

**ASSESSMENT OF MEDICATION ERRORS IN AMONG PATIENTS VISITING
COMMUNITY PHARMACIES IN RURAL AREAS OF CHIDAMBARAM,
TAMILNADU AT SOUTH INDIA: A PROSPECTIVE STUDY**

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ABSTRACT

Medication errors are important problems in hospitalized and outpatients department. Medication errors are inevitable and are affected by numerous human factors. Nevertheless, the epidemiological data about medication errors in outpatients in India is still limited. Objectives: This study was purposed to know the occurrence of medication errors including prescribing error, pharmaceutical error and dispensing error and the occurrence of the most type happened in these errors in outpatient settings. The present study is a prospective and study subjects were selected from community based ambulatory pharmacies. The study was carried over one month during January 2012. 250 prescriptions were collected and 212 of them were selected for the further analysis. We observed the prescription of 202 outpatients (of 212, 10 were excluded). About 81% of prescriptions were carrying with variety of errors. Among 202 prescriptions, 95.54 % were with prescribing errors, 9.9 % were with pharmaceutical errors and 7.91% were with dispensing errors. The most type of prescribing error was incomplete prescription orders and it was the most common stage of errors (95.54%). The dosing errors were including over dose and under dose of drugs, while dispensing errors includes improper drug preparation and incomplete or no drug information. Medication errors are still common problem in outpatients in Chidambaram, India. Pharmacists needed to prevent and overcome the medication errors.

Keywords: medication errors, community pharmacy, pharmacists, India.

INTRODUCTION

Pharmaceutical care is the responsible provision of drug therapy for the purpose of achieving definite outcomes that improve patients' quality of life. Any suboptimum therapy leads to medication error. [1] The adverse drug event (ADEs) and medication errors are most common types of injuries experienced by hospitalized patients. Such events may be related to professional practice, healthcare products, procedures

and systems.[2] A medication error is an episode associated with the use of medication that should be preventable through effective control systems.

The American Society of Health-System Pharmacists (ASHP) definition of medication errors includes prescribing, dispensing, medication administration and patient compliance errors.[3] Medication error is not only clinically significant on many occasions; it has serious economic consequences like extended

hospital stay, additional treatment and malpractice litigation. "Medicine is neither your `friend` nor your `enemy` you can make it either "A conservative estimate of Institute of Medicine reports "medical errors were the eighth leading causes of death in USA in 1999"^[4] One of the most important works was the Harvard Medical Practice study. In this study, it was shown that 3.7 % of patients admitted to hospitals in the State of New York experienced injury resulting from care. It was also shown that 19 % of these injuries were caused by the use of medication.^[5] The study about medication errors in outpatients setting reported that, in average, the patients received 10.9 medications and they experienced adverse effects which were related with medication errors (32%).

The study concluded that medication errors in outpatients setting were abundant and associated with significant adverse effect.^[6] Outpatients setting become more important for medication errors, because not only more procedures take places in non-hospital setting but also more hazardous and less regulated hospital setting.^[7] Various factors identified for medication errors are illegible orders, non-availability of patient information, inadequate medical knowledge, increased patient load, failure to monitor drug concentration or drug therapy, and not accounting for changes in renal and cardiac functions.^[8]

The literature review in India, shows there were very few studies was carried out, for example when all stringent GMP regulations and validated standard operating procedure (SOP), It could happen that cotrimoxazole tablets got contaminated with glibenclamide, an Antidiabetic drug and glycerol got laced with a toxic chemical, diethylene glycol (DEG) resulting in several deaths on use, it is likely that mistaken or error occurs in the use of medicines, termed as medication errors.^[4] This study was purposed to know the occurrence of medication errors including prescribing error, pharmaceutical error and dispensing error and the occurrence of the most type happened in these errors in outpatient settings.

MATERIAL AND METHODS

Study Design: The study was an analytical observational and prospective Study.

Study Place: The study was carried out in various private community pharmacies, situated in Chidambaram, Tamil Nadu, rural southern part of India.

Study Period: the study carried out over a one month period; from January to February 2012.

Inclusion Criteria: Special attention was given for patients of 1–24 months old (pediatrics). Repeat purchase of medicines the same patient was counted as two admissions. Community pharmacies, customers who bought drugs from pharmacy with prescription and on consultation to the pharmacist are included in the study, at exit patient check for the medication Error.

Exclusion criteria: The prescriptions with incomplete information for date of admission, discharge, and identification number were excluded from the study.

METHODS

The medication errors were analyzed through a prospective observational study conducted at Chidambaram in various private pharmacies, situated in rural part of southern India. The prescriptions were analyzed using the patient medication chart review method, which is well suited to identify the prescribing medication errors.^[9] The patients were randomly selected and the data for identification, medication details and relevant laboratory and progress reports were collected. The patient (or caretaker) was interviewed to gather information regarding the drug allergy and medications history. The drugs given on SOS basis were also taken into consideration.

The patient's prescriptions or medicines were to study the clinical significance of these medication errors and drug drug interactions. Each prescription was checked twice, once for identifying any medication error (s) and then for the possibility of a drug-drug interaction in the prescription. All the prescriptions were checked for errors by the Micromedex Drug-Reax database.^[10] The prescriptions were checked for incorrect dosing frequency, errors in dose, incomplete prescription, unrelated drug for the present state of disease, without knowing allergic conditions of the patients, inappropriate duration of therapy or the route of administration, monitoring error and drug – drug interactions. All the data was represented as average and percentages.

RESULT AND DISCUSSION

These results are based upon data collected from 202 patients (of 212, 10 were excluded). Out of 202 patients, 130 (64.35%) were male patients. The age profile showed that only 21(10.39 %) patients were

below the age of 15 years; 120 patients (59.40%) were between 18-60 years and 61 (30%) patients were over 60 years of age. A total of 912 medications were prescribed to 202 patients; and, the average number of medications per patient was found to be 4.60. The analysis of these averages vis-à-vis age groups showed an extremely significant statistical difference between the groups 15-60 years vs. over 60 years. The average number of medicines for these groups was 4.10 and 5.11 respectively. We found about 90% of prescriptions were prescribed for more than one drug that's polypharmacy, which can predispose to the occurrence of adverse drug reaction and medication errors.^[3] 250 prescriptions were collected and 212 of them were selected for the further analysis. We observed the prescription of 202 outpatients (of 212, 10 were excluded). About 81% of prescriptions were carrying with variety of errors.

The type of medication errors and stage of error were listed in **table 1** Prescribing errors included the incomplete or unclear of handwriting prescription order which were written by the physicians. The incomplete of handwriting prescription orders in the rule of administration included.

- i. Advise about drug consumption 20 (9.90 %), as before or after meal, in the morning or before bed time.
- ii. Improper use of antibiotics 30 (14.90%).
- iii. Formulating the medications without directions 16 (7.92%).

Physician ordering was the most common stage of errors (95.54%). This result is similar to the other studies. Number of Drugs/Prescription prescribed by Physicians, self medication, consultation with registered medical practitioners of Indian system (Ayush) the data is presented in **Figure No. 1**, most of the medication taken by self medication (39.60%) and then prescribed by physicians (24.25%), Ayush doctors and RMPs (23.76%) followed by consultation with pharmacists (17.32).

The self medication and Ayush physicians do not know much about the drugs, such as the brand name, the strength of the drug, the formulation, also the dose in specific conditions. Pharmacists are needed to make the medications proper with patients' condition but the pharmacist also don't know about proper medication use because in the present time the qualification of pharmacist in India is Diploma in Pharmacy (2 year study plus 500 hour practical training in hospital), it is not provide sufficient information and practice to the pharmacists. We also observed that, the pharmacists made some confirmations to the physicians in order to decrease

the prescribing errors. Nevertheless, some of the pharmacists did not need to make confirmations to the patients, because of the time limited and the high number of prescriptions and patients. In the outpatients setting, the study showed that the prescription errors were being the second cause of medication errors after the patient errors.^[6]

Pharmaceutical errors were improper doses and inappropriate dosage form. The overdose prescriptions were found on salbutamol and amikacin, whereas the under dose prescriptions were found on ofloxacin antibiotics, pirazinamide, phenytoine, barbiturate and carbamazepine. Amikacin is one of the drugs with narrow therapeutic index. The overdose of amikacin can cause toxicity such as ototoxicity, nephrotoxicity and neurotoxicity. Salbutamol is a bronchodilator and the over dose can cause exaggeration of common adverse reactions, particularly angina, hypertension, hypokalemia, seizures and cardiac arrest may occur.^[11]

On the other hand, the under dose of antibiotic can cause ineffective drug therapy. The study about preventing medication errors using quick list to computerized physician order entry system in patients can eliminate the errors of dose, formulation, drug interaction and allergy. The introduction of the Computer prescription order entry systems (CPOE), The computer can compare the orders against standards for dosing, check for allergies or interactions with other medications and warn the prescriber about potential problems.^[3] The CPOE could not be used in community setting in India, but it will need high cost to prepare the computerized order entry system, the Infrastructure and qualified trained staff.

The dispensing errors were the wrong drugs which were given to the patients, wrong labels and patients did not receive drug information. In this study, the dispensing errors, were improper drug preparation and incomplete or no drug information 15 (7.42 %).

These errors could be caused by the high number of prescriptions and the limited number of pharmacists. Incomplete or no drug information to the patient can cause discrepancies between the doctor's prescription and what the patient takes in actual practice. The impact of medications misuse because of these discrepancies can lead to morbidity and mortality.^[12] To avoid the medications misuse, the pharmacists should give information and education to the patients until they understand the role of medications in their health.

In order to prevent the medication errors, potential strategies could be followed, such as;

- i. Educating the physicians about the risk factors of medication errors, also about the impact of medication errors in therapeutic outcome,
- ii. Preparing the structured medication system for outpatients setting,
- iii. Educating the pharmacists to increase their roles in community setting.

The limitations of our study that, we could not follow the patients during drug consumption, therefore, we could not find the adverse events which were related with the medication errors. Further studies are needed to confirm our finding and to evaluate other types of medication errors in outpatient setting.

FDA advice for consumers to prevent medication errors:

1) It is important for the patients to be aware about the name of the medication that is being prescribed so that if the pharmacist prescribes something else, they can point it out. Even while receiving refills for medications, the medications should be proactively checked for the same color, size, shape, texture and packaging in order to avoid dispensing of incorrect medications.

2) The patients should be aware about the usage of medications. It is important that patients feel comfortable with their health care providers such as physicians, nurses and pharmacists. Inquisitiveness about the risks involved provided the patient forgets the dose, the correct medication intake time, spacing between doses, contact information in case of occurrence of side effects, storage information about medications and dietary restrictions while taking certain medications can go a long way in patients experiencing positive health outcomes.

3) The patients should know the purpose of taking their medications so that it can be taken correctly. It patients know what they are consuming and for what, they are more aware about the positive impact of the medications and can keep their physicians and pharmacists informed about any side-effects encountered, if any.

4) Patients should understand the medication indications so that they can follow the directions about its intake, quantity and duration. If the patient cannot read, they should let their physician or

pharmacist know so that they can provide directions in the regional language.

5) Patients should provide complete information to their healthcare providers about their medications in including complementary and alternative medications during each visit.

6) In case of patients taking multiple medications, it can be beneficial to maintain a list of all the medications and keep it in possession at all times so that during emergency, the healthcare providers can avoid medications that the patient is allergic to, if any and provide the appropriate treatment as well. A duplicate copy should also be given to a loved one so that atleast one person besides the patient is aware of his/ her treatment therapy and can help the patient's healthcare provider when need persists.^[13]

CONCLUSION

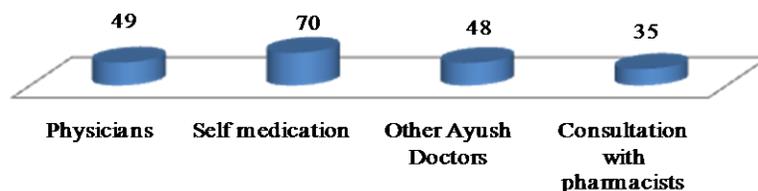
We reported that the medication errors were common at the site of study. The most common type of error was prescribing error. The incomplete or unclear handwriting of the physicians was the main reason of prescribing errors. The pharmacists' role should be intended to decrease the rate of medication errors because they also not have sufficient knowledge about medicine. The present results point to the establishment of a medication error reporting system at each hospital and community pharmacy and to share the data with other hospitals/healthcare settings. The role of a clinical pharmacist in this situation appears to be a strong intervention; and, the clinical pharmacist, initially, could only confine to identification of the medication errors. We hope in India new generation of clinical pharmacist like M. Pharm (Pharmacy Practice), M. Pharm (Pharmacology) and PharmD graduates that it will be more beneficial than conventional pharmacists to involve and reduce medication error. Adverse Drug Reaction reporting and monitoring in hospital pharmacy and community settings in India will also increase considerably.

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Table No. 1: Types of Medication Error

S. No.	Types of medication error	No. of errors (n)	Percentage of error (%)
1.	Prescribing Error		
	No doctor's name	15	7.42
	No date	17	8.41
	Wrong drugs name	20	9.90
	No rule of administration	50	24.75
	No patient's name	1	0.49
	No patients age	30	14.9
2.	Dosing Error		
	Over dose	12	5.94
	Under dose	8	3.96
3.	Dispensing Error		
	Improper drug preparation	1	0.49
4.	Incomplete or no drug information	15	7.42
	Stage of Error		
	Physician ordering	193	95.54
	Pharmacy dispensing	9	4.45

Figure No. 1: Showing number of prescription prescribed by different category of Physicians and Self medication practice**Table 2: Distribution of medication errors according to age groups**

Age group (yrs)	No. of patients (n)	No. of errors (n)	% of errors (within this age group)	Average No. of Medicines
< 15	21	8	10.39 %	4.6
15-60	120	80	59.42	4.10
>60	61	49	30.19	5.11

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