



## DRUG UTILIZATION PATTERN IN PREGNANCY IN A TERTIARY HOSPITAL IN EBONYI STATE, NIGERIA: A FIVE-YEAR RETROSPECTIVE ANALYSIS

KOSISOCHI CHINWENDU AMORHA <sup>1,\*</sup>, CHIOMA ASSUMPTA OKONKWO <sup>2</sup>

1. Department of Clinical Pharmacy and Pharmacy Management, Faculty of Pharmaceutical Sciences, University of Nigeria, Nsukka, PMB 410001, Enugu State, Nigeria.
2. Department of Pharmacy, Alex Ekwueme Federal University Teaching Hospital Abakaliki, PMB 102, Ebonyi State, Nigeria.

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### ABSTRACT

Drugs prescribed in pregnancy may diffuse across the placenta to the foetus thereby posing risk of teratogenicity. The rational use of drugs in pregnancy is paramount. The general objective of the study was to assess the pattern of drug utilization in pregnant women who attended antenatal outpatient department in Federal Teaching Hospital, Abakaliki, Ebonyi State (FETHA). A validated proforma was used to retrospectively retrieve information on drugs prescribed from 1st January 2013 to 31st December 2017 using the World Health Organization/International Network for the Rational Use of Drugs (WHO/INRUD) core prescribing indicators. Data were analyzed with descriptive statistics using the IBM SPSS version 25. Ethical approval was obtained from the Research and Ethics Committee of Federal Teaching Hospital, Abakaliki, Ebonyi State (FETHA) prior to conducting the study. A total of 1036 prescriptions were utilized, drawn from 415 patient folders. The mean age of the subjects was  $30.66 \pm 5.17$ . Most of the patients had tertiary education (82.6%) and were civil servants (46.6%). Patients' obstetrics history showed that about a fifth (20.2%) were primigravid and a tenth (9.9%), in their first trimester. Abdominal/muscle pains (7.9%), upper respiratory tract infections (7.7%) and malaria (7.3%) occurred most frequently. Haematinics (45.3%) were the most prescribed drugs while amoxicillin was the most frequently prescribed antibiotic (36.0%). The average number of drugs per encounter was 4.2. The percentage of encounters with an antibiotic and an injection prescribed were 12.9% and 0.96% respectively. Only 40.5% of the drugs were prescribed by their generic names. The average number of drugs per encounter was above the WHO/INRUD reference value. The percentage of drugs prescribed by generic name and from the essential drugs list or hospital formulary were less than 100%. Antibiotics and injections were not frequently prescribed. More efforts are needed to encourage rational prescribing, prescribing by generic name and the availability of drugs in the essential drugs list.

**KEYWORDS:** Drug utilization; Pregnancy; Rational drug use; WHO/INRUD core indicators.

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### INTRODUCTION

Few medicines have been specifically tested for safety in pregnancy, making the use of medicines in this category of patients challenging [1]. Special consideration needs to be given to drug prescribing in pregnancy, as every drug is potentially harmful to the growing foetus [2, 3]. Prescription drugs may pose dangers to pregnant subjects, as exemplified

by the thalidomide incidence of the 1960s and the teratogenic effects that were discovered related to diethylstilbestrol in 1971 [4, 5].

In pregnancy, prescriptions are made for the management of anaemia, treatment of conditions secondary to pregnancy such as urinary tract infections, eclampsia, upper respiratory tract infections, pains and to treat pre-existing chronic conditions [6]. A study on hypertension showed that therapy during pregnancy significantly reduced

\*Corresponding author: [kosisochi.amorha@unn.edu.ng](mailto:kosisochi.amorha@unn.edu.ng); +2348038539349

maternal and perinatal morbidity and mortality, pre-eclampsia, eclampsia and placenta *abruptio* [7]. Haematinics and malaria prophylaxis are beneficial in pregnancy [8]. Access to quality care and drugs during pregnancy, especially at delivery, is the crucial factor in explaining the disparity in maternal mortality between the developing countries and industrialized world [9]. Effects of irrational drug use include: developmental delay, intellectual disability, birth defects, miscarriage and stillbirth [10].

The World Health Organization (WHO) defined rational use of drugs as patients receiving medications appropriate to their clinical needs, in doses that meet their own individual requirements, for an adequate period of time and at the lowest cost to them and their community [11]. Irrational prescribing is influenced by: patients, healthcare professionals, environment, drug supply system (industrial impacts), legal regulations, information/misinformation about medicines and profiteering intentions by selling more medicines [12].

The major step towards rational use of medicines was taken in 1977, when WHO established the first model list of Essential Medicines to assist countries in formulating their own national lists. In 1989, the International Network for the Rational Use of Drugs (INRUD) was formed to conduct multi-disciplinary intervention research projects to promote more rational use of medicine [11]. Prescribing indicators (based on the practices observed in a sample of clinical encounters), measure the performance of health care providers in several key dimensions related to the appropriate use of drugs [11, 13 – 16]. Although the Federal Teaching Hospital, Abakaliki, Ebonyi State, Nigeria (FETHA) is a major tertiary hospital in Ebonyi State, receiving referrals from general hospitals and private clinics, there is paucity of data on the drug utilization pattern among pregnant women. Hence, this study sought to assess the pattern of drug utilization among pregnant women who attended antenatal outpatient clinic in FETHA, using the WHO/INRUD prescribing indicators.

## **METHODS**

### **Study design/setting**

This was a retrospective survey conducted in the Federal Teaching Hospital, Abakaliki, Ebonyi State, South East, Nigeria (FETHA) over a period of five years (1st January 2013 to 31st December 2017) to assess the pattern of drug utilization in pregnant women who attended its antenatal outpatient

department. FETHA was instituted in 2012, with over 502 beds and 11 wards.

### **Eligibility criteria**

The eligibility criteria included the prescriptions of all pregnant women 18 years old and older who attended the antenatal outpatient department of FETHA within the years under review.

### **Sample size and selection**

Based on a sample population of 20,023 registered antenatal patients, the Raosoft® sample size calculator was utilized to determine the minimum recommended sample size of 377 at 5% margin of error and 95% confidence level [17]. To allow for missing data, 10% of the sample size was added to arrive at 415 medical case files to be utilized.

Systematic random sampling technique was used to select the 415 case files. Three prescriptions (one for each trimester) were taken from each case file. Some case files did not contain data for some trimesters. Consequently, 1036 prescriptions were utilized, instead of 1245 prescriptions. All the prescriptions were within the years under review.

### **Data collection**

A structured pro-forma tool was used as the instrument for this study. This tool comprised five sections. Section A sought the demographic information of the patients; Section B focused on the obstetric information of the patients; Section C was related to the profile of medical conditions among the pregnant women for the five years; Section D focused on the drugs used/prescribed and Section E was the total drug count.

The questions contained in this pro-forma were generated from similar studies previously conducted [5, 18].

### **Data analysis**

Data were analyzed using the IBM SPSS Version 25.0. General characteristics of the respondents were summarized using basic descriptive statistics, such as mean  $\pm$  standard deviation. The WHO/INRUD methods of determining core prescribing indicators were employed in this study [11].

### **Ethical considerations**

Ethical approval was obtained from the Research and Ethics Committee of FETHA prior to conducting the study. The confidentiality of the data obtained was ensured. Neither the names, addresses nor other revealing details of the patients were documented in the pro-forma.

## RESULTS

A total of one thousand and thirty-six (1036) prescriptions were utilized, drawn from four hundred and fifteen (415) patient folders.

The mean age of the subjects (years) was  $30.66 \pm 5.17$ . Majority of the women (73.0%) were within the reproductive age of 25 - 34 years. Most women were civil servants (46.6%) and had tertiary education as their highest educational level attained (82.6%), as shown in Table 1.

Patients' obstetrics history showed that about a fifth (20.2%) were primigravid. A tenth of the women (9.9%) were in their first trimester with more women in the second and third trimesters, as presented in Table 2.

A total of 1189 medical conditions were identified. The pattern of medical conditions occurring among women in the facility showed muscle pains occurred most frequently (7.9%) followed by upper respiratory tract infections (7.7%) and malaria (7.3%). Vaginal bleeding, oedema, chicken pox and numbness of fingers were the least frequent, as shown in Table 3. From the medication history, 4328 counts were made. The patients' medication history showed that haematinics (45.3%), ascorbic acid (19.2%) and anti-malarials (12.2%) were the drugs most prescribed for the pregnant women. The bulk of the prescribed anti-malarials were for intermittent preventive therapy (IPT). Analgesics (6.2%), majorly acetaminophen, and antibiotics (3.1%) were also prescribed. Bronchodilators (0.02%) and steroid creams (0.02%) were the least prescribed, as depicted in Table 4.

Drug use according to the class of the drugs showed that amoxicillin was the most frequently prescribed antibiotic (36.0%), closely followed by amoxicillin/clavulanic acid (34.6%). Among the analgesics, acetaminophen was the most frequently used (96.3%). Sulfadoxine-pyremethamine was the most prescribed antimalarial agent (73.2%) and clotrimazole the most prescribed antifungal agent (46.0%), as shown in Table 5.

Based on the WHO/INRUD core prescribing indicators, out of the total drugs prescribed, the average number of drugs per encounter was 4.2. The percentage of encounters with an antibiotic and an injection prescribed were 12.9% and 0.96% respectively. One thousand seven hundred and fifty-two (1752) drugs were prescribed using their generic names (40.5%), as presented in Table 6.

## DISCUSSION

The results of this study revealed that the various medical conditions during pregnancy warranted the

use of different types of drugs. Majority of the women were 25 – 34 years old, multigravid and in their second or third trimester of pregnancy. Abdominal and muscle pains, upper respiratory tract infections and malaria were the most prevalent medical conditions. Sulphadoxine-pyrimethamine was the most prescribed anti-malarial drug. The average number of drugs per encounter was above the WHO/INRUD reference value. The percentage of drugs prescribed by generic name and from the essential drugs list or hospital formulary were less than 100%. Antibiotics and injections were not frequently prescribed.

The average maternal age of the women in this study was higher than obtained in other similar studies [5, 19 – 20]. Majority of the women were within the reproductive age (25 – 34) and almost all were married probably due to their socio-cultural and religious beliefs. In South-Eastern Nigeria, indigenes are majorly Christians and giving birth out of wedlock is loathed [21]. Most of the patients were educated up to the tertiary level. Also, a large percentage of the women were civil servants. These might be because the hospital is located in Abakaliki, the capital of the state. Although women from different parts of the state could have their antenatal visits in the hospital, most of those who are registered reside in the capital due to ease of access. Ebonyi people, women inclusive, are highly involved in agricultural activities but the capital has most government jobs and offices [22].

The antenatal clinics were majorly attended by women in their second and third trimesters. This is in concordance with the findings of the study conducted in Sokoto State, Nigeria [5]. However, another study conducted in a primary hospital in Ethiopia revealed that majority of the pregnant women visited antenatal care during their first trimester gestation [1]. Maternal factors such as health status in present pregnancy, ignorance of the appropriate time to register, exposure; socio-cultural factors such as preference for mother-in-law, friends or other women's advice during the early weeks of pregnancy; religious factors such as preference for prayer and faith healings; institutional factors such as long waiting time and frequent antenatal care follow-up schedule predispose pregnant women to late booking for antenatal care [23]. An increase in the number of contacts between health care providers and pregnant women has been suggested as a possible means to improve intermittent preventive treatment in pregnancy with Sulphadoxine-pyrimethamine (IPTp-SP) coverage

**Table 1: Patient demographic data, N = 1036**

<b>Variables</b>	<b>n (%)</b>
<b>Age (in years)</b>	
18 – 24	70 (6.8)
25 – 34	756 (73.0)
35 – 44	210 (20.3)
≥ 45	Nil
<b>Education</b>	
None	7 (0.7)
Primary	21 (2.0)
Secondary	152 (14.7)
Tertiary	856 (82.6)
<b>Marital status</b>	
Single	7 (0.7)
Married	1029 (99.3)
Widowed	Nil
Divorced	Nil
<b>Occupation</b>	
Civil servant	483 (46.6)
Self-employed/ business	252 (24.3)
Full-time house wife	130 (12.5)
Trader	57 (5.5)
Student	101 (9.7)
Farming	13 (1.3)
<b>Tribe</b>	
Hausa	3 (0.3)
Igbo	975 (94.1)
Yoruba	19 (1.8)
Others	13 (3.8)
<b>Religion</b>	
Christianity	1024 (98.8)
Muslim	12 (1.2)

Mean age in years (standard deviation) = 30.66 ± 5.17

**Table 2: Obstetric History, N = 1036**

<b>Variables</b>	<b>n (%)</b>
<b>Gravidity</b>	
Primigravid	209 (20.2)
Multigravid	827 (79.8)
<b>Trimester</b>	
1st trimester (0 – 13 weeks)	103 (9.9)
2nd trimester (14 – 26 weeks)	512 (49.4)
3rd trimester (27 – 39 weeks)	421 (40.6)

**Table 3: Profile of medical conditions among the pregnant women, n = 1189**

<b>Medical conditions</b>	<b>n (%)</b>
Pains	94 (7.9)
Upper respiratory tract infections	92 (7.7)
Malaria	87 (7.3)
Headache	82 (6.9)
Fungal infection	31 (2.6)
Urinary tract infections	31 (2.6)
Itching	29 (2.4)
High blood pressure	20 (1.7)
Nausea and vomiting	10 (0.8)
Other infections	10 (0.8)
Weakness	10 (0.8)
Gastro intestinal tract infections	7 (0.6)
Heart burn	7 (0.6)
Loss of appetite	6 (0.5)
Abdominal discomfort	5 (0.4)
Insomnia	3 (0.3)
Vaginal bleeding	2 (0.2)
Edema	1 (0.1)
Chicken pox	1 (0.1)
Numbness of fingers	1 (0.1)
Others	22 (1.9)
Nil	638 (53.7)
Total	1189 (100.0)

**Table 4: Drug Count, n = 4328**

<b>Drug class</b>	<b>n (%)</b>
Haematinics (ferrous sulphate and folic acid)	1962 (45.3)
Ascorbic acid	830 (19.2)
Anti-malarials	527 (12.2)
Calcium lactate	297 (6.9)
Analgesics	270 (6.2)
Antibiotics	136 (3.1)
Antifungals	50 (1.2)
Expectorants	49 (1.1)
Antiallergy	38 (0.9)
Antihypertensives	34 (0.8)
Anti-peptic ulcer drugs	32 (0.7)
Multivitamins and mineral preparations	27 (0.6)
Vitamin B complex	20 (0.5)
Antiprotozoals	20 (0.5)
Antiprotozoals and antifungal combinations	12 (0.3)
Hypnotics/sedatives	10 (0.2)
Myometrial relaxants	5 (0.12)
Anthelmintics	2 (0.05)
Electrolyte replacements	2 (0.05)
Steroid creams	1 (0.02)
Bronchodilators	1 (0.02)
Others	3 (0.07)
Total	4328 (100.0)

**Table 5: Drug count per class**

<b>Variables</b>	<b>n (%)</b>
<b>Antimalarials</b>	
Sulphadoxine-pyrimethamine	386 (73.2)
Artemether-lumefantrine	123 (23.3)
Alpha beta arteether	6 (1.1)
Artesunate amodiaquine	5 (0.9)
Chloroquine	4 (0.8)
Dihydroartemisinin piperazine	3 (0.6)
<b>Antibiotics</b>	
Amoxicillin	49 (36.0)
Amoxicillin/clavulanic acid	47 (34.6)
Erythromycin	18 (13.2)
Ampicillin/cloxacillin	9 (6.6)
Cefuroxime	4 (2.9)
Ampicillin	3 (2.2)
Azithromycin	2 (1.5)
Cefpodoxime	1 (0.7)
Co-trimoxazole	1 (0.7)
Ciprofloxacin	1 (0.7)
Penicillin	1 (0.7)
<b>Anti-peptic ulcer drugs</b>	
Liquid antacid	29 (90.6)
Chewable antacid	2 (6.3)
Ranitidine	1 (3.1)
<b>Analgesics</b>	
Acetaminophen	260 (96.3)
Tramadol	6 (2.2)
Mefenamic acid	4 (1.5)
<b>Antifungals</b>	
Clotrimazole	23 (46.0)
Nystatin	13 (26.0)
Clotrimazole cream	7 (14.0)
Fluconazole	5 (10.0)
Tioconazole cream	2 (4.0)
<b>Antiprotozoals</b>	
Metronidazole	20 (100.0)
<b>Electrolyte replacement</b>	
Oral rehydration salts	1 (50.0)
Infusion 5% dextrose in saline	1 (50.0)
<b>Anthelmintics</b>	
Albendazole	2 (100.0)
<b>Anti-allergy</b>	
Chlorpheniramine	20 (52.6)
Loratidine	10 (26.3)
Dexamethasone	3 (7.9)
Metoclopramide	3 (7.9)
Cetirizine	1 (2.6)
Promethazine	1 (2.6)
Hydrocortisone cream	1 (2.6)
<b>Antihypertensives</b>	
Methyldopa	21 (61.7)
Nifedipine	5 (14.7)
Low dose aspirin	7 (20.6)

Hydralazine	1 (2.9)
<b>Hypnotics and sedatives</b>	
Bromazepam	9 (90.0)
Diazepam	1 (10.0)
<b>Muscle relaxants</b>	
Hyoscine	5 (100.0)
<b>Antiprotozoals/ antifungals</b>	
Metronidazole/clotrimazole combination	12 (100.0)
<b>Bronchodilators</b>	
Salbutamol	1 (100.0)

**Table 6: WHO/INRUD core prescribing indicators**

<b>Prescribing Indicators</b>	<b>n or % (study results)</b>	<b>n or % (reference values)</b>
Average number of drugs per encounter	4.2	1.6 – 1.8
Percentage of drugs prescribed by generic name	40.5%	100%
Percentage of encounters with an antibiotic prescribed	13.13%	20.0 – 26.8%
Percentage of encounters with an injection prescribed	0.96%	13.4 – 24.1%
Percentage of drugs prescribed from EDL or formulary	90%	100%
Total injections prescribed	13	-
Total antibiotics prescribed	136	-
Total drug count	4328	-

EDL = essential drugs list

which is effective in preventing the adverse consequences of malaria on maternal and fetal outcomes [24].

Multigravid women were the majority in this study. This corroborates the findings of studies conducted in Sokoto and Edo State, both in Nigeria [5, 18]. Nigerian families appear to be favourably predisposed to having more than a child. Although, 99% of all maternal deaths occur in developing countries, maternal mortality worldwide dropped by about 44% between 1990 and 2015 [25]. In spite of the fact that late booking for antenatal care is a frequent occurrence among pregnant women in Nigeria, multigravid women are more experienced than primigravid women in issues regarding pregnancy as they may have attended antenatal clinics in their previous pregnancies [23].

Pains, upper respiratory tract infections and malaria were the medical conditions that occurred most frequently. In the study in Benin-City, Edo State, Nigeria, malaria fever occurred most frequently (38.3%), followed by upper respiratory tract infections (12.8%) and gastrointestinal infections (11.6%) [18]. Haematinics, ascorbic acid and antimalarial agents were the drug classes with the highest counts. In a similar study in Sokoto State, Nigeria, the patients' medication history showed that the most used drugs were: antimalarials, analgesics, antibiotics and haematinics [5]. In a study in Benin-City, the medicines frequently prescribed were: minerals/vitamins, analgesics, antimalarials and antibiotics [18]. The prevention and treatment of malaria are essential components of antenatal care in endemic areas but it requires special consideration during pregnancy. Inadequate consumption of antimalarial drugs by patients may be a major contributory factor to the diminishing efficacy of the commonly available antimalarial drugs and development of drug resistant strains of the *Plasmodium falciparum* malarial parasites in communities [26].

Anaemia is more common in pregnant women than non-pregnant women for a variety of reasons, including the dilutional effects of increased intravascular volume during the second trimester as well as the increased demand on iron and folate stores [27, 28]. The causes of anaemia during pregnancy include micronutrient deficiencies of iron, folate, and vitamins A and B12 and anemia due to parasitic infections such as malaria and hookworm or chronic infections like tuberculosis and Human Immunodeficiency Virus (HIV) [29 – 33]. Anaemia during pregnancy increases the risk of maternal and perinatal mortality [34, 35]. Vitamin C deficiency is prevalent among pregnant women in developing

countries. Vitamin C may help reduce the risks of some complications in pregnancy such as pre-eclampsia, intrauterine growth restriction and maternal anemia but further research is required [36, 37]. Ascorbate is a vitamin cofactor and an enhancer of dietary iron absorption [38].

Sulphadoxine-pyrimethamine (SP) was the most prescribed drug in the class of antimalarials. This differed from the study in Sokoto where artemether-lumefantrine was most prescribed [5]. In the study in Benin-City, chloroquine was most prescribed [18]. Due to the substantial risk malaria poses to the mother, her foetus and the neonate, intermittent preventive treatment of malaria in pregnancy (IPTp) is advocated, regardless of whether the recipient is infected with malaria [24]. WHO recommends IPTp with Sulphadoxine-pyrimethamine (IPTp-SP) in all areas with moderate to high malaria transmission in Africa [24]. It is recommended that this preventive treatment be given to all pregnant women starting as early as possible in the second trimester, such that the women receive at least 3 doses of SP during pregnancy, with each dose being given at least 1 month apart, even up until the time of delivery [24].

Amoxicillin was the most prescribed antibiotic, either alone or in combination with clavulanic acid. This was probably due to the high prevalence of upper respiratory tract infections among the pregnant women, as well as other bacterial infections. This was similar to the findings in the study in Sokoto [5]. Also, in the study in Benin-City, the penicillins were the most prescribed antibiotics [18]. Amoxicillin, assigned to pregnancy category B by the US Food and Drug Administration, has been the preferred drug for the treatment of respiratory and urinary tract infections which are frequently encountered in women of childbearing age [39]. However, its use in early pregnancy may be associated with an increased risk of oral clefts [39].

Pain was the most reported medical condition among the pregnant women and acetaminophen was the most prescribed analgesic probably due to its affordability, tolerability and fewer adverse effects compared to the non-steroidal anti-inflammatory drugs (NSAIDs) or opioid analgesics. Acetaminophen was also the major analgesic in similar studies [40 – 42].

Our study revealed that the average number of drugs per encounter was above the reference value. Similar results were obtained in Sokoto where the average drug per prescription was 3.1 and Benin-City, 3.0 [5, 18]. In pregnancy, there might be comorbid conditions which warrant the prescription of multiple drugs combined with the use of routine drugs such as iron preparations, folic acid, ascorbic

acid and vitamin B complex tablets [5]. Rational prescribing involves maximizing clinical and cost-effectiveness, minimizing harm while respecting patient choice [43 – 45]. Polypharmacy occurs when a person is taking many different medications at the same time which may increase the potential for drug interactions, adverse reactions, poor adherence and increased costs [15, 46, 47]. Possible causes of polypharmacy include poor knowledge of rational prescribing, absence of evidence-based guidelines, incentives to prescribers [47].

Not all medicines were prescribed by their generic names. Similar results were obtained in Benin-City and Sokoto [8, 15]. The World Health Organization highly recommends prescribing medications by their generic names, as a safety precaution for patients because it identifies the drug clearly, allows for safe prescription and dispensing of medicines to patients, enables better information exchange among health professionals and scientists worldwide [14, 48]. The practice of prescribing with brand names should be discouraged [13, 41, 49, 50]. Factors such as drug promotional activities, pressures of medical representatives from pharmaceutical companies, lack of continuing education on the principles of rational prescribing and non-familiarity with generic names among prescribers may be responsible for this trend [18].

The percentage of encounters with an antibiotic prescribed was lower than the WHO reference value which is commendable, consistent with results obtained in some other studies [18, 51]. Other studies had results higher than the reference value [5, 52]. Antibiotics should only be prescribed when there is justification for use. Irrational prescribing of antibiotics is associated with the development of resistance, a problem exacerbated by the limited number of new antimicrobials coming through the development pipeline of the pharmaceutical industry [53, 54].

The percentage of encounters with an injection prescribed was lower than the WHO reference value as similarly obtained in some other studies [18]. This was in contrast to some studies [1, 5]. The use of injections is sometimes necessary. For instance, most of the injections prescribed in our study were alpha beta arteether for severe malaria. In the treatment of severe and complicated malaria, the parenteral route of administration is indicated [55]. There are also instances where the parenteral route is the only option in the case of some drugs. However, it is worthy of note that the risk of drug toxicity is higher via this route of drug administration [5].

The percentage of drugs prescribed from essential drugs list or formulary was less than the WHO/INRUD core prescribing indicators reference value. Other studies conducted have shown equally high percentages but it is expected that 100% of the drugs would be prescribed from the essential drugs list (EDL) or hospital formulary [52, 56, 57]. Prescribing from the EDL issued by the WHO provides a framework for rational prescribing since drugs on the list are well established drugs, already tested in practice, with established clinical use and lower cost than newer drugs [58]. Prescribers should be regularly updated with a list of drugs available in the EDL or hospital formulary.

This study has some limitations. Poor documentation in the case files made it difficult to extract data. In addition, haphazard filing increased the retrieval time. The clarity of some prescriptions was a major challenge. Prescriptions were hand written and some were illegible. Furthermore, some patients were not regular with their antenatal care visits and this reduced the data collected. This study was not designed to reveal the reasons leading to irrational prescribing of drugs. Future studies are required to investigate these factors.

## CONCLUSIONS

The average number of drugs per encounter was above the WHO/INRUD reference value; percentage of drugs prescribed by generic name and from the essential drugs list or hospital formulary were less than 100% while antibiotics and injections were rarely prescribed. More efforts are needed to encourage rational prescribing, prescribing by generic name and the availability of drugs in the essential drugs list.

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