Evaluation of drug prescribing pattern among pregnant women attending antenatal clinic at the 34 military hospital, Freetown, Sierra Leone

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ABSTRACT

Background: Management of medical conditions in pregnancy is a challenge to clinicians. As a result, clinicians are faced with a quagmire in making evidence-based therapeutic decisions regarding patient management. No study has been conducted in Sierra Leone to determine drug prescription patterns among pregnant women.

Objective: This study assessed the prescribing pattern of drugs among pregnant women who attended antenatal care clinic at the 34 Military hospital in Freetown from May 1st, 2019 to October 31st, 2019.

Methods: A hospital-based cross-sectional retrospective study was conducted by reviewing medical charts of 314 pregnant women who attended antenatal clinic at the study site. The cases selected by simple random sampling were women who encountered at least one drug prescribed during their visit. The World Health Organisation (WHO) prescribing indicators and the United States Food and Drug Administration (FDA) pregnancy risk classification of medicines were used to assess drug prescribing patterns and contraindication in pregnancy respectively.

Results: Excluding minerals and vitamins, 99 (31.5%) of pregnant women from the 314 sampled for this study received at least one drug. Multivitamins/minerals 216 (40.3%) were the most frequently prescribed medicines. The average number of drugs prescribed per encounter was 1.7 with an index of polypharmacy of 0.86. The percentage encounters with an antibiotic and injection prescribed and drugs prescribed by generic names were 27.4%, 11.1%, and 40.0% respectively. About 221 (41.2%) of the drugs prescribed were from the FDA category A. No drug was prescribed from category X.

Conclusions: The prescribing pattern among prescribers was relatively rational, as three of the indicators met the WHO standard, with room for more improvement. The occurrence of contraindicated medicines was low as a high proportion of drugs were prescribed from FDA category A

Keywords: Drugs, Pregnancy, Prescription, Pattern, 34 Military Hospital,

Évaluation du modèle de prescription des médicaments chez les femmes enceintes qui fréquentent la clinique prénatale du 34 hôpital militaire de Freetown, Sierra Leone

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RESUME

Contexte : La prise en charge des conditions médicales pendant la grossesse est un défi pour les cliniciens. Par conséquent, les cliniciens sont confrontés à un bourbier pour prendre des décisions thérapeutiques fondées sur des données probantes concernant la prise en charge des patients. Aucune étude n'a été menée en Sierra Leone pour déterminer les habitudes de prescription de médicaments chez les femmes enceintes.

Objectif : Cette étude a évalué la tendance dans la prescription de médicaments chez les femmes enceintes qui se sont rendues à la clinique de soins prénataux de l'hôpital militaire 34 de Freetown du 1er mai 2019 au 31 octobre 2019.

Méthodes : Une étude rétrospective transversale en milieu hospitalier a été menée en examinant les dossiers médicaux de 314 femmes enceintes qui se sont rendues à la clinique prénatale sur le site de l'étude. Les cas sélectionnés par échantillonnage aléatoire simple étaient des femmes qui ont rencontré au moins un médicament prescrit lors de leur visite. Les indicateurs de prescription de l'Organisation mondiale de la santé (OMS) et la classification des risques de grossesse des médicaments de la Food and Drug Administration (FAD, Agence américaine des produits alimentaires et des médicaments) des États-Unis ont été utilisés pour évaluer respectivement les schémas de prescription des médicaments et les contre-indications pendant la grossesse.

Résultats : à l'exclusion des minéraux et des vitamines, 99 (31,5%) des femmes enceintes parmi les 314 échantillonnées pour cette étude ont reçu au moins un médicament. Les multivitamines/minéraux 216 (40,3%) étaient les médicaments les plus fréquemment prescrits. Le nombre moyen de médicaments prescrits par consultation était de 1,7 avec un indice de poly-pharmacie de 0,86. Les pourcentages de rencontres avec un antibiotique et une injection prescrits et des médicaments prescrits par des noms génériques était de 27,4%, 11,1% et 40,0% respectivement. Environ 221 (41,2%) des médicaments prescrits appartenaient à la catégorie A de la FDA. Aucun médicament de la catégorie X n'a été prescrit.

Conclusions : Le modèle de prescription chez les prescripteurs était relativement rationnel, car trois des indicateurs répondaient à la norme de l'OMS, avec une marge d'amélioration supplémentaire. Le nombre de cas de médicaments contre-indiqués était faible car une proportion élevée de médicaments de la catégorie A de la FDA était prescrite

Mots-clés : médicaments, grossesse, prescription, modèle, 34 hôpital militaire,

INTRODUCTION

Pregnancy is a special physiological condition, where medical treatment may create complications as a result of the intense metabolic changes that take place in the woman's body. These peculiar changes pose challenges for clinicians in managing diseases in pregnant women.[1] Proper use of medications during pregnancy is an essential part of antenatal care (ANC), since it can affect not only the well-being of the pregnant woman but also the developing foetus.[2,3]

The use of medicines in pregnancy has been on the increase for the past 30-40 years in many high-income countries as well as in low- and middle-income countries like Sierra Leone.[3,4] A review was done in the United States of America which reported that the average number of medicines taken by pregnant women increased by 68% from 2.6 in 1976-1978 to 4.2 in 2006-2008.[5] This may be as a result of changes in pregnant women demography, the prevalence of prior comorbidities and the development of obstetric conditions that require pharmacological intervention.[3]

Despite this, pregnant women are still categorised as therapeutic outcasts, as the majority of medical products such as therapeutics and vaccines are seldomly studied in them during research and development.[6,7] Safety data are usually obtained from pharmacovigilance post-marketing surveillance studies from medicines regulatory authorities such as the European Medicines Agency (EMA) in Europe, Pharmacy Board in Sierra Leone, and sometimes from pharmaceutical manufacturers. Furthermore, there is a disinterest from the pharmaceutical and biopharmaceutical manufacturers to include pregnant women in their drug research and development studies due to several medico-legal risks, ethical concerns, and the fact that the population of pregnant women as a cohort is small from an economic perspective. These and other factors are responsible for pregnant women being excluded from clinical research.[8]

The United States Food and Drug Administration (FDA) presented a system of rating pregnancy-risk linked with the use of medicinal products. This system classifies medicines into one of five pregnancy risk categories (A, B, C, D, and X) wherein A is for drugs with controlled studies that showed no risk; B is for drugs with no evidence of human risk in controlled studies; C is for drugs in which risk cannot be ruled out; D is for drugs with positive evidence of risk; X is for drugs contraindicated in pregnancy. It shows the effect of the agents on the foetus based on existing preclinical and clinical study data and specifies the level of precaution that should be undertaken with each medicine.[9,10]

The dearth of research study data on medicines use in pregnant women often creates a quagmire for clinicians in making evidence-based therapeutic decisions regarding patient management.[11] Studies done to assess drug utilisation patterns in pregnant women in Nigeria, Ireland, India, and Ethiopia showed that pregnant women ingest an average of three prescription medicines during pregnancy.[12-16] Additionally, a study by Jimoh and colleagues conducted in Sokoto Nigeria showed that the average drug per prescription was 3.1, encounter with antibiotics was 43.6% while encounter with injections was 21.2%.[17]

However, in Sierra Leone, no such studies have been conducted. Therefore, this study was conducted to assess drug prescribing patterns among pregnant women attending antenatal clinic at the 34 Military Hospital in Freetown, Sierra Leone using the World Health Organisation/International Network of Rational use of Drugs (WHO/INRUD) prescribing indicators. This study also investigated rational prescribing by utilising the Index of Rational Drug Prescribing (IRDP) and the medicines types prescribed concerning risk to the foetus.

METHODS

Study setting

This study was conducted at the Obstetrics and Gynaecology Department of the 34 Military Hospital in Freetown, Sierra Leone which serves as a medical centre for the Republic of Sierra Leone Armed Forces and the general public. This hospital was initially established to provide treatment for soldiers that were injured during the second world war. It was called 34 because it was the 34th Military hospital built in the British Empire. The hospital also has other departments such as: infectious diseases, surgery, internal medicine, psychiatry, pharmacy, nursing, and laboratory. This hospital was purposely selected as it is a tertiary referral hospital that provides obstetrics and gynaecological care for a substantial number of women living in the Western part of the capital city of Freetown and its surrounding.

Study population

The study population included pregnant women of all ages who were seen by doctors at the antenatal clinic of the 34 Military Hospital and for whom medicines were prescribed from September 1st, 2017 to August 1st,

2019. In-patients and patients whose charts were incomplete were excluded from the study. The study was conducted from May 1st 2019 to October 31st, 2019.

Study design, sample size determination, and sampling

This was a retrospective institutional-based cross-sectional descriptive study. The 314 medical charts used in this study was determined using the Fisher single population proportion formula based on a study done by Kebede and colleagues where the prevalence of drug use during pregnancy in Ethiopia was 71.3%.16 Patient charts were arranged by date and 314 charts were selected by simple random sampling from 613 charts using a computer software called Research randomizer18.

Data collection

Charts of the pregnant women were retrieved and information on age, diagnoses, and drugs prescribed were extracted and entered onto a data collection tool that was designed for the study based on the WHO prescribing indicators and the FDA safety rating for foetal risk.[10,19]

Data analysis

The WHO prescribing indicators such as the average number of medicines per encounter was calculated by dividing the total number of drugs by the number of encounters. Percentage encounters with generic names and medicines from the essential medicines list (EML), percentage encounters with antibiotics and injections were determined by dividing the number of occurrences by the total number of events, respectively, and expressed as a percentage.

The Index of Rational Drug Prescribing (IRDP) was determined by adopting an earlier validated method developed by Yuxin and Mingguang and used in other drug utilisation studies in Nigeria, Tanzania, and Sierra Leone.[20-23] It consists of five indices derived from the WHO prescribing indicators and developed by applying a mathematical model for a comprehensive appraisal of medical care. Each of the five indicators has an optimal index of 1; the closer to 1 the calculated index is, the more rational prescribing is practiced.

The index of polypharmacy in this study was measured by the percentage of non-polypharmacy prescriptions, that is prescriptions with three or fewer medicines. The generic name and essential medicines indices were measured by the percentages of drugs prescribed by generic name and drug prescribed from the Sierra Leone National Essential Medicines List respectively. The index of rational antibiotic prescribing was obtained by dividing the optimal level (30%) by the percentage of all prescriptions containing an antibiotic. The index of safety injection was calculated by dividing the optimal level (10%) by the percentage of prescriptions containing an injection. The total of the IRDP, which has a maximum value of 5, was calculated by adding the indices. The WHO Anatomical Therapeutic Chemical Classification System (WHO ATC) was used to classify drugs into their different pharmacological classes.[24] Drugs with a potential for foetal harm during pregnancy were evaluated based on the FDA pregnancy risk classification system using the Physicians' Desk Reference.[10,25]

All data were analyzed using Statistical Package for Social Sciences (SPSS) version 20 (IBM Statistics, Armonk, NY, USA). Descriptive statistics were used to calculate frequencies and percentages and the results were presented as tables and graphs.

Ethical consideration

Ethical clearance was obtained from the Sierra Leone Ethics and Scientific Review Committee. Permission to conduct the study was also obtained from the hospital administration. All information obtained in the study were kept confidential and used only for this research.

RESULTS

Age distribution of pregnant women

Table 1 showed that about half of the pregnant women 159 (50.6%) were within the age range of 16-25 years and a mean (±SD) of 27.4 (±5.4) years.

Table 1: Age distribution of pregnant women attending antenatal clinic at 34 Military Hospital

Age of patients	Frequency	Percentage (%)
13-15 Years	2	0.6
16-25 Years	159	50.6
26-35 Years	143	45.5
36-45 Years	10	3.2
Total	**314**	**100.0**

Pattern of medical conditions among pregnant women

Malaria occurred most frequently among pregnant women (Table 2).

Table 2: Profile of medical conditions among pregnant women

Medical conditions	Frequency	Percentage (%)
Malaria	39	36.1
Pain	21	19.4
Bacterial vaginosis	17	15.7
Infection	14	13.0
Loss of appetite	4	3.7
Vomiting	3	2.8
Weakness	3	2.8
Diarrhoea	2	1.9
Fever	1	0.9
Hypertension	1	0.9
Others*	3	2.8
Total	**108**	**100**

Others: Cough, hypertension, itching, nausea

Classification of common drugs prescribed to pregnant women

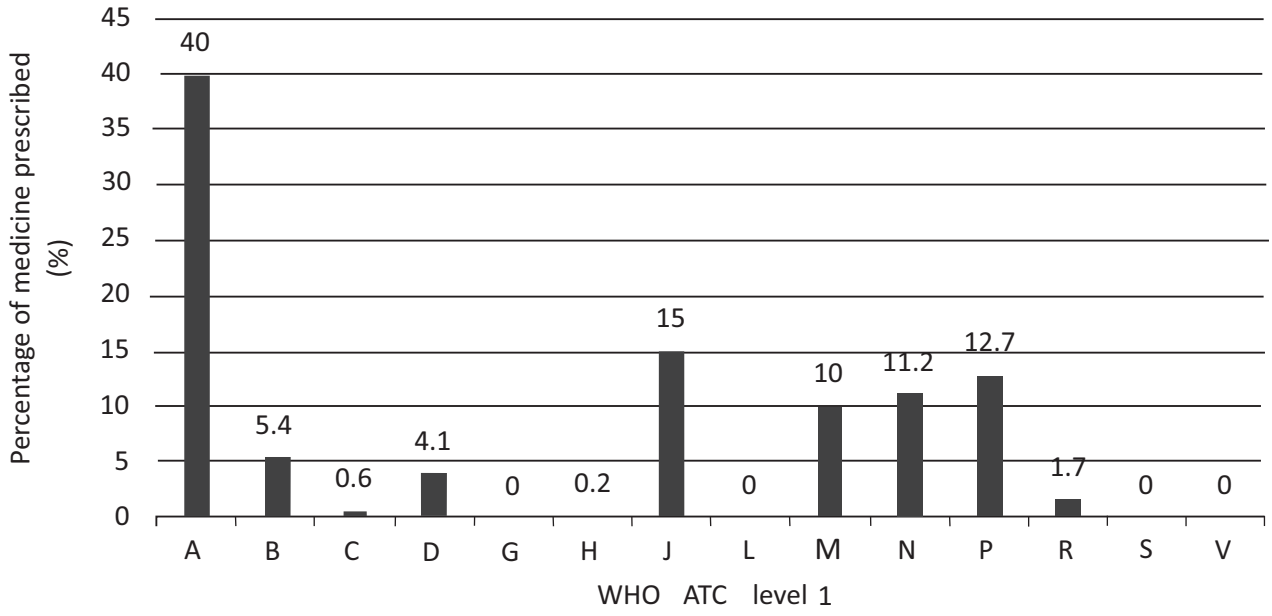
The distribution of medicines prescribed for these pregnant women is shown in Table 3. Excluding minerals and vitamins, 99 (31.5%) of the pregnant women from the 314 sampled for this study received at least one drug during their current pregnancy. Minerals and vitamins were the most frequently prescribed medicines 216 (40.3%). Of these multivitamins, 199 (37.1%) were the most frequently prescribed. Other minerals and vitamins prescribed included iron/folic acid combination 7 (1.3%) and folic acid 4 (0.7%). Paracetamol was the most frequently prescribed analgesic 59 (11.0%); other analgesics included diclofenac 36 (6.7%) and naproxen 14 (2.6%). Six different types of antibiotics were encountered in the study. Cefuroxime 55 (10.3%) was the most frequently used antibiotic at the antenatal clinic, followed by metronidazole 28 (5.2%) and ceftriaxone 6 (1.1%). Antimalarials were the fourth most prescribed medicines with artemether/lumefantrine 43 (8.0%) being the most prescribed followed by sulphadoxine/pyrimethamine 4 (0.7%).

Table 3: Top ten drugs prescribed at the antenatal clinic

Medicines prescribed	Frequency	Percentage (%)
Multivitamins and minerals	216	40.3
Paracetamol	59	11.0
Cefuroxime	55	10.3
Artemether-Lumefantrine	43	8.0
Diclofenac	36	6.7
Metronidazole	28	5.2
Albendazole	21	3.9
Naproxen	14	2.6
Metoclopramide	6	1.1
Ceftriaxone	6	1.1
Others*	52	9.7
Total	**536**	**100**

Others: Cyproheptadine, antacid, doxycycline, guaifenesin, diazepam, levofloxacin, omeprazole, erythromycin, hyoscine butyl bromide, tinidazole, methyldopa, furosemide, ampiclox, amoxicillin, co-amoxiclav

At least one drug was prescribed from ten of the WHO ATC Level 1 groups and about 214 (40%) of the drugs prescribed to pregnant women were alimentary tract and metabolism medicines (Figure 1).



A-Alimentary tract and metabolism, B-Blood and blood-forming, C-Cardiovascular, G-Genito-urinary system and sex hormones, J-Anti infectives for systemic use, M-Musculoskeletal system, N-Nervous system, P-Antiparasitic products, insecticides and repellents, R-Respiratory system, S-Sensory organs, V-Various

Figure 1: The percentage of medicines prescribed according to the WHO ATC Level 1 group medication category

WHO/INRUD prescribing indicators

The average number of drugs per prescription was 1.7. The percentage of drugs prescribed by generic name and from the Sierra Leone EML were 40% and 79.3% respectively. About twenty-seven percent (27.4%) of the prescriptions had at least one antibiotic, while 11.1% of pregnant women encountered an injection (Table 4).

Table 4: Drug prescribing indicators at 34 Military Hospital

Drug prescribing indicators	Values obtained Average/Percentage (%)	Reference values (WHO, 1993)
Average number of drugs per encounter	1.7	1.6 - 1.8
Percentage of drugs prescribed by generic name	40.0%	100%
Percentage encounters with an antibiotic	27.4%	20 - 26.8%
Percentage encounters with an injection	11.1%	13.4 - 24.1%
Percentage of medicines prescribed from the EML	79.3%	100%

EML=Essential Medicines List

The index of rational drug prescribing

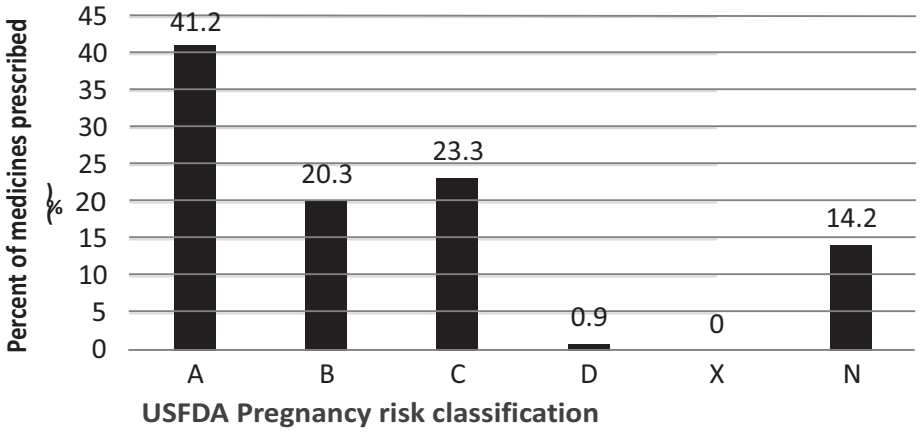
The total IRDP indices was 4.04. Table 5 shows that the indices of rational antibiotic, safety injection, and polypharmacy prescribing had the highest values of 1.09, 0.90, and 0.86 respectively.

Table 5: Index of Rational Drug Prescribing (IRDP) indicators at 34 Military Hospital

Drug prescribing indicators	Values obtained	Optimal index
Index of polypharmacy	0.86	1
Generic name index	0.40	1
Index of rational antibiotic prescribing	1.09	1
Index of safety injection	0.90	1
Essential medicine index	0.79	1
Total IRDP indices	**4.04**	**5**

Classification of drugs according to the FDA pregnancy risk rating system

Figure 2 shows the FDA classification of medicines according to risk to the foetus in which, 221 (41.2%) were in category A, followed by 125 (23.3%) in category C and 109 (20.3%) in category B.



A= Controlled studies show no risk; B=No evidence of human risk in controlled studies;
C= Risk cannot be ruled out; D= positive evidence of risk; X= Contraindicated in Pregnancy; N=Not classified by FDA

Figure 2: FDA pregnancy risk classification of medicines

Classification prescribed drugs by dosage forms

Table 6 shows that 327 (61.0%) drugs prescribed were tablets.

Table 6: Dosage forms of drugs prescribed at the antenatal clinic

Dosage form	Frequency	Percentage (%)
Tablets	327	61.0
Injection	56	10.4
Syrup	35	6.5
Gel	28	5.2
Capsules	18	3.4
Aerosol	2	0.4
Cream	2	0.4
Drops	2	0.4
Others	66	12.3
Total	**536**	**100**

DISCUSSION

The mean maternal age obtained in this study was similar to that obtained in other studies done in Nigeria and India.[17,26] The proportion of pregnant women who received at least one drug in this study excluding minerals and vitamins is comparable to a study done in Canada (27.0%), but lower than those obtained in Brazil (91.0%) and the US (76.5%).[27-29] Nevertheless, published studies on drugs used during pregnancy contrast widely regarding variables such as dissimilarity in medications use between countries, size and demographics of the target population, the use of computerised pharmacy archives, changeability of methods (prescription evaluation, interview, medical chart review) and hospital settings where these studies are conducted coupled with disparities in prescribing practices between high and low- and middle-income countries.[30]

The utilisation of drugs when classified according to the WHO ATC system level 1, revealed that most of the drugs used belonged to the alimentary and metabolism category followed by the anti-infectives. In comparison to studies done by Varghese *et al*.[26], Dillion *et al*.[13], Zhu *et al*.[31], and Maats and crowther[32], anti-infectives followed by alimentary and metabolism classes were the most frequently prescribed drugs.

The commonly prescribed drugs to pregnant women in this study were minerals and vitamins, followed by paracetamol, cefuroxime, and artemether/lumefantrine. This was consistent with studies done in Brazil, Pakistan, and Ethiopia.[28,33,34] This may due to the preponderance occurrence of headaches and anaemia during pregnancy.[35,36]

Studies have shown that the utilisation of minerals and vitamins during pregnancy differs substantially. In this study, a great number of pregnant women used minerals and vitamins which can be accounted for by the policy of the Ministry of Health and Sanitation (MOHS) which stipulates that iron and folic acid should be given to pregnant women as part of ANC for the prevention and treatment of anaemia.[37] A study conducted by Pouchieu *et al*.[38] in France revealed that 64.9% of women consumed vitamins, while another study done by De Oliveira and Fonseca in Brazil showed that 16.7% of pregnant women used vitamin supplements.[39] Due to the metabolic changes that women experience during pregnancy, the need for vitamins and minerals increases considerably.[40]

Paracetamol was the most frequently prescribed analgesic used by pregnant women. Liew *et al*.[41] in a study in Denmark reported that more than half of all mothers reported paracetamol utilisation in pregnancy. The use of paracetamol during pregnancy is not associated with increased abortion risk, stillbirth, low birth weight, and prevalence of congenital anomalies.[42,43] However, an association between paracetamol and childhood asthma and attention-deficit-hyperactivity disorder has been established in studies done by Eyers *et al*.[44], Shaheen *et al*.[45], and Liew *et al*.[41] respectively. Hence, the prescription of paracetamol for pregnant women must be done with caution.

Antibiotics are drugs commonly used in pregnancy.[46] In this study, cefuroxime was the most common antibiotic prescribed followed by metronidazole and ceftriaxone. Fonseca *et al*.[47] and De Jonge *et al*.[46] have reported similar utilisation rates of antibiotics in pregnant women. The Beta-lactam antibiotics such as the cephalosporins used in this study block cell wall biosynthesis and have great selective toxicity and hence low proclivity to harm pregnant women and the foetus which makes them suitable for use in pregnancy.[47]

Malaria is endemic in Sierra Leone with stable and perpetual transmission throughout the country. It is estimated that about 2,240,000 outpatient visits are due to malaria every year of which pregnant women who are among the most vulnerable constitute 4.4% of the total population.[48] Enato *et al*.[49] reported in a study done in Nigeria that pregnant women attending ANC clinic perceived malaria as a common health problem. Malaria in pregnancy may be linked to maternal anaemia, intrauterine growth retardation, low neonatal birth weight, premature delivery, and neonatal mortality.[50-53] Malaria was the most occurring medical condition among pregnant women in this study and the antimalarials such as the artemisinin-based combination therapy (ACT) were among the most prescribed drugs. This is comparable to other studies reported by Jimoh *et al.*[17] and Amorha and Okonkwo.[54] However, the use of sulfadoxine and pyrimethamine as chemoprophylaxis in this study was low which was attributed to lack of documentation in the charts. Prevention and treatment of malaria are essential components of antenatal care in endemic countries like Sierra Leone and necessitates special considerations for pregnant women.

Tablet administration accounted for over half of the dosage forms given to pregnant women. In a similar study conducted in Ethiopia, oral dosage form was the main route of administration used (75.2%) as it is the most convenient and simplest way for any patient to take a medicine.[55]

The average number of drugs per encounter in this study was 1.7 which complies with the WHO reference (19). This is an indication of non-polypharmacy as demonstrated by the high index of polypharmacy of 0.86. This value is greater than that reported by Gawde *et al*.[56] in India (2.4) and Guerra *et al.*[57] in Brazil (3.3), but comparable to results reported by Fikadu *et al*.[55] and Belay *et al*.[58] in Ethiopia (1.4 and 1.7) respectively. The consequences of polypharmacy are that patients may have more medicines than they can handle with respect to cost and adherence.[59,60] High number of medicines prescribed may also increase the risk of drug-drug interactions which may eventually result in increased susceptibility to adverse drug reactions.[61]

Over half of the medicines were prescribed by brand names irrespective of the type and about a quarter was not from the EML. The low generic name and essential medicines indices are an indication of irrational prescribing. Joshi *et al*.[62] in India reported a much lower value of generic prescribing (21.5%) which is dissimilar to a study done in Ethiopia (96.6%) by Gadisa and colleagues.[63] The result of this study implies that prescribers at the study site are not complying fully with the national medicines policy of Sierra Leone and the WHO recommendation that drugs should be prescribed using their international nonproprietary names.[64] Prescribing by brand names may result in cost implications for these women. Promotional and marketing activities of pharmaceutical companies, obliviousness of the national medicines policy, and unfamiliarity with generic names of medicines may be contributing factors. This can be overcome by raising awareness about the policy among clinicians and enforcing its use through periodic medication review with subsequent feedback to management and staff of the clinic for implementation.

The percentage of encounters with antibiotic met the WHO standard as indicated by the very high index of rational antibiotic prescribing of 1.06. This result is corroborated by similar studies conducted by Chaudhari *et al*.[14] in India (13.2%) and Belay *et al*.[58] in Ethiopia (24.0%) but in contrast to a study by Eze *et al*.[12] in Nigeria (88.0%). This is encouraging since irrational prescribing of antibiotics can maximise drug resistance problems and hence medical procedures such as organ transplantation, cancer chemotherapy, diabetes management, and major surgeries can become complicated. Antibiotic resistance increases the cost of health care with lengthier stays in hospitals and more intensive care required.[65]

The encounters with injectables were low in this study and met the WHO standard coupled with a high index of safety injection of 0.90. Such findings from this study are similar to other studies by Jimoh *et al*.[17] (21.2%) and Joshi *et al*.[62] (2.2%) respectively. This result is encouraging since the use of injectables may introduce a high concentration of drug in the plasma and could lead to toxicity.

Prescription of contraindicated drugs was low as most of the drugs prescribed were from category A of the FDA pregnancy risk classification of medicines followed by categories C and B. Doxycycline and diazepam were the only drugs belonging to category "D". Drugs in this category according to the FDA are classified as medicines with potential risk although they can be prescribed when the benefit outweighs the risk. This may have accounted for the fewer cases of category D drugs encountered in this study. This result is consistent with studies done by Molla *et al*.[66] and Patel *et al*.[67] in Ethiopia and India correspondingly.

Concerning the limitations of this study, it does not provide information on drugs dispensed in inpatient settings or for self-medication. Hence, the prevalence of drug use may be under-estimated. This was a cross-sectional study that could not determine the association between drug exposure and pregnancy risk coupled with the fact that information on the trimester of pregnancy was lacking. The study did not describe the practice of drug prescribing in other health institutions. It was limited to one hospital in the capital city of Freetown and hence did not assess the practice of drug use in other hospitals in the city, rural communities, therefore making generalisation of the result impracticable.

CONCLUSION

Malaria was the most common medical condition among pregnant women. Vitamins and minerals topped the list of most commonly prescribed drugs. The average number of drugs per encounter, the percentage of antibiotics and injections prescribed met the WHO standard, indicating a good practice of nonpolypharmacy and rational prescribing. The occurrence of contraindicated medicines was low as a high proportion of drugs were prescribed from FDA category A followed by category C and B. Only two drugs with positive evidence of risk from category D were prescribed. Also, none of the prescribed drugs was from category X which constitutes drugs found to have proven foetal risk.

Therefore, drugs prescribed at the antenatal clinic should be done using generic names and from the EML. This study has provided a scope for further research concerning the use of over the counter medicines and self-medication in pregnant women, assessment of inpatient utilisation of drugs, multi-hospital studies, and determining the association between drug exposure and pregnancy risk.

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