DRUG UTILIZATION PATTERN IN SICKLE CELL DISEASE IN HEMATOLOGY UNIT OF UNIVERSITY OF PORT HARCOURT TEACHING HOSPITAL: A 5-YEAR RETROSPECTIVE STUDY

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ABSTRACT

Background: Sickle cell disease (SCD) is an important public health problem in Nigeria and about 2% of all newborn are born with the disease. The treatment of the symptoms of SCD includes adequate hydration, blood transfusion and use of analgesics, antibiotics, and anti-malarial drugs. Globally, drugs accounts for about 60% of non-personnel cost of healthcare and about 50% of medications are presumed to be inappropriately prescribed dispensed or sold. **Aim:** The aim of the study was to assess the drug utilization pattern in the management of SCD patients in the hematology unit of University of Port Harcourt Teaching Hospital in Rivers State, South-south Nigeria; and to assess conformity to World Health Organization (WHO) standards and specification. **Method:** A cross-sectional retrospective approach was adopted for the study which involves the review of 101 case notes of sickle cell disease patients seen in the hematology unit of University of Port Harcourt Teaching Hospital, Rivers State from January 2013 to December 2017. Administrative approval for the study was obtained from the Facility's Management. Data were collected from case notes of patients and were analyzed using descriptive statistics. **Result:** An average of 4.3 drugs per prescription was prescribed. The percentage of drugs prescribed as generic was 68.5% while the percentage of drugs prescribed on the Essential Drug List (EDL) was 93.2%. Analysis of the prescriptions showed that 24.7%, 20.2% and 15.5% of the drugs were Vitamins with micronutrients, Analgesics and Anti-malarials respectively. While 34.3% of the total prescriptions contained one or more antibiotics and 31.4% having one or more injections. There were more females than males among the sickle cell disease patients and most of the patients (39.6%) were within the age of 21-30. **Conclusion**: Drug utilization pattern in sickle cell disease patients in the facility reasonably conform to standard, However, strict adherence to WHO/International Network on Rational Drug Use standard and core prescribing indicators would optimize patient management and therapeutic outcome.

KEYWORDS: Drug utilization pattern, sickle cell disease**.**

INTRODUCTION

Sickle cell disease is the most common genetic disease and has been recognized as a major public health problem by international organizations such as World Health Organization (WHO) and United Nations Educational, Scientific and Cultural Organization (UNESCO). Sickle cell disease is widespread affecting many people in Africa, the Mediterranean, India and their descendants elsewhere.[1] The course of the disease varies widely with some persons exhibiting severe manifestations requiring frequent hospital visits and admissions. The acute and painful vaso-occlusive crisis is the number one cause of hospital admission in patients with sickle cell disease.[2] SCD is a genetic blood disorder characterized by abnormal red blood cell that assume a rigid, sickle shape which decreases its flexibility resulting in their early destruction, thus blocking blood flow which may cause many complications. SCD is expressed in persons with genotype HbSS.
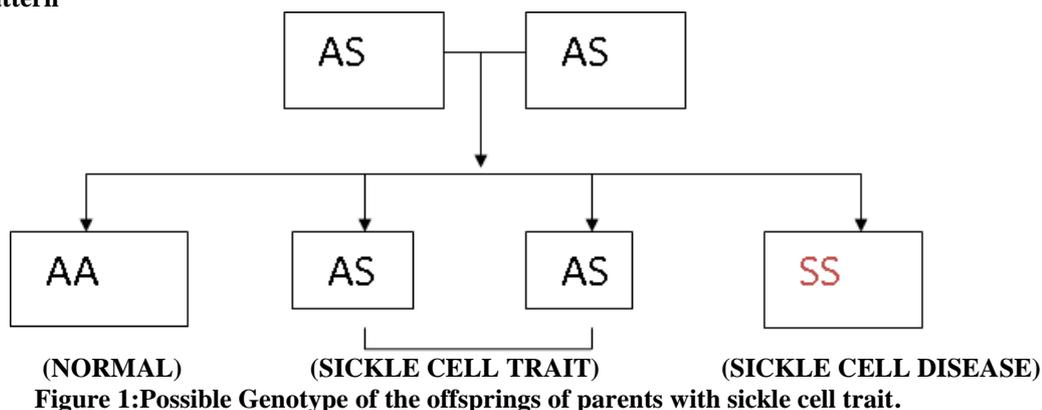
Inherittance Pattern

Figure 1:Possible Genotype of the offsprings of parents with sickle cell trait.

It is important to keep in mind that each time this couple has a child, the chances of a child having sickle cell disease remains the same.

Drug Utilization Review
Drug utilization review has been defined by the World Health Organization as marketing, distribution, prescription and use of drugs in the society, with specific emphasis on medical, social and economic consequences.[3] Drug utilization studies (DUS) are very important tool in the evaluation of health care systems as well as to find irrational prescriptions and for logical healthcare planning.

STATEMENT OF THE PROBLEM
Inappropriate drug prescribing is a global problem.[4] Misuse of drugs occurs in all countries and irrational practices are especially common and costly in developing countries[5] Some studies in Nigeria have revealed that appreciable gaps in knowledge exist with respect to rational drug use among health care professionals.[6,7] Another study among elderly patients in a Nigerian rural tertiary hospital in Southwest Nigeria found that up to 25.5% of all patients had a potentially inappropriate medication prescribed.[8]

JUSTIFICATION OF THE STUDY
• Drug utilization studies play an important role in the rational use of drugs by providing drug prescribing patterns, quality of use, determinant of use and outcome of use.
• Knowledge of drug prescribing is therefore important for effective treatment, and counseling the patient about the potential harm of drug use is a matter of high priority, which should be carried out by every prescriber.

AIM OF THE STUDY
• The aim of the study is to assess the drug utilization pattern in sickle cell disease in the hematology unit of University of Port Harcourt Teaching Hospital.

SPECIFIC OBJECTIVES
• To determine the most frequently prescribed drug for sickle cell disease patients

• To determine the socio-demographic data (age and gender distribution) that influence prescribing pattern.
• To determine the proportion of drug prescribed per prescription.
• To determine the percentage of drugs prescribed by generic name.
• To determine whether the prescribing pattern is in accordance with national and international standards (WHO/INRUD drug use indicators).

METHODS
Study design: The study was a cross-sectional retrospective review of hospitals record of 101 case notes of sickle cell disease patients, managed at haematology unit of the University of Port Harcourt Teaching Hospital (UPTH), Rivers State. Nigeria between January 2013 and December, 2017

Study Population: The study population includes 101 sickle cell disease patients, who were registered at the Haematology unit of University of Port Harcourt Teaching Hospital.

Data Collection
A total of 101 clinical records of SCD patients for a five year period (2013-2017) from Haematology unit, were collected. WHO core prescribing indicator proforma was used to collect data, and information retrieved included demographic details of patients (age and gender distribution) and the WHO/INRUD core prescribing indicators. WHO/INRUD methods of determining core prescribing indicators were employed, which includes number of medicines per prescription, percentage encounter of these drugs as generics, percentage occurrence of injections, percentage occurrence of antibiotics and percentage of essential drugs.

Data Analysis
The data obtained were entered into a spreadsheet and crosschecked for accuracy. The collected data were then analyzed by descriptive statistics to obtain averages and percentages, using the statistical package for social sciences (SPSS) version 20.

➤ **Procedures for calculating prescribing indicators**
The interpretations of the findings were done and compared with standard values of WHO/INRUD parameters.[9]

Average number of drugs prescribed per encounter was calculated to measure the degree of poly-pharmacy, and it was obtained by dividing the total number of drugs prescribed by the number of encounters surveyed.

Percentage of drugs prescribed by generic name was obtained to measure the tendency of prescribing by generic name, and it was calculated by dividing the number of drugs prescribed by generic name by total number of drugs, which was then multiplied by 100.

Percentage of encounter in which an antibiotic was prescribed was calculated to measure the overall use of commonly overused and costly form of drug therapy. It was calculated by dividing the number of encounters in

which an antibiotic was prescribed by the total number of encounters surveyed, multiplied by 100.

Percentage of encounter with an injection prescribed was calculated to measure the overall use of commonly overused and costly form of drug therapy. It was calculated by dividing the number of patient encounters in which an injection was prescribed by the total number of encounters surveyed, multiplied by 100.

Percentage of drugs prescribed from an essential drug list (EDL) was calculated to measure the degree to which practices conform to a national drug policy. The percentage was calculated by dividing the number of drugs prescribed which are in Essential Drug List, by the total number of drugs prescribed, and multiplied by 100.

Ethical consideration: Ethical approval was obtained from the ethics review committee of the University of Port Harcourt Teaching Hospital.
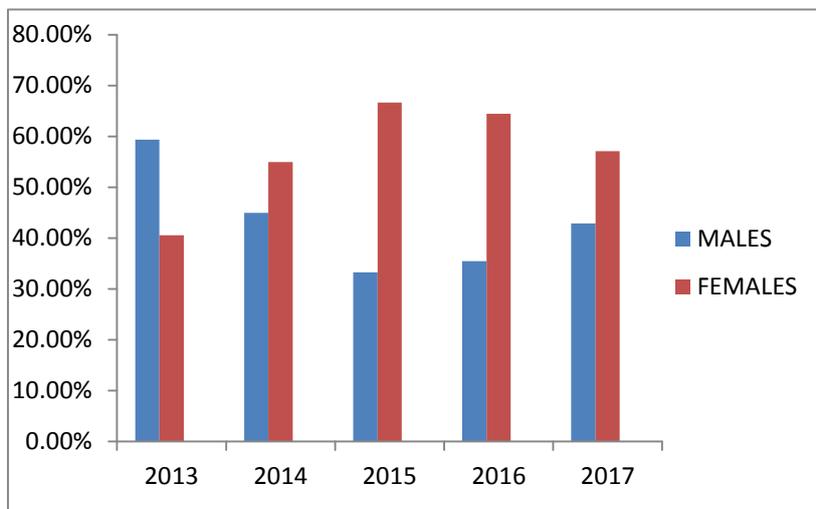
RESULTS

Figure2: Gender distribution of sickle cell disease patients (2013-2017).

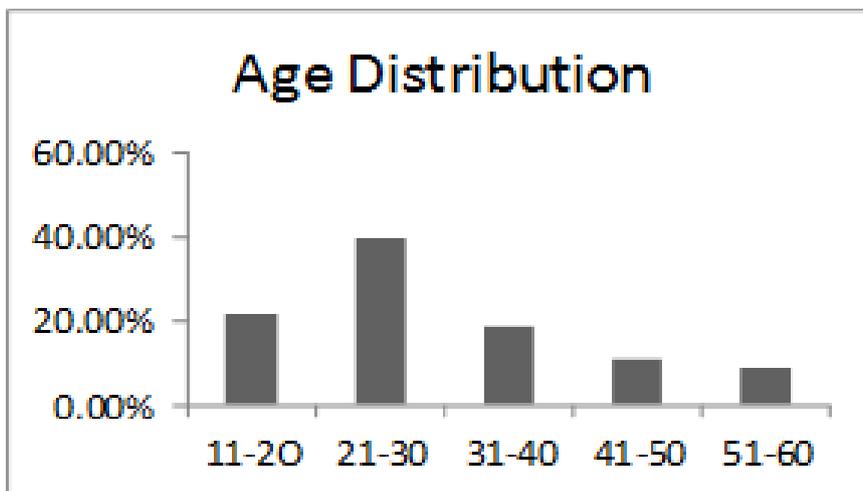**There were more females than males during the study period**

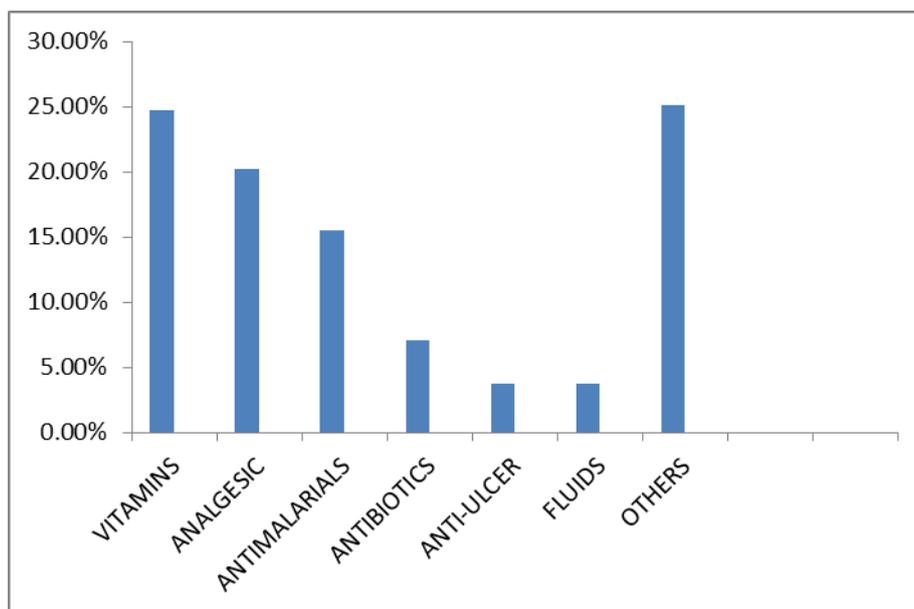**Figure 3: Age distribution of the patients.**

Figure 4: Classes of drugs prescribed

From the figure above, Vitamins and micronutrients (24.7%) was the most prescribed medication followed by Analgesics (20.2%) and then Antimalarials (15.5%).

Other classes of medication were relative to the patients' other comorbidities.

Prescribing Indicators
Table 1: WHO Core prescribing indicators among SCD patients prescription (2013-2017).

Prescribing indicators	Year	Average/percentage	WHO Ideal values
Average number of drugs per prescription	2013	3.94	1.6-1.8
	2014	4.0	
	2015	3.8	
	2016	4.2	
	2017	4.3	
Percentage of drugs prescribed by generics	2013	69.8%	100%
	2014	71.2%	
	2015	72.8%	
	2016	65.6%	
	2017	68.5%	
Percentage of encounter with antibiotics	2013	21.9%	(20.0-26.8%)
	2014	45.0%	
	2015	13.3%	
	2016	29.0%	
	2017	34.3%	
Percentage of encounter with injection	2013	18.8%	(13.4-24.1%)
	2014	10.8%	
	2015	20.0%	
	2016	22.6%	
	2017	31.4%	
Percentage of drugs on Essential Drug List(EDL)	2013	88.1%	100%
	2014	93.7%	
	2015	88.6%	
	2016	91.6%	
	2017	93.2%	

N/B: The standard values gotten from Isah *et al.,* (2006)

DISCUSSION
This study showed that more females were treated at the study center during the study period. Although SCD is

known to affect males and females equally,[10] significant gender differences in morbidity and mortality have been reported in adults with SCD. It is believed that men who

have the disease experience worse symptoms than women. A possible reason for this is the role of estrogen which help to stimulate the production of nitric oxide, a vasodilator which gives the sickle shaped cells more room to pass through the vessels, preventing blockages which is the cause of sickle cell crisis.[11] Majority (39.6%) of the SCD patients fell within the age range of 21-30.

The most prescribed drugs among SCD patients were Vitamins and micronutrients (24.7%), Analgesics (20.2%) and antimalarials (15.5%). The high percentage of analgesic is in agreement with previous reports that acute pain episode is the number-one cause of hospital admissions among patients with SCD.[1] Narcotics (mild opioids) accounts for the highest of prescribed analgesic. Even though the chronic daily use of opioids in SCD patients with frequent severe painful episodes is controversial, many clinicians report that patients improved and function better after treatment with opioid analgesics.[12] On anti-malarial use, 76.3% of prescriptions were for proguanil (prophylactic anti-malarial). It has been advocated that anti-malarial prophylaxis be prescribed to all patients, as malaria has been associated with severe anemia in patients with HbSS.[13]

An assessment of the WHO core prescribing indicators showed that the average number of drugs per prescription was 3.94(2013), 4.0(2014), 3.8(2015), 4.2(2016) and 4.3(2017). This is higher than the WHO standard of 1.6-1.8 (Isah *et al.,* 2006). About 69.8% (2013), 71.2% (2014), 72.8%(2015), 65.6%(2016), 68.5%(2017) of drugs in the study were generic prescriptions. This is lower than the 100% stipulated by WHO. Generic prescribing will eliminate or reduce the incidence of therapeutic d\uplication errors[14], reduce the cost of drugs for the patients[15] and maintain a more economic stock control system.[16]

The percentage encounter with antibiotics was high in this study compared to the WHO standard of 20-26.8%[8] Scientific literature had reported large scale inappropriate antibiotic use globally and this can potentially lead to antibiotics resistance and increase the necessity to use more expensive antibiotics to treat common and life threatening infections.[15] Also, prescription of parenterals in our study was higher than the standard value. This may be because most patients are admitted during their crisis period. Lack of knowledge about appropriate antibiotic use, including overestimation of the severity of illness and pressure from patients has been reported as major factors influencing high antibiotic prescribing at health centers.[16] These same factors may possibly play a role in University of Port Harcourt Teaching Hospital (UPTH). From the present study, the percentage of drugs prescribed from the WHO Essential Drugs List(EDL) was 93.2%). This was commendable, compared to previous studies. Reports has it that the higher the

compliance with this list, the more rational the drug prescribing pattern.[17]

CONCLUSION
Vitamins and micronitrients was the most prescribed medication followed by analgesic. There were more females than males in this study and majority of patients were within the 21 – 30. The proportion of drugs prescribed in generics was fairly above average. There was high level of adherence to WHO Essential Drug List. Strict adherence to standards would help reduce cost, recognize and prevent potentially dangerous drug-drug interaction and antibiotic resistance.

RECOMMENDATIONS
- There should be training among healthcare providers so as to ensure rational prescribing patterns and drug use.
- Active community medical education about the sickle cell disease through medical personnel and public societies
- Counseling before marriage should be prioritized to prevent SCD inheritance
- Periodic prescription audit and review at the health facility level could promote drug utilization pattern.
- There is the need for future studies to consider other WHO indicators such as patient care indicators and facility indicators which are also very important tools in evaluating drug use of a healthcare facility, so as to ensure a more conclusive finding, in sickle cell disease management.

REFERENCES
1. Weatherall DJ, Clegg JB. (2001), "Inherited haemoglobin disorders: an increasing global health problem". Bull. World Health Organ, 79(8): 704-12.
2. Ballas, S.K., Lusardi, M. (2005), Hospital readmission for adult acute sickle cell painful episodes: frequency, etiology, and prognostic significance. Am J Hematol, 79(1): 17-25.
3. World Health Organisation (2002) policy perspectives in medicines. Promoting rational use of medicine: core components. WHO Report. Available at: http://apps.who.int/medicinedocs/en/d/Jh3011e/.
4. . Enwere OO, Falade CO, Salako BL. Drug prescribing pattern at the medical outpatient clinic of a tertiary hospital in southwestern Nigeria. Pharmacoepidemiol Drug Saf, 2007; 16: 1244-9.
5. . Hogerzeil HV, Bimo, Ross-Degnan D, Laing RO, Ofori-Adjei D, Santoso B, *et al.* Field tests for rational drug use in twelve developing countries. Lancet, 1993; 342: 1408-10.
6. Chukwuani CM, Onifade M, Sumonu K. Survey of drug use practices and antibiotic prescribing pattern at a general hospital in Nigeria. Pharm World Sci, 2002; 24: 188-95.
7. Okoh A. An assessment of rational drug use in public tertiary hospital in Edo state. Nigeria. Geneva Health Forum, GHF, Research Project, 2012.

8. Fadare JO, Agboola SM, Opeke OA, Alabi RA. Prescription pattern and prevalence of potentially inappropriate medications among elderly patients in a Nigerian rural tertiary hospital. Ther Clin Risk Manag, 2013; 6: 115-20.
9. Isah, A.O., Laing, R., Quick. J., Mabadeje, A.F., Hogerzeil, H., & Ross-Degnan, D. The development of reference values for the WHO health facility core prescribing indicators. West Afr J Pharmacol Drug Res, 2006; 18: 6-11.
10. Christopher D. Reiter and Mark T. Gladwin. An emerging role of nitric oxide in Sickle Cell Disease vascular homeostasis and therapy. Curr Opin Hematol, 2003; 10(2): 99–101.
11. Schechter, N.L., Berrien, F.B., Katz, S.M. The use of patient-controlled analgesia in adolescents with sickle cell pain crisis: A preliminary report. J Pain Symptom Manage, 1988; 3: 109-13.
12. Akinyanju O, Johnson AO. Acute illness in Nigerian children with sickle cell anaemia. Ann Trop Paediatr, 1987; 7: 181-6.
13. Gaston, M.H., Verter, J.I., Woods, G., Pegelow, C., Kelleher, J., Presbury, G., *et al.,*. Prophylaxis with oral penicillin in children with sickle cell anemia. A randomized trial. N Engl J Med, 1986; 314: 1593-9.
14. Lazarou, J., Pomeranze, B.H., & Corey, P.N. Incidence of Adverse Drug Reactions in Hospitalized Patients: A Meta-Analysis of Prospective Studies. JAMA, 1998; 279(15): 1200–1205.
15. Tamuno I, Fadare JO. Drug prescription pattern in a Nigerian tertiary hospital. Trop. J pharm. Res, 2012; 11(1): 146.52 doi: 10.4314/tjpr.v11i1.19.
16. Awad, A.I., & Himad, H.A. Drug use practices in teaching hospitals of Khartoum State, Sudan. Eur. J. Clin. Pharmacol, 2006; 62: 1087–1093. crossref
17. Babalola, C. P., Awoleye, S. A., Akinyemi J. O. and Kotila O. A. Evaluation of prescription pattern in Osun State (Southwest) Nigeria. Journal of Public Health and Epidemiology, 2011; 3(3): 94-98.