

## Assessment of Legibility of Handwritten Prescriptions and Adherence to W.H.O. Prescription Writing Guidelines in Ahmadu Bello University Teaching Hospital Zaria – Kaduna State, Nigeria

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### Abstract

**Introduction:** The issues of incorrectness and incompleteness for written prescriptions may result to dispensing errors and unintended outcomes of care. The objective of the study was to assess the legibility of handwritten prescriptions and adherence to W.H.O. prescription writing guidelines in Ahmadu Bello University Teaching Hospital Zaria.

**Method:** A cross-sectional prospective study design was used, and existing prescriptions were sampled from selected in-patient and outpatient pharmacy units of Ahmadu Bello University Teaching Hospital Zaria. This was approved by the ethics and research committee of the institution. The prescriptions were then evaluated for quality based on the layout, legibility, and clarity of the details in the prescriptions and screened for medication errors.

**Result:** The extent of prescribing drugs by generic name was (68.37%), the legibility percentage was moderate and the percentage of prescriptions in which details of the drug, route of administration, and duration of treatment were complete was 85.23%, 80.80%, and 82.40%, respectively. The doctor's signature (84.87%) was present in the prescriptions. Many of the prescribers did not use to indicate patients' weight, age, and clinic on prescriptions, these are deviations from good prescribing practices while total medication error was 38.01%.

**Conclusion:** Prescribers have a duty of care to their patient and a professional duty to their colleagues (pharmacists) to ensure drug prescriptions are readily identifiable. Interventional techniques such as the use of printed or electronic prescriptions can improve the ease of interpreting information and reduce medication errors.

**Keywords:** Prescriber, Patient, Legibility, Medication error, WHO prescription writing guidelines

### Introduction

Prescription and dispensing are critical components in the rational use of medicine around the world. They necessitate a wide range of skills and knowledge, as well as time, effort, and experience to achieve proficiency (Sawalha *et al.*, 2010). Prescribers issue legal, legitimate, legible orders to pharmacists and the most crucial requirement is that they be legible and include basic information (Varghese *et al.*, 2018). The World Health Organization establishes the format for prescriptions. It should include the following information: the prescriber's name, address, and phone number; the date of the prescription, the generic name of the drug, the strength (dose), dosage form and total amount, the label (instruction and warning); the patient's name, address, and age; and the prescriber's signature or initials (WHO, 1994). Despite the lack of a universal standard, each country has its own prescription writing procedures and regulations (Sheikh *et al.*, 2017).

In Nigeria, the prescription format is almost identical to that of WHO format. It contains the following information: the patient's hospital number, date, patients name, age, weight, sex, drug details (generic name of the drug and strength, dosage form, and duration of treatment), prescriber's qualification, name, and signature as shown in Appendix I, a format in ABUTH Zaria setting.

The Nigeria National prescription which is backed by legislation establish who can prescribe and who cannot, hence, a registered physician, dentist, veterinarian, or senior nurse can prescribe, while registered pharmacists are the only authorized personnel to dispense. There were exceptions, such as the handling of narcotics, essential medicine, prescription-only medicine, and dealing with counterfeit pharmaceuticals. This is a broad topic that aims to promote proper, effective, and efficient pharmaceutical use in order to minimize medication errors (Erhun *et al.*, 2001; Melku, *et al.*, 2021; Compilation of Pharmacy, Drugs, and Related Laws and Rules in Nigeria - Pharmacy Council of Nigeria; Prescription Legislation in Nigeria. Google Retrieved 12 December 2022).

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Medication errors, which prevent the right patient from receiving the right medication at the right dose at the right time via the right route of administration, are major health concern (Zaleke et al., 2014). The most crucial objective is to improve prescribing quality because medication errors are most frequently observed at the time of prescription, according to Fallaize *et al.*, 2018. The aim of this study is to assess the overall pattern of prescription error, completeness, and legibility of handwritten prescriptions filled in the various pharmacy units of Ahmadu Bello University Teaching Hospital ABUTH Zaria – Nigeria.

WHO guidelines for prescription writing (WHO, 1994)

- Name, address and telephone number of the prescriber
- Date
- Generic name of the drug and strength
- Dosage form and total amount or duration of treatment
- Label: instructions and warning
- Name, address and age of the patient
- Signature and or initials of prescriber

### Method

The study was conducted in both the outpatient and inpatient pharmacy units of Ahmadu Bello University Teaching Hospital (ABUTH) Zaria from August to November 2021. Ethical approval was obtained from the Research ethics committee of ABUTH (ABUTHZ/HREC/H24/2021). Patients' prescriptions coming to the various pharmacy units of ABUTH Tudun-Wada, Institute of child health Banzazzau, Medicine Outpatient Department (MOPD), Main outpatient pharmacy, and in-patient pharmacy (IPP) unit for medication dispensing were used. Prescriptions written by physicians from various disciplines were studied. However, refill prescriptions and prescriptions written after peak hours were excluded from the study. The prescription was evaluated for its completeness using WHO standards for good prescribing practice; (a) Prescriber information: Hospital name, address, and information about the department and unit. Details about the prescriber i.e., name, designation, and signature. (b) Patient information: Name, age, sex, weight, and address of the patient and date of prescription issue. (c) Details of each medication prescribed: Generic/Brand name, strength, frequency of administration, quantity to be dispensed, route, dosage form, and instructions for use of the medication. The prescriptions were carefully analyzed for the listed parameters and the study also rated physician's handwriting on the

prescriptions on a subjective scale as Grade 1: Illegible, Grade 2: Barely legible, Grade 3: Moderately legible, and 4: Clearly legible. No more than one prescription was taken from the same patient to avoid bias.

### Study design and setting

The prescriptions were obtained from the outpatient and inpatient pharmacy units of Ahmadu Bello University Teaching Hospital Zaria. A cross-sectional prospective study design was employed to collect prescriptions.

### Sample size determination

The sample size was calculated using the formula

$$\text{(Pourhoseingholi et al., 2013): } n \geq \frac{NZ^2pq}{(d^2(N-1) + Z^2pq)}$$

The total sample size (n) was calculated using the following information; the estimated number of prescriptions filled in 7 days in the six pharmacy units (N), the expected proportion of prescriptions which are completely legible (p) and those illegible (q) will be taken as 0.5, Z statistic for 95% level of confidence (Z = 1.96), the margin of error (d) of 0.05 and 5% non-response rate. Considering the above assumptions, to have a representative sample, the least required number in 7 days was 332.

### Sampling design and allocation

A stratified random sampling method was utilized to obtain the tentative samples from each pharmacy unit. The pharmacy units were considered as strata, and samples were taken from each pharmacy unit systematically. The calculated sample size was proportionally allocated among the six pharmacy units (Table 1).

### Data collection tool and technique

Prescription's data were collected between August 3<sup>rd</sup> and November 10<sup>th</sup>, 2021 using a recording checklist form. The form was constructed to enable fast data recording and retrieval of patients, prescribers, and drug information from the patient's prescriptions. Prescriptions were evaluated for compliance with WHO standards for good prescribing practice, which was obtained from a validated survey that investigated medication errors and adherence to WHO prescription writing guidelines in a tertiary care hospital (Sheikh et al., 2017). Three pharmacists (two senior and one junior) evaluated the legibility of prescriptions.

**Table 1:** Sample Allocation of the Prescriptions

S/No.	Pharmacy Unit	Total number of Prescriptions Filled in a 7-day period	Samples taken in 7 days
1	Main Pharmacy	615	83
2	MOPD Pharmacy	217	29
3	IPP Pharmacy	210	29
4	A and E Pharmacy	616	84
5	Tudun-Wada Pharmacy	472	64
6	ICH Pharmacy	314	43
	TOTAL	2444	332

MOPD-maternity outpatient department, IPP-In-patient Pharmacy, A and E- Accident and Emergency, ICH- institute of Child Health

### Variable measurement

The percentage completeness of prescriptions was assessed based on the percent score. First, a score of (1) for presence and (0) for absence was assigned to the total 13 elements (N =13) of the patient's information, prescriber's identity, medication information, and other information (presence of Date). Then, the assigned scores were summated and divided by the total number of elements (13 for prescriptions with one drug, 18 for prescriptions with two drugs, and so on. The score was given separately for the different drugs when the prescription contains more than one drug for the different drugs. Drugs having their dose, frequency, route, quantity weighed/or duration mentioned were scored as 1.

It is essential to write drugs with their generic names, doses, frequency, and route of administration whenever necessary, and the drug's name or dose units must be some approved abbreviations that may be used: g for gram, mg for milligram. Microgram and nanogram should be written in full. Doses in mg should be written in milligrams, mcg as micrograms, and ml should be written in milliliters.

### Data processing and statistical analysis

Statistical Package for Social Sciences (SPSS), version 25 was used for data analysis. Data entry was done directly on the software and frequency tests were performed. Responses were presented as frequency and median. Data was presented in graphs and tables as appropriate.

### RESULT

The study analyzed 4183 prescriptions, out of which 59.84%, 78.84%, and 81.94 were filled completely with the patient, prescriber, and drug information respectively. With regard to patient information completeness in the prescriptions, 87.71% were found with the patient's name. The hospital number and gender were found in the majority of the prescriptions at 72.94% and 64.45% respectively, the weight and age were absent in more than 50% of the prescriptions. In the medication identification, the generic name was included in 68.37 % of prescriptions. The frequency and duration of medication were missed in less than 20 % of prescriptions.

**Table 2:** Patient information

Variables	Frequency of completeness (n)	Percentage (%)
Patients Card Number	3051	72.94
Patients Name	3669	87.71
Age	2063	49.32
Weight	1528	36.53
Gender	2696	64.45
Clinic	2012	48.10

**Table 3:** Prescribers' information

Variables	Frequency of completeness (n)	Percentage (%)
Prescribers' names	3313	79.20
Qualification	2721	65.05
Signature	3550	84.87
Prescription date	3607	86.23

Table 4: Drug information

Variables	Frequency of completeness (n)	Percentage (%)
Generic drug name	2860	68.37
Drug strength/Dose	3565	85.23
Frequency of administration	3885	92.88
Route of administration	3380	80.80
Duration	3447	82.40

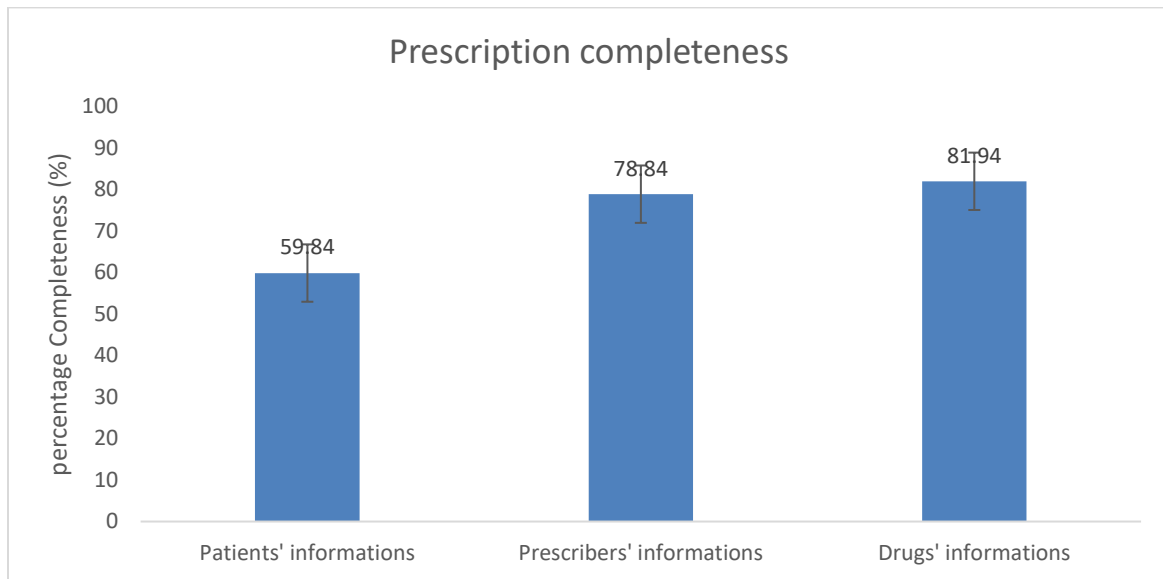


Figure 1: Prescription's completeness

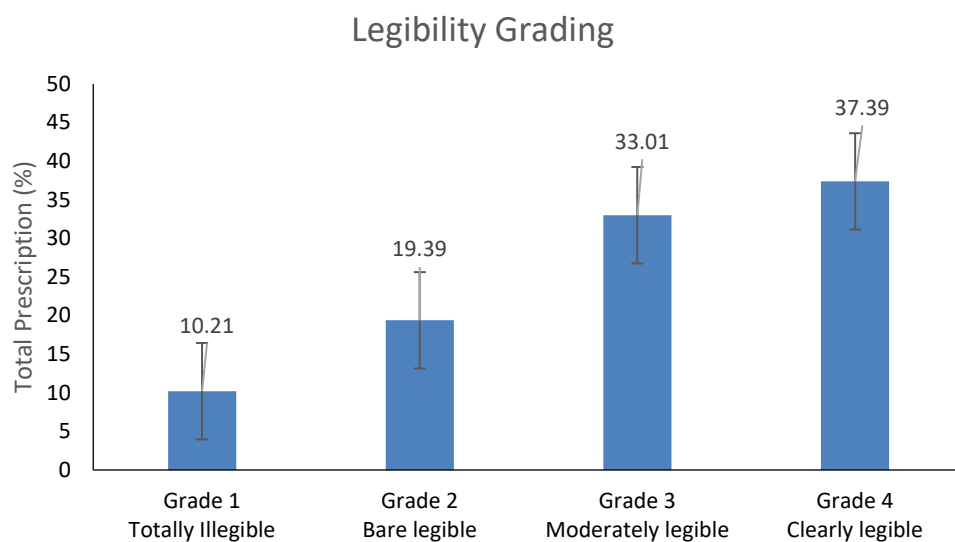


Figure 2: Legibility grading of prescriptions

Table 5: Error distribution

Error classification	Frequency (n)	Percentage (%)
Improper or omitted dose	365	8.73
Improper or omitted frequency	309	7.39
Improper or omitted route of administration	427	10.21
Incorrect treatment duration	334	7.98
Medical duplication	93	2.22
Drug interaction	62	1.48
<b>Total error</b>	<b>1590</b>	<b>38.01</b>

### Discussions

Medication is critical for both in-patients and out-patients; ensuring clear and legible written prescriptions for all categories of patients ensures minimal errors, particularly at the point of dispensing by the pharmacist; additionally, incorporation of key components of prescriptions including all patients' details; age, ward/clinics, dose, duration, route, timing, and frequency of administration ensures optimal therapeutics which is in accordance with WHO guidelines (WHO, 1994).

A total of 4183 prescriptions were analyzed. On the prescriptions, the hospital, address, and the Rx (pharmacy order) symbol were printed on all the prescription sheets, which come in a form of a booklet. 48.10% of prescriptions had the department or clinics where the prescription was issued filled by the prescriber, which is particularly important at Tertiary care facility with different cadres of prescriber including consultants, medical officers and resident doctors with various units under a single department. This is to ensure easy verification of a prescription's origin when need be (Bhosale *et al.*, 2013).

To evaluate the completeness of individual patients' information, this study has 87.71% of prescriptions containing full patients' names, as opposed to Albarrak *et al.*, 2014, who found that all prescription samples contained patients' names. Also, 63.47% and 50.68% of prescriptions do not contain patients' weight and age respectively as illustrated in table 2. In line with WHO recommendations, the presences of weight and age are integral components of pediatric and geriatrics patients' prescription (De Vries *et al.*, 1994; Weldemariam *et al.*, 2020). Also, a large number of prescriptions have patients' weight (63.47%) and age (50.68%) that was not filled, this showed a higher percentage of incompleteness. The completeness of individual patients' information was illustrated in table 2. The WHO recommends the presence of weight and age in the prescriptions especially, for children and the elderly (De Vries *et al.*, 1994). Providing weight and age information when writing a prescription for pediatrics is important as this will help the pharmacist dispense the appropriate dosage form of the drug and for calculating proper dose.

The present study screened patient's prescriptions for WHO prescription writing guidelines and it was found that more than 60% of the prescriptions contained prescriber's details such as name, qualification, signature and date. Prescriber's details, including the full name (79.20%), qualification (65.05%), signature (84.87%), and prescription date (86.23%), were included in the prescription (Table 3). This is an improvement over a similar study conducted by Gul (2014), which found that most prescriptions lacked the prescriber's and patient's details.

In table 4, the percentages for a generic name, medication strength/dose, frequency, route, and duration of administration are 68.37%, 85.23%, 92.88%, 80.80%, and 82.40%, respectively. According to WHO, 100% of drugs should be written in generic names (Roy *et al.*, 2013), yet this study reveals only 68.37% of drugs were prescribed in generic name, a significant difference in comparison to WHO standards. This study differs from the study of Mendonca *et al.*, 2010 which reported that all the prescription's reviewed has their drugs in generic names.

The choice of drugs by generic name may be influenced by several factors. One is the propensity of prescribers to tend to favor brand-oriented prescribing because generic names are difficult to remember, whereas prescribers are easily reminded of brand names courtesy of advertisements by medical representatives (Roy *et al.*, 2013). A concern among medical practitioners about the efficacy and overall quality of generic drugs in comparison with branded formulations may be another reason (Saurabh *et al.*, 2011). The WHO has emphasized that drugs should be prescribed by generic name with the intention of offering quality drugs at an affordable cost to patients (Patil *et al.*, 2015).

The prescription completeness, however, was depicted in figure 1 of this study as a bar chart with patient information, prescriber information, and drug information at 59.84%, 78.84%, and 81.94%, respectively. In contrast to the indicated study by Calligaris *et al.*, 2009, where more than 20% of incompleteness is labeled as unacceptable, the findings in this study demonstrate incompleteness. Figure 2 also depicts prescription legibility in bar chart in the form of grading, with grade 1 (10.21%), grade 2 (19.39%), grade 3 (33.01%), and

grade 4 (37.39%), respectively. This is translated as totally illegible, barely legible, moderately legible, and clearly legible.

The overall percentage of prescribing errors observed in our study was 38.01% as shown in Table 5 without causing any harm to the patients whereas, in a similar study conducted by Reddy and Mandha, (2015), the incidence of medication errors was found to be 66.32% without any fatal outcome. Among medication errors, prescribing errors are easier to intercept than administration errors. This is because of the dexterity and ingenuity of the pharmacist.

### Conclusion

The study revealed serious inadequacies in prescription writing quality together with poor adherence to the W.H.O. prescription writing guidelines. It is necessary to critically address the completeness which was unacceptably high (more than 20%) and legibility of the prescriptions in a continuous and frequent manner. Prescribers have a duty of care to their patient and a professional duty to pharmacists to ensure drug prescriptions have all the necessary information, and are legible and readily identifiable. Intervention techniques such as the use of printed or electronic prescriptions can be employed to solve the issue of prescription legibility and thus improve the level of completeness of the information and reduce medication errors.

The opinions expressed in this paper are those of the authors.

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APPENDIX I: Ahmadu Bello University Teaching Hospital (ABUTH) prescription format for adults.

**AHMADU BELLO UNIVERSITY TEACHING HOSPITAL**

<b>ADULT PRESCRIPTION SLIP</b>		HOSPITAL No.				
		<table border="1" style="width: 100%; height: 20px;"> <tr> <td style="width: 33%;"></td> <td style="width: 33%;"></td> <td style="width: 33%;"></td> </tr> </table>				
Name In Block Letter		N41502				
Surname		Other Names				
Age	Weight	Sex	Clinic			
DRUGS PRESCRIBED		DOSE	DURATION			
		N	COST K			
Rx						
1.						
2.						
3.						
4.						
5.						
		Total Cost ₦				
Signature _____		Signature _____				
Dr.'s Full Name/Code No.		Pharm's Full Name/Code No.				
Date: _____		Date: _____				
MR10		PRESCRIPTION FORM - ADULT				