

Original Article

Prevalence and pattern of prescription errors in a Nigerian kidney hospital

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SUMMARY

Objectives: To determine (i) the prevalence and pattern of prescription errors in our Centre and, (ii) appraise pharmacists' intervention and correction of identified prescription errors.

Design: A descriptive, single blinded cross-sectional study.

Setting: Kidney Care Centre is a public Specialist hospital. The monthly patient load averages 60 General Out-patient cases and 17.4 in-patients.

Participants: A total of 31 medical doctors (comprising of 2 Consultant Nephrologists, 15 Medical Officers, 14 House Officers), 40 nurses and 24 ward assistants participated in the study. One pharmacist runs the daily call schedule. Prescribers were blinded to the study. Prescriptions containing only galenicals were excluded.

Interventions: An error detection mechanism was set up to identify and correct prescription errors. Life-threatening prescriptions were discussed with the Quality Assurance Team of the Centre who conveyed such errors to the prescriber without revealing the on-going study.

Main outcome measures: Prevalence of prescription errors, pattern of prescription errors, pharmacist's intervention.

Results: A total of 2,660 (75.0%) combined prescription errors were found to have one form of error or the other; illegitimacy 1,388 (52.18%), omission 1,221(45.90%), wrong dose 51(1.92%) and no error of style was detected. Life-threatening errors were low (1.1-2.2%). Errors were found more commonly among junior doctors and non-medical doctors. Only 56 (1.6%) of the errors were detected and corrected during the process of dispensing.

Conclusion: Prescription errors related to illegitimacy and omissions were highly prevalent. There is a need to improve on patient-to-healthcare giver ratio. A medication quality assurance unit is needed in our hospitals.

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Keywords: Doctors, drugs, hospitals, Nigeria, prescription errors.

INTRODUCTION

Drug prescription is a standard component of physicians' practice. It requires appropriate knowledge, skill and professional judgment. To ensure patient safety and clinical outcome, the Global Health Policy set out expectations for physicians who prescribe drugs.¹

A prescription is defined as a written order, which includes detailed instructions of what medicine should be given to whom, in what formulation and dose, by what route, when, how frequently, and for how long.² Thus, a prescription error can be defined as a failure in the prescription writing process that results in a wrong instruction about one or more of the normal features of a prescription.²

Estimates show that in developed countries as many as one in 10 patients is harmed while receiving hospital care.³ In developing countries, the probability of patients being harmed in hospitals is higher than it is in industrialized nations.

With the emergence of sophisticated and specialized drugs, among other factors such as ageing patient groups, increasing prevalence of co-morbidities and rising number of patients visiting hospitals, the likelihood of a rise in the risk of harm from medication error is high.⁴

For instance, a steady rise in deaths arising from prescription errors in US and the United Kingdom was reported in an over-lapping period between 1983 and 2000.^{5,6}

Prescribing errors are a potentially preventable source of harm to patients that leaves no level of medical expertise out. Dornan et al showed that both junior and experienced senior doctors commit prescribing errors with mean error rates as high as 8.9 per 100 medication orders.⁷

It is therefore an important target for improvement. To achieve this goal, efforts must be made to understand this subject and determine ways to reduce the frequency of its occurrence in our setting. Many nations have already set up monitoring institutions to promote safe medication use and thereby reduce iatrogenic harm to patients.^{8,9,10}

We therefore set out to determine (i) the prevalence and pattern of prescription errors by prescribers at the Kidney Care Centre, Ondo State, Nigeria and (ii) pharmacists' intervention and correction of identified prescription errors.

METHODS

Description of study area: The Kidney Care Centre, Ondo is an 18-bedded tertiary institution situated in Ondo State, Southwest Nigeria. It is a multi-disciplinary state - of - the art facility established in 2013 to offer services to patients with kidney related disorders and cardiovascular diseases. The hospital receives referrals from major hospitals in South West Nigeria and other geo-political zones in Nigeria. We run an average number of 8 medical out-patient clinic sessions per month with an average attendance of 15 patients per clinic and 17.4 in-patient hospital admissions per month.

Study design: This was a descriptive, cross-sectional study designed to assess all consecutive prescriptions written between March 2014 and February 2015. The prescribers in the centre were blinded to the study throughout the period of research. They were classified into medical doctors and others. There were a total of 31 medical doctors comprising of 2 Consultant Nephrologists, 15 Medical Officers (including medical doctors on the National Youth Service Corps programme) and 14 House Officers (on rotation at different time periods during this study). The group referred to as others included other healthcare workers; Kidney Care Centre has forty nurses and 24 ward assistants. The doctors' daily call duty roster includes 1 house officer, 2 medical officers and 1 Consultant Nephrologist. The nurses and their assistants run 3 shifts in a day; 1 pharmacist runs

the daily call schedule. Each doctor was provided with an identification code that differentiated between Consultants, medical officers and house officers. This made error tracing to individual prescriber possible. The other healthcare workers were not given codes.

Each prescription was reviewed by the attending Pharmacist and any error detected was categorised according to specified definitions and documented.¹¹ Potential life-threatening and /or ambiguous prescriptions were discussed with the Quality Assurance Team. A feed-back mechanism to convey corrections to the erring prescriber without revealing the study was set up. Prescriptions containing only galenicals were excluded.

Ethical approval: Ethical approval was received from the Ethical Research Committee of the State Specialist Hospital, Akure, Ondo State (Ref No AK/16/06).

Definition of terms¹¹

Error of illegitimacy: This occurs when the prescription is deficient of one or all of the following information; date, prescribers name, patient's name, sex and age.

Error of Omission: This occurs when information essential to filling the prescription such as dose, dosage form and/or dosage frequency, are not specified on the prescription.

Error of style: This refers to the use of abbreviations which are not standard and illegible hand writing in prescriptions.

Error of wrong dose: This consists of under-dosage and over-dosage errors.

Analysis

Data was analyzed using SPSS version 17. Continuous variable were expressed as frequency and percentage, mean standard \pm deviation.

RESULTS

A total of 3,545 prescriptions were reviewed. Prescriptions written by medical officers, house officers, Consultants and others were 2,043(57.6%), 830(23.4%), 545(15.4%) and 127(3.6%) respectively (Table 1).

A total of 2,660 (75.0%) combined prescriptions were found to have errors of varying forms; 1,388 (52.2%) had error of illegitimacy, 1,221 (45.9%) had error of omission, wrong dosing was found in 51 (1.9%) prescriptions while error of style was not encountered.

Occurrence rates for prescription error within prescribers' class were 85.83%, 83.34%, 78.12% and 48.26% by non-doctors (others), house officers, medical officers and Consultants respectively (Table 1).

Error of illegitimacy: This occurred more frequently among the non-doctor prescribers (78.9%) and least among the medical officers (46.4%) as shown in Table 2. Table 3 details the specific areas of errors committed under illegitimacy; medical officers skipped the ages of patients (59.3%) and date of prescription (46.5%) more than other classes of prescribers. Patients' names were entirely left out by nurses and ward attendants.

Error of omission: This occurred most frequently among house officers (56.7%) than others (Table 2).

However, medical officers contributed most to specific omission errors as indicated in Table 3.

Error of wrong dosage: This type of error was most prevalent among house officers (2.2%) and medical officers (2.1%). No error of dose was documented against other healthcare workers (Tables 2 and 3).

Error of style: None was recorded.

Fifty six (1.6%) prescriptions with errors necessitated discussions with erring prescribers.

Table 1 Percentage error by class of prescribers

Prescriptions	Consultants	Medical Officers	House Officers	Others	Total
Total prescriptions (TP)	545	2043	830	127	3545
Prescriptions with error (PWE)	263	1596	692	109	2660
TP/PWE x 100%	48.26%	78.12%	83.34%	85.83%	

Table 2 Types and frequency of prescription errors among classes of prescribers

Type of error	Consultants	Medical Officers	House Officers	Others
Illegitimacy	139 (52.9%)	740 (46.4%)	423 (61.1%)	86 (78.9%)
Omission	121 (46.1%)	685 (42.9%)	392 (56.7%)	23 (21.1%)
Style	0	0	0	0
Wrong dose	3 (1.1%)	33 (2.1%)	15 (2.2%)	0

Table 3 Details of prescription error types across classes of prescribers

Type of error	Consultants n (%)	Medical Officers n (%)	House Officers n (%)	Others n (%)	Total n (%)
Illegitimacy (n=1,388)					
No age	109 (9.9%)	648 (59.3%)	255 (23.3%)	81 (7.4%)	1,093 (100%)
No date	110 (14.4%)	356 (46.5%)	198 (25.9%)	102 (13.3%)	766 (100%)
No patient's name	132 (39.2%)	0	127 (37.7%)	78 (23.2%)	337 (100%)
No prescriber's name	0	0	0	70 (100%)	70 (100%)
No gender	27 (20.9%)	28 (21.7%)	18 (14.0%)	56 (43.4%)	129 (100%)
Omission (n=1,221)					
No dose/strength	85 (10.4%)	396 (48.5%)	281 (34.4%)	54 (6.6%)	816 (100%)
No dosage form	18 (18.8%)	48 (50.0%)	17 (17.7%)	13 (13.5%)	96 (100%)
No duration	108 (12.8%)	417 (49.2%)	291 (34.4%)	31 (3.7%)	847 (100%)
No frequency	94 (10.8%)	514 (59.1%)	232 (26.7%)	30 (3.5%)	870 (100%)
Wrong dose (n= 51)					
Under dose	1 (3.1%)	19 (59.4%)	12 (37.5%)	0	32 (100%)
Over dose	2 (10.5%)	14 (73.7%)	3 (15.8%)	0	19 (100%)

DISCUSSION

Prescription error is one of many contributors to morbidity and mortality in any hospital setting. It is also one of many factors leading to increased hospital stay and high costs of care.^{6,12}

The cumulative prescription error found in our centre was 75%. This occurrence rate is slightly lower than 76.3% found among only medical registrars and pharmacists by Arulogun *et al* in four different units at the

University College Hospital Ibadan.¹¹ Our study, on the other hand, cut across all levels of medical doctors. The high rate of error recorded in our study may likely be due to our consideration for omission of seemingly 'harmless' information such as name of patient, age and gender. In some other studies where the criteria for prescription errors was less strict, relatively lower prevalence figures below 50% were obtained.^{13,14}

Our observation of errors of illegitimacy (52.2%) and omission (45.9%) contributing to the bulk of the prescription errors and their relatively high prevalence among all levels of doctors (78.9%) in our study may be a reflection of the attitude of the prescribers to the seeming 'harmlessness' of these aspects of prescription writing. Most doctors assume their unimportance. For instance, in a study by Ajemigbetse et al, omission of duration of therapy and patient age were among the most common prescription errors made.¹⁵

However, no matter how simple the error, it has been known to result in adverse drug reaction and mortality.¹⁶ Mistaken identity in hospital settings has been linked to in-hospital morbidity and mortality.

It may also reflect the imbalance of healthcare giver-to-patient ratio. Workload, stress, fatigue and time pressures have been identified as some of the causes of prescription error by prescribers. In the study by Ross et al, pressures of time were thought to impact on safety practices such as checking prescriptions against the British National Formulary and returning to complete unfinished tasks.^{7,15,17}

Again, junior doctors (medical officers and house officers) often work in stressful circumstances that are perceived as routine by experienced doctors leaving them more prone to errors.^{18,19}

A wide range of errors (1.9 to 52.2%) was identified in this study. This is similar to a range of less than 1% and above 40% found by previous authors.^{18,20} It has been postulated that this wide range may be as a result of varying criteria set by different researchers as there is no consensus yet on standardized nomenclature and methodology.

Among the doctors, occurrence rate for prescription error was highest among the house officers and lowest among Consultants (83.34%). This seems to mirror the relative gradient in knowledge, experience and expertise. Consultants are specialists with in-depth knowledge about drugs and their interactions, theoretical and experiential knowledge of the patients and higher perception of risk. Avery *et al* identified five conditions that affect the prescriber, namely their therapeutic training, drug knowledge and experience, knowledge of the patient, perception of risk, and physical and emotional health.²¹

Omission error was the second most prevalent error. Most infusions were prescribed without strength, frequency and duration.

Injections were also prescribed based on the quantity the patient required at the time of prescribing rather than a proper prescription containing strength, duration and frequency. This seems to be a common error among prescribers as demonstrated by Arulogun *et al*.¹¹ This might be due to inadequate knowledge of properly prescribing parenteral preparations especially infusions.

Just 1.6% of the prescription errors were intervened and corrected by the pharmacists. This low rate of intervention may be due to the lopsided pharmacist-to-patient ratio at our centre. Crowd of patients at the dispensary usually overwhelm the pharmacist(s) on duty at each time of the observation. Our result is in conformity with 1.5% reported by Dean *et al* and a range of 0.3 to 1.9% in United States.^{19,22}

CONCLUSION

Prescription error related to illegitimacy and omissions predominated over the more life-threatening errors. There is a need to improve on the patient-to-healthcare giver ratio in our setting in order to reduce or eliminate errors occasioned by pressure of work.

RECOMMENDATIONS

A medication quality assurance unit should be set up in our centres. Hospitals should provide prescribers and dispensers with the use of on-line aids, uniform prescribing charts in order to avoid transcription and omission errors, and a feedback control system and immediate review of prescriptions which can be performed with the assistance of a hospital pharmacist are also helpful. Frequent review of prescriptions by the pharmacist reduces adverse effects. Prescription audits should also be performed periodically.

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