



**PRESCRIBING PATTERN IN A PEDIATRIC OUTPATIENTS CLINIC OF A SECONDARY HEALTHCARE FACILITY IN DELTA STATE, NIGERIA**

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**ABSTRACT**

Appropriate prescribing enhances rational use of medicines which ultimately reduces drug-related problems. This study evaluated the prescribing pattern of medicines to patient under age five attending an out-patient pediatric clinic. This study was done at the "Under-five" pharmacy unit of Central hospital Warri, Delta State Nigeria. Prescriptions of patients under five years of age who visited the unit from 20<sup>th</sup> August - 20<sup>th</sup> November 2018 were assessed using the WHO prescribing indicators. Descriptive statistical analysis was done to determine the mean number of drugs prescribed and the percentages of encounters for other WHO prescribing indicators. Pearson chi square test was also performed to determine relationship between these indicators. A total of 1408 drugs and an average of  $3.05 \pm 1.02$  drugs were prescribed in the 462 prescriptions assessed. Percentage of drugs prescribed by generic names was 67.83%. The percentage of encounters with antibiotics and injections prescribed was 69.04% and 0% respectively. Percentage of drugs prescribed from the Essential Drugs List was 94.03%. There was significant relationship between number of drugs prescribed and number of diagnosis ( $P < 0.001$ ) and between number of drugs prescribed and the occurrence of antibiotics in a prescription ( $P < 0.001$ ). Irrational prescribing of antibiotics was detected and this is a major concern in this age group which is particularly vulnerable to infectious diseases.

**KEYWORDS:** Prescribing indicators; Pediatrics; Rational drug use.

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**INTRODUCTION**

Rational use of medicines refers to the appropriate, correct and proper use of medicines. It requires prescribing the appropriate drug in the right quantity for the right duration and at a least the cost. The World Health Organization (WHO) estimates that over 50% of all medicines are erroneously prescribed, dispensed or sold and that half of patients do not take them the right way This wrong use may be in the form of misuse, overuse or underuse of prescription or non-prescription medicines, polypharmacy, inappropriate self-

medication [1]. The prescribing behavior of physicians and other healthcare professionals who sometimes stand in their position as issuer of drug prescriptions determines the extent to which drug is used.

The prescribing practice of a healthcare professional reflects his ability to determine the drugs which will benefit the patient the most. In order to achieve safe and effective pharmacotherapy in pediatric patients there should be a prompt development of information on how medicines should be used across all age groups in pediatrics and also the development of suitable formulations [2]. Irrational prescribing gives rise to adverse reactions, increased occurrence of

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drug interactions and high cost of healthcare [3]. Regular prescriptions auditing enables the identification of various types of non-rational prescribing such as polypharmacy, irrational use of antimicrobials and injectables [4]. Irrational use of antimicrobials results in antimicrobial resistance and ultimately therapy failure. A study in Tanzania reported that 72.2% of patient with common cold were prescribed Amoxicillin [5]. Polypharmacy and other forms of inappropriate forms of prescribing could be extremely harmful in children because of their physiological peculiarities [6].

Children below age 14 constituted more than 40% of the Nigerian population [7] and those below age five constitute the majority of patients attending the pediatrics outpatient clinics in Nigeria. Mortality rates within this age bracket is very high because of their vulnerability to many communicable infectious diseases and this necessitates special attention towards their care. Adverse drug reactions in children particularly could contribute to morbidity and mortality because of the immaturity of their immune system and their inability to communicate adequately. In an attempt to reduce the morbidity and mortality rates, the Delta state government had initiated free Medicare for patients aged between 0-59 months old. This initiative which is laudable, will, however, yield great benefits with associated rational drug prescribing. There is paucity of research on the prescribing pattern to pediatric patients in this state and this has prompted a study as this which evaluated the prescribing pattern in pediatric patients and ultimately the rationality of drug use in this age group.

## METHODS

The study was done in the "Under-five" pharmacy unit of Central Hospital Warri, a secondary healthcare facility. The 'Under-five' pharmacy unit is where prescriptions are filled for children between the ages of 0–59 months and opens from 10am to 3pm on week days. This prospective cross-sectional study was undertaken between 20<sup>th</sup> August and 20<sup>th</sup> November 2018. The study population included all children under the age of 5(0-59months) who were brought in by their mothers or other caregivers to see the doctors for medical treatment. Other out-patient pediatrics age 5 years and above and all in-patient pediatrics were excluded from the study. Data was extracted from the prescriptions which were presented at the pharmacy unit after patients' consultation with the doctor.

Data was collected using a pretested data abstraction form and these included patients' demographics, diagnoses, and name of drugs,

dosage regimens. The data were evaluated and documented using World Health Organization (WHO) prescribing indicators which included Average number of drugs per encounter, Percentage of drugs prescribed by generic name, Percentage of encounters in which an antibiotic was prescribed, Percentage of encounters with an injection prescribed, Percentage of drugs prescribed from the Essential Drugs List [8].

Nigerian Essential Medicine List, 6<sup>th</sup> edition 2016 was used for assessing the number of drugs prescribed from the Essential Drugs List. Drugs prescribed were categorized into various classes using the USP therapeutic categories model guidelines [9].

The data obtained were sorted and entered into Microsoft Excel software and coded. Descriptive statistical analysis was done with the aid of the Statistical Package for Social Sciences (SPSS) software and results were expressed in terms of frequency and percentages. Also, chi square tests were performed to determine the relationship between categorical variables with values of significance set at  $p < 0.05$ . Also, the mean occurrence of different classes of drugs in the prescriptions studied were compared.

This study was a part of a larger study on Assessment of drug-related problems in a pediatric population, granted ethical approval at Central Hospital Warri, Delta State, Nigeria.

## RESULTS

A total of 462 prescriptions were encountered in the study. The majority of the patients were female (233, 50.4%) and were aged between >1 month to 24 months (360, 77%) as shown in Table 1.

A total of 1408 drugs were prescribed to 462 patients. The average number of drugs prescribed per encounter was  $3.05 \pm 1.02$  with a range of 1 to 7 drugs. Percentages of drugs prescribed by generic names, of encounters with antibiotics, of drugs from the Essential Drugs List and encounters with injections are 67.83%, 69%, 94.03% and 0%, respectively (Table 2).

A total of 699 diagnoses were made in the 462 prescriptions studied with 237(51.3%) of encounters having more than one diagnosis.

Pearson's Chi Square tests results between categorical variables are as shown in Tables 3,4,5,6, and 7.

There was a significant association between the number of disease conditions diagnosed and number of drugs dispensed ( $P < 0.001$ ). Also, occurrence of antibiotics in a prescription was

significantly associated with the number of disease conditions diagnosed in a patient ( $P < 0.001$ ). Relationships between other categorical variables were not statistically significant (Tables 3, 4, 6)

Malaria was diagnosed in 317 (68.6%) encounters and made up 45.5% of total cases diagnosed; Upper Respiratory Tract Infections (URTI) was diagnosed in 255 (55.2%) encounters and made up 36.5% of total cases diagnosed. Upper Respiratory tract infection was therefore only next to malaria as the most frequently diagnosed condition among all the diagnosis made.

About 73 in every 100 encounters had drugs from the category of Electrolyte/Vitamins /Minerals, 69 in every 100 encounters had analgesics and antibacterials while Antiparasitic drugs had an occurrence of 66 in every 100 encounters. Figure 1 shows the mean occurrence of different categories of drugs in the encounters.

Paracetamol occurred in 305 of the 462 encounters, while Artemether/Lumefantrine and cefuroxime were prescribed in 281 and 132 encounters respectively. Consequently, Paracetamol, Artemether/Lumefantrine and Cefuroxime accounted for the most prescribed drugs.

## DISCUSSION

This study assessed the pattern of prescription in outpatients below five years of age. The high number of drugs prescribed per encounter seen in this study corroborates findings in other parts of the world where high values such as 3.77 [10], 4.29 [11], and a range of 2.9 -3.8 in some facilities in Nigeria [12, 13] but this value is higher than that in children in a tertiary hospital in India [14] where an average number of prescriptions was 1.9. Moreover, an Italian study [15] which had prescription prevalence rate of 65% in children age 1-5 years reported an average prescription rate of 2.9. Polypharmacy is having many drugs in one prescription or prescribing too many medications for a particular patient. Polypharmacy has been reported to be one of the causes of adverse drug reactions in children [16] which can further add to the cost of therapy. The occurrence of more than one diagnosis in over half of the prescriptions studied could have been contributory to the high average drugs per encounter obtained in this study. This was further buttressed by the significant association between number of drugs prescribed and the numbers of diagnosis. In this prevailing situation, polypharmacy can therefore be

regarded as "Appropriate" as suggested by Masnoon et al [17]. The percentage of encounters with antibiotics was higher than the W.H.O optimal range (20.0 – 26.8%). Umar and colleagues reported a lower value of 49.5% in hospitalized children in Nigeria [18] and another study on children admitted to pediatric general medical wards across five countries reported 65.1% of patients receiving at least one systemic antibacterial [19]. A Ghanaian study found that 55.2% of all prescriptions in an out-patient department contained an antibiotic [20]. The high percentage of antibiotics may be due to patient expectation to receive antibiotics and the finding that the use of antibiotics in "under-fives" is largely based on symptoms [21] and the frequent prescription of antibiotics for upper respiratory tract infections. Similarly, antibiotics were overprescribed in patients with upper respiratory tract infections in Tanzania [5]. Antibiotics are one of the groups of drugs most commonly involved in adverse drug reactions and often found to be overused. Inappropriate use of antibiotic leads to increase in antibiotic resistance and may increase treatment costs. As much as possible antibiotics prescribing in health facilities should be low and if possible based on susceptibility test results against the responsible microorganisms. This is mainly to combat the emanation of infections caused by multidrug resistant organisms which are more difficult to treat. It is for such reasons that W.H.O recommends antibiotic prescribing should be as low as less than 30%.

The percentage of drugs prescribed by generic names is comparable to those found in a Nigerian study [13] where 65.3% and 62.3% were reported in different centers. This was somewhat different in a primary and secondary facilities in Northern Nigeria where 55.0% and 57.9% were reported [12]. Although a South Indian study [22] reported only 19.16% of drugs prescribed by generic names to in-patients in a pediatric unit, a Sierra-Leonean and Egyptian studies [10, 23] reported 71% and 95.4% of drugs prescribed by generic names respectively. Prescribing in generics reduces the cost of treatment and prevent errors and confusion in prescription writing and dispensing. Pressure from company representatives and lack of continuing education on rational prescribing are some factors which are responsible for prescribing in brand names. None prescription of injections observed at this study centre may be attributed to a better knowledge of physicians regarding risk of injection. Also, pediatric patients with emergency cases are treated in the

**Table 1: Demographics characteristics of patients**

Characteristics		Frequency	Percentage (%)
Age	0 – 1 month	14	3.0
	>1 month – 24 months	360	77.9
	>24 months – 59 months	88	19.0
Sex	Male	229	49.6
	Female	233	50.4

**Table 2: Prescribing Indicators**

WHO Prescribing Indicators	Total drugs prescribed	Average/Percent (%)	Optimal values
Average number of drugs/encounter	1408	3.05 ±1.02	1.69 - 1.8
Percentage of drugs prescribed by generic names	955	67.83	100%
Percentage of encounters with antibiotics prescribed	319	69.01%	20.0 – 26.8%
Percentage of encounters with injections prescribed	0	0%	13.4 – 24.1%
Percentage of drugs prescribed from Essential Drugs List (EDL)	1324	94.03%	100%

**Table 3: Association between Number of drugs prescribed and Age group**

Age group	No of Drugs Prescribed		Chi Square	P value
	≤3 drugs	>3drugs		
Neonate and Infant(0-12months)	193	61	1.167	0.558
Toddlers (>12months -36months)	122	49		
Young Child (>36 months - 59months)	27	10		

**Table: 4 Association between number of Diagnosis and Age group**

Age group	Diagnosis		Chi square	P value
	One disease condition	Two more or disease conditions		
Neonates and Infants (0-12 months)	126	128	0.526	0.769
Toddlers (> 12 months - 36months)	83	88		
Young child (> 36 months -59 months)	16	171		

**Table 5: Association between Number of drugs and Number of disease conditions diagnosed**

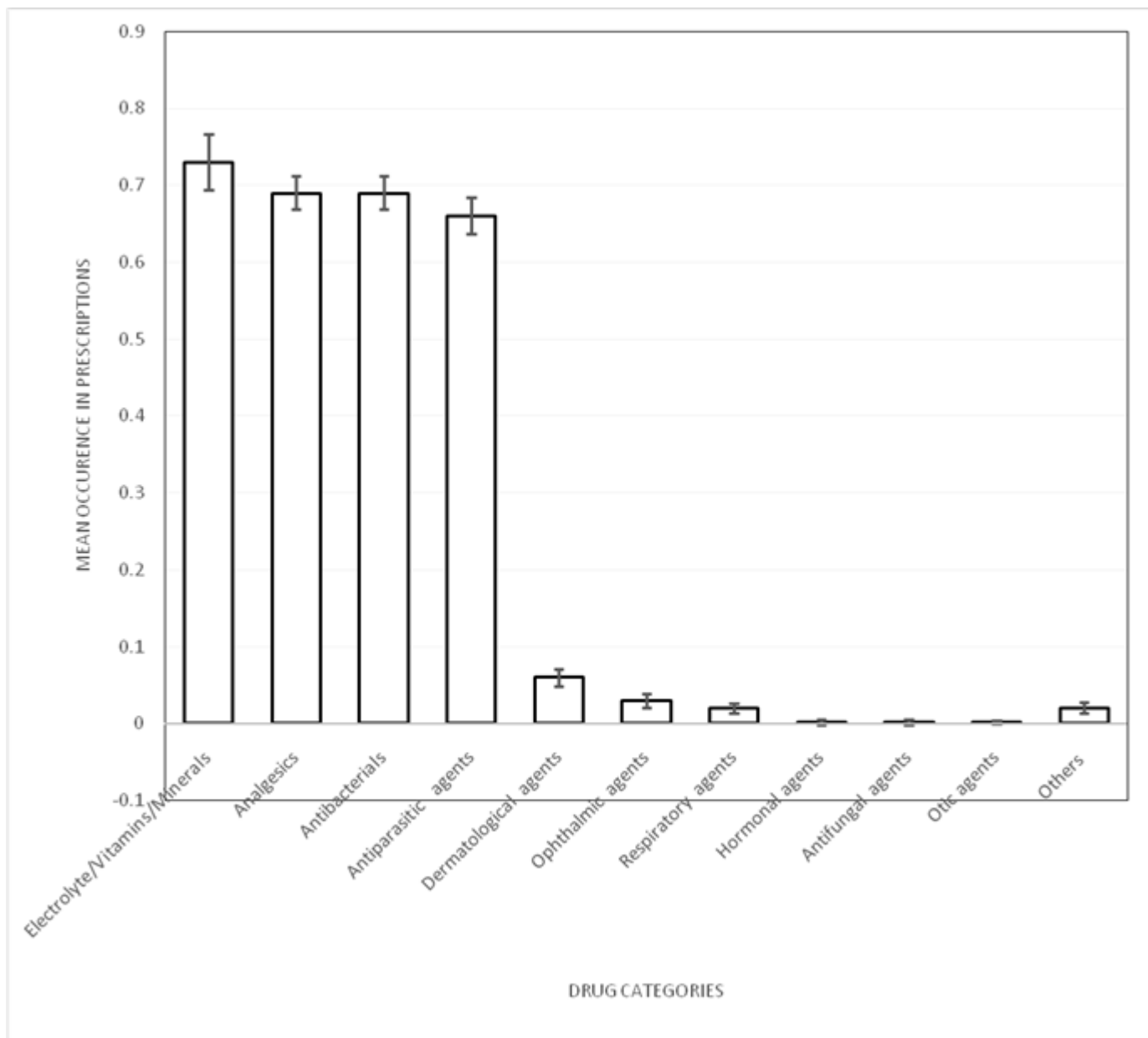
Diagnosis	Number of drugs prescribed		Chi square	P value
	≤ 3 drugs	>3 drugs		
One disease condition	197	28	41.756	0.000
More than one disease condition	145	92		

**Table 6: Association between number of drugs prescribed and occurrence of antibiotics in a prescription**

Occurrence of antibiotics	Number of drugs prescribed		Chi square	P value
	≤ 3	>3		
No Occurrence	101	32	0.356	0.639
Occurrence	241	88		

**Table 7: Association between the number of disease conditions diagnosed and occurrence of antibiotics in a prescription**

Occurrence of antibiotics	Diagnosis		Chi Square	P value
	One disease condition	More than one disease condition		
No Occurrence	92	41	31.330	0.000
Occurrence	133	196		



**Figure 1: Categories of Drugs Prescribed.**

Emergency clinic or admitted to the wards for adequate medical care.

The percentage of drugs prescribed from the Essential Drugs List was higher than those derived in other studies conducted in Nigeria [12,13] with values ranging from 85.6-91.7%. However, 49.8 and 70.6 % of drugs were prescribed from the W.H.O Essential Medicines List in a South Indian [22] and Sierra Leonean [10] pediatric populations respectively. Interestingly, Senthilselvi *et al.* reported the prescription of drugs exclusively from the Essential drugs list [12]. The high value obtained in this study, though, lower than the 100% recommended by the WHO could be attributed to the efforts of the state government to promote drug prescribing from the Essential Drugs List in the free Medicare program for these patients. Prescribing from Essential Drugs List promote rational and cost-effective use of medicines. Paracetamol, Cefuroxime and Artemether/Lumefantrine accounted for the drugs most often prescribed, which is could be a result of the high incidence of malaria and respiratory tract infections diagnosed in this population.

## CONCLUSION

Irrational prescribing was detected as shown by non-adherence to some of the WHO prescribing indicators. High prescription of antibiotics as shown by the prescribing indicator portends great danger at it could result in antibiotics resistance leading to treatment failures. Also, drug prescription by brand names increases cost of treatment and should therefore be discouraged. There is the need to improve on the prescription pattern by ensuring adherence to optimal values in antibiotic prescription, percentage of drugs prescribed by generics and percentage of drugs per encounter thereby improving on rational drug use in this pediatric population.

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