



ROLE OF PHARMACIST IN PREVENTION OF MEDICATION ERRORS IN HOSPITALS AND COMMUNITY SETTINGS

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ABSTRACT

Background: Medication error is currently one of the major public health issues worldwide. This will lead to patient non-compliance towards therapy due to adverse drug reactions. The study aims to evaluate the most commonly occurring medication errors in hospital and community settings and role of pharmacist for the prevention of these daily occurring medication errors. **Methods:** A cross-sectional study design was adopted using convenient sampling technique, during the period June-2017 to August-2017. A sample size of 150 pharmacists was taken and data was collected from hospitals and chain pharmacies of Lahore Pakistan. Pharmacists working in hospital and community

settings were included in study. Data collection form was designed and filled during face to face interviews with pharmacists. **Results:** The results showed that the most common medication errors were during the ordering and prescription stage (35%). Medication errors during transcription, dispensing and at administration were 30%, 15% and 20% respectively. 10% pharmacists observed the cases of untreated indications. 20% of improper drug selection, 30% of sub therapeutic dosage, 33% of over dosage and 70% therapeutic duplication in prescriptions. Pharmacists observed that 18% medical problems are due to adverse drug reactions, 30% medication errors reported in daily prescriptions, 40% pharmacist had collaboration with physician and other health care providers. 9% pharmacist did interventions to reduce incidence of medication errors, of which 17% were accepted by physicians and patients. **Conclusion:** The role of hospital and community pharmacist was effective in recognizing, designing and implementing tailored interventions for reduction of medication errors.

KEYWORDS: Medication Errors, Pharmacist, Prescription, Transcription, Untreated Indications, Therapeutic Duplication.

INTRODUCTION

Medication error is any avertable event that may cause or lead to inappropriate medication use or patient harm, while the medication is in the control of the health care proficient, patient, or consumer. Such events may be related to professional practice e.g. prescribing; order communication; product labeling, packaging and nomenclature; compounding; dispensing; distribution; administration; education; monitoring; and use.^[1] A medication error is simply divergence of medication dose from the physician's order or direction.^[2]

Most common causes of medication errors include illegible handwriting, improper transcription, Inaccurate dosage calculation, Incompetently trained personnel, inappropriate abbreviations used in prescribing, labeling errors, excessive workload and medication unavailability.^[3] Medication errors have important repercussions for patient safety, and their identification is a main target in improving clinical practice errors. Error detection is the first decisive step. The major techniques for detecting medication errors are chart review, computerized monitoring, incident reporting, and patient monitoring.^[4]

Medication Errors in elderly patients is most commonly due to prescribing errors.^[5] Prescribing and drug administration appears to be associated with the greatest number of medication errors, whether harm is caused or not.^[6-7] Educational, operational, and risk-management activities should include efforts directed at reducing the risk to patients from prescribing errors.^[8] Leape and co-workers found that 56% of the cases detected were due to prescription errors and 44% involved delivery and administration. 66% prescribing errors reduction reported by Leape et al after a clinical pharmacist was assigned to round with a physician team in a medical ICU.^[9]

Prescribers need to pay more attention to drug dosing. Medication errors suggest that dosing errors are probably the most common type of error in the pediatric patient.^[10] Studies in pediatric populations have generally found higher rates of medication errors primarily due to incorrect calculation of doses.^[11] The incidence of wrong drug doses was 3.4% of the total number of prescriptions, 29% of the wrong prescribed drug doses were overdosed, while 71% were under dosed. Most of the errors connected with drug dosing relating to antibiotics.

Adverse drug reactions are responsible for medication errors Bates et al. reported a rate of adverse drug events of 6.5 per 100 admissions with 27% determined to have been preventable, or 1.75 preventable events per 100 admissions.^[12] Gandhi et al. reported an overall rate of adverse drug events of 27 per 100 patients during a 3 month study period.^[13]

In Dutch hospital setting therapeutic duplication have estimated from a few percent to up to 70%. Therapeutic duplication in non steroid anti-inflammatory drugs (NSAIDs) e.g. Diclofenac, ketoprofen and indomethacin were observed). Calcium channel blockers were also simultaneously prescribed e.g. verapamil nifedipine. Kistner et al. conducted a study that dispensing errors cause's major medication errors.^[14]

Some drugs are also associated with medication errors. Beta-blockers, theophyllines and anti-convulsants had the highest error frequencies in multidisciplinary pediatric intensive care units.^[15] Inaccurate medication history results in potential harm in more than one-third of patients taking more than four drugs.^[16] Most common causes were using abbreviations instead of full names of drugs, similar names of drugs and poor hand writing.^[17] MEs are among the most common medical errors, harming about 1.5 million people every year.^[18]

Failure Mode and Effect Analysis (FMEA) is a systematic process for identifying potential process failures before they occur, with the objective to eliminate them or minimize the risk associated with them.^[19] Healthcare Failure Mode Effect Analysis methodology is qualitative method that proactively identifies risks to patients and corrects medical errors before they occur.^[20]

The role of pharmacist in preventing medication errors are sorted in major areas i.e. hospital and community settings. Role of community pharmacists in medication safety are dispensing prescriptions medicines to the public, check dosage, ensure the medicines are correct and safe, coordinate with doctors about prescriptions, counseling and advising the community on their complaints, adverse effects and potential interactions of medicines.^[21]

Medications errors were also found due to increased workload by pharmacist. These can be prevented by reducing the work pressure by increasing the personnel proportional to the number and condition of patients.^[22] Medication errors occurred most often during ordering and administering.^[23]

Strategies to reduce medication errors are adherence to established policy, non-disciplinary approach to reporting of errors, adequate number and range of staff for the clinical goals of patient safety.^[24] Prescribers need to pay more attention to drug dosing.^[25] MEs occurs in 3.1% to 16.7% of hospitalized patients. One well-controlled study of medication errors points to pharmacy-dispensing gaffes in which a wrong drug or an incorrect dosage potency was prescribed.^[26] The objective of the study is to improve patient safety through determining and

reducing the major causes MEs after applying tailored preventive strategies and the attainment of the best therapeutic outcomes and upgrading the patient's quality of life by reducing MEs.

MATERIALS AND METHODS

A cross-sectional study design was adopted using convenient sampling technique, during the period of June-2017 to August-2017. 150 sample size was taken and study was carried out in six major hospitals (Services Hospital Lahore, Fatima Memorial Hospital Lahore, Jinnah Hospital Lahore, Ganga Ram Hospital Lahore, Doctors Hospital Lahore, Punjab Institute of Cardiology Lahore) and six major chain pharmacies (Branches of Clinix + Lahore, Branches of Fazal Din's Pharma Plus Lahore, Boots Pharmacy Lahore, Shifa Pharmacy Lahore, Farmacia Lahore, Doctor's Farmacia Lahore) of Lahore Pakistan. Questionnaire was designed and data was collected by face to face interview with pharmacists of hospitals and community settings.

Ethical Considerations

The study was conducted after obtaining approval from the Institute of Pharmacy Lahore College for Women University. The verbal consent was asked before data collection. The study participant's willingness or unwillingness was confirmed by their yes or no response. Confidentiality and privacy were insured for information collected from study participants by recording data anonymously.

RESULTS

Figure-1 shows 100% pharmacists have the knowledge about medication errors. None of the pharmacist said that they have no knowledge about medication errors. Pharmacists observe many cases of medication errors daily.

Figure-2 shows that 35% of errors occur at prescribing stage, 30% errors occur at transcribing stage, 15% errors occur at dispensing stage and 20% errors occur at administration stage. Errors at dispensing stage were due to poor handwriting and use of abbreviations. Dispensers read improperly and dispense wrong drugs.

Figure-3 shows 20% of pharmacists observed the improper drug selection in prescription of patients and 80% pharmacists did not observe improper drug selection. Figure-4 shows 30%

of pharmacists observed the sub-therapeutic dosage in prescriptions of patients and 70% did not observe sub-therapeutic dosage prescribed by pharmacist.

Figure-5 shows 33% of pharmacists observed the over dosage in prescriptions of patients and 67% pharmacists did not observe over dosage in prescriptions of patients. Figure-6 shows 70% of pharmacists observed therapeutic duplication in prescription of patients and 30% pharmacists did not observe therapeutic duplication.

Figure-7 shows that 30% of medication errors are daily reported by pharmacist. Figure-8 shows that 9% pharmacist did interventions to reduce incidence of medication errors and from which 17% of interventions were accepted by physicians and patients. 83% of physician and patients did not accept the interventions made by pharmacists.

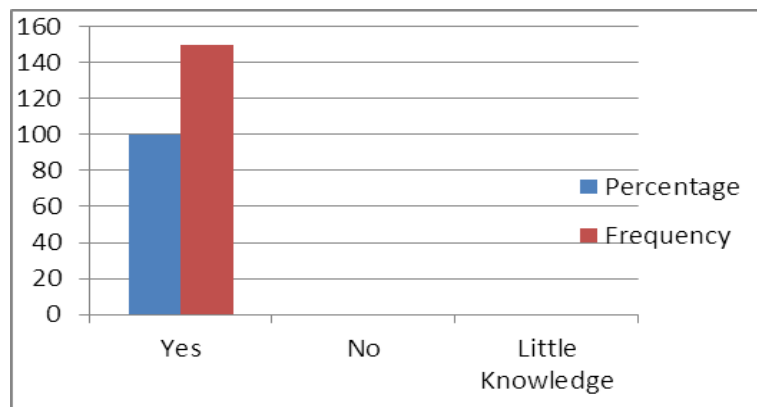


Figure-1: Knowledge about medication errors.

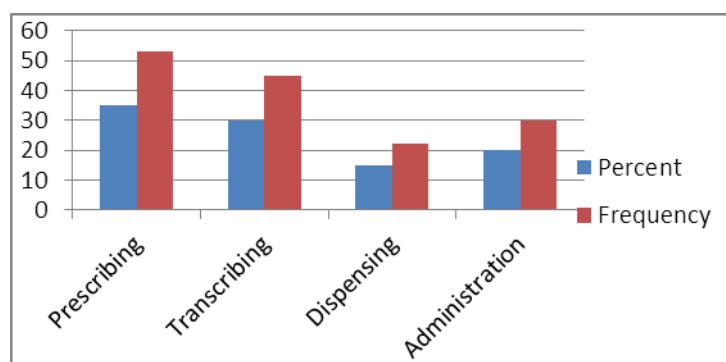


Figure-2: Commonly occurring medication errors.

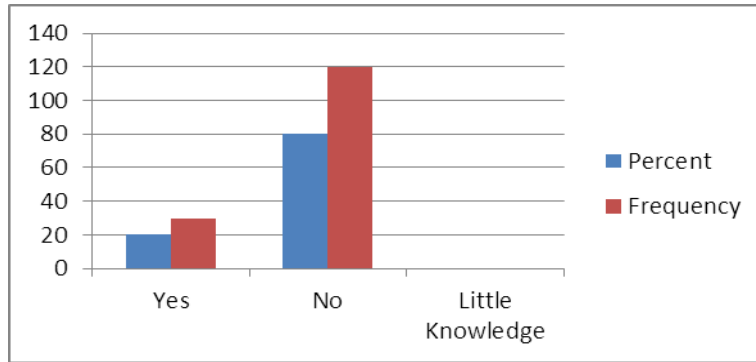


Figure-3: Improper drug selection.

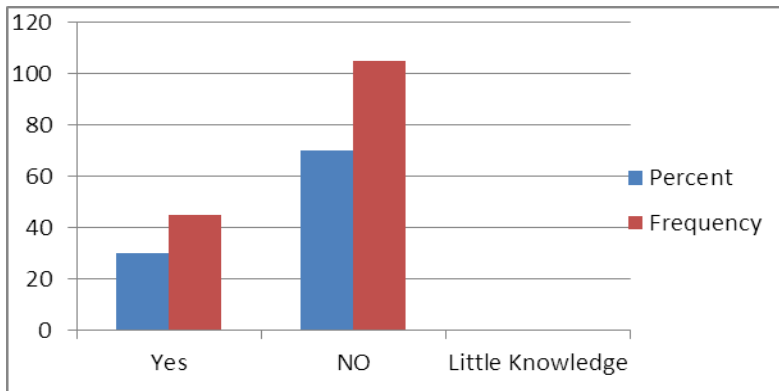


Figure-4: Sub Therapeutic Dosage.

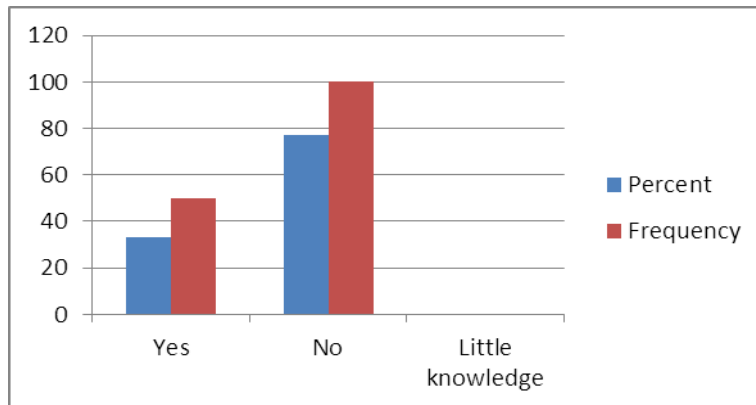


Figure-5: Over Dosage.

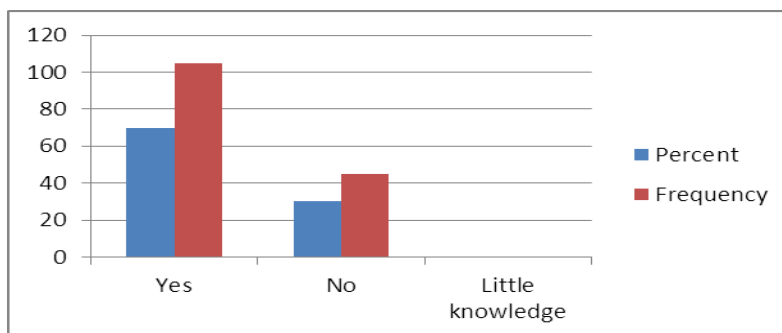


Figure-6: Therapeutic Duplication.

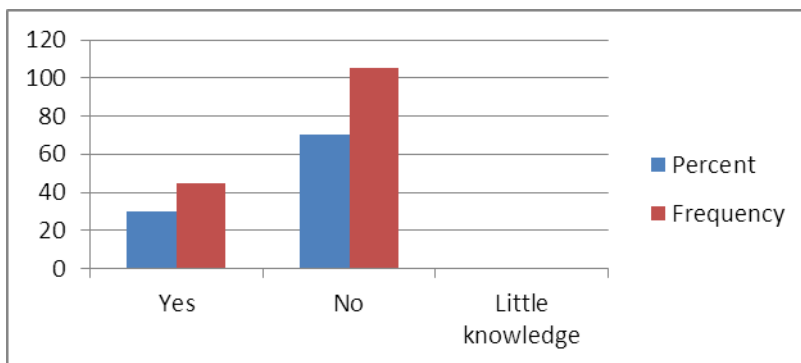


Figure-7: Reporting of medication errors.

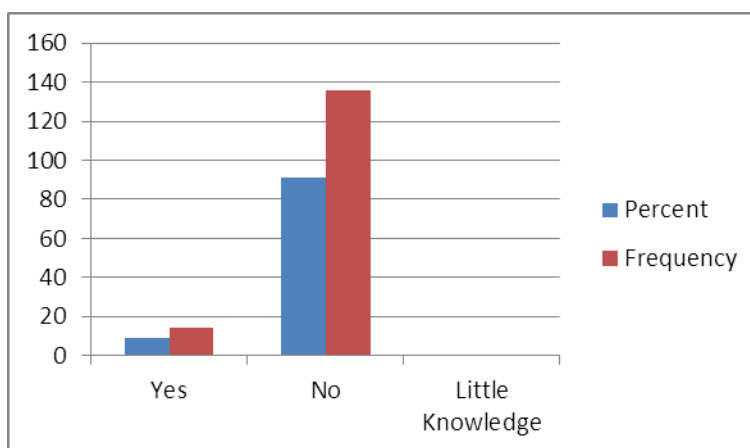


Figure-8: Intervention to reduce incidence of medication errors by pharmacist.

DISCUSSION

The study highlighted the attainment of the best therapeutic outcomes and upgrading the patient's quality of life by reducing medication errors. Medication errors have significant role in patient safety. These errors occur at all stages ordering, prescription, dispensing, and administration. Pharmacist have role in detection of these errors and thus encouraging a safe use.

In this study, medication errors were observed during the ordering and prescription stage which are in accordance with the studied of Leap and Co workers. These medication errors are reduced when clinical pharmacists have round with physicians.^[5-9] Transcription and dispensing errors also have major part in medication errors which relates to the studies of Kistner et al. Many Pharmacists noticed untreated indications, improper drug selection, and Sub therapeutic dosage.^[14]

Medication errors due to dosage observed in many prescriptions of pediatric population which also observed in previous studies.^[10] Prescribing process can generate many medication errors through faults in dose selection. Paediatric population majorly suffer from dosing

errors, sub therapeutic and overdoses prescribed by prescriber. These errors were also observed in past studies. Prescribers need more attention towards doing of pediatrics population and should prescribe according to body surface area of any child.^[11] Therapeutic duplication observed by pharmacist in prescriptions. Most of the physicians prescribe two or more drugs of same class, mostly therapeutic duplication observed in OTC products, antibiotics and non steroidal anti-inflammatory drugs (NSAIDs). These findings were similar to the results of Dutch hospital settings. To prevent duplications in therapy, providers may consider a multi-disciplinary approach to ensure medication reconciliation and patient education.^[14]

Adverse drug reactions also observed in daily prescriptions by pharmacists. Pharmacists should have collaboration with physician and other health care provider to reduce these MEs. These results are comparable to the research work done by Bates et al and Gandhi et al.^[12-13] ADRs report on daily bases. Every hospital have adverse drug reactions reporting form for ADRs reporting. Pharmacist does intervention to reduce incidence of medication errors but there is low rate of acceptance of these interventions by other health care providers and in most of the cases patient also failed to receive the drug or any interventions by pharmacist.

Most commonly medication errors observed due to poor handwriting and use of abbreviations. Dispensers read improperly and dispense wrong medications. Insufficient knowledge and incomplete information about clinical characteristics and past medical history of individual patients result in prescribing faults, including the use of potentially inappropriate medications. These errors were also commonly occurring in previous studies which are parallel to current study.^[17]

Transcription error is due to data entry error that is commonly made by the human operators. Although rates of dispensing errors are generally low. Pharmacists should intensify their checking of prescriptions to reduce prescription errors and should realize strategies to communicate adequately with patients, in order to prevent administration errors. In administration stage, errors of omission mostly observed along with incorrect administration technique.^[24]

There is need of pharmacist to play role in counseling and educating the patients as well as monitoring prescription and collaboration with health care provider to reduce medication errors. To solve problem of medication error is the responsibility of every health care practitioner. However, pharmacist must understand the unique role in detection and prevention of

errors. They have to develop understanding and patient compliance with prescriptions and over the counter medications.

CONCLUSION

Error reporting and cause analysis are important tools to identify the major causes of MEs. Medication error reporting systems should be improved by removing barriers and by clarifying the importance and the role of health care professionals. Educational and training programs on drug therapy are required for medical/paramedical students, drug prescribers (doctors) and nurses (administering drugs) to condense drug errors and to improve patient safety. An appropriate functioning national standardized system for MEs detection and reporting using an amalgamated terminology all over the country is necessary to allow for better knowledge sharing and practice change.

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