

**CLINICAL PHARMACIST INTERVENTIONS IN OUTPATIENT GENERAL MEDICINE  
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**ABSTRACT**

**Introduction:** Clinical Pharmacists involvement in patient care has improved the quality of care and reduced medication errors. However, this has required a lot of work that could not have been accomplished without documentation of interventions. Several means of documenting errors have been proposed in the literature but without a consistent comprehensive process. As per the recommendations of American College of Clinical Pharmacy (ACCP), we sought to analyze interventions by monitoring prescribing and dispensing errors. Objectives: Type of medication errors, its severity and role of clinical pharmacist intervention in detection and prevention of medication errors were evaluated in this study. Methods: A Cross sectional interventional study carried out over a period of 6 months monitoring 1200 prescriptions in outpatient pharmacy department at a tertiary care teaching hospital. Results: During this study period, we found 136 prescriptions with medication errors. Of the 136 medication errors, 27.94% (38) were prescribing errors, and 72.05% (98) were dispensing errors. The most type of prescribing error was Untreated Indication 52.63% (20). The most type of dispensing error identified was Dispensing Incorrect drug 24.48% (24) and Dispensing Drug in Excess 24.48% (24). Majority of interventions in our study were to Supply Required Drug 68(50%). The acceptance of our interventions were found to be 118 (86.6%). Conclusion: Clinical pharmacists interventions can effectively prevent these errors. The types of errors indicate the need for continuous education and implementation of clinical pharmacist's interventions.

**KEYWORDS:** General Medicine. Clinical Pharmacist. Intervention. Medication error.**INTRODUCTION**

The role of Pharmacist has been diversified from dispensing medications to patient care, patient counsellor, healthcare educator and community service to clinical practice.

The Joint Commission on Accreditation of Healthcare Organizations (JCAHO) has recommended that all prescriptions must be reviewed by pharmacists before dispensing and stressed that the outcomes should be documented as a result of direct patient care by the pharmacy.<sup>[1]</sup>

Studies show a positive relationship between inappropriate prescribing and increased mortality, use of health-care services and adverse drug events.<sup>[2]</sup>

Working environment, workload of prescriber, whether or not they were prescribing for their own patient, communication within their team, physical and mental well-being, lack of knowledge, inadequate training, low perceived importance of prescribing, a hierarchical

medical team, and an absence of self-awareness of errors are common risk factors for prescribing error.<sup>[3]</sup>

Every day a high missing legal or procedural requirements has been observed in teaching hospitals with prescription errors such as duplication, wrong strength, wrong dosage form, wrong route, and drug-drug interactions.

Errors in prescribing may be classified into two main types, errors of omission and errors of commission. Errors of omission are defined as prescriptions with essential information missing while errors of commission involve wrongly written information in the prescriptions.<sup>[4]</sup> which end up with several drug related problems such as over-dosage, under-dosage, drug interactions, drug allergy, and non-compliance.<sup>3</sup> Drug-drug interactions (DDIs) are one of the commonest causes of ADRs.<sup>[5]</sup>

Persons with limited health literacy skills are more likely to have chronic conditions and are less able to manage them effectively.<sup>[6]</sup>

Pharmacist interventional studies have promoted treatment effectiveness and increased adherence and more importantly reduced the potential harm from serious prescription and dispensing errors.<sup>[3]</sup>

A study showed that 99% of the 137 general practitioners surveyed agreed that pharmacist have a role to play in the screening of prescriptions for possible problems<sup>7</sup>. An educational intervention programme led by the practicing pharmacist was considered and applied by detecting level of errors before and after each intervention.<sup>[8]</sup>

Most pharmacists would probably agree that the screening of prescriptions is one of the professional responsibilities but the degree to which prescription screening is performed varies greatly among different drug-delivery systems and even among different pharmacists' practices.<sup>[7]</sup>

This study was conducted to determine the number and type of medication errors intervened by the clinical pharmacists at Out Patient Pharmacy Department.

## MATERIALS AND METHOD

### Study design and period

It is a Cross Sectional Interventional study conducted for six months (August 2017 to January 2018) at Outpatient General medicine department, Sri Venkateshwara Ramnarayana Ruia Government General Hospital, a 1200 bedded tertiary care teaching hospital in Tirupathi.

### Study subjects

Patients between age 15-80 years, irrespective of gender patients visiting outpatient pharmacy for receiving treatment. Prescription with errors were included in the study. Patients who are not willing to participate in the study, Patients below 15 years of age, Patients visiting other than general medicine department were excluded in the study.

### Study materials

Data was collected from outpatient prescription sheets and screened for any Medication errors.

### Study method

Patient's prescription along with dispensed medications were screened randomly for the prescribing and dispensing errors in patient counselling center at outpatient General medicine department. Details such as OP number, Age, Clinical Condition, Department, Drugs involved are observed and errors are identified. Identified errors are classified into Dispensing error and Prescribing error which is further sub categorized into Error of Omission and Error of Commission.

Those identified errors include Quantity to supply not specified, Dosage form not specified, Untreated indication, Wrong frequency, Drug use without indication, Drug-Drug interactions, Required quantity not supplied, Substitution in generic name, Required

drug not supplied, Dispensing incorrect drug, Duplication, Required strength not supplied, Dispensing drug in excess were collected.

Interventions were made for the errors collected by discussing with concerned Physician or Pharmacist such as Supply required drug, Withdraw excess drug, Supply required strength, Withdraw incorrect drug, Potential DDI's noticed and reported, Withdraw duplicated drug, Change in frequency, Supply required quantity, Withdraw unindicated drug. Based upon the type of intervention made severity of error was categorized as minor those that do not harm the patient and need monitoring; moderate those that can cause a temporary harm if used; major were those that can harm temporarily may be leading to hospitalization and resulting in permanent harm, near-death or death.

### Statistical Analysis

The collected data from the specially designed proforma were entered into Microsoft Excel 2016 to project the results.

## RESULTS

A total of 500 prescriptions were randomly collected, out of them 84 prescriptions were identified with Medication error. Among them 42 (50%) Males, 42 (50%) Females [Fig-1]. Prescribing errors were found to be 22 (26.7%), Dispensing errors were found to be 62 (73.8%) Among Prescribing errors 12 (54.4%) where Error of Omission, 10 (45.45%) where Error of Commission. Among Dispensing errors 20 (30.25%) where Error of Omission, 42 (67.74%) where Error of Commission [Fig-2].

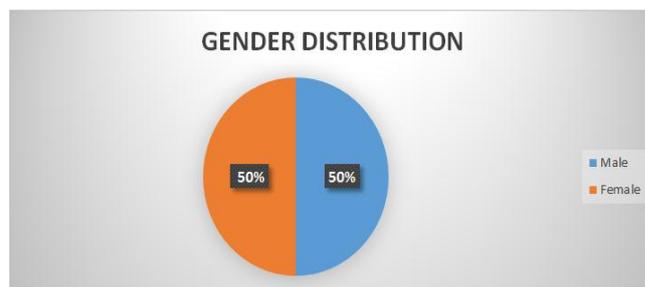


Fig-1: Gender wise distribution.

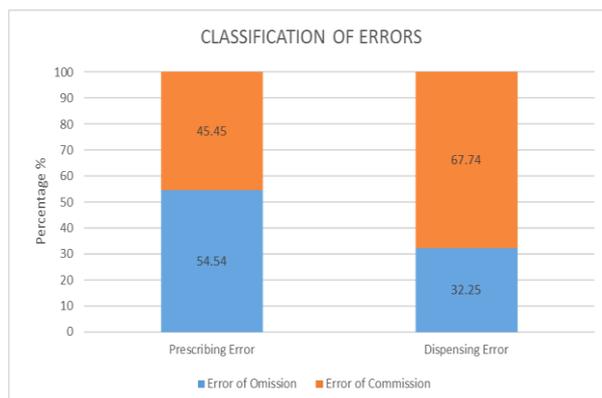


Fig-2: Classification of Errors.

**Table 1: Distribution of Prescribing Errors among Error of Omission.**

Prescribing Error (Error of Omission)	Number	Percentage (%)
Quantity to supply not specified	2	16.66
Untreated indication	10	83.33
<b>Total</b>	<b>12</b>	<b>100</b>

Table 1: indicates that majority of the Omission Errors are found to be 10(83.33%) Untreated indication followed by 2 (16.66%) Quantity to supply not specified.

**Table 2: Distribution of Prescribing Errors among Error of Commission.**

Prescribing Error (Error of Commission)	Number	Percentage (%)
Wrong frequency	2	20
Drug Interaction	4	40
Drug use without indication	2	20
Duplication	2	20
<b>Total</b>	<b>10</b>	<b>100</b>

**Table 2:** indicates that majority of the Commission Errors were 4 (40%) Drug Interactions, followed by 2(20%) Wrong Frequency, 2(20%) Drug use without indication, 2(20%) Duplication errors.

**Table 3: Distribution of Dispensing Errors among Error of Omission.**

Dispensing Error (Error of Omission)	Number	Percentage (%)
Required quantity not supplied	8	40
Required drug not supplied	8	40
Required strength not supplied	4	20
<b>Total</b>	<b>20</b>	<b>100</b>

Table 3: indicates that majority of the Error of Omission were required drug not supplied 8 (40%), followed by required quantity not supplied 8 (40%), required strength not supplied 4 (20%).

**Table 4: Distribution of Dispensing Errors among Error of Commission.**

Dispensing Error (Error of Commission)	Number	Percentage (%)
Dispensing incorrect drug	12	28.57
Dispensing of drug in excess	22	52.38
Substitution in generic name	6	14.28
Duplication	2	4.76
<b>Total</b>	<b>42</b>	<b>100</b>

**Table 4:** indicates that majority of the Error of Commission were 22 (52.38%) Dispensing of drug in excess followed by 12 (28.57%) Dispensing incorrect drug, 6 (14.28%) Substitution in generic name, 2 (4.76%) Duplication error.

Interventions made were 26 (30.95%) Supply required drug, followed by 22 (26.19%) Withdraw excess drug, 12(14.28%) Withdraw incorrect drug, 8 (9.52%) Supply required quantity, 4 (4.76%) Potential DDI's were noticed and reported, 4(4.76%) Supply required strength, 4 (4.76%) Withdraw duplicated drug, 2 (2.38%) Change in frequency, 2 (2.38%) Withdraw unindicated drug [Fig-3].

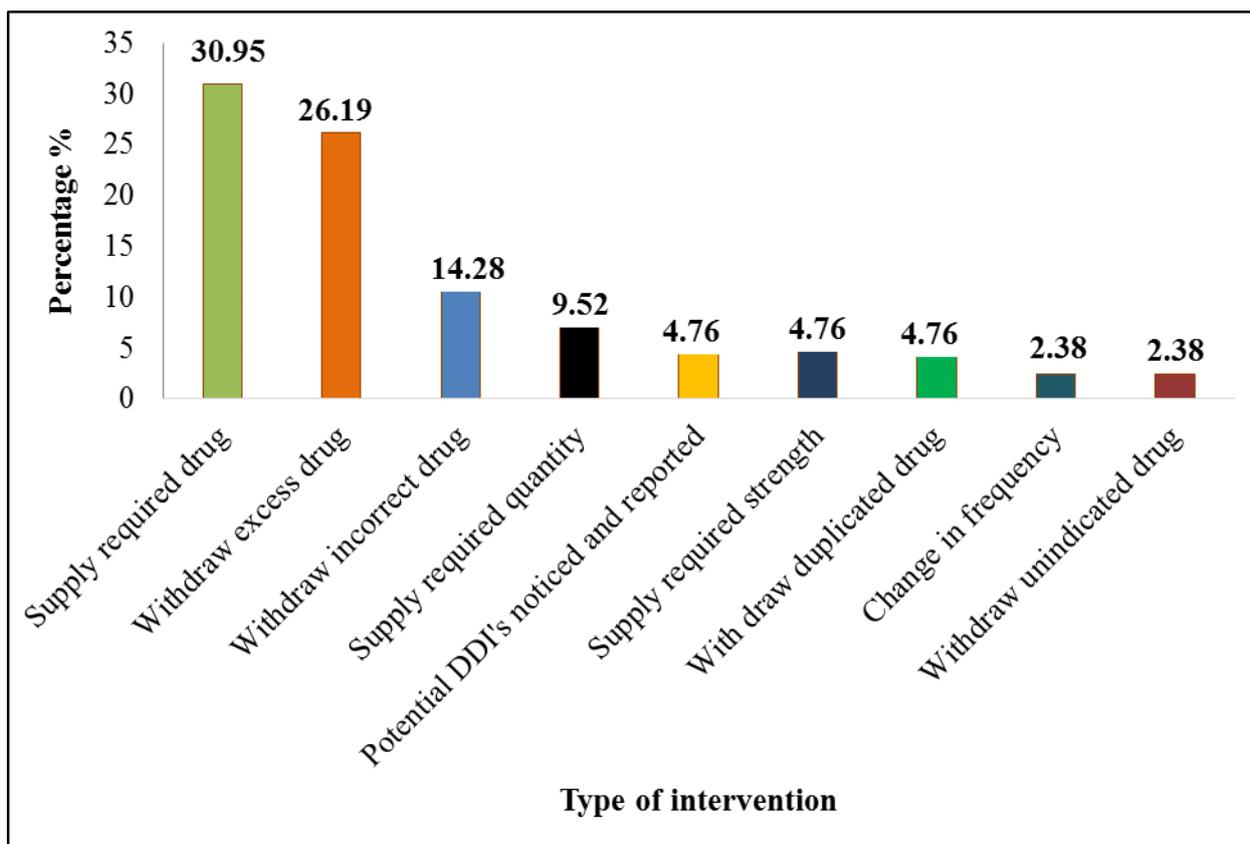


Fig-3: Type of intervention.

Out of 84 Interventions 74 (88.09%) were accepted and 10 (11.9%) were rejected. 22 Interventions were made with Physician of which 18 (81.81%) accepted and 4 (18.18%) rejected. 62 Interventions were made with Pharmacist of which 56 (90.32%) accepted and 6 (9.67%) rejected.

Severity of error based on interventions made, 48 (56.94%) were found to be Minor followed by 28 (33.33%) Moderate and 8 (9.52%) Major.

## DISCUSSION

The overall percentage of medication errors observed in our study is 11.3% whereas in study conducted by Reddy P et.al the incidence of medication errors was found to be 66.32%.<sup>[8]</sup>

### Error of Omission

Untreated Indication 83.33% was found to be highest among the Prescribing errors, these errors are due to increased workload, poor physician-patient counseling, and lack of involvement of pharmacist in treatment plan, inadequate supervision and monitoring may account for these errors in our context.<sup>[3]</sup>

Due to unavailability and confusions among the strengths, 20% Required Strength not supplied, 40% Required Drug not Supplied and 40% Required Quantity not supplied were the commonly occurred among dispensing errors.

16.6% Quantity to Supply is not Specified for some of the medications (antacids, analgesics) in comparison to Kuan Mun et al. study where their results viewed Quantity to Supply not Specified was 5.8%.<sup>[7]</sup>

### Error of commission

An error of commission occurs when a doctor or another medical professional deviates from the normal treatment practice and routine and makes a mistake, resulting in harm to a patient.

52.38% Dispensing of drug in excess, 28.57% Dispensing of incorrect drug was found to be highest among the Dispensing errors, these errors are due to increased workload, inadequate supervision and monitoring may account for these errors in our context.

Due to unavailability and confusions among the dosage forms 20% Duplication errors has occurred in this context. 14.28% Substitution in Generic name has been done due to unavailability of the prescribed drug. For example: Tablet Chlorpheniramine Maleate was dispensed instead of Tablet Cetirizine.

20% Drugs Prescribed Without Indications were anti-emetics in comparison to Kuan Mun Ni et.al study where their results viewed 10.2% Drug Prescribed Without Indications were analgesics. Although many of these drugs may be given on "as required" basis, the prescriber is still the best judge on the total quantity

supplied to be based on the patient's medical requirement.<sup>[7]</sup>

A total of 40% drug-drug interactions were identified, according to Kuan Mun Ni *et al.* study results viewed 4.41% drug-drug interactions, most of the consequences of interactions could be overcome with careful monitoring of the patients. Few examples of drug interactions identified in this study include drug interaction between Aspirin, Clopidogrel leading to unusual bleeding. The percentage of Drug-Drug interactions is due to lack of physician knowledge about drug pharmacokinetics and pharmacodynamic properties. Drug interaction is the major factor that might cause ADR, Therapeutic failure and drug related harm to the patients, as drug interactions can affect patient's clinical outcome. The aim of reporting such drug-drug interactions is to bring awareness to the health care professionals so that appropriate precautions would be observed to minimize any adverse consequences.<sup>[7,9]</sup>

Among the interventions made 11% were rejected and 88.09% were accepted. These results are better than the results of a Hussain Abdullah *et al.* research study 82% of the interventions were accepted.<sup>[1]</sup>

Some of the interventions were rejected because of drugs unavailability and based on patient's clinical condition some drugs must be prescribed and administered even though errors are found.

Our interventions showed that the majority of the errors 56.94% were categorized as minorly significant having no potential to cause morbidity or mortality whereas, 33.33% interventions were moderately significant and 9.52% were majorly significant. These results were similar to the Al Rahbi *et al.* study 73.1% minorly significant followed by 19.4% moderately significant and 7.5% minorly significant. Seriousness of consequences caused by the intervened medication errors was categorized as minor were those that do not harm the patient and need monitoring; moderate were those that can cause a temporary harm if used; major were those that can harm temporarily may be leading to hospitalization, resulting in permanent harm, near-death or death.<sup>[1,10]</sup>

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#### DECLARATIONS

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**Conflict of interest:** No.

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