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Rational use of drugs in hypertensive outpatients of public hospitals in Kano State, Nigeria

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Abstract
Appropriate drug utilization has a huge contribution to global reduction in morbidity and mortality with its consequent medical, social and economic benefits. The aim of this study was to evaluate the rational use of antihypertensive drugs in public healthcare facilities in Kano, Nigeria and to administer intervention where necessary. The study was a cross sectional prospective survey involving 600 patients from six public healthcare facilities (100 from each) selected by multistage sampling technique. Using a modified extraction form, data were collected, compiled, audited and analyzed according to the WHO/INRUD Rational Drugs Use indicators. Educational intervention was administered in the areas that needed intervention and the impact measured. A total of 3,044 individual drugs were prescribed for 1,176 patient's encounters, giving an average of 2.6, and the range of drugs per encounter varied from 1 to 5. The average number of drugs per prescription does not significantly vary after intervention ($p < 0.275$). Although there was an increased in the percentages of drugs prescribed by generic after intervention (from 65.6% to 70.6%), it was not statistically significant ($p = 0.081$). All drugs were prescribed from EML/STGs and prescription by generic was high. Average consultation time significantly increase from 5.95 to 6.09 minutes ($p = 0.045$). Additionally an insignificant increase in dispensing time (1.10 to 1.27 minutes) after intervention ($p = 0.182$). Educational intervention improved rational use of antihypertensive drugs. Continuous supervision and educating the healthcare team on rational use of drugs must be encouraged.

Keywords: Antihypertensive; Hypertension; Drug utilization; Rational drug use

INTRODUCTION

The World Health Organization (WHO) has defined drug utilization research as the marketing, distribution, prescription, and use of drugs in a society, with special emphasis on the resulting medical, social, and economic consequences [1,2]. Drug utilization research is an essential part of pharmacoepidemiology that describes the extent, nature, and determinants of drug exposure with the ultimate goal to facilitate rational use of drugs in the population [1-3]. Appropriate drug utilization has a huge contribution to global reduction in morbidity and mortality with its consequent medical, social and economic benefits [4]. Inappropriate and cost-ineffective uses of pharmaceuticals are worldwide phenomena especially in the developing countries [2]. Drug utilization research provide insights into

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different aspects of drug prescribing including pattern, determinants, outcomes of drug use and quality control cycle [2]. The ultimate goal of drug utilization studies focus on the factors related to the prescribing, dispensing, administering, and taking of medication, and its associated events [5-7]. Rational use of drugs should be one which meets up patients 'clinical needs in doses that meet their own individual requirements for an adequate period of time at the lowest cost to them and their community [8]. In spite of extensive programs on rational use of drugs and the Essential Medicine List (EML) [9], prescribing behavior has not been changed significantly. Emerging evidence shows that the pattern of diseases in sub- Saharan Africa is changing, with non-communicable diseases (NCD) responsible for about 22% of the total deaths in the region in 2000; cardiovascular disease alone accounting for 9.2% of the total mortality [10]. According to Kearney et al, [11], by 2025 about 75% of the world hypertensive population will be in developing countries. In Nigeria for example, it is the number one risk factor for stroke, heart failure, ischemic heart disease, and kidney failure. With an increasing adult population as well as rising prevalence of hypertension, Nigeria will experience economic and health challenges due to the disease if the tide is not arrested. Therefore, the aim of this study was to evaluate the rational use of antihypertensive drugs in public healthcare facilities in Kano, Nigeria and to administer intervention where necessary.

METHODS

Study population and sample size. The study population consists of all adult hypertensive patients attending hypertension clinics and receiving treatment in the selected hospitals. These patients are followed up in the hospitals for regular treatment and checkup depending on high blood pressure control. Based on WHO methodology [1], which recommends at least 600 encounter for drug utilization study, six health care facilities were included in the study and in each facility, 100 participants were assessed.

Study design. The study was a quasi-experimental study involving six public healthcare facilities selected by multistage sampling technique. List and addresses of all registered public healthcare facilities operating in the State was obtained from the State Ministry of Health (SMoH). Based on the list, there are fourteen hospital zones across the state. These zones were used as strata. Each of these zones was assigned a unique number. The numbers were then entered into Microsoft Excel and five zones were then chosen according to a computerised randomly generated numbers. From the five zones selected, simple random sampling was used again to select hospitals to participate in the study. Where the zone has only one hospital, that hospital is automatically included in the study. Furthermore, the only available teaching hospital was added to make-up the six facilities. Hundred participants were assessed in each of the facilities.

Inclusion criterion. Hypertensive patients that are 18 years and above, and are managed for hypertension for more than 6 months were included in the study.

Exclusion criterion. Sick patients on the appointment day requiring an admission**,** pregnant hypertensive patients**,** individuals who were not capable of hearing and speaking**,** individuals with known mental disorders were all excluded from the study.

Data collection

Pre-intervention. In each health facility, 100 hypertensive patients were recruited (from June 2017 to April 2018) and data collected in a pre-designed form. All collected data were compiled, audited and analyzed according to the WHO/ International Network for Rational Use of Drugs (INRUD) indicators [12] for

number of drugs per prescription, number of antibiotics per prescription, number of drugs prescribed by generic name, number of drugs prescribed from the WHO Model List of Essential Medicines (EML)/ Nigerian Standard Treatment Guidelines (STGs), average dispensing time, average consultation time and number of injectable per prescription [9]. The demographic data of the respondents was also recorded. Data collected during pre-intervention period was analyzed and areas that needed intervention were identified. These are: lack of EML, short prescribing time, and short dispensing time.

Intervention. Following pre-intervention period analysis, three least performing hospitals under study were chosen for intervention and the rest served as the control. These hospitals are Murtala Muhammad Specialist Hospitals (MMSH), Muhammadu Abdullahi Wase Specialist Hospital (MAWSH) and Waziri Gidado General Hospital (WGGH). Educational intervention in form of focus group discussions were held (May to September 2018) with the prescribers and dispensers on the rational use of hypertension medication. Prescribers were advised to always enlighten patients on the importance of adherence in their BP control and importance of interacting with patients by at least spending the minimum consultation time recommended by WHO. Free soft copies EML were also distributed with the aim of improving rational use of drugs and quality of service to patients. In addition, the dispensers were also advised to improve their pharmaceutical care and dispensing time.

Evaluation of impact of the intervention. The impact of the intervention was assessed by collecting data of the same patients in each of the facilities under study between October 2018 and March 2019 using WHO Drug Utilization Indicators as in the pre-intervention study. Pre-intervention and post-intervention indicators of both intervention and control group were expressed as mean ±SD and compared using paired *t*-test. The intervention was considered positive when statistically significant improvement on rational utilization of antihypertension medication was observed in the intervention group only. Practical significance was also tested using effect size (Cohen's d).

RESULTS

In all the facilities, majority of the study participants were women except in MAWSH where males constituted about 61% of the participants. The mean age of the participant from MMSH was the highest (61.6 ±12.4) among the facilities while that of participants from Kura general hospital (KGH) was the lowest (44.4 ±15.5). Majority of the respondents in all the facilities were married, followed by widowed, divorced/separated and those who had never married.

Those without formal education constituted the majority with 36, 64, 65, 77, 44, and 57 representing Kura General Hospital (KGH), Dawakin Tofa General Hospital (DTGH), WGGH, MMSH, MAWSH and Aminu Kano Teaching Hospital (AKTH) respectively. In MAWSH, 20 participants reached post-secondary school, representing the highest among the facilities under study while MMSH had only one participant representing the lowest as shown in Table 1.

Prescribing indicators

Average numbers of drugs prescribed per encounter. A total of 3,044 individual drugs were prescribed for 1,176 encounters, giving an average of 2.6; and the range of drugs per encounter varied from 1 to 5. Figure 1 shows that the average number of drugs per prescription does not significantly ($p < 0.275$) varied after intervention. The values of the indicator however decrease in the right direction (from 2.73 to 2.39) after the intervention.

Percentage of drugs prescribed by generic name. Generally, prescription by generic

name was high; about 71% of the drugs were prescribed by generic name in the control group while 65.6% in the intervention group. Although there was an increased in the percentages of drugs prescribed by generic after intervention (from 65.6% to 70.6%), it was not statistically significant but practically significant (p = 0.081; d = 0.46).

Percentage of drugs prescribed from EML/STGs. All the drugs prescribed in the facilities were from WHO/STGs in all groups both in pre and post intervention period. For details, see table 2.

Percentage of antibiotics prescribed per encounter. The percentage encounter with an antibiotic prescribed was found to be low. About 8% in the control group and 12.7% in the intervention group. There was insignificant reduction to 10.7% in the intervention group after intervention but practically significant (p=0.670; d = 0.27).

Percentage of injections prescribed per encounter. The prevalence of encounter with injections as indicated in table 2 was low in control group (1%) as compared intervention group (3.33%).There was reduction after the intervention (p = 0.529) but not statistically significant.

Patient care indicators

Average consultation time. The average time, which a patient spends with a prescriber in the facilities under study during the pre-intervention period in the intervention group was 5.95 minutes. The time recorded at the post-intervention period was significantly higher (6.09 minutes) than that observed during the pre-intervention study (p = 0.045; d =+0.25).

Average dispensing time. Dispensing time in this study was defined as the time a dispenser spent with patient giving him drugs and pharmaceutical care without billing time. The average time, which a patient spends with a dispenser in the studied health facilities during the pre-intervention period was 1.10 minutes. The time recorded at the post-intervention period was insignificantly higher (1.27) than that observed during the pre-intervention studies (p = 0.182; d = 0.47).

Percentage of drugs actually dispensed. Percentages of drugs dispensed were similar among the facilities in both groups. An insignificant decrease was observed in all the groups. For details, see table 3

Percentage of drugs adequately labelled. Drugs dispensed in all the facilities and groups were inadequately labelled as the name of the patient and in some cases the generic name of the drug were not written.

DISCUSSION

Average number of drugs prescribed per prescription is an important indicator in prescribing practice. A study in Nigeria reported average number of drugs per prescription as 2.82± 1.77 [13]. Values ranging 2.3 to 3.7 drugs per encounter has been reported in Nigeria, Ghana and India [14-17]. In the present study, 2.73 drugs per encounter was calculated in the study group prior to intervention, which positively decreased to 2.39 after intervention. It has been proposed that the average number of drugs per prescription be 1.6 to 1.8 [18]. Higher number of drugs could predispose patient to drug interaction and possible therapeutic and economic lost. The mean number of drugs per prescription is computed to be measure of degree of polypharmacy. Polypharmacy could be as a result of multiple concomitant diseases and can increase the risk of adverse drug reactions, drug interaction, and cost of illness and medication error [19].

Prescribing by generic is believed to reduce cost of drug treatment and rationalizing drug therapy [14]. Optimal percentage of prescription by generic should be close to 100% [18]. In the present study, it was 65.63% and 70.60% before and after intervention respectively in the intervention

group. This is lower than 100% reported by Bhavesh et al, [20] and 94.3% by Akshaya et al, [21]. In contrast, Kumari et al, [22] reported 27.1%. Prescription by generic is strongly recommended as it facilitates education and knowledge. It also helps the pharmacists to maintain a more economic stock control system [23].

Tables 1: Respondents' Demographic Characteristics

Variables		KGH	DTGH	WGGH	MMSH	MAWSH	AKTH
Mean age (±SD)		44.4 (15.5)	52.9 (15.3)	58.7 (14.4)	61.6 (12.4)	54.8 (11.7)	49.0 (13.2)
Gender	Male	31	20	30	23	61	22
	Female	66	77	70	76	38	78
Marital Status	Never Married	0	0	5	1	3	5
	Married	76	67	58	50	75	54
	Divorced/Separated	1	0	5	7	9	7
	Widowed	22	32	32	41	34	34
Address	Rural	37	23	52	12	12	46
	Urban	63	73	48	87	83	54
Employment	Formally Employed	18	4	5	4	13	11
	Unemployed	61	39	48	68	52	39
	Self Employed	17	56	34	25	29	38
	Pensioner	1	1	13	2	5	12
Educational Level	No Formal Education	36	64	65	77	44	57
	Primary	19	22	4	18	11	11
	Secondary	24	6	19	3	24	16
	Post-Secondary	18	3	12	1	20	16

Key: KGH –Kura General Hospital, DTGH – Dawakin Tofa General Hospital, WGGH – Waziri Shehu Gidado General Hospital, MMSH– Murtala Muhammad Specialist Hospital, MAWSH – Muhammadu Abdullahi Wase Specialist Hospital, AKTH – Aminu Kano Teaching Hospital.

Table 2. WHO Core Prescribing Indicators

Variable	Control Group Mean (SD)		Intervention Group Mean (SD)		*p*-value	Mean Diff	Cohen (d)
	Pre	Post	Pre	Post			
% Prescribed from EML	100	100	100	100			
% prescribed with antibiotic	7.67 (3.06)	6.67 (1.16)	12.67 (4.50)	10.67 (5.86)	0.478[c] 0.670[i]	-1	+0.27*
% with Injection	1.00 (1.73)	1.00 (1.00)	3.33 (1.53)	2.67 (1.53)	1.000[c] 0.529[i]	-0.66	+0.83***

Post-intervention compared with pre-intervention using Paired *t*-test, $\alpha < 0.05$. SD = Standard Deviation
Difference (-) = decrease and (+) = increase; Effect size (Cohen's d) - * = 0.2-0.4 (small); ** = 0.5-0.8 (medium); *** = > 0.8 (strong); (+) = improvement, (-) = deterioration

Table 3. Patient Care Indicators

Variable	Control Group Mean (SD)		Intervention Group Mean (SD)		*p*-value	Mean Diff	Cohen (d)
	Pre	Post	Pre	Post			
% Actually Dispensed	96.47 (1.22)	92.47 (0.96)	96.13 (1.79)	93.07 (3.53)	0.066[c] 0.423[i]	+0.94	+0.5**
% Adequately Labelled	0	0	0	0		-	-

Post-intervention compared with pre-intervention using Paired *t*-test, $\alpha < 0.05$. SD = Standard Deviation
Difference (-) = decrease and (+) = increase; Effect size (Cohen's d) - * = 0.2-0.4 (small); ** = 0.5-0.8 (medium); *** = > 0.8 (strong); (+) = improvement, (-) = deterioration.

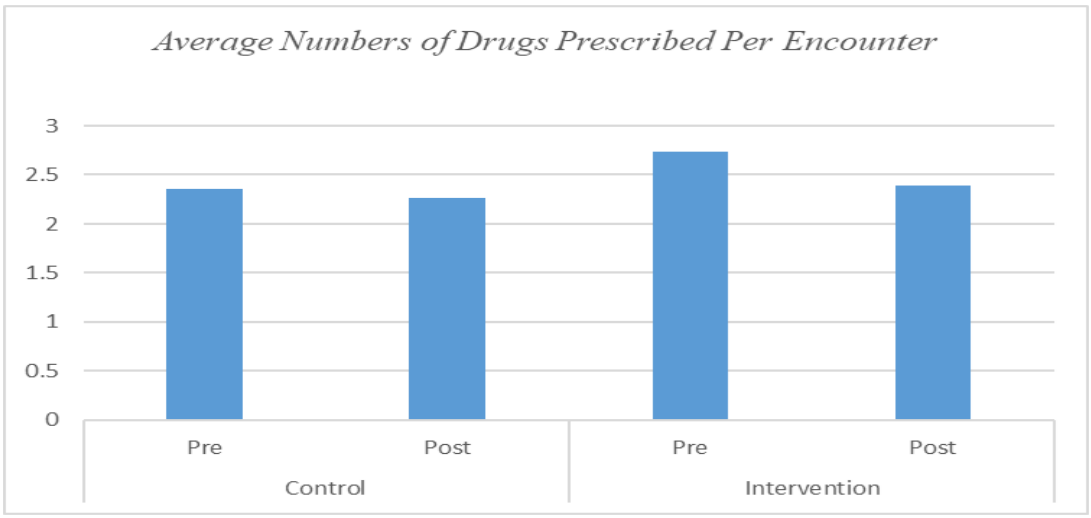

Fig. 1. Average number of drugs prescribed per encounter
[Paired t-test, α = 0.275; Mean difference = - 0.07; (Cohen's d) = 1.4]

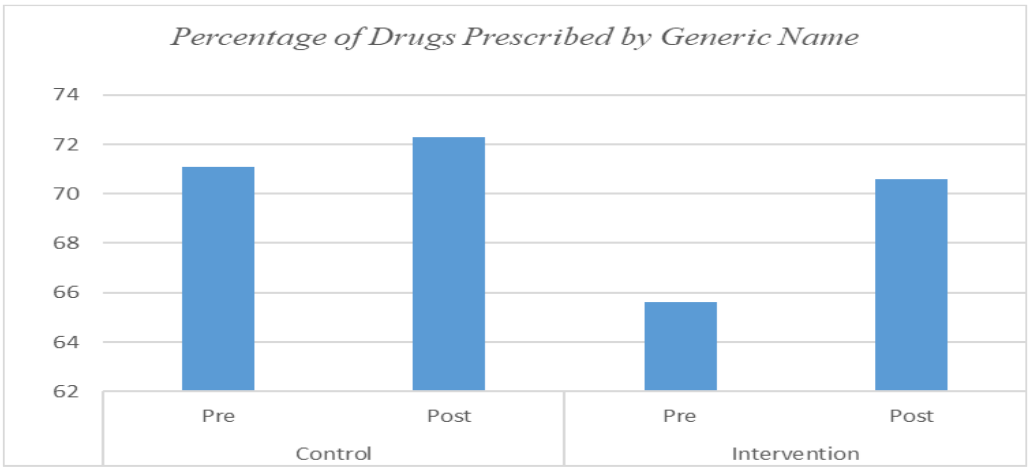

Fig. 2. Percentage of drugs prescribed by generic name
[Paired t-test, α = 0.081; Mean difference = +3.74 (Cohen's d) = 0.46.]

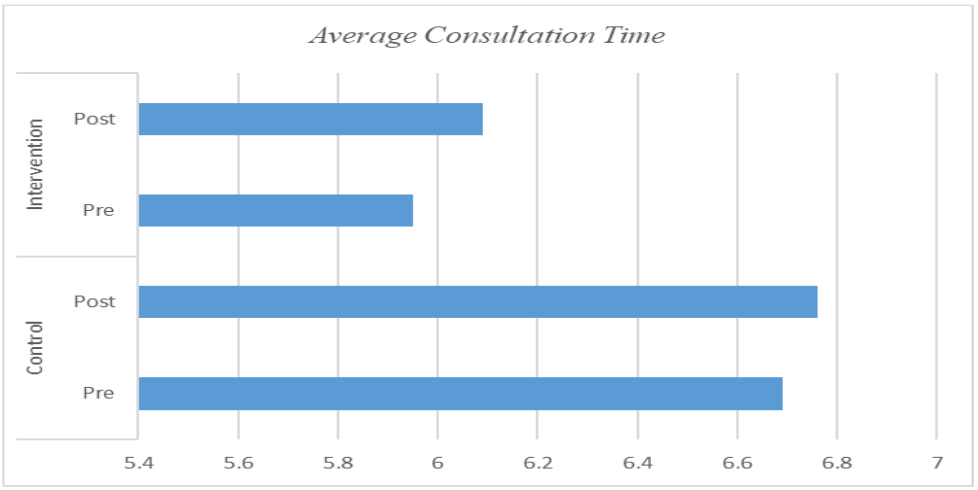

Figure. 3. Average consultation time
[Paired t-test, α = 0.045; Mean difference = +0.07 (Cohen's d) = +0.25]

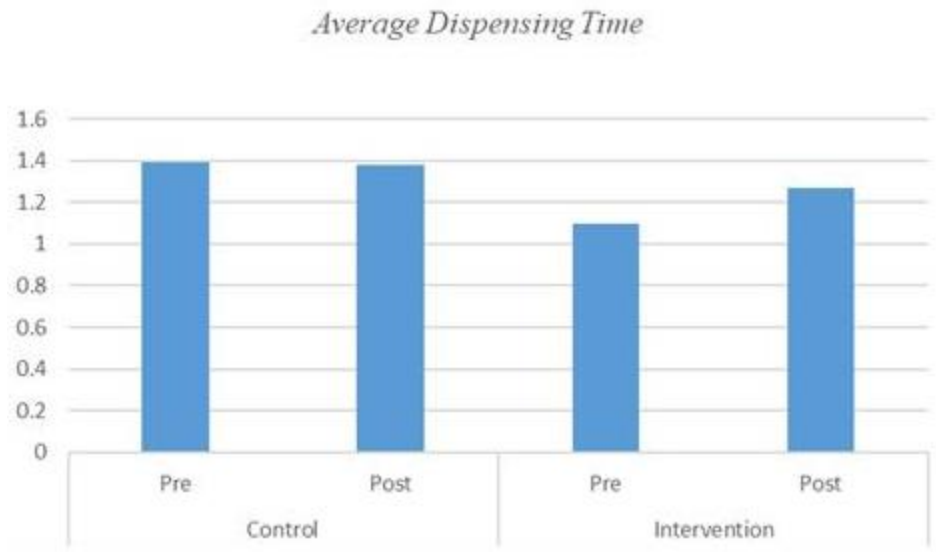

Figure 4. Average dispensing time
[Paired t-test, α = 0.182; Mean difference = +0.18 (Cohen's d) = 0.47.]

Percentages of drugs prescribed from EML in the study is 100% in both pre and post intervention in all groups which is the recommended optimal value [18]. Lower percentage was reported (91.79) in same area [14] although the study was for general outpatient in all diseases in pediatric patients not specific to antihypertensive patient. Having 100% stock on specific disease would be easier than that of all diseases.

Percentage of antibiotics prescribed in the intervention group of the present study was 12.67% before intervention and decreased to 10.67% after intervention. This is similar to the 14.9% reported by Nachiya et al, [24] and lower than 46.17% reported by Bhavesh et al, [20]. In-appropriate use of antibiotics may lead to emergence of drug resistance. It is recommended that fewer than 30% of prescriptions should contain antibiotics [18]. High levels of injection prescribing has been reported by different studies ranging from 17.1 to 80 % [18, 25]. In this study, the percentage was 3.33% before intervention and decreased to 2.67% after intervention. This value is well below the proposed optimal value of 17.2% [26].

In the present study, result showed that an average consultation time in the intervention group was 5.95 minutes and slightly increase to 6.09 post intervention. This result is shorter than the one reported by Vania Dos Santos *et al.,* [27] (9.2 min.) and higher than 4.13 min and 54 seconds reported by Akshaya et al, [21] and Hogerzeil et al, [26] respectively. It is recommended that the minimum consultation time should be up to15 minutes [28,29] in order to allow for proper examination, diagnosis and rational prescription. There are no guidelines on the best consultation time but studies have found that patients prefer to have more time with the doctor.

Average dispensing time increased from 1.10 to 1.27 minutes in the intervention group. This is lower than 2.44 min reported by Nachiya et al, [24]. This value is higher than the average (12.5 second) obtained in from twelve developing countries [26]. WHO recommends that the time pharmacist spend with subject should be at least 180 seconds hence the reported dispensing time in the present study is not good. Short dispensing time would not be expected to provide adequate counseling on medication and could facilitate error, which may lead to non-adherence and treatment failure. Factors that may lead to short dispensing time may be

prepackaged and pre- labelled drugs and heavy flow of patients with staff shortage [14].

In both the control and intervention group, more than 90% of the prescribed drugs were actually dispensed. This is higher than the frequencies reported by other studies [21, 24]. This indicates that the prescribers and drugs managers in the hospital pharmacy are in harmony, a phenomenon described by Pepe [30] as "a consensus between the selection criterion and culturally consolidated prescription practice".

WHO recommends that each drug label should contain dosage regimen, drug name and patient name [31], in all the facilities under study, patient name was not written in all the drug labels, both in the pre and post intervention. Chedi et al, [32] in a study that determined anti-malarial drug utilization pattern reported similar findings. However, Nachiya [24] reported that 87.1% of the studied prescriptions were adequately labelled. In addition to educational intervention, behavioral and prepackage drugs may improve dispensing practice and subsequently treatment outcome [32]

Conclusion. Results indicate that there is improvement in rational use of antihypertensive drugs, generic prescription and reduction in polypharmacy after educational intervention. Continuous supervision and imparting education to the healthcare team on rational use of drugs need to be encouraged.

REFERENCES

1. World Health Organization and International Network for Rational Use of Drugs, How to Investigate Drug Use in Health Facilities: Selected Drug Use indicators, *WHO/DAP/93.1,WHO*. 1993 Geneva, Switzerland.

2. World Health Organization WHO, Introduction to Drug Utilization Research, *WHO, Oslo, Norway*. 2003. http://apps.who.int/medicinedocs/en/d/Js4876e/.

3. D. Lee and U. Bergman. "Studies of drug utilization," in Pharmacoepidemiology, L. B. Storm, Ed., pp. 401–417, *John Wiley & Sons, Chichester*. 2005 UK.

4. A. Teferra, D. Zeruesenay, and G.Y. Asfawossen, Prescribing Pattern of Drugs in Medical Wards of Three Hospitals in North-West Ethiopia. *J Ethiopia Med Pract* 2002 4: 8–13.

5. P.K. Lunde, and I. Baksaas. Epidemiology of drug utilizationbasic concepts and methodology. *Acta Med Scand*. 1988 721:7-11.

6. B.L. Strom, Pharmacoepidemiology. Fourth ed: *John Wiley & Sons, Ltd*. 2005

7. J. Costa, M.M. Rosa, J. J. Ferreira, C. Sampaio, and C.A. Vaz. Cardiac effects of acute poisoning with tricyclic antidepressants: systematic review of the literature. Part I. *Rev Port Cardiol.* 2001 20:671-8.

8. World Health Organization WHO. The Rational Use of Drugs – *Reports of the Conference of Experts, convened by the WHO, Nairobi*, 1985: 25-29.

9. World Health Organization WHO (2017) model list of essential medicines.20th edition, March 2017. Available on http://www.who.int/medicines/publications/essentialmedicines/en/

10. World Health Organization WHO. The World Health Report 2002: Reducing Risks, Promoting Healthy Life: *Stylus Pub Llc*. 2002

11. P.M. Kearney, M. Whelton, K. Reynolds, P. Muntner, P.K Whelton, et al. Global burden of hypertension: analysis of worldwide data. *Lancet* 2004, 365: 217– 223.

12. K. Holloway (Editor), Green T. Drugs and Therapeutics Committees– A Practical Guide. World Health Organization, 2003. Geneva, Switzerland. *WHO/EDM/PAR/2004.1*

13. I. Tamuno and J. O Fadare, Drug Prescription Pattern in a Nigerian Tertiary Hospital. *Tropical Journal of Pharmaceutical Research*. 2012, 11 (1): 146-152

14. B.A.Z. Chedi, I. Abdu-Aguye, and H. O. Kwanashie. Drug use pattern in outpatient children: A comparison between primary and secondary health care facilities in Northern Nigeria. *African Journal of Pharmacy and Pharmacology*. 2015, 9(4), 74-81.

15. S. Dimri, P. Tiwari, S. Basu and V.R. Parmar. Drug Use Pattern in Children at a Teaching Hospital. *Indian Paediatr*. 2008, 46:165-167

16. O.O. Odusanya Drug use indicators at a secondary health care facility in Lagos, Nigeria. *J. Comm. Med. Primary Health Care*. 2004, 16(1):21-24.

17. F.T.K. Owusu-Dakuu, and J. Sablah The essential drug list and drug use indicators at two university hospitals: KNUST and Legon, Ghana. *West Afr. J. Pharm*. 2004, 18(1):53-57.

18. A. O. Isah, J. Quick, R. Laing, and A.F.B. Mabadeje. The development of standard values for the WHO drug use prescribing indicators. *International conference on improving use of medicines*. 2006.

19. P.R. Shankar, D.K. Upadhyay, P. Subish, R.B. Bhandari, and B. Das. Drug utilization among older inpatients in a teaching hospital in Western Nepal. *Singapore Med. J*. 2010, 51(1):28-34

20. K.L. Bhavesh, R.S. Hiray, and B.B. Ghongane. Drug prescription pattern of outpatients in a tertiary care teaching hospital in Maharashtra. *Int. J. Pharm. Biol. Sci.* 2012, 3(3):225–229.

21. S. B. Akshaya, T. Getachew, D. Messay, E. Zeryawkal, M. Ibrahim, and A. Tadele, A prospective study on evaluation of use of drugs at prescriber, dispenser and patients' level based on "WHO" core drug use indicators in Ethiopia. *Int. J. Comm. Pharm*. 2013, 6(1): 21-32.

22. R. Kumari, M. Z. Idris, V. Bhushan, A. Khanna, M. Agrawal, and S.K. Singh. Assessment of prescription pattern at the public health facilities of luck now district. *Indian J. Pharmacol*. 2008 40(6):243-27.

23. A.I. Awad, and H.A. Himad. Drug-use practices in teaching hospitals of Khartoum State, Sudan *Eur J Clin Pharmacol*. 2006, 62: 12, 1087–1093.

24. R.A.M.J. Nachiya, S. Parimalakrishnan, and M.R Rao. Study on drug utilization pattern of antihypertensive medications on outpatients and inpatients in a tertiary care teaching hospital: A cross sectional Study. *African Journal of Pharmacy and Pharmacology* 2015, 9(11): 383-396.

25. B. Trap, E.H. Hansen, and H.V. Hogerzeil. Prescription habits of dispensing and non-dispensing doctors in Zimbabwe. *Health Policy Plan*, 2002, 17:288-295.

26. H.V. Hogerzeil, R.D. Bimo, R.O. Laing, D. Ofori-Adjei et al. Field tests for rational drug use in twelve developing countries. *Lancet* 1993, 342:1408–1410.

27. S. Vania dos, M. Sandra, and O.N Ottati. Prescription and patient-care indicators in healthcare service. *Rev Saude Public.,* 2004, 38(6).

28. H. Britt, L. Valenti, and G. Miller. Time for care. Length of general practice consultations in Australia [online]. *Australian Family Physician*. 2002, 31: 876-80.

29. J. Cape. Consultation length, patient-estimated consultation length, and satisfaction with the consultation. *The British journal of general practice: the journal of the Royal College of General Practitioners*. 2002, 52(485), 1004-6.

30. V.L.E. Pepe. Estudosobre a prescrição de medicamentosemumaunidade de atençãoprimária [dissertação de mestrado]. Rio de Janeiro: *Instituto de MedicinaSocial da UERJ*. 1994.

31. World Health Organization. How to investigate drug use in health facilities (Selected drug use indicators). *Action Programme on Essential Drugs, WHO*: 1995 Geneva.

32. B.A.Z. Chedi I. Abdu-Aguye, and H.O. Kwanashie. Interventional Studies of Anti-Malarial Drugs Utilization in Public Health Facilities in Kano, Nigeria. *Bayero Journal of Pure and Applied Sciences*. 2015, 3(1): 49 – 53.