An Audit of Selected Prescriptions Written at the Lagos State University Teaching Hospital

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Authors' contributions

This work was carried out in collaboration between all authors. All authors read and approved the final
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ABSTRACT

A prescription is a legal document that should be carefully prepared. One of the duties of care which a doctor owes a patient is to write a drug prescription clearly, and failure to do so is negligence.

A quantitative study in design, quasi-experimental in method, prospective and correlational cross-sectional with a purposeful convenience sampling strategy was used to audit 611 prescriptions which were presented over a period of three months. A primary data collection method was used to audit prescriptions presented at the fee-paying pharmacy of the Lagos State University Teaching Hospital, by comparing it with the World Health Organisation standard for good prescription. The data were analysed using the statistical package for social sciences (SPSS) version 21.0.

A total of 611 prescriptions were audited. All the audited prescriptions were written by doctors. The date of prescription was documented in 97%. 96.6% were legible, 96.7% had the patient's name while 70% indicated the age of the patients. The strength of drug was written in only 66.1%. The prescriber's name was written in 54%. Information for package label was documented in 4.3%, less

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than 20% had the initials or signature of the prescriber. In all, only 0.8% complied excellently, 65.8% were good, 29.8% were average while 3.6% rated poorly. The overall mean score of all the prescription was good (7-9).

There is a need to develop a standard prescription policy at the Lagos State University Teaching Hospital that will help in reducing medication errors.

1. INTRODUCTION

A prescription is an instruction from a prescriber to a dispenser [1]. In most cases, the prescriber is usually but not always a doctor [2]. Other paramedical workers such as nurses also prescribe drugs [2]. Also, the dispenser is also not always a pharmacist [2]. A prescription should have at least the following: Name, address, telephone of prescriber, date the drug was prescribed, generic name and strength of the drug, dosage form, total amount, label that contains the instructions and warnings about the drug, name, address, age of patient, and signature or initials of prescriber, according to the World Health Organisation [1]. Not only is every country expected to have its standards for the minimum information required for a prescription, but each country is also expected to have its laws and regulations to define which drugs require a prescription and who is entitled to write it [2]. After a careful search, there is currently no standard information required for prescription in Nigeria no any law regulating this.

Although there have been many reports on drugs from Nigeria [3-7], most of the reports were on the rational use of drugs using the World Health Organization's rational drug use criteria [8]. Also, there are various laws relating to drug use in Nigeria [9], but there has been none on the prescription of drugs. Inappropriate prescribing is known to be a significant problem in healthcare all over the world [10]. Writing a prescription is indeed a vital part of the rational therapeutics, since a poorly written prescription can make a clinical consultation a waste of time, and cost human lives [10].

2. RESEARCH QUESTION

What is the degree of compliance of prescriptions written at the Lagos State University Teaching Hospital, Lagos, Ikeja with the World Health Organization recommendation on good prescription writing?

2.1 How the Research Question was Answered

2.1.1 Hypotheses

Null Hypothesis (HO): There is no statistically significant difference between the quality of the prescriptions written at the Lagos State University Teaching Hospital, Lagos, Ikeja Lagos and that of the World Health Organization recommendation on good prescription writing.

Alternative Hypothesis (HA): There is a statistically significant difference between the quality of the prescriptions written at the Lagos State University Teaching Hospital, Lagos, Ikeja Lagos and that of the World Health Organization recommendation on good prescription writing.

2.2 Variables

The independent variables (IV):

- Subspecialty (Surgery =0, Medicine =1, Paediatrics =2, Obstetrics and Gynaecology =3),

Dependent Variables (DV):

The dependent variable was the degree of compliance with the prescriptions written by doctors at the Lagos State University Teaching Hospital, Lagos, Ikeja, Lagos with that of the World Health Organization standard.

- Degree of compliance (Poor, Average, Good, Excellent).

Each expected parameter on a prescription was graded one, a total of eleven was expected on each prescription. The quality of the written prescription was graded as follows;

Poor: if the written prescription scored less than four out of the eleven graded above.

Average: If the written prescription scored less than or equal to six out of the eleven graded. Good: If the written prescription scored from seven to nine out of the eleven graded above. Excellent: If the written prescription scored ten and above.

2.3 Audit of the Prescriptions

An audit of the degree of compliance with each prescription written with the World Health Organization standard was done. The expected content of a good prescription was scored as follows:

Name, with telephone number (if possible) ………1, if no telephone number, then it is half point
Address of the prescriber …………………………..1
Date of the prescription………………………………..1
Name of the drug written legibly……………………...1
Strength of the drug written legibly…………………1
Dosage form and total amount………………………1
Information for the package label…………………1
Prescriber's initials or signature……………………...1
Name of the patient…………………………………1
Age of the patient (for children and elderly) ……..1
Address of the patient………………………………1

2.4 Assumptions

It was assumed that subjects were not transferred from one clinical department to another during the period of the study to avoid obtaining data from the same subject more than once to avoid duplication.

2.5 Description of the Study Centre

The Lagos State University Teaching Hospital (LASUTH) is one of two teaching hospitals in Lagos. It is a 550-bedded hospital, and the estimated population of Lagos is 21 million people [11]. The hospital is an urban tertiary centre located in the heart of Lagos, Southwestern Nigeria. It serves as a referral centre for public and private hospitals in Lagos and her neighbouring states like Oyo, Ogun and Osun hence serves a population of more than 30 million Nigerians altogether [12,13].

Also, LASUTH is attached to a college of medicine, the Lagos State University College of Medicine. It has accreditation of both Postgraduate Colleges in Nigeria; National Postgraduate Medical College of Nigeria and The West African Postgraduate Medical College to train resident doctors in all the various clinical and non-clinical units and their subspecialties as mentioned above. The hospital also has accreditation of the Medical and Dental Council of Nigeria for an internship for the newly graduated doctors, pharmacist, radiographers and physiotherapists. Apart from the training of doctors, the hospital is also the centre for the acquiring of clinical and non-clinical skills by medical students under training at the Lagos State University College of Medicine.

The Lagos State University Teaching Hospital, Ikeja is unique in Nigeria as the busiest tertiary institution, with a heavy load of patients from various part of the country [14]. The centre also receives students on elective posting from various parts of the world. It serves as a referring centre for not only more than twenty general hospitals in Lagos, but also private hospitals and federal medical centre in Lagos. It receives patient from South Western Nigeria and from all over the country especiallyPaediatric patients due to the free health policy for the under twelve years of age [15]. LASUTH has a fee-paying pharmacy which is central and three other non-fee-paying pharmacies. The non-fee-paying pharmacies have a central store in the hospital from which they obtain their stocks. The Lagos State Government through the hospital management and other non-governmental organisations donate drugs to the centrally stored drugs of the non-fee-paying pharmacies from where drugs are then disbursed to the various non-fee-paying pharmacies. A non-fee-paying pharmacy is attached each to the Department of Paediatrics and Surgical emergency. Another non-fee-paying pharmacy serves the Medical emergency, Family Medicine and Community Health Department clinics.

3. MATERIALS AND METHODS

A primary data collection method was used with a quantitative design, which was cross-sectional to audit consecutive prescriptions written by doctors at the Lagos State University Teaching Hospital and submitted at the fee paying pharmacy.

3.1 Definition of the Target Population

The prescriptions presented at the fee-paying (central) pharmacy of the hospitals were used. The prescriptions were from the four clinical

departments in LASUTH namely; Surgery, Paediatrics, Obstetrics and Gynaecology, Internal Medicine department [16].

3.2 Duration of Study

The study lasted for three months (August to October 2017).

3.3 Type of Sampling

A purposeful convenient sampling method (which is a non- probability sampling method) involving consecutive prescription sheet submitted at the fee-paying pharmacy was used in selecting the sampling method [16].

3.4 Sample Size Calculation

The study sample size was determined using the standard statistical formula for estimating a single proportion [17]. The estimated minimum sample size was 96. The calculated sample size was also increased further to increase further, the power and precision of the study.

3.5 Variables

The independent variables (IV):

- Subspecialty (Surgery = 0, Medicine = 1, Paediatrics = 2, Obstetrics and Gynaecology = 3).

Dependent Variables (DV):

The dependent variable was the degree of compliance with the prescriptions written bydoctors at the Lagos State University Teaching Hospital, Lagos, Ikeja, Lagos with that ofthe World Health Organization standard.

Degree of compliance (Poor, Good, Excellent)

3.6 Data Collection

The researcher audited each prescription using the questionnaire generated. The data obtained on each prescription were captured into the researcher's personal computer.

3.7 Additional Information from the Pilot Study

A pilot study was done by administering the questionnaire to audit about ten randomly selected prescription sheets at the generic pharmacy. Data obtained were also subjected to

statistical analysis and interpreted. This was to help further to show any ambiguity in the measuring instrument which could affect the validity of the measurement. The errors or ambiguity detected were addressed before proceeding with the study. A major error detected was the absence of Department of origin on many of the prescription sheets which would had made it difficult to achieve the third objective of the study. The error was addressed by auditing many more prescriptions than the calculated minimum sample size calculated. Hence a total of 611 prescriptions were audited in all and analysed.

3.8 Ethical Consideration

A written permission to conduct the study was obtained from the Research and Ethics committee of the Lagos State UniversityTeaching Hospital. A written consent was also obtained from the individual departments from which the prescription sheet at the pharmacy was generated, including the pharmacy department itself after explaining the goals of the study to them. Confidentiality and privacy were maintained. The prescription sheets were only identified with numbers and not name. Data were treated with utmost care and safety [18,19].

3.9 Data Analysis

The data were captured into the researcher's personal computer and analysed using the statistical package for social sciences (SPSS) version 21.0 [17]. The clinical unit, and address was entered including the degree of compliance of the prescription with the World Health Organization standard. Tables and charts were used to depict those variables. A measure of central tendencies such as mean, median and mode were documented for continuous variables of continuous variables while proportions were used for nominal variables. Continuous variables for the writer of the prescription were compared using the Student t test, and proportions using Chi-square test. The quality of the prescriptions written by doctors in the different clinical units was compared using ANOVA. Level of significance was set at $p < 0.05$ [20]. In analyzing the data, the degree of compliance with the prescriptions was measured as a continuous score with the mean calculated while the addresses were categorical. The scores from the samples were determined if they were normally distributed or not. Those normally distributed were analysed using student t-test, or analysis of

covariance was used to compare the two groups and determine if the statistical tests were significant [20].

4. RESULTS

In all, 611 prescriptions written by doctors in LASUTH were audited over a period of three months. Table 1 gives a summary of the audit of all the prescriptions. Fig. 1 shows the degree of compliance with the 611 prescriptions written in LASUTH with the World Health Organisation standard for good prescription.

The overall mean score of all the prescription was good (7-9). There was no statistically significant difference between the quality of the prescriptions written by doctors at the Lagos State University Teaching Hospital, Lagos, Ikeja Lagos and that of the World Health Organization recommendation on good prescription writing hence the Null hypothesis was accepted.

5. DISCUSSION

The practice of the regular prescription audit is an effective means of reducing medication error [21]. It helps in the improvement of prescribing quality and thus enables patients to receive a high standard of health care. The current study aimed to determine the degree of compliance of prescriptions written by doctors at the Lagos State University Teaching Hospital, Lagos, Ikeja Lagos with the World Health Organization recommendation on the excellent prescription writing from August to October 2017. In this study, four clinical departments that receive a large turnout of patients' prescriptions were audited using the WHO standard guideline on prescription.

One of the findings of the current study showed that the bulk (63%) of the prescriptions studied was from the Medicine department, followed by the Surgery department (29%) and then the Paediatrics department (7%) and the least (1%) was from the Obstetrics and Gynaecology department. The reason for this disparity in the proportion of the prescriptions studied is not immediately apparent, but it may be due to the following: The department of Medicine is the closest in proximity to the central fee-paying pharmacy where the prescriptions studied were obtained from, also next in proximity to the central fee-paying pharmacy is the Surgery department followed by the Paediatrics department. The Obstetrics and Gynaecology department was the farthest from the central pharmacy. Also, the Obstetrics and Gynaecology Department was undergoing renovation at the time of the study and was only rendering skeletal services. Another plausible reason for the differences in the proportion of prescriptions studied from the various department might have included being able to identify the Department where the prescriptions originated since it was not indicated in many of the prescriptions.

Also, the non-fee-paying pharmacy attached to the Departments of Paediatrics and Surgery which were located within the building of the Departments where emergency drugs and other drugs were made available at no cost to the patient, could further explain the relatively lower turn out of prescriptions from the department of Paediatrics and Surgery to the central fee-paying pharmacy. The researcher would have preferred to study each of those pharmacies. Unfortunately, the needed records of prescriptions presented at those pharmacies were not available during this study.

Table 1. The adherence of the 611 prescriptions written by doctors in LASUTH to the World Health Organisation standard for good prescriptions

| Prescription with:	Number (n=611)	Percentage
Name of prescriber	330	54.0
Address of prescriber	217	64.5
Date of prescription	594	97.2
Name of drug written legibly	565	92.5
Strength of drug	404	66.1
Dosage form and total	559	91.5
Information for package label	26	4.3
Prescriber's initial and signature	139	22.7
Name of patient	591	96.7`
Age of patient	427	69.9
Address of patient	392	64.2
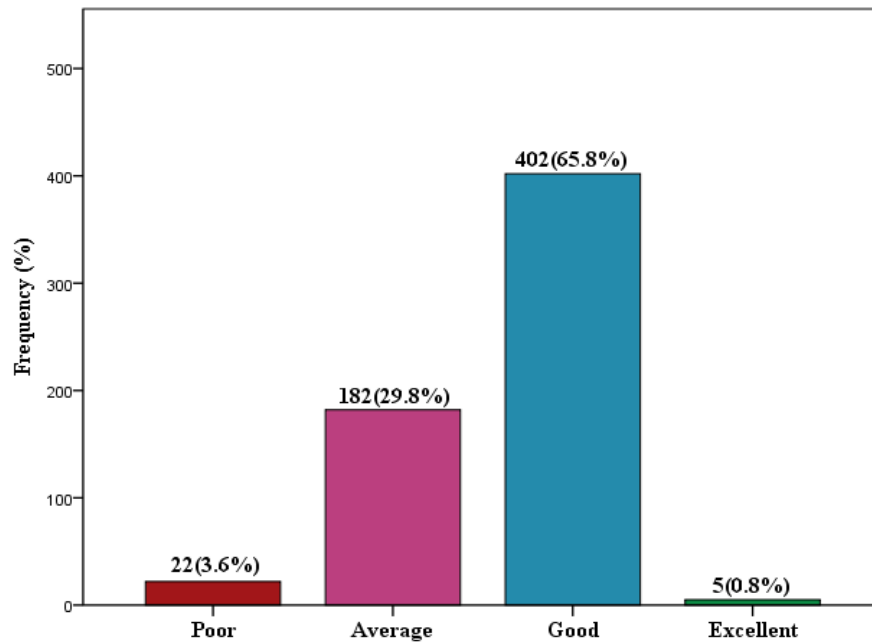
Fig. 1. The degree of compliance ofthe 611 prescriptions written by the doctors in LASUTH with the world health organisation standard for good prescriptions
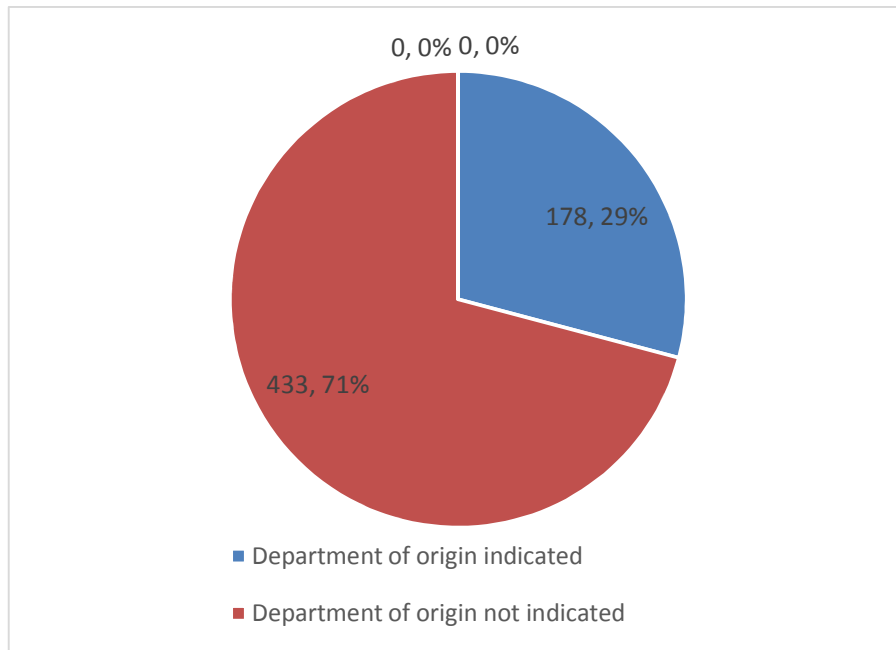

Fig. 2. The percentage of prescriptions among the 611 presriptions analysed whose department of origin was indicated

There were very low number of prescriptions whose originating Department was indicated, which made the prescribing source to be missing in more than 70% of the prescription is worrisome. It is much higher than the 7.4% reported by Ndungu et al. [22]. It is also higher than the figure of 33.3% and 40% in both public and private hospitals respectively reported by

Akoria and Isah [23]. The reason for this alarming rate of the missing information on the source of prescription in the current study is not immediately apparent. The current study, although was carried out from the same country as that of Akoria and Isah [23]. It was carried out in a different geopolitical zone and it audited prescriptions from only one institution, a possible reason for the vast disparity in compliance in documentation of the prescriber's address compared to the study by Akoria and Isah [23] where several hospitals were involved. The prescriber's name, address and phone number ideally should be pre-printed on the prescription sheet [24]. This is to enable the pharmacist to be able to contact the prescriber for any enquiry if necessary [24].

The prescriber's name was written in 54% of all the audited prescriptions (611) but 69.1% of audited prescriptions whose departments of origin were indicated (178) in the present study. These values are low compared to 81.5% reported by Ndungu et al. [22] in Nairobi, Kenya in a study done in 2004. It is, however, higher than reported value of 33.3% and 20% in an audited public and private hospitals respectively, a study done in the Eastern part of Nigeria by Akoria and Isah [23] over sixteen years ago. The reason for the disparity may be explained by the differences in the methodology used. The study by Ndungu et al. [22] was like the current study because the data collection was also pharmacy-based, perspective and consecutive prescriptions presented at the fee-paying pharmacy was used, but the study was for about six months, also the study set out to assess other contents of the prescriptions such as the classes of the drugs prescribed.

The methodology used by Akoria and Isah [23] was different, the prescriptions were obtained from doctors and it was also retrospective. The prescriber's name ideally should be pre-printed on the prescription sheet [24] as discussed above. The date of prescription was documented in 97% of the total prescription audited but in 99.4% of prescriptions with the address of the prescriber in the present study. This is comparable to 96.4% reported by Ndungu et al. [22] 100% and 90% in public and private hospitals audited by Akoria and Isah [23]. Although there is not currently any rule on the validity of prescription in Nigeria, the date of prescription is needed to be able to know the validity of a prescription in countries where there is a time limit for validation of a prescription [22].

Prescriptions' legibility was satisfactory in 96.6% of cases in the present study. This is quite a bit higher than the reported values of 86.8% and 86.3% by Balbir et al. [25] and Ndungu et al. [22] respectively. The higher percentage compared to 20% legibility reported by Akoria and Isah [23] could also be due to the involvement of several hospitals in their study. Presriptions which are not clearly written to a pharmacist in LASUTH would likely be sent back, but the possibility of decline is questionable in some private hospitals where profit making is a priority.

It is a legal obligation of a prescriber to write clearly, and nothing short of total compliance should be aimed at [21]. Writing in capital letters has been suggested and found to be effective in ensuring legible writings [26]. Some have also recommended that prescriptions should be typed out to avoid errors from illegible handwriting [24]. Typing of prescriptions will require availability of computers, regular supply of electricity to operate the computers and training of the prescribers on the use of the computers; all these may be difficult to implement in a developing country like Nigeria, where supply of electricity is irregular, and funding of healthcare is still a significant challenge.

The strength of the drug was written in 66.1% of all the audited prescriptions and 61.2% of prescriptions with the name of originating department indicated. This is lower than the 97% dosage accuracy reported by Ndungu et al. [22]. The reason for the disparity is not immediately apparent but may also be due to the differences in methodology; the current study assessed the strength of the drug while the study by Ndungu et al. [22] assessed the dosage accuracy. It is important to always write the strength and total amount of drugs clearly, legibly and fully in words to avoid errors from the use of abbreviations. Writing entirely in words is also important to prevent tampering with the dosage [24].

Up to 91% of the total audited prescriptions had the dosage form written. The percentage of the prescriptions with a dosage of the drug written in the current study is also similar to the 95% documented by Hamid et al. [26] in the United Kingdom but higher than reported value of 72.6% by Balbir et al. [27] in Haryana.

Information for package label was documented in 4.3% of all the audited prescriptions. This low compliance was also documented by Akoria and

7

Isah [23] in Nigeria where 16.7% and 10% of prescriptions in public and private hospitals respectively had it documented. Instructions to the dispenser such as minimum and maximum dose and constitution should be indicated by the doctors.

An outstanding finding in the current study is the low compliance with the requirement for the writing of initials or the signature of the prescriber in the prescriptions audited in the present study. Less than 20% of all the audited prescription had the initials or signature of the prescriber. This is quite low compared to the 83.3% and 70% of doctors' signatures in public and private hospitals reported in the studies by Akoria and Isah [23]. The WHO has recommended that at least one of either the prescriber's initials or signature should be documented. The presence of the prescriber's initials or signature has legal implications due to the prescriber accepting the responsibility and consequences of writing the prescription. A higher proportion of 54% and 69% had the names of the prescribers written on it. Writing of the name can be done by anyone, but signature or initials is a better way of identifying the prescriber since signatures are more likely to be unique to individuals. It may be plausible to think that the use of a prescription sheet with pre-printed prescriber name, address and phone number which is the ideal recommended by WHO may save the prescriber the need to always write the initials or signature but the safety of the prescription sheet to ensure that only the prescriber whose name was pre-printed on it uses it cannot often be guaranteed.

The patients' names were documented in 96.7% of all the audited prescriptions. This is similar to the findings of Ndungu et al. [22]. The question is, how could a dispenser have given medications without an identity such as the patient's name?

The WHO has recommended the documentation of the patient's age, especially in the Paediatric age group and the elderly. Medication in the elderly is age-dependent due to changes in the composition and function of the body [28]. In children, there are significant changes in body composition with development which consequently affects pharmacology [29]. The age of the patientwas written in about 70% of all the audited prescriptions. This is lower compared to total compliance in writing patients' names in the study in the UK and public hospitals in Benin

Nigeria [27]. The low documentation of age in the present study may also be explained by the fact that age is more important in the paediatric age group and the elderly.

The patients' addresses were written in 64.2% of all the audited prescriptions. In Nigeria, a similar finding of 66.7% was reported by Akoria and Isah [23]. The percentage of documented patients' addresses in the present study is, however, lower compared to the 97.7% rate reported by Ndungu et al. [22] in Nairobi and 100% reported by Balbir et al. [27] in Haryana.

The current study also aimed to document the degree of compliance of prescriptions written by doctors at the Lagos State University Teaching Hospital with the World Health Organisation recommendation on good prescription writing, although, other previous literatures and reports on the current topic did not assess the degree of compliance of prescriptions written by doctors with the World Health Organisation recommendation on good prescription writing. To achieve this objective, the parameters expected to be on the prescription sheets according to the WHO standard for proper prescription were scored, with a maximum score of 11. Out of all the 611 audited prescriptions, only 0.8% complied excellently, 65.8% were good, 29.8% were average while 3.6% rated poorly. The overall mean score of all the prescription was good (7-9). There was no statistically significant difference between the quality of the prescriptions written by doctors at the Lagos State University Teaching Hospital, Lagos, Ikeja Lagos and that of the World Health Organization recommendation on good prescription writing hence the Null hypothesis was accepted.

6. CONCLUSIONS

Only 2.8% of the prescriptions written by doctors at the Lagos State University Teaching Hospital, Lagos, Ikeja Lagos complied excellently with the World Health Organization recommendation on the excellent prescription writing. Up to 88% had good compliance, 8% had average compliance while 0.5% had poor compliance.

7. STUDY LIMITATIONS

The study is limited by the fact that it is a single centered study, data was collected over a short period, data collection was primary and the involvement of data from only the fee-paying pharmacy of the hospital.

8. RECOMMENDATIONS

There is a need to develop an educational program to improve the awareness of doctors at the Lagos State University Teaching Hospital on WHO standards on good prescriptions. There should be the provision of standard prescription policies that will help in reducing medication errors. An example of this is the prescribing practices and policy guideline of Commonwealth of Massachusetts [30].

CONSENT

A written consent was also obtained from the individual departments from which the prescription sheet at the pharmacy was generated, including the pharmacy department itself after explaining the goals of the study to them.

ETHICAL APPROVAL

A written permission to conduct the study was obtained from the Research and Ethics committee of the Lagos State University Teaching Hospital.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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