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Evaluation of drug use pattern in Lulu Brigg's Health Centre, University of Port Harcourt, Nigeria using WHO, prescribing indicators

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Abstract
Background: To ensure rational drug use, it is important to assess patterns of drug utilisation in health care facilities using established principles as provided by the WHO core drug use indicators. A cross sectional study was carried out in which 12,615 patients' records from pharmacy department of the Health Centre registered with the NHIS and TISHIP insurance schemes were analysed using WHO prescribing indicators. The average number of drugs per prescription were 3.43 (range1-8) and 3.81(range1-12) drugs per encounter in NHIS and TISHIP respectively. Percentage encounter with antibiotics prescription from both insurance schemes were 9.7% and 8.5%, while 92% and 93% of drugs were prescribed with generic names. All the drugs were prescribed from the essential drug list (EDL). The most commonly prescribed medicines were multivitamins and antimalarials. The study has shown appropriate use of antibiotics but high rate of polypharmacy. Rational drug use requires continuous monitoring in health care facilities.

Keywords: Rational drug use, WHO indicators, polypharmacy, antibiotics.

1. Introduction
The University Health Centre, provides healthcare for the students, staff and families of the University community usually at the level of primary health care. Two insurance schemes are employed in the University Health Centre, the National Health Insurance Scheme (NHIS) which caters for the staff and the Tertiary Institution Students Health Insurance Scheme TISHIP (TISHIP) which caters for the students. NHIS was established in Nigeria in the year 2004 to provide easy access to health care through various prepayment systems to all Nigerians at affordable cost. TISHIP is a product of NHIS which serves the Health Care needs of students both full-time and part-time in tertiary institutions [1].

Health care is delivered by health professionals such as the medical doctors, pharmacists, nurses, midwives and other health care providers either through prescription writing, dispensing and administration of drugs to the patients. Since drug provision is a major component of health care, it is very imperative that adequate attention be given to it. In the light of this, the World Health Organisation (WHO) has set up principles that serve as indicators to ensure rational drug use in health care facilities.

Rational drug use means prescribing right drug, in adequate dose for the sufficient duration and appropriate to the clinical needs of the patient at lowest cost. The World health organization (WHO) defines 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 the lowest cost to them and their community [2, 3].

Irrational drug use on the hand is non-compliant to the above definition and involves indiscriminate prescribing of drugs sometimes in the wrong doses, indication or multiple prescription of drugs to an individual. Common irrational drug use include polypharmacy (use of too many medicines per patient), inappropriate use of antimicrobials, over-use of injections when oral formulations would be more appropriate, failure to prescribe in accordance with clinical guidelines, prescribing with brand names [4]. The consequences of irrational drug use include serious morbidity and mortality rates especially in children with infection and chronic diseases, waste of resources, increasing out-of-pocket expenses for patients as well as adverse reactions and increased rate of antibiotic resistance [2].

Indications from studies have shown that irrational drug use is a global problem particularly in healthcare settings of developing countries and urgently needs to be addressed [5, 6].

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Reports from World Health Organisation and other researches have indicated that globally, greater than 50% of all medicines are either not prescribed correctly or sold and about 50% of patients fail to use their medicines properly [2]. The ultimate goal of drug utilization research must be to assess whether drug therapy is rational or not and it involves evaluation of prescriptions, dispensing and distribution of medicines.

Guidelines for evaluating rational drug use as recommended by WHO in collaboration with International Network for the Rational Use of Drugs (INRUD) include prescribing indicators, patient care indicators and facility indicators [4]. The present study focuses on prescribing indicators which measures the performance of health care providers and comprise of 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 injection prescribed and percentage of drugs prescribed from essential drug list or formulary (EDL).

The study was designed to evaluate the pattern of drug prescribed for the staff and students that attend the Health Centre for their primary healthcare using WHO prescribing indicators and determine the commonly administered drugs as well as potentially inappropriate medications (PIM) prescriptions. PIM were defined as drugs whose risks outweigh their benefits [7]. For the present study only tramadol-an opiate analgesic is classified as such because other analgesic medications can be used in place of tramadol. Ethical approval for the study was obtained from Lulu Briggs Health Centre.

2. Materials and Methods
2.1 Study Area
The study was conducted at Lulu Briggs Health Centre in the University of Port Harcourt Choba, Rivers State, Nigeria. Rivers State is in the Niger Delta Region of Nigeria, known for its oil and gas activities. The Students' population is 37,000 (about 7,000 admitted students per session) with 1,561 academic staff and 1,456 for non-academic staff strength. The Health Centre has two Health Insurance Schemes: the Tertiary Institution Student Health Insurance Programme (TISHIP) which strictly caters for students and National Health Insurance Scheme (NHIS) that caters for staff and families of the University.

2.2 Data Collection
Retrospectively, 6 month's (July-December, 2015) prescription records were systematically selected from the two insurance schemes available in the Health Centre according to World Health Organisation [2]. Using the minimum 600 encounters for investigating drug use in health facilities as recommended by WHO, a total of 12,615 patients' records from drug dispensary department of the Health Centre were utilized to retrieve information. [4]. Information collected include the demography of the patients, type and number of drugs prescribed, number of medications per prescription for both Health Insurance Schemes, and PIM prescriptions. The collected data were entered in Microsoft Excel 2013 and statistically analysed using SPSS version 20 (Statistical package for the social sciences). The results were expressed as frequencies, and percentages.

Prescribing indicators evaluated for the study include average number of drugs per encounter per patient, percentage of drugs prescribed by generic name, percentage encounter with antibiotics and drugs prescribed from essential drug list (EDL). Calculations were done according to the WHO guidelines. Average number of drugs per encounter was calculated by dividing the total number of drugs prescribed with the total number of patients; percentage drugs prescribed by generic name was obtained by dividing the number of drugs prescribed by the generic name by the total number of drugs and multiplying by 100. The percentage of antibiotics was calculated by dividing the number of patient encounters with antibiotic prescribed by the total number of encounters and multiplied by 100. PIM was calculated from the total analgesics prescribed. The percentage of drugs prescribed from the Essential Drug List was not calculated because all the drugs prescribed were on the list.

3. Results
Analysis of the demographic data of 12,615 patients' records shows that 8,932 (70.8%) were from the NHIS while 3,683 (29.2%) were from the TISHIP. Observation from the data reveals that a greater percentage (62%) of the patients from both schemes are females as against 38% males. Age stratification in the NHIS scheme shows that a greater percentage of patients (90.6%) were above 18 years, 7.9% were below 12 while 1.5% were between 13-18years. On the other hand, all the patients in the TISHIP scheme were 18 years and above.

A total of 30,658 and 14,014 drugs from NHIS and TISHIP respectively were prescribed for the patients, giving an average of 3.43 (range of 1–8 medicines) and 3.81 (range of 1–12 medicines) drugs per encounter for NHIS and TISHIP respectively. From this, the highest occurrence of prescription was 3 medications per prescription with a frequency of 3,197 and 1,304 in NHIS and TISHIP respectively. TISHIP had one occurrence of 12 drugs prescribed at a time while the highest level of medication per prescription in NHIS is 8.

Study results show that percentage antibiotics prescription from both insurance schemes were 8.5% and 9.7% encounters for TISHIP and NHIS respectively. Prescription by generic name had values of 92% and 93.7% in NHIS and TISHIP respectively (Table 1). The drugs prescribed in brand names comprise of antibiotics (17.9% and 20.3%), antiemetics (18.9% and 22.7%), antihistamines (50.7% and 57%) respectively and antidiabetics 12.5%, NHIS only.

The breakdown of prescribed drugs reveals that the most commonly prescribed drugs in the TISHIP from the present study are the multivitamins (12.4%) closely followed by NSAIDS (11.2%) and antimalarials (9.8%) and the least is antihypertensives and ARVs (0.1%) while in the NHIS, the highest is antimalarials and antiulcer (10.6%) followed by antihistamines (10.4%) with the least being ascaricides (1%) (Table 2). Percentages obtained of Tramadol which is the only PIM in the study were 4.8% and 5% of drugs prescribed in TISHIP and NHIS respectively. All the drugs prescribed in both schemes were from EDL.
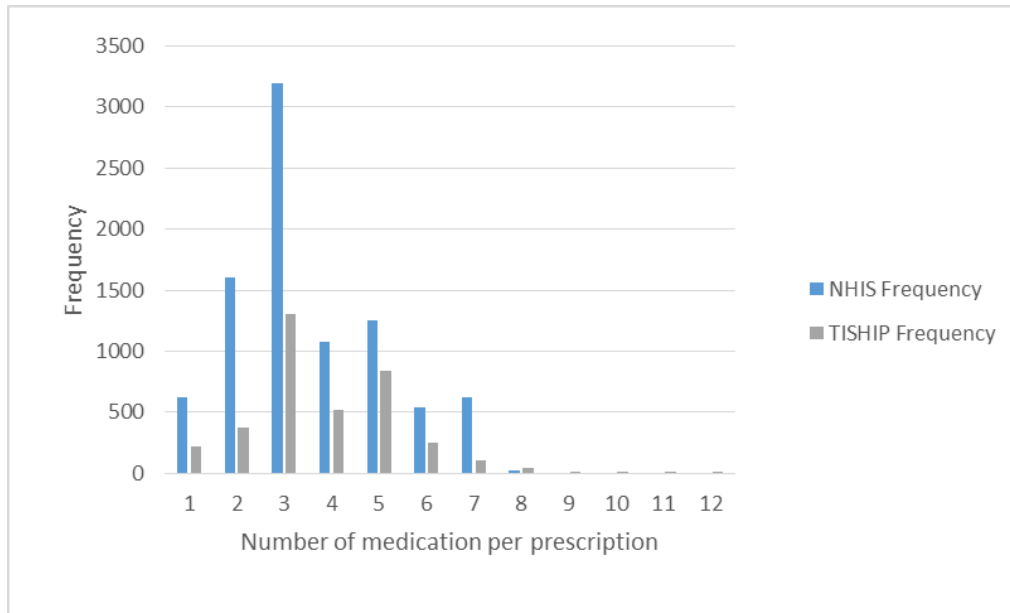
Fig 1: Comparison of number of medication per prescription in NHIS and TISHIP

Table 1: Summary of drug prescribing indicators

Prescribing indicators assessed	TISHIP Total drugs/encounters (%)	NHIS Total drugs/encounter (%)	Ideal Standard WHO
Average number of drugs per prescription	14,014 (3.8)	30,658 (3.43)	1.6 – 1.8%
Drugs prescribed in generic names	13,131 (93.7)	28,171 (92)	100%
Drugs prescribed in EDL	14,014 (100)	30,658 (100)	100%
Encounter with antibiotics	1,196 (8.5)	2,967 (9.7)	20.0 – 26.8%

Table 2: Frequency of classes of drugs prescribed in NHIS and TISHIP

Drug Class	NHIS Frequency (%)	TISHIP Frequency (%)
Antimalarials	3261 (10.6)	1379 (9.8)
Antihistamines	3150 (10.4)	1260 (9)
NSAIDs	2715 (8.9)	1568 (11.2)
Vitamins	3124 (10)	1732 (12.4)
Antiulcer	3244 (10.6)	914 (6.5)
Antibiotics	2967 (9.7)	1196 (8.5)
Non-NSAIDs Analgesics (Tramadol)	1572 (5)	669 (4.8)
Throat Preps	267 (0.9)	850 (6.1)
Antihypertensives	2528 (8.3)	7 (.1)
Intravenous Fluid (Dextrose and Normal Saline)	1084 (3.5)	676 (4.8)
Antifungals	575 (1.9)	731 (5.2)
Steroids/ Anti-inflammatory	787 (2.7)	889 (6.2)
Antiemetics	1397 (4.6)	809 (5.8)
Suppositories	20 (.1)	74 (.5)
Ascaricides	318 (1)	141 (1)
ARVs	0	7 (.1)
Antidiarrheals	218 (.7)	67 (.5)
Antiasthma	608 (2)	50 (.4)
CNS Drugs	376 (1.2)	95 (.7)
Anthelminthics	1409 (4.6)	900 (6.4)
Antidiabetics	1038 (3.4)	0
Total	30,658 (100)	14,014 (100)

4. Discussion

Irrational drug use remains a problem in health institutions especially in developing countries and drug utilisation review is the tool for assessing the issue because it addresses the type and amount of irrational drug use as well as the reasons why medicines are used irrationally.

Study results show a high percentage of female patients in consonance with previous studies even in Western countries [8, 9] even though in Nigerian population statistics women constitutes 49.5% against 50.9% men [10].The higher population here could be because women are more attentive to health issues than men, having been established by past studies to report more symptoms than men who have been proven to seek healthcare at later stages [11, 12].

The result of this study revealed the average number of drugs per encounter to be 3.43 (range of 1 – 8 medicines) and 3.81 (range of 1 – 12 medicines) for NHIS and TISHIP respectively above the WHO standard range of 1.6 – 1.8 [4]. These values are in consonance with average number of drugs of 3.4-3.99 obtained from previous studies in Nigeria but was however at variance with studies done in Ethiopia where the average number of drugs prescribed was 1.9 [5, 13, 14]. Also the range of 1-12 medicines obtained from the TISHIP arm of the study tallies with the result obtained in a secondary health facility in western Nigeria [15]. This pattern shows high rate of polypharmacy in Nigerian prescriptions compared to the Ethiopian studies. Poly-pharmacy is said to occur when multiple medications are prescribed for a patient or the administration of more medications than are clinically indicated representing unnecessary drug use [16]. The use of multiple medications have been associated with increased adverse drug reactions as well as drug-drug interactions, non-adherence and high cost of treatment especially in the elderly [16, 17].

Antibiotics prescription from both insurance schemes was very low with values of 8.5% and 9.7% encounters for TISHIP and NHIS respectively, well below the 20.0-26.8% minimum recommended by WHO/INRUD [4, 2]. These values are at variance with values ranging from 45-75% obtained in earlier Nigerian studies both in public and private establishments [15, 18, 5]. The low percentage of antibiotics could be because the doctors in the health Centre are very

cautious of antibiotic use. Over prescribing and inappropriate use of antibiotics have the potential to cause antibiotic resistance which may invariably result to use of very expensive medicines for minor ailments. Therefore the result of the antibiotics encounter in the present study is very commendable.

Drug prescription by generic name in this study showed values of 92% and 93.7% in NHIS and TISHIP respectively. Even though these values are higher than results of previous Nigerian studies of 42.7%, 49.5% and 69.81%, there is need for more improvement to get to the ideal 100% value as required by WHO [19, 20, 21, 4]. Drug prescription by generic name is known to reduce the cost of drug treatment and rationalizing drug therapy [18]. The drugs prescribed in brand names comprise of antibiotics (17.9% and 20.3%), antiemetics (18.9% and 22.7%), antihistamines (50.7% and 57%) respectively and antidiabetics 12.5% in the NHIS arm only.

The breakdown of prescribed drugs reveals that the most commonly prescribed drugs in the TISHIP from the present study are the multivitamins (12.4%) closely followed by NSAIDS (11.2%) and antimalarials (9.8%) and the least is antihypertensives and ARVs (0.1%) while in the NHIS, the highest is antimalarials and antiulcer with 10.6% followed by antihistamines (10.4%) with the least being ascaricides (1%). There was no ARV prescribed in the NHIS arm. This could be because the NHIS attend to the staff and the HIV-infected persons would rather obtain their ARV drugs from other places since they would not like their status to be known in their place of work.

Percentages (9.8 and 10.6) of antimalarial prescription were very similar to results of 10.2% and 12.7% obtained from previous studies in Nigeria [15, 23]. Nigeria is a malaria endemic country and most patients that attend the hospitals are presumably treated for malaria without laboratory confirmation. Therefore it is not surprising that antimalarial agents accounted for such a high percentage of the drugs prescribed in the health centre. Furthermore, earlier studies have reported a prevalence of 11% and 12.3% prevalence of malaria in the area [23, 24].

Regarding antihypertensive prescription, the 8.3% obtained from the NHIS arm even though was higher than the report of Akande *et al*, in Illorin, it is much lower than results from other parts of Nigeria. Studies from other health facilities in Nigeria report a higher antihypertensive prescription percentage of 25.8-50.4% compared to the result of the present study [21, 22, 25]. These studies were however carried out in tertiary hospitals which attend to a higher number of patients and have specialist physicians in attendance unlike Primary Health Centres such as Lulu Briggs where the present study was carried out.

Even though Tramadol comprises of 4.8% and 5% of drugs prescribed in TISHIP and NHIS respectively, it actually accounts for 30% and 36.7% of the prescribed analgesics. This is much higher than 17.8% obtained in a study among the elderly in Nigeria [25]. Tramadol being a centrally acting opiate analogue was classified as PIM because of the tendency to be abused. Newspaper reports in Nigeria abound with cases of abuse of tramadol by the youths [26]. The choice of tramadol as analgesic could be due to pressure from the patients since many people now use it as energy booster and recreational drug or maybe the prescribers are unaware of the extent of the abuse in the society. Also many people believe that paracetamol is ineffective for treatment of pains besides

headache hence they opt for stronger analgesics. Furthermore the gastrointestinal adverse effects of NSAIDs could account for the choice of tramadol in situations where they cannot be used. It is always advisable to ensure that the benefits of every drug should outweigh the risks. It is noteworthy that all the drugs prescribed were in the Nigeria's Essential Drug List which is based on World Health Organization (WHO) Model Formulary and this is quite commendable.

5. Conclusion
Even though prescribing from EDL in the present study was ideal and prescribing in generic names was very commendable according to the WHO, there was a very high rate of polypharmacy which have been reported in previous studies. The study has also revealed/highlighted the inappropriate prescribing of the opiate analgesic tramadol, a potential trigger to drug abuse among the university students.

There is need for continuous training and awareness of rational use of drugs especially among prescribers. The study also recommends that Health insurance scheme should be adequately funded as to meet up with the health needs of the patients such as wider range of drug dosage forms, availability of various types of drugs.

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