Outcome of pharmacists intervention on out-patient prescriptions in a Nigerian tertiary health facility

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Abstract

Background: Pharmacists' intervention has contributed to the detection of medication errors, prevention of adverse drug reactions (ADRs), improvement in the quality of life of patients and cost reduction. There are few documented studies in resource-constrained settings on the outcome of pharmacist intervention. The objectives were to document pharmacists' intervention and evaluate the outcomes in our setting.
Methods: A prospective, descriptive study was carried out between November 2010 and May 2011 in the Out-Patient Pharmacy unit of Jos University Teaching Hospital, Jos, Nigeria. Pharmacists interviewed patients, screened prescriptions, made recommendations and documented interventions. Outcomes were evaluated in terms of prevention of ADRs, improved therapeutic effectiveness, improved compliance and cost reduction.
Results: A total number of 6631 prescriptions were processed, and total of 103 prescription errors were identified, giving an average of 1.6 errors per 100 prescriptions. The drug-related problem (DRP) most frequently encountered was incomplete prescription (47%), followed by dose and frequency (27.3%). Others were contraindication (6.1%) and drug interaction (3%). To resolve the DRPs, 20 (33%) of the problematic prescriptions were changed and dispensed, 33(55%) were clarified and dispensed without change, 4 (7%) were dispensed as written, while 4 (7%) were not dispensed. 66 interventions were carried out, representing an intervention rate of 1%. Recommendation acceptance rate was 93.5%.

Key Words: Drug Related Problems, Medication Errors, Pharmacists Intervention,

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Introduction

Pharmacists' intervention is the process and action in which a pharmacist manages patients' medication regimen by providing comprehensive medication reviews and educational services for both patients and practitioners in order to prevent or solve drug related problems (DRP) and improve therapeutic outcome. The duty of the pharmacist in validating to ensure that a correct prescription is dispensed has been rated as a positive modification in the effectiveness of pharmacotherapy[1,2].

Studies have shown that medication or prescription error is one of the most frequent forms of medical error and is associated with significant medical harm[1, 3,4]. Prescription error rates of 2.87 to 4.9 per 1000 medication orders have been reported by various studies[5-7]. A study conducted in out-patient pharmacies found that approximately 4 per 100 dispensed prescriptions had problems and required pharmacists intervention[8]. Another study involving audit of prescription from community pharmacies found that 2.6% of the prescriptions required active pharmacist intervention to resolve a prescribing error[9].
The outcome of pharmacist intervention can be judged in terms of the clinical value and, in some cases, the humanistic or economic value of the modified prescriptions. Measuring these outcomes can be challenging[10]. Different parameters have been used for this purpose, including estimates of harm, adverse health outcomes of a DRP, evaluations of the intensity of health care needed (such as hospital admission) and finally, evaluations of the effectiveness of the patient's therapeutic management[11, 12].

Although most pharmacists in Nigeria are involved in prescription screening and interventions to a varying degree, literature is sparse on the documentation of such activities and their outcomes. Therefore, the present study was conducted to identify and document the types of pharmacist intervention and its outcome on problematic prescriptions.

Materials and Methods

Design and setting

This prospective, descriptive, cross-sectional study was carried out between November 2010 and May 2011 in the Outpatient Pharmacy Department (OPPD) of Jos

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university teaching hospital (JUTH), Nigeria. JUTH is a 620-bed capacity teaching hospital. The OPPD received an average of 300 prescriptions per day.

Data Collection

Prescriptions presented at the outpatient pharmacy during the study period were screened by a registered pharmacist for drug-related problems (DRP). Target DRP included allergy, prior adverse drug reactions (ADR), contraindications, drug interactions, therapeutic substitutions, generic substitutions, dosage problems, inconvenient forms, unnecessary drug, wrong drug, drug unavailability, duplications, excessive duration and usage problem. Actions carried out on prescription with problems included pharmacist phone calls to the attending physician or a written note with a recommendation along with the prescription or patient's education depending on the level of intervention. Interventions were documented on a form developed for this purpose. The main outcome measure in this study was physician acceptance of pharmacists' recommendation. Data was analyzed descriptively. Qualitative variables were expressed in frequencies and percentages.

Results

A total number of 6631 prescriptions were processed during the study period, out of which 66 interventions were carried out, representing an intervention rate of one percent. A total of 103 prescription errors were identified, giving an average of 1.6 errors per 100 prescriptions. The pattern of DRP is shown in Table 1. Analysis of the drug-related problems showed that errors of commission or major errors, such as errors relating to therapeutics (39.4%) and compliance (6.0%), accounted for 45.4%, while errors of omission or minor errors accounted for 54.54% of drug related problems.

Table 1: Drug related problems in outpatient prescriptions at the Jos University Teaching Hospital

Category		Frequency	%
Therapeutic			
	Contraindications	4	6.0
	Wrong dose	13	19.6
	Drug Interaction	2	3.0
	Therapeutic duplication	1	1.5
	Wrong drug	1	1.5
	Wrong dose schedule	5	7.5
Prescription			
	Incomplete prescription	33	49.9
	Illegible prescription	3	4.5
Potential Compliance Difficulties		36	54.5
	Excessive duration	2	3.0
	Inconvenient dosage form	2	3.0
Total		66	100

Table 2 shows the recommendations made by the pharmacist, acceptance rates and actions taken. Recommendation acceptance rate by physicians was 93.5% (58/62). The number of recommendations rejected was four (6.5%) while another four (6.5%) recommendations were inconclusive as prescriber could not be contacted. In resolving the DRPs, 20 (33%) of the problematic prescriptions were changed and dispensed, 33(55%) were clarified and dispensed without change, four (7%) were dispensed as written while four (7%) were not dispensed as the drug was removed from the prescription. Pharmacists' perceived benefits of the interventions included cost reduction (17%) and prevention of potential ADR prevention (20%), and no perceived benefit (5%).

Table 2: Proportion of recommendations accepted and actions taken

Type of recommendation	Recommendation accepted	Action taken by pharmacists after recommendation			
	Yes (%)	C & D	CL & D	DW	ND	Total
Change dose	12 (100)	10	1	1	0	12
Change drug	2 (66.7)	2	0	1	0	3
Change duration	1 (50)	1	0	1	0	2
Change dosage schedule	5 (100)	5	0	0	0	5
Clarify	2 (100)	0	2	0	0	2
Complete prescription	31 (100)	1	30	0	0	31
Stop drug	5 (83.3)	0	0	1	5	6
Total	58 (93.5)	20	33	4	5	62

C&D= Changed and dispensed, CL & D= Clarified and dispensed, DW= Dispensed as written, ND= Not dispensed

Discussion

We observed a low prevalence of pharmacist intervention (1%) compared to similar studies were intervention rates ranged from 2.6 and 2.9% [4, 5]. The medication error rate was 1.1 per 100 prescriptions. Literature is spare on medication error rate in low resource settings. Studies conducted in US and UK have report median error rate (interquartile range [IQR]) of 7% (2-14%) of medication orders, 52% (8-227) errors per 100 admissions and 24% (6-212) errors per 1000 patient days[12]. It is important that pharmacists intercepted and reported errors before these errors caused harm. The low level of intervention in this study suggests several possibilities. Some prescriptions with errors might have been dispensed to the patients without being detected, or it is possible that some problematic prescriptions, especially those with errors of omission, may have been dispensed with some assumptions, and hence, no pharmacist intervention was documented. Several factors can influence

pharmacist intervention rate. Expertise in pharmacotherapy, standard procedures and deployment of technology in prescription screening processes significantly impact on the pharmacist's intervention rates.

The pattern of DRP obtained in this study is comparable to that reported in a similar study in Malaysia, where errors of commission and omission were 46% and 54%, respectively[5]. Rupp and colleagues[9] reported similar patterns of 29% and 51% errors of commission and omission, respectively. The most frequently encountered type of error in the study was that of incomplete prescription. This accounted for 46.97% of the drug-related problems. Incomplete prescription has the potential to cause harm as it could result in identity problems, which might result in the right drug being dispensed to the wrong patient. Also, when essential demographic information are lacking on a prescription, the ability of the pharmacist to carry out an informed evaluation of a prescription for appropriateness, safety and correctness would be significantly impaired. It is crucial that standard guidelines are put in place and enforced to reduce medicinal mishaps resulting from incompleteness of prescriptions. Implementing safer practices require developing safer systems. Many errors occur as a result of poor oral or written communications. Enhanced communication skills and better interactions among members of the health care team and the patient are essential[13].

Errors of commission could lead to dire consequences if left unidentified and uncorrected[13]. In this study, high dose of drug (12.1%) ranked highest in the errors of commission, followed by wrong dosing schedules (7.5%). Prescription practices and dispensing procedures to filter errors of commission are critical to maximizing the benefits of pharmacotherapy and reducing harm to the patient. This can be achieved through a multilevel process improvement with interventions at the prescribing, dispensing and patient levels. In setting with adequate capacity, systems must be redesigned, and seamless, computerized integrated medication delivery must be instituted by health care professionals adequately trained to use such technological advances. Sloppy, handwritten prescriptions should be replaced by computerized physician order entry, a very effective technique for reducing prescribing/ordering errors, but another far less expensive yet effective change would involve writing all drug orders in plain English, rather than continuing to use the elitists' arcane Latin words and shorthand abbreviations that are subject to misinterpretation. After all, effective communication is best accomplished when it is clear and simple[13].

A significantly high proportion (93.5%) of the recommendations was accepted. Barber et al[14] had previously reported an acceptance rate of 96.2% in a group of British hospitals. In another study of pharmacist intervention among pediatric patients, an acceptance rate of 87.3% was reported[15]. Physicians' acceptance rate of documented clinical pharmacist interventions is an indication that the treating physician considered most of the interventions appropriate. This also reflects prescribers' acceptance of pharmacists as reliable sources of drug information[16]. In most of the interventions, the prescription was clarified and dispensed while 32.2% involved a change of patients' drug therapy with regard to dose and frequency (Table 2).

The perceived benefits of the interventions in this study correlates with several other studies where pharmacist-initiated interventions resulted in improved drug safety, decreased mortality rates and drug cost, and increased quality of patient care[17,18]. Assessing the clinical significance of pharmacist-initiated intervention is challenging and could be subject to interpretation bias. A study by Dale et al[19] found that pharmacists have a tendency to grade the importance of interventions higher than physicians; therefore, the use of a multidisciplinary panel provides a more reliable grading of the clinical significance of interventions. Struck et al[15] assessed the agreement between pharmacists' rating with regards to clinical significance and found the interventions to be reasonably reliable.

Conclusions

The results highlights the potential positive impact pharmacist intervention has on patient outcomes. Although the pharmacist intervention rates were low, the acceptance rate and proportion of clinically significant interventions were high. Strategies that will improve pharmacists' intervention rates are desirable in resource-limited settings.

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