu Kano Teaching Hospital, – a tertiary health facility providing services to a population of over ten million people covering the three States of Kano, Katsina and Jigawa in the North-Western region of Nigeria. This health facility is a tertiary centre in which most specialties in medicine are found. It also serves as the Teaching Hospital for the Faculty of Medicine of the Bayero University, Kano.

The General Outpatient Unit is the first point of patient contact with the health facility outside emergency cases which are attended to at the Accident and Emergency Unit of the hospital. The GOPD, as the General Outpatient Department is commonly called, is run by specialists in family medicine, as well as other general practitioners, with varying degrees of post-qualification practice experience. The unit is opened for clinical services twenty four (24) hours a day and large volumes of drugs are prescribed daily

by the clinicians in the unit for different ailments presenting to them. Medical care is provided by over twenty (20) clinicians in the GOPD working in different shifts. Drugs prescribed in the GOPD were usually dispensed in the hospital pharmacy, which has a large unit within the department. Where the drugs were not available, patients were advised to purchase their drugs from private pharmacies outside the hospital. Records of prescriptions made in the GOPD were properly stored by the medical records department of the hospital. These records were readily made available to us for the evaluation of drug prescription pattern

### **Ethical Consideration**

Before the commencement of the study, ethical approval for the study protocol was granted by the Ethical Committee of the Aminu Kano Teaching Hospital.

### **Data Collection**

The data for this study were collected from individual patient folders where prescriptions for the patients were kept. Data collection form was designed and used by the investigators to record data and information on the prescribed drugs in the health facility. Systematic random sampling was used to select 500 prescriptions issued to different patients attending the health facility between June 2008 and May 2009. With an average of 200 prescriptions per day, a sampling interval of 20 was used to select prescriptions used for the study with ordinary balloting used for the first pick. For ease of data collection, records of all patients who were 12 years old and above were included, while records of antenatal and post natal clinic attendances as well as pure surgical cases where drugs were not usually prescribed were excluded from the study. Also, illegible prescriptions and those with the use of non-standard abbreviations were excluded.

### **Data analysis**

The WHO following prescribing indicators were used in evaluating the prescription pattern in the health facility, namely, average number of drugs per encounter, percentage of drugs prescribed by generic name, and encounters with (a) an antibiotic prescribed, (b) an injection prescribed, and also percentage of drugs prescribed from essential drug list or formulary.

Prospective enquiries were made as to the availability of a copy of the essential drug list at the point of prescription. Further analysis of the data was done to characterize some disease-specific prescribing indicators including encounters with (a) an analgesic prescribed, (b) an anti malarial prescribed, (c) an anti-hypertensive prescribed and (d) a vitamin prescribed. A model list of 12 commonly used key drugs was drawn up on the basis of which the availability (%) of key drugs was assessed.

Data generated from the prepared data forms were analyzed using SPSS version 16 (Chicago, IL, USA), after manual verification and cleaning. Descriptive statistics (means and percentages) was used to present the results.

## **RESULTS**

Five hundred prescriptions were studied and data entered into the data entry forms designed for the study. However, three data entry forms representing three prescriptions were excluded from the analysis due to problems with legibility and use of non-standard abbreviations. A total of four hundred and ninety seven (497) prescriptions were successfully evaluated. All the encounters had one or more drugs prescribed. A total of 1512 drugs were prescribed in the 497 patient encounters evaluated with an average of  $3.04 \pm 1.39$ . Two hundred and fifteen (43.2 %) encounters had at least 4 drugs prescribed while 42.7% of drugs were prescribed by generic names. In 34.4% of encounters, an

antibiotic was prescribed while 10.9% of encounters had at least two antibiotics prescribed. The quinolone antibiotic ciprofloxacin was the most prescribed antibiotic constituting 21.5% of all antibiotics prescriptions while chloramphenicol was the least prescribed antibiotics (0.5%). Injections were prescribed in 4% of encounters with one encounter (0.2%) having 3 injections prescribed. Table 2 shows other prescribing indicators evaluated.

**Table 1:** Core prescribing indicators in a tertiary health facility in Kano, Nigeria

Prescribing indicator	Value
Average number of drugs per encounter	3.0±1.4
Drugs prescribed by generic names (%)	42.7
Encounters with an antibiotic prescribed (%)	34.4
Encounter with an injection prescribed (%)	4.0
Drugs prescribed from essential drug list (%)	94.0
Key drug availability at point of dispensing (%)	91.7
Availability of a copy of essential drug list at point of prescription (%)	0

**Table 2:** Other prescribing indicators in a tertiary health facility in Kano, Nigeria

Prescribing indicator	Value (%)
Encounter with an analgesic prescribed	36.20
Encounter with an antimalarial prescribed	19.10
Encounter with an antihypertensive prescribed	25.80
Encounter with an anxiolytic prescribed	1.00
Encounter with a multivitamin prescribed	9.70

Ninety-four percent of the drugs prescribed were listed in the essential drug list even though no copy of the list was available at the points of prescription. Furthermore, 91.7 % (11 / 12) of key drugs in a model list for the treatment of common health problems were available in the facility studied. In 25.8 % of encounters, an antihypertensive drug was prescribed with one encounter having five antihypertensive drugs prescribed. Analgesics, anti malarials, vitamins and anxiolytics were prescribed in 36.2, 19.1, 9.7 and 1 % of encounters, respectively, as shown in Table 2.

## DISCUSSION

A prescription provides an insight into a prescriber's attitude to the disease being treated and the nature of health care delivery system in the community [13]. Using the WHO prescribing indicators, this study has provided a better understanding of the prescribing practices in the facility being studied and has shown areas that need intervention. In the results shown by this study, poor quality of pharmacotherapy is reflected. Whereas reference values of 1.6 – 1.8 drugs per encounter were recommended by the WHO guidelines on rational use of drugs in the region [7], an average of 3.04 drugs per encounter were prescribed by clinicians in the facility studied. A closer look at the pattern reveals that over 60% of the prescriptions had at least 3 drugs. Higher values of 3.3 and 3.5 were reported in studies done in some tertiary institutions in the region [9,14], while values of 3.99 and 4.4 had been reported by workers in Ilorin [8] and Benin [13]. Hogerzeil and Colleagues had earlier reported much lower figures of 1.3 – 2.2 for Bangladesh and Lebanon respectively[6] while studies in Burkina Faso [15], Cambodia [16], and Nepal [17] had all reported similar high values for average drug prescriptions amongst clinicians in the various institutions studied. Polypharmacy, observed in this and other studies across the developing world, increases the risk of drug interactions and affects compliance.

Literature has shown a linear relationship between the number of drugs taken and incidence of new hospital admissions per year due to adverse drug reactions, inappropriate medication use and mortality [18,19]. Other problems associated with poly pharmacy are drug- food interactions, neutraceutical – drug interactions, medication cascade effect as well as therapeutic duplication errors. Medication adherence can also be adversely affected leading to poor therapeutic outcomes.

In this study, injection use was found in 4.0 % of encounters. This is low when compared with findings from other studies and even lower than the WHO values of 10.1 – 17.0 [7], as found in the reference value determination study done in South-South Nigeria in 2002. However, much higher values of 26.9 % were reported from a study in Enugu, Nigeria [20], and those from Sudan and Uganda as reported by Hogerzeil *et al* [6]. The lower values of injection use found in this facility may be a direct result of persistent enlightenment of the patients and clinicians in this facility on the dangers of excessive injection use in an era of many blood borne diseases like Hepatitis B and Human Immunodeficiency Virus (HIV). Another reason for this finding may be the setting where the study was carried out. In general outpatients departments or units, fairly stable patients are seen and followed up routinely, so the need for injections might be minimal. The use of injections will probably be higher if the study was done in the Accident and Emergency Department of the hospital.

Prescribing by generic names is the expected standard for clinicians, however only 42.7 % of drugs prescribed in this study were done in generic names. This is considerably low, more so, for a tertiary centre engaged in the training of medical students and post graduate medical doctors. Increasing generic prescribing could substantially reduce the cost of drugs for the patients and reduce cost for pharmacies. This low generic prescribing

appears to be consistent as similar low values have been reported in Nigeria [7-9], and Nepal [17]. Much higher figures of 75.0 to 99.8 % of generic prescription have been reported from Bangladesh and Cambodia [16]. It is on record that over 120 developing countries including Nigeria have adopted the essential drugs concept and developed a national essential drugs list [10]. Prescribing by trade or brand names negates this concept. In addition to the lower economic cost to patients and health systems, generic prescribing will eliminate or reduce the incidence of therapeutic duplication errors [19]. Duplicate drug ingestion unknowingly occurs when the patient takes the generic and brand name drugs e.g digoxin plus Lanoxin (a trade name from Glaxo Smith Kline). In health facilities and systems burdened with high levels of poly pharmacy, where patients struggle with proper compliance with their old regimen, low generic prescribing will add to their confusion and possibly increase the incidence of adverse events.

In this study, 34.4 % of encounters had antibiotics prescribed, which is much higher than the WHO reference value of 20.0 – 25.4 % [7]. It is however lower than figures reported by studies done in Ilorin (45.0 %) [8], Benin City (50.4 %), Kano (67.7 %) [9], and in private and public facilities (55 and 75 %, respectively) in Warri [2]. Studies carried out by Hogerzeil *et al* in 12 developing countries reported figures of 47.5 to 100% of encounters with antibiotic prescriptions [6], while workers in Nepal reported lower value of 17.5 % [17]. Scientific literature had reported large scale inappropriate antibiotic use globally. Inappropriate use of antibiotics can potentially lead to antimicrobial resistance and increase the necessity to use more expensive antibiotics to treat common and life threatening infections.

Analgesics are the most prescribed drug group in this health facility with 36.2 % of encounters having an analgesic prescribed. This may be so due to patients demand and

the primary instinct of pain alleviation by prescribers. However, higher values of 64.3 and 41 % have been reported from other studies in Nigeria [11]. Antimalarials were prescribed in 19.1 % of patient encounters in this study. This is lower than the 33 % reported for Ilorin, and 67 % for Warri. It is conceivable that the various strategies of the Roll back malaria programme which are vigorously pursued in Kano and its environs may be yielding positive results by reducing the number of patients presenting with malaria to the hospital. Another probable reason for this result is the fact that patients with uncomplicated malaria might not present frequently at the study setting because of its status as a tertiary centre. Most of them would have received treatment at various primary or secondary care centres around the city of Kano.

The percentage of encounters with anti hypertensive drugs prescribed in this study was 29.8, a value higher than 6 % from the Warri study and 15.2 % from the Ilorin study. Fourteen and half percent (14.5%) of all encounters had at least 2 anti hypertensive drugs prescribed while five anti hypertensive drugs were prescribed in one encounter. Bendrofluazide (8.9%) was the most commonly prescribed anti-hypertensive followed by lisinopril (5.6 %).

Vitamins and anxiolytics were prescribed in 9.7 and 1 % of encounters in this study respectively. These figures are much lower than those found in the Ilorin study where 62.9 and 7.4 % of encounters had vitamins and anxiolytics prescribed respectively. The reasons for these differences are not clear but the influence of drug companies representatives may have a role to play. It is conceivable that these drugs were prescribed to gratify patients, thus serving as mere placebos.

A majority (94 %) of all drugs prescribed in the encounters studied were listed in Nigeria's Essential Drug List even though no copy of the list was found at the various

points of prescription. However, all the clinicians at the GOPD admitted to knowledge of the essential drug list and the usefulness of the list. This value is close to that reported by Chedi *et al* [9] here in Nigeria, while it is higher than other reports from abroad [21].

Eleven out of 12 key drugs (91.7 %) from a model list made for the study were available in the facility studied. These key drugs are useful for the treatment of common health problems in the community.

### **Limitations of the study**

The major limitation of the study is the fact that it was limited to only one centre hence the result cannot be generalized. This is in addition to other limitations usually associated with retrospective studies.

### **CONCLUSION**

Polypharmacy, low rate of generic prescriptions, overuse of antibiotics remain a problem in health facilities in Nigeria. While a national drug policy is in place and Nigeria has adopted the essential drugs concept with the publication of a national essential drugs list, there is a need for concerted efforts to introduce interventional strategies to improve prescribing practices by re-orientation and training of clinicians on rational drug use to avoid the negative effects on the individual patients and the healthcare system of the nation. There is a need for periodic audit of prescribing practices to assess the success or otherwise of such interventional programmes.

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