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## Prescription Patterns and Drug Use Indicators in a Nigerian Urban Tertiary Health Care Facility

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### Abstract

Rationale use of drugs increases the quality of health care, ensures cost effectiveness in health care delivery and better therapeutic outcomes. It however remains a problem in most parts of the world especially in the developing nations. This study was carried out to describe the pattern of drug utilization in a Nigerian Urban Tertiary Health Care Facility and evaluate the quality of prescriptions. This was a cross sectional study of all prescriptions received at the Pharmacy Department of the Lagos State University Teaching Hospital, Nigeria for the month of November, 2013. All prescriptions were analyzed for some standard indices of rationale prescription. Descriptive Statistics were done using SPSS version 17.0. There were 7,516 encounters with a total of 14,794 drugs prescribed. The mean number of drugs per encounter was  $2.3 \pm 1.4$  drugs. Practically all classes of drugs were represented with Antibiotics being the most prescribed (26.2%), followed by Analgesics (19.4%) and Antihypertensive drugs (10.4%) respectively. Only 47.8% drugs were prescribed using generic name while there were 25% encounters with injections. The percentage prescription from the Essential Medicines Lists of the hospital was 27.9%. There were deficiencies in the quality of drug prescriptions studied as well as indices of irrational use of medicines among the prescribers. Appropriate measures needs be identified and implemented to improve on the use of medicine.

**Keywords:** Prescriptions; Quality Indicators; Tertiary Hospital; Nigeria.

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## **1. Introduction**

The use of medicines constitutes a very important aspect of health care delivery systems globally. It is estimated that patients receive about 1.8 trillion days of therapy globally in 2019 with an average of 234 per person and this has been on the increase at a 3% compound annual growth rate since year 2014 [1]. In spite of this record of utilization of medicines and the increasing trend, about one third of the global population still lacks access to essential medicines and over 50% use medicines irrationally. These include inappropriate prescribing, dispensing and sales of medicines. Examples of irrational use of medicines include polypharmacy, overuse of injections when oral formulations would be more appropriate, inadequate dosages and use of antimicrobials for non-bacterial infections and failure to prescribe according to clinical guidelines [2,3].

The concept of rational use of medicines instituted by the World Health Organization (WHO) aims at ensuring patients receives medications appropriate to their clinical needs, in doses that meet their individual requirements and for an adequate period of time at affordable costs [4]. It enhances the quality of pharmaceutical care, ensures cost effectiveness in health care delivery, avoids preventable adverse drug reactions and drug interactions as well as promoting patient's adherence with better therapeutic outcomes. The concepts of Essential Medicines Lists (EML) and Standard Treatment Guidelines (STG) are measures put in place to promote rational use of medicines. As a means of consistent and reliable identification of drug use problems, the WHO and the International Network for Rational Use of Medicines (INRUD) developed a set of standardized indicators categorized as prescribing, patients care and facility indicators [5].

Despite these measures, irrational prescribing remains a problem in most parts of the world especially in the lower- and middle-income (LMIC) countries and the subject remains understudied in Nigeria [6–10]. This study was therefore carried out to describe the pattern of drug utilization in a Nigerian Urban Tertiary Health Care Facility and evaluate the quality of prescriptions using some standard indicators.

## **2. Methodology**

A cross sectional study of all prescriptions received and dispensed at the Pharmacy Department of the Lagos State University Teaching Hospital (LASUTH), Lagos, Nigeria. The hospital is a major referral center in Lagos metropolis with a bed capacity of 774 beds and one of three tertiary centers serving an estimated catchments population of over 19 million people in Lagos State, Nigeria. The hospital provides tertiary care in practically all sub-specialties of internal medicine, surgery, pediatrics and obstetrics and gynecology.

The hospital uses paper-based prescriptions which are handed over to the patients in duplicates. The patient holds the original copy after the medications are dispensed mostly purchased out of pocket while the hospital pharmacy retains and archives the duplicate copies. All prescriptions for the month of November, 2013 were retrieved by trained data collectors who were pharmacy interns and relevant information extracted into a database. The data was subsequently analyzed using descriptive statistics with SPSS version 17.0 for some standard indices of rationale prescription including the number of drugs per encounter, the pattern of prescription, percentage antibiotics prescription, percentage encounters with injection, percentage generic

prescription and percentage prescriptions from the hospital’s essential medicine list. The study received ethical approval from the Lagos State University Teaching Hospital Research Ethics Committee.

### 3. Results

There were 7,516 encounters with a total of 14,794 drugs prescribed within the one-month period studied. The mean number of drugs per encounter was  $2.3 \pm 1.4$  drugs. 38% prescriptions had no age of patients indicated while 9.6% had no gender of patients. Practically all classes of drugs were represented with Antibiotics being the most prescribed (26.2%), followed by Analgesics (19.4%) and Antihypertensive drugs (10.4%) respectively. Table 1 shows the overall pattern of prescription summarized by classes of drugs.

**Table 1:** Pattern of Drug Prescription over a month period.

Class of Drugs	Frequency (N)	Percentage (%)
Antibiotics	3875	26.2
Analgesics	2866	19.4
Antihypertensive Drugs	1533	10.4
Multivitamins	1396	9.4
Hematological Drugs	908	6.1
Gastrointestinal	881	6.0
Central Nervous System Drugs	692	4.7
Antimalarial	583	3.9
Antihistamines/Anti-allergic Drugs	393	2.7
Steroids/Anti-inflammatory Drugs	372	2.5
Nutraceuticals/Supplements	285	1.9
Endocrine Drugs	197	1.3
Electrolytes/Osmotic Diuretics	177	1.2
Anti-hyperlipidemic Drugs	161	1.1
Respiratory	131	0.9
Ophthalmic	123	0.8
Anesthetics/Muscle Relaxants	96	0.7
Antifungals	57	0.4
Dermatological	38	0.3
Immune modulators	29	0.2
Ear, Nose and Throat	1	0.01
Total	14,794	100.00

The comparisons of the quality of prescriptions with the WHO/INRUD standard indicators of rational prescription are shown in Table 2. Apart from the percentage of encounters with antibiotics prescribed of 26.2% which falls within the <30% recommended standard, all the other indices measured were unsatisfactory.

**Table 2:** Comparison of the Quality of Prescriptions over a period of one month studied with the WHO/INRUD Standard Indicators for Rational Prescription.

Indicator	Standard	Performance
Average number of drugs per encounter	$\leq 2$	2.3 $\pm$ 1.4
Percentage of drugs prescribed by generic name	Close to 100%	47.8%
Percentage of encounters with an antibiotic prescribed	< 30%	26.2 %
Percentage of encounters with an injection prescribed	< 10%	25%
Percentage prescription from EML	Close to 100%	27.9%

#### 4. Discussion

The study revealed a total of 7,516 encounters with 14,794 drugs prescribed within a month. This total is much higher than the total prescription of 1239 reported over a month period in a similar study in United Arab Emirate (UAE) in 2011[11]. This is indicative of a large volume of drug utilization occasioned by high patient load at the hospital and the multi-specialty nature of the services rendered. The completeness of the prescriptions studied showed 62% had age stated (38% had none) which was poorer than findings in similar studies from Ethiopia and UAE where age was stated in 91.8% and 100% of the prescriptions respectively [6,11]. Our study also found sex was included in 90.4% of patients lower than the 94.5% reported in the cited Ethiopian study above [6]. These recorded lacks of appropriate patients identifiers in our study suggests some deficiencies in the prescribers knowledge and skills of prescription writing.

The mostly prescribed groups of drugs were antibiotics (26.2%), analgesics (19.4%) and anti-hypertensive drugs (10.4%). A similar study conducted in a tertiary hospital in Kano, Nigeria had reported 34.4% of antibiotics as the most prescribed drug[12], similar to the rate of 36.71% recorded from 26 randomly selected primary health care facilities in Cameroon over a one year period [13]. While antibiotics remains the most prescribed drugs in other parts of Africa, studies from Ethiopia and Ghana however reported higher percentages of 58.6% and 60% respectively [10,14]. These higher percentages from Ethiopia and Ghana studies are more consistent with the pooled prevalence of antibiotics prescription of 52% (95% ci: 51%-53%) obtained in a meta-analysis of 48 studies from public health facilities in 27 low and middle income countries [15]. More importantly to note is the fact that the rate of antibiotics prescription in this study falls within the < 30% expected WHO indicator within the period studied [16]. The three mostly prescribed groups of drugs of antibiotics, analgesics and anti-hypertensive drugs are reflective of the high prevalence of infectious diseases and rising prevalence of non-communicable diseases especially hypertension in Nigeria [17–19].

The average number of drugs per encounter obtained in this study was 2.3 $\pm$  1.4 (Table 2) which is higher than the recommended standard of  $\leq 2$  drugs. Other studies in Nigeria have reported much higher averages per encounter ranging from 3.04 by Tamuno and his colleagues to 3.5 $\pm$ 1.4 by Odusanya, findings that were consistent with the rate of 3.52 $\pm$ 2-31 reported in a Chinese study [8,12, 20].

Only 47.8% prescriptions were in generic name as against expected standard of as close to 100% as possible. This low proportion is consistent with the findings of 42.7% of generic prescription in another tertiary hospital in Kano, Nigeria [12]. Studies from other African countries and other parts of the world however recorded better rates of generic prescriptions in excess of 90% [6, 10, 20].

There were 25% encounters with injections prescribed in this study which is in excess of the standard indicator of <10%. This however is consistent with findings from most other studies in Nigeria and other countries reporting higher rates of 47% in Kano, Nigeria, 20% in Ethiopia and 20.02% in China respectively [6,12,20].

Prescriptions from the essential medicines lists (EML) was abysmally low in this study with only 27.9% as against the standard of as close to 100% as possible. A higher rate of 60.4% was recorded by Fadare and his colleagues among prescriptions for under five children in a pediatrics clinic in Southwestern Nigeria. The low rate of compliance with the EML was also recorded in China with the finding of 48.5%. [20] Studies from other parts of Africa however had higher compliance of 86.3% and 91.4% with the EML as reported by Yilma and his colleagues and Getahun and his colleagues respectively [6, 10].

## **5. Conclusion**

Apart from the percentage of encounters with antibiotics prescribed which was within normal limit during the study period, other indices of rational prescribing measured remained unsatisfactory. These showed gross deficiencies in the quality of drug prescribing consistent with non-rational use of medicines. There is a need to re-evaluate the prescribing practices in this hospital and compare with these findings to inform any progress made over the years and the appropriate interventional measures needed to promote rational use of medicines.

## **6. Study Limitations**

This study reported the pattern and prevalence of use of drugs in a single health facility and over a period of one month. A multicenter and multi-level survey lasting a longer period of time would have been more desirable and more representative of drug utilization pattern in the country. This however was difficult to achieve as a result of the lack of electronic prescribing system in the hospital and the data had to be gathered manually, a factor that constitutes the second limitation.

## **7. Competing Interests**

Authors declare there is no competing interests in the conduct and reporting of this study.

## **8. Authors Contributions**

OOO: Conceived of the study, designed the study, carried out data acquisition, data analysis and interpretation and drafted the manuscript. MRO contributed to data acquisition, data analysis and revised the manuscript. AFY contributed to data analysis and revised the manuscript. All authors read and approved the final manuscript.

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