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Medication Prescription in Children: Assessment of Pattern and Completeness in a Tertiary Healthcare Facility in Kwara, Nigeria

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Abstract

Background: The most common approach for treating pediatric illness in clinical settings is the use of medication. Children's prescription drug patterns and completeness, however, have not received enough research attention. In order to raise prescription standards and lessen the issues brought on by irrational prescription and usage of medication, it is critical to assess these trends.

Objectives: The study's objective was to evaluate the pattern and completeness of pediatric pharmaceutical prescriptions using the WHO prescribing indicators.

Methods: It was a six-month retrospective study of prescriptions (1st January, 2022 to 30th June 2022). A total of 705 prescriptions were collected from the pharmacy section of the pediatrics outpatient department. A validated data capture form was used for the study following the WHO prescribing indicator guideline. These indicators were examined, analyzed, and compared to the standard advised by the WHO. SPSS version 20 was used to analyze the data.

Results: In our study, we discovered that every prescription indicator evaluated fell short of the WHO recommendation. 3.28 medications on average were prescribed per patient. The percentages of encounters with injections, antibiotics, and other medications by generic name were 57.4%, 77.2%, and 75.6%, respectively. 43.6% of the medications prescribed came from the list of essential medicine.

We deduced that all prescriptions for medications were incomplete and that the indicators of drug usage did not follow the WHO recommendation. Therefore, we proposed that programs or initiatives that will promote rational prescription and use of medicines should be instituted.

Key words: Rational prescribing, Medication, Polypharmacy, Generic drugs, Essential medicine list

Introduction

One of the most efficient therapeutic interventions in the healthcare system is the

use of pharmaceuticals, especially when done so responsibly. (WHO, 2019) It is crucial to the delivery of healthcare,

especially when it comes to the treatment and management of illnesses. Effective patient care depends on the accessibility and affordability of appropriate and quality medications as well as their prudent application. Medication use is a complex activity that involves interactions between patients, healthcare facilities, and healthcare experts. All of these relationships influence the use of medicine in many ways, whether it is logical or irrational.

The World Health Organization (WHO) defines rational medicine usage as when a patient takes medications that are appropriate for clinical needs, in doses that fit their unique needs, for an adequate period of time, and at a cost that is affordable to them and their family. (WHO, 2019),(AA Azayzih MMM *et al*, 2017) It is well known that the sensible use of medicine has advantages for the individual as well as society at large in terms of social, economic, and health-related aspects. Most of the major causes of mortality and disability in developing countries can be prevented, treated, or at least decreased, if inexpensive critical medicines are used wisely. Inappropriate prescribing, which occurs when medications are not prescribed in accordance with the advised protocol, is one indication of irrational medicine use.

This has a negative impact on the standard of medical treatment and pharmacological therapy, increases healthcare expenses, and could result in serious adverse responses. (Jain S *et al*, 2015) As with antimalarial and antibiotic resistance, it can also play a role in the emergence and spread of drug resistance.(WHO *et al*,2017)

WHO believes that at least 50% of all drugs are taken inappropriately, which has been recognized as a major issue in healthcare

globally. (WHO,2021) Irrational medicine use has been shown to increase patient morbidity and death, individual and governmental spending, as well as lowered confidence in the healthcare system, in developing nations where 20–50% of health budgets are spent on drugs and other health commodities.(Atif M *et al*,2016)

The misuse and underuse of drugs, polypharmacy, the overuse of antibiotics and injections, as well as incorrect prescribing that is at odds with clinical guidelines, are all examples of irrational drug use.(Sheikh D *et al*, 2017),(Sharma A *et al*,2016)Patients who receive irrational prescriptions are more likely to experience negative drug responses and medication mistakes.(Wang H *et al*,2013)Irrational prescription can be caused by a variety of factors, including a lack of objective pharmacological information, patient demands or expectations, a prescriber's lack of training, and aggressive drug advertising by pharmaceutical corporations.(Mortazavi SA *et al*,2010) It will encourage safe and effective drug therapy, which in turn will promote the rational use of drugs, when patients and prescribers are well-informed about medications and their uses.

WHO created a set of standardized drug use indicators to define the drug use environment in healthcare institutions. These indicators can be used as a planning and implementation tool for rational medicine use strategies. The prescribing indicators, patient care indicators, and facility care indicators are the three basic categories into which these WHO core drug use indicators are divided.(Desalegn AA *et al*,2013),(Mensa M *et al*,2017) A prescription is said to be complete when it takes into cognizance all the patients, treatments and prescribers' information for

better patient management as specified by WHO.

The prescription indicators can help to spot issues with general prescribing. These are a few of them: Average number of prescriptions per visit (which gauges the degree of polypharmacy), percentage of generic prescriptions (which gauges how cost-effective the healthcare system is in obtaining and using drugs), and proportion of prescriptions for antibiotics and injections (measures the extent to which two significant, but frequently misused and pricey, drug therapy modalities are used) and the proportion of medications prescribed that are on the national essential medicines list. (Desalegn AA *et al*, 2013), (Mensa M *et al*, 2017) Indicators of patient care aid in understanding how medications are administered. The amount of time that prescribers and dispensers spend with each patient places significant restrictions on the level of diagnosis and treatment that may be provided. Patients who are prescribed medication should, at the very least, get well-labeled prescriptions and be aware of how to take each medication. (Desalegn AA *et al*, 2013), (Mensa M *et al*, 2017) To determine whether the characteristics of the working environment have an impact on the prescribed medications, health facility indicators are used. A sufficient supply of necessary medications and easy access to accurate information about these medications are the two key elements. (Mensa M *et al*, 2017)

Despite the fact that irrational prescription and use of medication happens everywhere, it has been found to be more prevalent in Africa, particularly in sub-Saharan African nations like Nigeria. (Odusanya OO. 2004) (Tamuno I and Fadare JO, 2012) Studies conducted in the United States, Ethiopia,

and India revealed instances of illogical medication usage and prescription, including polypharmacy, increasing use of antibiotics and injectables, and disregard for national treatment recommendations or Essential medication lists (EML). (Chai G *et al*. 2002-2010), (Lenjisa TH and Fereja JL, 2013), (Phalke VD, *et al* 2011) The off-label use of medications, the usage of inferior and counterfeit drugs, prescription shortages, unrestricted drug marketing, and aggressive advertising all contribute to this problem in Africa. (Khan N *et al*, 2016), (Singh UR *et al*, 2014) There aren't many studies on this in sub-Saharan African nations, including Nigeria, especially in children. This is in addition to the significant burden (in terms of increased morbidity and mortality) of illogical prescription.

This study is crucial, especially in light of the fact that WHO is stepping up its efforts to combat irrational prescribing and pharmaceutical errors.

Therefore, in order to generate the necessary data and close the knowledge gap, it is crucial to conduct research using the WHO's recommended indicators for drug use on prescription pattern and prescription completeness in children. This will ensure that children are using medications safely while taking into account their vulnerability and improve treatment outcomes.

The results of this study will help healthcare policy makers make decisions, raise the bar for rational prescriptions, and protect the country's health.

Methods

Study setting and design: To examine the current pattern and completeness of prescriptions from Pediatric outpatient department (POPD) where children were

assessed and treated, we conducted a retrospective study evaluating the drug prescriptions stored in the pharmacy department of University of Ilorin Teaching Hospital (UITH) for a period of six month (1st January to 30th June 2022). UITH is a 600-bed facility that is located in Ilorin, the capital of Kwara State in the North Central geopolitical zone of Nigeria.

The Prescription pattern and completeness assessment was evaluated using the drug indicators recommended by the WHO. The indicators are; total number of drugs in the prescription, average number of drugs per prescription, percentage of drugs prescribed by generic name, percentage of prescriptions with antibiotics and percentage of prescriptions with injectable preparations. Completeness of the medication prescription was evaluated using the patient's information (name, age, sex, address, weight and phone number of the patient), treatment information (diagnosis, strength of drug, dosage, frequency, duration and direction of use of the drug) and prescriber's information (name, institution, phone number and signature of prescriber) provided on the prescription. Prescription of intravenous fluids, blood, blood products, medical devices/equipment, prescription for inpatients were excluded from this study.

Sample size and Sampling procedure:

According to the WHO guide, at least 600 encounters should be included in a study to describe the current prescribing practices, with a greater number if possible because the larger the sample size, the more reliable the data. A convenient sampling technique was used taking into consideration the months and years to be sampled. Records of prescriptions made and prescriptions in the pediatrics outpatient clinics were properly stored by the Pharmacy department of the

hospital. These prescriptions were made available for the study after getting ethical approval from the ethical committee of the hospital with approval number: ERC PAN/2022/04/0309. A total of 705 prescriptions were reviewed under the study period.

The WHO prescribing indicator manual was used to produce a data capture form (DCF) for the study. The prescribing indicators include the average number of drugs per encounter, the percentage of drugs prescribed by generic name, the percentage of encounters with antibiotics prescribed, the percentage of encounters with injection prescribed and the percentage of drugs prescribed from essential drug list which were all captured in the DCF.

Data analysis

After manual verification and cleaning, data collected from the data capture forms were analyzed using statistical software SPSS Version 20.0 (Chicago, IL, USA). The results were displayed using the relevant means, frequencies, and percentages. Results were interpreted using the WHO prescribing indicators' standard values.

Results

A total of 705 medication prescriptions were reviewed and analyzed over a period of six months between January and June 2022. It was found that a total of 2185 drugs were prescribed in the 705 patient encounters. Of the 2185 drugs, the most prescribed were antibiotics (27%), followed by analgesics (20%) and antimalarial drug (18%)(Figure 1). The average number of drugs per prescription per encounter was 3 (40%). The least number of prescriptions per encounter was 7 and 8 which were 2% respectively as shown in figure 2. Comparing the observed prescriber indicator with WHO standard, it

was observed that 57.4% of the prescriptions were done using generic name, which was below the recommendation by WHO. In 544 (77.2%) and 533 (75.6%) encounters, prescriptions for antibiotics and injections

were given. These were more than the recommended percentages by WHO, this an indication of over-prescription of both antibiotics and injections (Table 1).

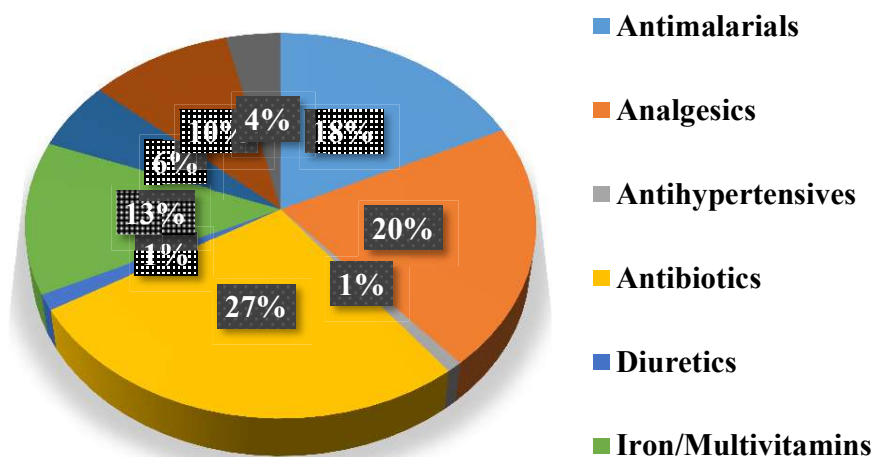
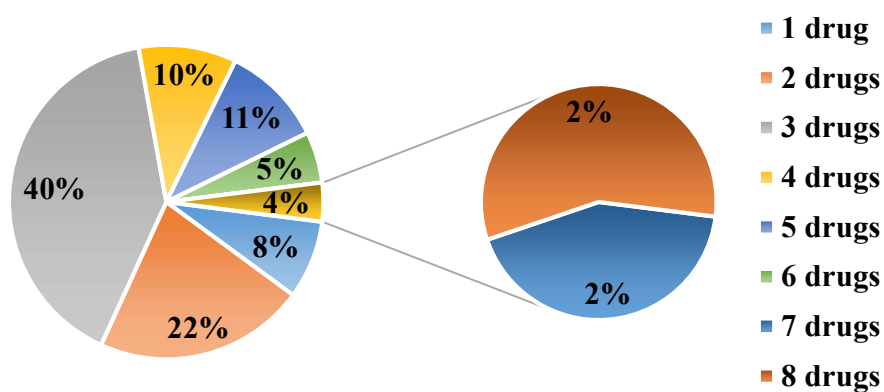


Figure 1: Frequency of medication prescription by the drug class



N.B; The 4% in the main pie chart represent prescription of 7 and 8 drugs per encounter which were 2% respectively.

Figure 2: Percentage distribution of number of medications in the prescription

Table 1: Comparison of the Prescribing indicators observed with World Health Organization standard reference rang

Prescribing indicators	Number	Average/ percentage	Ideal WHO value(1)
Average number of Drugs per encounter / Prescription		3.28	1.6-1.8
Percentage patient Encounter with Antibiotics	544	77.2%	20.0-26.8%
Percentage patient Encounter with Injections	533	75.6%	13.4-24.1%
Percentage Drugs Prescribed by Generic Name	1327	57.4%	100%
Percentage Drugs from Essential Drug List	1007	43.6%	100%

The patient-related characteristics evaluated for the medicine prescriptions' completeness revealed that the patient's name was written on the majority of them (92.7%). Patient age, gender, weight, residence, and phone number results were all below 25%. A review of the treatment data showed that a sizable portion of the prescriptions for medications had the necessary therapeutic information regarding the medication's strength (83.8%), dose (85.5%), frequency

(84.1%), and duration (82.3%). The patient's diagnosis and the recommended course of therapy were both given in treatment information of 0.9% and 15.6%, respectively. Analyzing the prescriber's information revealed that the majority (96.3%) had the institution's name and the prescriber's signature (90.9%). The name and telephone number of the prescriber were only written in 28.1% and 1.7% of the prescription respectively (Table 2).

Table 2: Prescription Completeness Assessment

Patient information		Treatment information		Prescriber Information	
Parameter	Percent (%)	Parameter	Percent (%)	Parameter	Percent (%)
Patient Name	685 (97.2%)	Diagnosis	6 (0.9%)	Name of Prescriber	198 (28.1%)
Age (Months/ Years)	98 (13.9%)	Strength of Drug	591 (83.8%)	Institution of Prescriber	679 (96.3%)

Weight (kg)	47 (6.7%)	Dosage	603 (85.5)	Phone Number of Prescriber	12 (1.7%)
Address of Patient	160 (22.7%)	Frequency	593 (84.1%)	Signature of Prescriber	641 (90.9%)
Sex	106 (15.0%)	Duration	580 (82.3%)		
Phone Number of the Patient	2 (0.3%)	Directions of Use	110 (15.6%)		

Discussion

This study evaluated the pattern and completeness of pediatric medicine prescriptions, a topic that has not received much attention. The prescribing indicators recommended by WHO for evaluating prescription trend and completeness in healthcare facility was used. With regard to the logical prescription and use of medications, these metrics track how well the healthcare system and the doctor are performing. It was discovered that an average of 3.28 pills were prescribed for each patient in this investigation. This exceeded the WHO-recommended maximum level by twotimes. This result was equivalent to the results of 3.3 and 3.4 that were reported by Singh *et al.*, 2014 and Otoom *et al.*, 2010. Zewdu *et al.*, 2020 in their study revealed that the average number of drugs per prescription was 1.65, which was in line with WHO recommendations and demonstrated acceptable prescription practices. This study found that polypharmacy is practiced in our center. Polypharmacy is defined by the average number of drugs per prescription. The health impacts of polypharmacy cannot be overstated, making this a significant concern. This includes undesirable pharmacological effects, drug-drug interactions, poor or non-compliance, unsuccessful therapy, and the emergence of drug resistance. This indicates that prescribing a patient with numerous

medications is a risk factor for later adding additional medications.^{22,23}

Antibiotic resistance is becoming a big problem on a global scale. Studies have demonstrated that the proportion of the patient population exposed to antibiotics influences the frequency of antibiotic resistance. Igbiks T *et al.*, 2011, Alyamani NA, *et al* 2009 According to our study, antibiotics were often prescribed, with a percentage encounter with antibiotics of 77.2%, which was over three times the WHO-recommended upper range of normal. Similar percentages of encounters with antibiotics—71% and 74%, respectively—were reported by Tigistu *et al.*, 2014 and Nicholas *et al.*, 2015 in their studies. Zewdu *et al.*, recorded 58.6%, which was over twice the WHO-recommended upper range of normal. Both Mahmood *et al.*, 2016 (17.7%) and Azayzih *et al* 2 (9.8%) reported good antibiotic prescribing practices in their respective studies. Mahmood *et al.*, 2016

In contemporary society, there is a false notion that administering an injection would quickly alleviate the symptoms of a sickness and cure it. The use of injections in patient care has expanded as a result of this notion. Notably, the abuse of injections and lax safety standards play a significant part in the spread of various blood-borne illnesses, including hepatitis B, hepatitis C, and HIV. Our finding on the prescription of injections was around three times the maximum value

advised by the WHO. This demonstrated that injections were frequently prescribed in our center, which may be related to the false perception of injections in this setting.

Evaluation of medicine prescriptions written using the generic names of the drugs in this environment revealed that somewhat more than the average number of prescriptions were written using the generic names of the drugs, falling short of the 100% advised by the WHO. In their research, Laychiluh *et al.*, 2014 (97.3%) and Desalegn *et al.*, 11 (98.7%) recorded higher percentages. Instead, Mulwu *et al.*, 2015 (44.5%), Lgbisks *et al.*, 2012 (42.7%), and Otoom *et al.*, 20 (10.2%) reported lower percentages of prescriptions using the drug's generic name in their research. Given that our findings fall short of WHO recommendations, it is critical to raise prescribers' knowledge and awareness of generic prescribing. According to reports, non-generic prescriptions raise healthcare costs and constitute a separate risk factor for medication errors.

A generic prescription guideline should be implemented to assist current and potential prescribers, such as medical students, pharmacy students, and others, in developing a prescription habit. At order to improve generic prescription in healthcare facilities, several academics have proposed a number of measures, such as banning financial incentives from pharmaceutical companies or their medical representatives to prescribers and superfluous drug advertising (Nicolosi *et al.*, 2009).

An essential medication list is a crucial clinical tool that enhances pharmacotherapy and rational medication use. Prescriptions for medications should come from the EML, as recommended by the WHO, however our findings show otherwise. In their respective

studies, Demeke *et al.* 2015 and Laychiluh *et al.*, 2014 observed that the prescriptions for EML were followed exactly as prescribed. EML is available in our hospital but not adhered to by most prescribers as medications were prescribed outside the list.

The importance of completeness of medication prescription cannot be over-emphasized. It is an important aspect of patient management. An incomplete prescription can result in medication errors, adverse drug reactions and treatment failure, all of these increases the cost and burden of disease on the patient and the healthcare system. For a complete prescription, details of patient's information, treatment information and prescriber's information must be provided by the prescriber (T. Assefa, *et al.* 2018), (H. Admassie *et al.*, 2013). In this study we found that patient's information was grossly inadequate except for patient's name that was provided in nearly all the assessed prescription. Our findings with respect to patient age, gender, weight, address and phone number of the patient were all below the recommendation by WHO but was better when compared to the one reported by Zewdu *et al.*, 2020. Evaluation of the treatment information showed that diagnosis (0.9%) and direction of use (15.6%) were least documented in the prescription while Zewdu *et al.*, 2020 found that dosage (8.3%) and total drug dose (37.3%) were the least recorded in treatment information. Evaluation of prescribers' information for prescription completeness showed that most of the prescriptions did not contain information on the name and phone number of the prescriber which was similar to reports by some researchers. (Qian J *et al.*, 2017), (B. Demeke *et al.*, 2015). Information on the name of the institution and signature of the prescriber

were better documented in the prescription. It should however be noted that all indicators for assessing completeness of medication prescription were below the WHO recommendation.

Our study documented the prescription practices in children in this environment and showed that most medication prescriptions were incomplete and the WHO prescribing indicators were not met by most prescribers. This study revealed the practice of polypharmacy, over-prescription of antibiotics and injections in this center. Poor prescription of generic drugs and prescribing outside the EML was also documented in this study. Efforts should be

geared towards promoting safe and rational prescription of medicine among children and instituting appropriate measures to reduce polypharmacy, over prescribing of antibiotics and injections, increase generic prescribing and prescribing from essential medicine list have to be implemented by the therapeutic care unit of the hospital and healthcare policymakers.

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