



PRESCRIBING ERRORS IN CARDIOVASCULAR DISEASES IN A TERTIARY HEALTH CARE FACILITY

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ABSTRACT

Prescription errors are now known to be contributing to a large number of deaths during the treatment of cardiovascular diseases. However, there is paucity of information about these errors occurring in health facilities in Nigeria. The objective of this study was to investigate the prevalence of prescribing errors in prescriptions for patients with cardiovascular diseases in a Nigerian tertiary health care facility. In a retrospective study, the prescription errors in 156 prescription sheets issued to both in-patients and out-patients attending Madonna University Teaching Hospital between January and December 2007 were evaluated. A total of 17 different types of prescribing errors occurred 459 times in the 156 prescription sheets. An error rate of 29 per 100 prescription sheets was detected. The common errors were absence of signature of prescribers (6.1%), date on prescription (0.9%), patient's age (1.1%) and sex (0.7%), wrong frequency (2.8%) as well as non-specification of formulation types (1.1%), strength of drug prescribed (15.7%), frequency (1.7%) and duration of administration (2.6%). It is concluded that many prescribing errors occur in the treatment of cardiovascular diseases in the health facility studied and these call for the need to create awareness of the dangers of prescription errors to all prescribers in Nigeria, generally.

KEYWORDS: Prescribing Error, Cardiovascular Disease, Prescriptions.

INTRODUCTION

Medical errors are the eighth leading cause of death in the United States and are estimated to account for between 44,000 and 98,000 deaths yearly (Kohn *et al.*, 2000). The annual preventable medication-related adverse events in the United States are estimated to be 450,000 and these account for about \$3.5 billion of health care expenditure (Aspden *et al.*, 2006). Medication errors are the most common type of medical error, and

prescribing errors account for a large proportion of these errors. Prescribing errors have been defined as the result of a prescribing decision or prescription writing process that results in an unintentional but significant reduction in the probability of treatment given being timely and effective or an increased risk of harm compared with generally accepted practice (Abutitah and Amporful, 2008). The errors often occur during the selection of drug to be prescribed and in writing the

prescription, and relate to inappropriate prescribing by a prescriber who may not necessarily be a medical doctor but any other properly licensed person. Prescribing errors could be prescribing a wrong medication or a drug to which the patient is allergic, ordering duplicate therapies for a single indication, prescribing a dose that is too low or too high, right medication in an inappropriate dosage form, dosage interval or duration of therapy, and inappropriate route of administration (Coleman, 1999). These errors have serious medical, social and psychological consequences.

Cardiovascular diseases are the world's largest killers, claiming 17.1 million lives a year. Over 80% of deaths resulting from the disease take place in low- and middle-income countries and occur almost equally in men and women (WHO, 2010). Available data suggests that the number of drugs accessible for the treatment of these diseases has increased over the years and super specialization of the physicians is increasing. However, the physicians' knowledge and clinical experience are declining, thus creating room for prescribing errors since the prescribers have to choose from several options (Van den Bemt *et al.*, 2000; Bates *et al.*, 1995). There are indications that medications prescribed for the treatment of cardiovascular diseases account for a large proportion of medication errors.

In Nigeria, the poor infrastructure for the training of medical doctors and inadequate facilities in the hospitals appear to increase the chances of prescribing errors in the hospitals. However, the extent to which these errors occur and the types of errors that occur have not been well documented in many of the hospitals, particularly in private hospitals. Therefore, in this

study, the errors occurring in prescriptions for patients with hypertension, stroke and heart failure in a privately-owned teaching hospital in Nigeria was evaluated.

METHODS

This study was carried out in Madonna University, Elele (MUTH) in Rivers State, Nigeria serving the Madonna University Medical School, the entire community in Elele and surrounding communities. In this hospital, medical officers as well as consultant medical doctors prescribe drugs for patients suffering from cardiovascular diseases.

In a prospective study, a total of 156 prescription sheets for patients with cardiovascular diseases, including hypertension, stroke, and heart failure were evaluated over a period of one year (January to December 2007). Included in the study were all prescriptions for hypertension, stroke and heart failure, irrespective of the number of times the patients involved visited the hospital. To avoid much bias, only prescription sheets which were proven to have originated from the relevant medical officers in the hospital studied were included.

The prescription sheets were assessed for prescribing errors, and these were documented in a pre-designed research data collection proforma. In defining the errors for this study, improper dosing or timing, delivery of an incorrect or unnecessary medication, administration to the wrong patient (errors of commission), and failure to prescribe appropriate medication therapy or needed monitoring of medication therapy (errors of omission) as earlier defined (AHA, 2010) were evaluated. Other errors sought for in the prescription sheets included absence of signature of prescriber, formulation type not specified, absence or correctness of

strength of drugs prescribed, dosage not specified, wrong frequency or frequency of dosage not indicated, absence of duration, prescriber's name absent (when no means of identification of signature was available in Pharmacy Department in the hospital), illegible writing, date absent on prescription, patient's age absent, patient's sex absent. These other errors were included for this study because prescription writing and nearly all other processes in the hospital evaluated was still being done manually.

The data collected were entered into Microsoft Excel in a computer and double checked before analysis using descriptive statistics. Data estimated included the proportion of each type of errors that occurred, average number of errors per prescription sheet, and average number of each type of error per 100 prescription sheets.

RESULTS

Seventeen (17) types of prescribing errors were detected, with an average of 29 errors per 100 prescription sheets. The frequency of non-drug and drug-related errors occurring in the prescriptions sheets are given in Table 1. The most common non-drug-related error was absence of prescribers' name on prescription sheet (27.5%) while the most common drug-related error was absence of strength of the drugs prescribed (15.7%). Other errors were absence of signature of the prescriber (6.1%), absence of formulation type (1.1%), the dosage of drug to be used not indicated (2.8%), over dosing (1.5%), under dosing (1.1%), absence of recipe sign, Rx (1.5%), illegible writing (9.6%), absence of date (0.9%), absence of the patient's age (1.1%) or sex (0.7%). Drug-related prescribing errors occurred 242 times and non-drug-related prescribing errors occurred 217 times. Twenty-five dose-

related prescribing errors were detected while prescribing errors related to frequency of administration occurred 18 times. Also, prescribing errors related to duration occurred 12 times.

Drug related errors accounted for 52.5% of the total errors while errors relating to dose accounted for 5.4%. The number of drugs per encounter was 5.35 ± 0.58 . Of these, the number of oral drugs per encountered was 5.18 ± 0.58 while the number of injections per encountered was 1.44 ± 0.78 . A critical finding in this study was that the prescriptions were all dispensed to the patients.

DISCUSSION

The detection, reporting and analysis of prescribing errors are essential in ensuring the safety of patients in the use of medications (AHA, 2010). It is recognized that omission of life-saving medications is an under-recognized medication error in the management of patients with acute cardiovascular disease (AHA, 2010). In some earlier studies, failure to prescribe adjunctive therapies, including antiplatelet agents (Lee *et al.*, 2008), β -blockers (Mehta *et al.*, 2006), angiotensin-converting enzyme inhibitors (Michaels *et al.*, 1999), and cholesterol-lowering agents (Murohy *et al.*, 2007) for patients with acute coronary syndrome are examples of medication omissions that have been observed. In our study, however, omission errors were not identified in any of the prescriptions and the most common errors that occurred in MUTH were absence of prescribers' name on prescription and absence of strength of the drugs prescribed.

The observed number of errors occurring per 100 prescription sheets (29) in this study was low when compared to other earlier studies such as that in National Orthopedic Hospital

Table 1: Drug and non-drug related prescribing errors

Types of errors	Number of errors	Percentage of errors as a proportion of all drug items on prescription	Number of errors per 100 prescription sheets	(1)
Non-drug related errors				
No signature of prescriber	28	6.1	17.9	
Recipe Rx sign not indicated	7	1.5	4.5	
Illegible writing	44	9.6	28.2	
Prescriber's name absent	126	27.5	80.8	
No data on prescription	4	0.9	2.6	
Patient's age absent	5	1.1	3.2	
Patient's sex absent	3	0.7	1.9	
Drug related errors				
Formulation type not specified	5	1.1	3.2	
Strength not specified	72	15.7	46.2	
Under dosing	5	1.1	3.2	
Over dosing	7	1.5	4.5	
No dosage Specification	13	2.8	8.3	
No frequency indication	8	1.7	5.1	
Wrong frequency	10	2.2	6.4	
No duration	12	2.6	7.7	

Lagos, Nigeria which had an average of 45 errors per 100 prescriptions (Yinusa, 2000) even though the differences in the type of drugs prescribed and the location and type of hospitals may provide some explanation. While the prescription of drugs for patients with cardiovascular diseases in MUTH was done by medical doctors with experience in cardiovascular diseases, the prescribers in the orthopedic hospital prescribed for conditions such as malaria and infectious diseases which are not directly related to bone. However, our finding falls within the range reported in Netherlands which reported that prescribing errors varied from 3 to 169 per 100 prescriptions (Lesar et al, 1997).

The absence of the prescribers' names reported in this study (27.5%) was very high compared to that reported in a study carried out in Dubai which was only 12.2% (Sharif *et al.*, 2009). Although not in the same setting, the drug related errors accounting for 52.5% of the total errors in this study

was approximately twice that reported in a previously study conducted in an internal medicine unit in Spain (Gutiérrez *et al.*, 2006). The other errors seen in the health facilities have been reported elsewhere but it was interesting to note that the drugs prescribed under the conditions evaluated were all dispensed under the supervision of the pharmacist on duty on account of verbal confirmation of the sources of the prescriptions. Failing to dispense the drugs with the errors would have helped to reduce the obvious errors.

Usually, it is recommended that the elderly should receive reduced adult doses due to their aging organs and therefore diminishing functions as well as changes in their pharmacokinetic and pharmacodynamic (Swahetty and Woodhouse, 2007). Judging from the results, lots of patients must have been seriously injured or even died as a result of these errors since no accurate records were kept. It is essential that prescribers should ensure that their prescriptions are correct and

legible so as to prevent misinterpretations. They should abide by the 5 R's vital to prescribing which are ensuring that it is the right medication, right patient, right dosage, right route and right time. The problems of prescribing errors must be introduced to health professionals, especially the prescribers early in their training and the principles reinforced repeatedly. Doctors and other prescribers in this setting should be educated on the need for good prescribing practices. Also, seminars should be organized for the prescribers on good prescribing practices. In future, the hospital should introduce computerized prescribing to reduce error rates.

CONCLUSION

What was obvious in this study was the frequent occurrence of prescribing errors and frequent use of multiple drugs in the management of patients with cardiovascular diseases. Though polypharmacy is expected for most elderly patients who form a reasonable proportion of the patients that the prescriptions studied were issued to, the increasing risks of cardiovascular diseases in Nigeria (Abegunde *et al.*, 2007; Erah and Suleiman, 2010) and the frequent prescribing of multiple medications to patients as seen in this study, means that concerted efforts for the prevention, reporting, and management of medication errors must be made nationally. Minimum functionality standards for error-prevention, enhance education of healthcare professionals early in their training and throughout their careers, and adequate regulation needed to promote improved medication errors by all stakeholders are needed in Nigeria.

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