VOLUME 40, NUMBER 1
January 2023

ISSN 0189 - 160X

WAJM

WEST AFRICAN JOURNAL OF MEDICINE

ORIGINALITY AND EXCELLENCE IN MEDICINE AND SURGERY

OFFICIAL PUBLICATION OF
THE WEST AFRICAN COLLEGE OF PHYSICIANS *AND*
WEST AFRICAN COLLEGE OF SURGEONS

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ORIGINAL ARTICLE

Prescription Patterns and Patient Care Practices in Two Tertiary Hospitals in South-South Nigeria

Modèles de Prescription et Pratiques de Soins aux Patients dans deux Hôpitaux Tertiaires du Sud du Nigéria

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ABSTRACT

BACKGROUND: Inappropriate use of medicines still characterize all levels of healthcare, with important public health implications. Available evidence indicate that irrational use of medicines can lead to poor therapeutic outcomes, adverse drug reactions, and thus increase morbidity and mortality rates. This study assessed the prescription pattern, patient and health care facility indicators in two tertiary health facilities in Nigeria.

METHODS: A cross-sectional survey of 1800 prescriptions and 600 patients' encounters was conducted at the General Outpatient Departments of the University of Benin and Delta State University Teaching Hospitals using the WHO drug use indicators. Data from 12-month prescription sheets as well as patient interviews were entered into standard indicator forms and analyzed according to WHO guidelines.

RESULTS: Overall, the average number of drugs per encounter was 2.8 ± 1.6. The percentage of generic prescription was 49.6%, while percentage of encounters with antibiotics, antimalarial and injections were 27.4%, 23.2% and 12.4% respectively. Prescription of medicines listed in the Essential Medicines List was 66.6%, even though no copy was available at the consulting rooms. Average consulting and dispensing time were 15.3 minutes and 136 seconds respectively. Percentage of medicines actually dispensed was 86.2% while 98.7% of medicines were adequately labelled.

CONCLUSION: Gaps still exist in the rational use of medicines in Nigeria. There needs to be sustained interventional schemes with capacity for monitoring and evaluation to detect inappropriate drug use patterns and prevent the undesirable consequences of irrational use of medicines. **WAJM 2023; 40(1): 78–83.**

Keywords: Essential drugs, Rational Use of Medicines, Prescription Pattern, Tertiary Hospitals, South-South Nigeria.

RÉSUMÉ

CONTEXTE: L'utilisation inappropriée des médicaments caractérise encore tous les niveaux de soins de santé, avec d'importantes implications pour la santé publique. Les preuves disponibles indiquent que l'utilisation irrationnelle des médicaments peut entraîner de mauvais résultats thérapeutiques, des réactions indésirables aux médicaments et donc augmenter les taux de morbidité et de mortalité. Cette étude a évalué les modèles de prescription, les patients et les indicateurs des établissements de soins de santé dans deux établissements de santé tertiaires au Nigeria.

MÉTHODOLOGIE : Une enquête transversale portant sur 1800 ordonnances et 600 rencontres avec des patients a été menée dans les départements ambulatoires généraux de l'Université du Bénin et des hôpitaux universitaires de l'État du Delta à l'aide des indicateurs de consommation de médicaments de l'OMS. Les données des feuilles d'ordonnance de 12 mois ainsi que des entretiens avec les patients ont été saisies dans des formulaires d'indicateurs standard et analysées conformément aux directives de l'OMS.

RÉSULTATS: Dans l'ensemble, le nombre moyen de drogues par rencontre était de 2,8 ± 1,6. Le pourcentage de médicaments génériques prescrits était de 49,6 %, tandis que le pourcentage de consultations avec des antibiotiques, des antipaludéens et des injections était de 27,4 %, 23,2 % et 12,4 % respectivement. La prescription des médicaments figurant sur la liste des médicaments essentiels était de 66,6%, même si aucune copie n'était disponible dans les salles de consultation. Le temps moyen de consultation et de distribution était de 15,3 minutes et 136 secondes respectivement. Le pourcentage de médicaments effectivement délivrés était de 86,2 %, tandis que 98,7 % des médicaments étaient correctement étiquetés.

CONCLUSION: Des lacunes subsistent dans l'utilisation rationnelle des médicaments au Nigéria. Il faut des programmes d'intervention durables dotés d'une capacité de suivi et d'évaluation pour détecter les modes de consommation inappropriés de drogues et prévenir les conséquences indésirables d'une utilisation irrationnelle des médicaments. **WAJM 2023; 40(1): 78–83.**

Mots clés: Médicaments essentiels, Utilisation rationnelle des médicaments, Modèle de prescription, Hôpitaux tertiaires, Sud-Sud du Nigéria.

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Abbreviations: ACT, Artemesin Combination Therapy;**EML**, Essential Medicine List; **GOPD**, General Outpatient Departments; **HBV,** Hepatitis B Virus; **HIV**, Human Immunodeficiency Virus; **SDG**, Sustainable Development Goal; **WHO**, World Health Organization.

INTRODUCTION

Pharmacotherapy has increasingly expanded both in content and scope, and the emergence of newer frontiers in pharmacology has renewed hope for more potent and efficacious medicines.[1–3] Model antimicrobials, analgesics, cytotoxic and cardiovascular medicines have been developed for infections, arthritis, hypertension, diabetes and cancer in the last decade alone.[4-6] Interestingly, majority of these medicines rapidly find their way into Africa's emerging pharmaceutical market. With a projected growth of $45 billion as at 2020 and at an annual rate of 10.6%, growth opportunities will continue to move away from traditional pharmaceutical markets as growth patterns in developed markets continue to flatten.[7] Nigeria is at the epicenter of this movement due to its population and current economic and political ranking in the continent.[8] Recent data estimate that Nigeria alone accounts for 60% of medicines consumption in sub-Saharan Africa, thus underlying a huge sub-regional market.[9] These realities have important implications for access to medicines, which include rational use and reliable health and supply systems.

Correct knowledge and rational application of medicines is needed to enhance patient care and institutions' capacities to deliver quality healthcare. Thus, the concept of rational use of medicines is an important health priority for the World Health Organization (WHO), and an integral part of the Sustainable Development Goal (SDG-3).[10] Sadly, there are indications that this has not been met particularly in developing countries like Nigeria where poor regulation of medicines and medical practice combines with poor health-seeking behaviour to encourage inappropriate medicine use. For instance, non-generic prescription, polypharmacy, overuse of antibiotics and injections still feature prominently among prescribers.[11–13]

The result is unbridled antibiotic resistance patterns, risk of HIV and HBV transmission, medication errors, risk of adverse drug reactions and a burgeoning health cost, all of which interact to compound the already poor morbidity and mortality indices in Nigeria.[14–16]

Clearly, the subject of drug use has both biomedical and socio-economic dimensions. Thus, aspects of medicine use can change with time. Periodic appraisal is necessary to situate current status of rational use of medicines with a view to identifying areas for intervention.

Rationale use of medicine in Nigeria is still deficient despite evidence of its contribution to decline in drug related morbidity and mortality. Drug utilization research thus offers a ready tool for situational analysis as well as for impact assessment. Efforts at intervention are usually directed at identified lapses in aspects of drug use, thus the need for periodic reviews of medicines. The study assessed the drug use patterns and patient care practices in two tertiary health facilities in Nigeria.

METHODS

Study Setting and Design

This was a descriptive cross-sectional study that assessed the drug use pattern and patient care practices in two tertiary hospitals in Nigeria. The research was conducted at the General Outpatient Departments (GOPD) of the University of Benin Teaching Hospital (UBTH), Benin City, Edo State and the Delta State University Teaching Hospital (DELSUTH), Oghara, Delta State, both in South-South Nigeria

Study Population

Patients who were older than 18 years presenting daily at the General Outpatient Departments (GOPD) of the afore-mentioned hospitals were recruited for the study. Patients attending the surgical, ante-and post-natal clinics were however excluded from the study.

Prescription records for a 12-month period (January to December) were also utilized for the study.

Sample Size

The sample size was determined according to the WHO recommendation of at least 600 encounters for a drug use study.[17] The goal is to estimate percentage indicators that summarize values for the sample as a whole with a 95% confidence interval. Thus, for each facility, 900 prescriptions and 300 patient encounters were computed for the prescriber and patient care-indicator studies respectively. This gives a total of 1800 prescriptions and 600 patient encounters for the prescribers and patient care-indicator studies respectively.

Sampling Technique

Prescribing Indicator Study

A systematic random sampling technique was used to select prescriptions. For each facility, the sampling frame was determined by counting the total number of encounters in the period under study. The sampling interval was then computed by dividing the sampling frame by the required sample size per facility. In the UBTH, 18,960 prescriptions were made between January and December for the year. Thus, every 21st prescription after random balloting for the first was sampled until the desired sample size of 900 was obtained. Similarly, the sampling frame of 9,089 prescriptions was estimated for DELSUTH, which gave a sampling interval of 10.

Patient Care Indicator Study

Extrapolation from the average number of patients seen per day in the outpatient clinics of UBTH and DELSUTH gives a monthly average of 4600 and 1200 respectively. Dividing these values by the sample size of 300 for each facility gives a sampling interval of 16 and 4 for UBTH and DELSUTH respectively. Thus, at the beginning of the week, the first patient was chosen by simple ballot. Subsequently, every sixteenth patient (UBTH) and every fourth patient (DELSUTH) were selected until the desired sample size of 300 patients per facility was attained.

Study Tools

Data on patient care and facility indicators were collated using a modified WHO drug use indicator tool.[18] Prescribing indicators studied included average number of drugs per encounter; percentage of drugs prescribed by generic name; percentage of encounters with an antibiotic prescribed; percentage of encounters with an antimalarial prescribed; percentage of encounters with an injection prescribed and percentage of drugs prescribed from essential drugs list or formulary.

Patient care indicators studied included average consultation times; average dispensing time; percentage of drugs actually dispensed; percentage of drugs adequately labeled and patients' knowledge of correct dosage.

Facility indicators studied included availability of copy of essential drugs list or formulary and availability of key drugs.

Data Collection

Data on drug prescribing patterns were collected retrospectively using prescriptions for the 12 months from the pharmacy records of both hospitals. Information on the number of drugs prescribed, number of generic prescriptions, presence of antibiotic and injection prescriptions were extracted from the prescription sheets and then recorded in the prescribing indicator form.

Three pharmacy interns were trained as research assistants. The training was a 3-day intensive tutorial on patient care observation, interview and general data collection in consonance with the WHO prescribed methodology. Several sessions were held and a pilot study conducted to test study tools and to ensure mastery of the process.

Data on patient care practices were obtained prospectively by trained research assistants. Consulting and dispensing times were determined in a surreptitious manner by direct observation and timing with a stopwatch. This approach was used both in the clinic and the pharmacy to ensure the doctor and dispenser were unaware of the process. Data on knowledge of dosage, number of drugs prescribed, dispensed and labeled were obtained from patients by oral interview and entered into the patient care form.

Data Analysis

Data generated in the collection forms was entered into a spread sheet on Microsoft excel version. The relevant core indicators (prescribing, patient care and health facility indicators) were then computed using the WHO guidelines:[17]

A. Prescribing Indicators

Average number of drugs per encounter = Total number of different drug products prescribed, divided by the number of encounters surveyed.

Percentage of drugs prescribed by generic name = Number of drugs prescribed by generic name, divided by the total number of drugs prescribed, multiplied by 100.

Percentage of encounters with an antibiotic/antimalarial prescribed = Number of patient encounters during which an antibiotic/ antimalarial is prescribed, divided by the total number of encounters surveyed, multiplied by 100

Percentage of encounters with an injection prescribed = Nnumber of patient encounters during which an injection is prescribed, divided by the total number of encounters surveyed, multiplied by 100.

Percentage of drugs prescribed from essential drugs list or formulary = Number of products prescribed which are listed on the essential drugs list, divided by the total number of products prescribed, multiplied by 100.

B. Patient Care Indicators

Average consultation time = Total time for a series of consultations, divided by the number of consultations.

Average dispensing time = Total time for dispensing drugs to a series of patients, divided by the number of encounters.

Percentage of drugs adequately labelled = Number of drug packages containing at least patient name, drug name and when the drug should be taken, divided by the total number of drug packages dispensed, multiplied by 100.

Patients' knowledge of correct dosage = Number of patients who can adequately report the dosage schedule for all drugs, divided by the total number of patients interviewed, multiplied by 100.

C. Health Facility Indicators

Availability of copy of essential drugs list or formulary = Yes or no, per facility.

Availability of key drugs = Number of specified products actually in stock divided by the total number of drugs on the checklist or basket of drugs, multiplied by 100.

Values obtained were compared with reference standard as appropriate and determination of level of irrational drug use was made. Data on prescriber and patient care and health facility indicators were collated and analyzed using IBM SPSS version 20. Continuous variables were summarized by mean and standard deviation and differences in means between two groups were analyzed with an independent t-test. Frequencies and proportions were used to summarize categorical variables and the chi square test was used to test the associations between relevant independent and outcome variables. The results were presented in prose and tables.

Ethical Considerations

The ethical issues in this study were predominantly those of beneficence, confidentiality and justice. Therefore, prior ethical approval was obtained from the research and ethics committees of both health care facilities. Institutional clearance was also obtained from the various heads of the GOPDs in both hospitals and individual patient consent was solicited before recruitment for interview.

RESULTS

Prescribing Indicators

A total of 5,051 drugs were prescribed in the 1800 prescriptions examined with the mean ± SD number of drugs per encounter being 2.8 ± 1.6. A breakdown showed that the DELSUTH had a higher total number of drugs prescribed (2609 versus 2442) and a mean ± SD number of drugs per encounter (2.9±1.8 versus 2.7±1.4) than UBTH. Table 1 shows the distribution of the number of drugs prescribed per prescription. A statistically significant difference was found in the mean number of drugs

prescribed per encounter between facilities (p=0.016).

Overall, about half (49.8%) of the drugs were prescribed by generic names with the DELSUTH having a better margin than the UBTH (56.0% versus 43.1%). The observed difference was statistically significant (p<0.001).

In 27.4% of all encounters in both facilities, an antibiotic was prescribed while 23.2% had an antimalarial prescribed. At least one injection was prescribed in 12.4% of all encounters. A breakdown showed that antibiotic rate was higher in UBTH than DELSUTH (29.1% versus 25.7%) but the difference was not statistically significant (p=0.101). Similarly, antimalarial prescription rate in UBTH more than doubled that of DELSUTH (32.0% versus 14.3%). This difference was however statistically significant (p<0.001). In 14.1% of encounters in DELSUTH, injection was prescribed compared to 10.7% in UBTH and this difference was statistically significant (p=0.027). Regarding the Essential Medicine List, 66.6% of drugs prescribed were listed in the Essential Medicines List. No copy of the EML was available in the consulting rooms of both hospitals. DELSUTH had a higher proportion of EML drugs prescribed compared to UBTH (69.4% versus 63.6%), although this difference was not statistically significant (p=0.053) (Table 2).

Patient Care Practices

One thousand two hundred patient encounters were studied, each hospital having 600, with 300 observed for consultation times and the other 300 for dispensing times. The overall mean ± SD consultation and dispensing times were 15.3±10.9 minutes and 135.9±113.3 seconds respectively. Mean consultation time was twice as long in DELSUTH compared with UBTH (20.2±12.4 versus 10.4±5.8 minutes) and this difference was statistically significant (p<0.001). Similarly, there was a statistically significant difference in dispensing times between the UBTH 151.3±115.7 seconds and DELSUTH 120.7±108.8 seconds (p=0.001).

Overall proportion of drugs actually dispensed was 86.2% with the DELSUTH having a slightly higher proportion of dispensed drugs compared to UBTH (89.8% versus 82.2%). The difference was however not statistically significant (p=0.192). The proportion of adequately labelled drugs was 98.7% with the DELSUTH being slightly higher than UBTH (99.0% versus 98.3%). Again, this difference was not statistically significant (p=0.917). On the other hand, 96.5% of patients knew the correct dosage of prescribed drugs with both facilities having comparable values (96.7% in DELSUTH versus 96.3% in UBTH). This difference was not statistically significant (p=0.824) (Table 2).

Health Facility Indicators

Neither facility had a copy of the EML in the consulting rooms. Of 15 key drugs, an average of 12 (80%) were actually in stock. However, there was a reckonable difference in availability of key drugs between DELSUTH, 100.0% (n=15) which had a higher proportion of availability of key drugs compared with UBTH, 60.0% (n=9) (Table 3).

Table 1: Distribution of number of drugs prescribed per prescription in DELSUTH and UBTH

No. of Drugs Prescribed	DELSUTH n=900 Freq. (%)	UBTH n=900 Freq. (%)	Total n=1800 Freq. (%)
0	2 (0.2)	0 (0.0)	2 (0.1)
1	256 (28.4)	206 (22.9)	462 (25.7)
2	190 (21.1)	213 (23.7)	403(22.4)
3	161 (17.9)	254 (28.2)	415 (23.1)
4	123 (13.7)	128 (14.2)	251 (13.9)
5	83 (9.2)	65 (7.2)	148 (8.2)
6	39 (4.3)	28 (3.1)	67 (3.7)
7	31 (3.4)	5 (0.6)	36 (2.0)
≥8	15(1.6)	1 (0.1)	16 (1.0)

Table 2: WHO Drug use Indicators – Prescribing and Patient Care Indicators in DELSUTH and UBTH

Core Indicators	DELSUTH	UBTH	Total	Test Statistics	p-value
Prescribing Indicators					
Mean ±SD number of drugs per encounter	2.9±1.8	2.7±1.4	2.8±1.6	2.420†	0.016
% of drugs prescribed by generic name	56.0%	43.1%	49.8%	28.195*	<0.001
% of encounters with an antibiotic prescribed	25.7%	29.1%	27.4%	2.685*	0.101
% of encounters with an antimalarial prescribed	14.3%	32.0%	23.2%	78.906*	<0.001
% of encounters with an injection prescribed	14.1%	10.7%	12.4%	4.919*	0.027
% of drugs prescribed from EML	69.4%	63.6%	66.6%	3.749*	0.053
Patient Care Indicators					
Mean ±SD consultation time (mins)	20.2±12.4	10.4±5.8	15.3±10.9	12.410†	<0.001
Mean ±SD dispensing time (secs)	120.7±108.8	151.3±115.7	135.9±113.3	–3.338†	0.001
% of drugs actually dispensed	89.8%	82.2%	86.2%	1.703*	0.192
% of drugs adequately labelled	99.0%	98.3%	98.7%	0.011*	0.917
Patients' knowledge of correct dosage	96.7%	96.3%	96.5%	0.049*	0.824

**Chi-square test, †t-test, p<0.05 = significant.*

Table 3: WHO drug use indicators - Facility and Complementary Drug use Indicators in DELSULTH and UBTH

Core Indicators	DELSUTH	UBTH	Total	Test Statistics	p-value
Facility Indicators					
Availability of a copy of the Essential Medicines List	No	No	No		
Availability of key drugs	15 (100.0%)	9 (60.0%)	12 (80.0%)		
Complementary Drug Use Indicators					
Mean ± SD medicine cost per encounter (₦)	2,278.15±3207.77	1,796.90±1503.01	2,037.53±2515.72	4.126†	<0.001
% of drug cost spent on antibiotics	14.1%	18.9%	16.2%	10901.64*	<0.001
% of medicine cost spent on injections	13.0%	3.5%	8.2%	86675.04*	<0.001
% of medicine cost spent on antimalarial	4.9%	11.2%	8.1%	43723.79*	<0.001
% of patients treated without medicines	0.2%	0.0%	0.1%	2.002*	0.157
% of patients satisfied with the care	91.7%	89.3%	90.5%	0.950*	0.330

**Chi-square test, †t-test, p<0.05 = significant*

DISCUSSION

This study was an assessment of prescribing patterns and patient care practices in Nigeria using the WHO drug use indicator tools. Result of the study indicates the existence of specific medicine-use problems as revealed by the core indicators of drug use in the facilities. The study showed an average number of drugs of 2.8, indicating a deviation from the WHO recommended reference values of 1.6–1.8.[19]

The percentage of drugs prescribed by generic name in this study was a little lower than 50%. Low generic prescription presages increment in drug cost and incidences of therapeutic duplication errors.[12,20] Antibiotic use in this study was slightly above reference standard, suggesting the persistence of gaps in antibiotic stewardship in the setting. However, in the light of higher values reported by previous studies in the country, this result showed an improvement in antibiotic stewardship and demonstrate the impact of earlier interventions.[18,21,22] Results of the study however indicate prudent use of injections in the setting with a value which is less than reference standard (13.4–24.1%). An interesting finding in this study is the observation that areas with higher antimalarial prescription had a lower injection use rate (UBTH) and areas with lower antimalarial prescription had higher injection use rate (DELSUTH). The observed pattern in this study may be a reflection of the better injection practice observed among the UBTH prescribers and an indication of compliance or preference for enteral routing of co-formulated ACTs. Another reason is the existing free malaria treatment in Delta State which allow only patients with complicated malaria (most of whom are usually treated with injections) present to the DELSUTH, thus accounting for the lower antimalarial prescription and higher injection rate.[23] Antimalarial prescription was observed in just above one-fifth of patient encounters in this study. The antimalarial prescription rate may mirror the malaria prevalence rate in the area and the differential reports may be due to variances in the application of the Roll Back Malaria program in these areas. In particular, antimalarial prescription rate in the UBTH was observed to be more than twice as high as that of the DELSUTH. This difference which was statistically significant may be due to existing malarial control and essential medicines projects in Delta State which may have impacted on the prevalence of malaria.

This study showed that two-thirds of prescribed medicines were listed in the country's Essential Medicine List (EML). Pharmaceutical detailing with incentives to prescribe new medicines may explain why medicines outside the EML are prescribed.

Regarding patient care indicators, there was a marked difference in the consultation time for both facilities which was statistically significant. This may be due to the differential patient load and hence patient-prescriber ratio between facilities leading to a tendency to quickly dismiss patients where the load or ratio is high. Thus, the UBTH with an estimated patient-prescriber ratio of 9:1 recorded a lower consultation time compared to DELSUTH with a ratio of 4:1. The mean consultation time of this study is 15.3 minutes. The longer average consultation time observed in this study may be an indication that doctors now spend sufficient time with patients.

The statistically significant difference between the facilities could be due to the observation that counselling in the DELSUTH were done by pharmacy interns who may not be sufficiently experienced in the art and thus spend less time in the process. Counselling in the UBTH however, was undertaken largely by experienced pharmacists who devote enough time to underscore the importance of the process. Clearly, the dispensing time is critical as it is the stage where the totality of the patient-hospital interaction is summarized in form of medication collection and counselling. Availability of drugs, which is mirrored by the actual number of dispensed drugs, impacts directly on health facility utilization and patient satisfaction. This study showed that majority of prescribed drugs were actually dispensed at the pharmacy. Knowledge of prescribed medicines in terms of use, dose and adverse effects correlates well with medication adherence and ultimately therapeutic success and quality of health care.[24,25] This was demonstrated by a 96.5% rate of correct knowledge of medication therapy.

A limitation of the study was missing prescription sheets of the year under review due to poor record keeping. This was overcome by using prescription records that were available after the sampling procedure that entailed using a sampling interval for selection.

Conflict of Interest

The Authors declare that there is no conflict of interest.

Funding

This research received no specific grant from any funding agency in the public, commercial or not-for-profit sectors.

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