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ROLE OF CLINICAL PHARMACIST IN IDENTIFICATION OF MEDICATION ERRORS IN A HOSPITAL

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ABSTRACT

Medication errors can occur at any stage of the treatment process, from prescribing to administration. It raises healthcare costs, and reduces patients' quality of life. **Objective**: Identification of the medication errors and analyze the severity of medication error according to NCCMERP index. **Methods:** A Prospective observational study was conducted over a period of 12 months in a hospital. Patients admitted to the Depts. of Ophthalmology, ENT, Pulmonology, and Gen medicine, were selected randomly by considering the study criteria. The data collected were analyzed for Identifying Medication errors such as Prescribing errors, Administration errors, Dispensing errors.

Results: A total of 1200 In-patients prescriptions were collected during study period. Out of1200 In-patients prescriptions 372(31%) had errors and 828(69%) without errors. A total of 426 MEs were identified in 372 In-patients prescriptions**.** Among 426 MEs, Prescription centered MEs were 322(76%) followed by Administration centered MEs74 (17%) and Dispensing centered MEs were 30(7%). The NCCMERP index was used to determine the degree of harm caused by the medication errors. Among 426 MEs, Category- A (No Error) were found in 140(32.86%), Category-B (Error No Harm) were130 (30.51%), Category-C (Error No Harm) were90 (21.12%), Category-D (Error No Harm) were 66(15.49%). **Conclusion:** The study results indicated that the medication errors are significant at study site which highlights the need of conducting the educational programs regarding medication

errors and its prevention strategies. A clinical pharmacist can be extremely helpful in identifying and preventing medication errors.

KEYWORDS: Medication errors, NCCMERP, Clinical pharmacist.

INTRODUCTION

Medication plays an important role in the health-care system when it is effectively utilize, contributing to significant improvements in outcomes. Due to their extensive use, medications, on the other hand, are one of the most common sources of errors and adverse consequences.[1]

Medication error (ME) can be defined as, Any preventable event that may cause or lead to inappropriate medication use or patient harm, while the medication is in the control of the health care professional, patient or consumer. It may occur at any time; from prescription to consumption of the medicines by the patient. An error is a disorder of intentional act, something incorrectly done through ignorance. Error arises when an action is anticipated but not performed.[2]

CLASSIFICATION OF MEDICATION ERRORS (MEs)

Medication Errors can be classified into 3 types

I. Prescription - Centered Medication Error.
II. Dispensing - Centered Medication Error.
III. Administration - Centered Medication Error

I. Prescription - Centered Medication Error: It can be divided into two parts: Errors in prescribing decision and Errors in prescription writing. Errors in prescribing decision (Prescribing Fault) may occur due to selection of the wrong drug, the wrong mode of administration, as well as the wrong frequency.[3]

Errors in prescription writing can be divided into two categories: omission errors and commission errors. Omission errors are defined as missing important information in prescriptions. Absence or partial specification of dosage form, strength, dose or dosing regimen, amount or duration of drug to be provided, unreadable prescriptions, and prescriptions that breach legal requirements are examples of omission errors. Errors of commission involve wrongly written information in the prescriptions. Errors of commission include wrong strength, wrong dosage form, drug-drug interactions and wrong drug name.

Omission errors may lead the pharmacist, physician, and patient to spend time as the pharmacist calls the physician to finalize the prescription. While errors of commission should be quickly identified and corrected, failing to do so might endanger the health of patients or at the very least damage the suggested treatment plan.[4]

II. Dispensing - Centered Medication Error

A dispensing centered medication error can be defined as an inconsistency between the dispensing of medication to the patient against medications prescribed.[5]

Dispensing errors commonly involve supply of the wrong drug, the wrong strength and the wrong form of medication.[6]

During the dispensing procedure, errors might occur during issuing of medication, labeling and Documentation.[7]

III. Administration Centered- Medication Error

Medication administration error (MAE) is one of the most prevalent types of medication errors, and it occurs when the medications given to the patient differ from the medications prescribed by the physician.[8]

Medication administration errors are more harmful to patients than any other stage of the medication uses process because they are administered to patients at the end.[9]

It is the leading cause of disability and mortality worldwide. It may also prolong patients' stays in hospitals, raising the expense of treatment for patients, and their families.[10]

ROLE OF CLINICAL PHARMACIST IN IDENTIFICATION AND PREVENTION MEDICATION ERRORS

Clinical Pharmacists, as an integral part of the health care team, have made a significant contribution to public health care delivery in response to rising global health demands. The World Health Organization (WHO) and the International Pharmaceutical Federation (FIP) have both stated unequivocally that pharmacists play an important role in rising health-care demands. The pharmacist's role has change to become more patient-centered as a result of the constantly expanding and complex range of medications available, as well as non-adherence to recommended dosages. The World Health Organization launched a worldwide safety challenge on medications overall safety with the goal of minimizing the harm caused by medication errors. Clinical pharmacists have a critical role in lowering MEs. It was found that

when a clinical pharmacist participated in a medical team round of ICU patients, more than 66% of errors due to ordering or prescription errors were reduced.[11]

METHODOLOGY

Objectives

- To identify the medication errors among the inpatients and to categorize.
- Analyze the severity of medication error according to NCCMERP.

Study procedure: A Prospective observational was carried out for a period of 12 months in a teaching hospital. During study periods 1200 Case sheets of In-patients were studied. Patients admitted to the Dept of Ophthalmology, ENT, Pulmonology, and Gen medicine, were selected randomly by considering the study criteria. The obtained data were examined to identify medication errors, including errors in prescribing, dispensing and administration. Each reported medication error was evaluated using the National Coordinating Council for Medication Error Reporting and Prevention (NCCMERP) recommended index for categorizing medication errors.

- The study does not require any investigations to be conducted on patients or other humans or animals.
- The Institutional review board Approval was obtained before conducting the study.

Study Criteria: Patients were enrolled into the study by considering study criteria.

Inclusion criteriab

1. Patients admitted to the Depts. of Ophthalmology, ENT, Pulmonology, and Gen medicine.
2. Patients who were willing to participate in the study.

Exclusion criteria

1. Patients who were not willing to participate in the study
2. Patients from Out Patient Department

RESULTS

Table 01: Gender wise distribution of In- Patients.

S.no	Gender	Total no of patients(n=1200)	Percentage (%)
1	Male	680	56.66%
2	Female	520	43.33%

A total of 1200 In-patients were enrolled in the study among them 680(56.66%) were male and 520(43.33%) were female**.**

Table 02: Total number of In-Patients prescriptions with and without errors.

Total number of In-patients prescriptions collected	Total number of In-patients prescriptions with errors	Total number of In-patients prescriptions without errors
1200	**372(31%)**	**828(69%)**

Out of 1200 In-patients prescriptions 372(31%) had errors and 828(69%) without errors.

Table 03: A total of 426 MEs were identified in 372 In-patients prescriptions.

Total number of In-patients prescriptions with errors	Total number of MEs in 372 In-patients prescriptions
372	**426**

A total of 426 MEs were identified in 372 In-patients prescriptions.

Table 04: Department wise distribution of prescription errors, dispensing errors and Administration errors.

Departments	No of errors(n=426)	Prescription errors	Dispensing errors	Administration errors
General Medicine	153	116	11	26
ENT	120	92	8	20
pulmonology	94	71	6	17
Ophthalmology	59	43	5	11
Total	**426**	**322**	**30**	**74**

Department wise distribution of MEs during the study shows that, Out of 153 errors From General Medicine department, 116(76%) prescription errors, 11(7%) dispensing errors, 26(17%) Administration errors were found. Out of 120 errors From ENT Department, 92(76%) prescription errors, 8(7%)dispensing errors, 20(17%) Administration errors were found. Out of 94errors From pulmonology Department, 71(76%) prescription errors, 6(7%) dispensing errors, 17(17%) Administration errors were found. Out of 59 errorsFrom Ophthalmology Department, 43(76%) prescription errors, 5(7%) dispensing errors, 11(17%) Administration errors were found.

Table 05: Prescription centered MEs (n=322).

Types of MEs(Errors in prescribing decision)	No of MEs (n=66)	Percentage (%)
Irrational prescribing	38	58%
Under dosage	10	15.15%
Over dosage	6	9%
Therapeutic duplication	12	18.18%

Prescription writing errors. **Errors of omission(n=200)**	**(n=256)**	
Dosage form not mentioned	32	16
Frequency not mentioned	24	12
Rout of administration not mentioned	22	11
Strength not mentioned	30	15
Duration/quantity not mentioned	61	30.5
Illegible prescription	31	15.5
Errors of commission (n=56)		
Wrong strength	22	39%
Wrong dosage form	28	50%
Incorrect drug	6	10%

On evaluation of Prescription centered MEs from the collected data, it was found that out of 66 errors in prescribing decision section, Irrational prescribing identified in 38(58%) of errors followed by Therapeutic duplication 12(18%), Under dosage 10(15%), Over dosage 6(9%) respectively. Errors of omission were 200 and Errors of commission were 56.among errors of omission the majority of errors were due to Duration/quantity not mentioned in 61(30.5%) followed by Dosage form not mentioned in 32(16%), Illegible prescription 31(15.5%), Strength not mentioned in 30(15%), Frequency not mentioned in 24(12%) and Rout of administration not mentioned in 22(11%). among 56 errors of commission errors regarding Wrong dosage form were 28(50%),Wrong strength 22(39%), followed by Incorrect drug 6(10%).

Table 06: Dispensing centered MEs (n=30).

Types of MEs	**No of MEs (n=30)**	**Percentage (%)**
Wrong medicine	**0**	**0**
Incorrect drug strength (if more than one strength was available).	**8**	**26.6%**
Incorrect dosage form	**8**	**26.6%**
Wrong quantity	**5**	**16.6%**
Omission (i.e. failure to dispense)	**9**	**30%**

Out of 426 MEs, 30 Dispensing centered MEs were identified. Among them error regarding Omission (i.e. failure to dispense) were 9(30%), incorrect dosage form and Incorrect drug strength 8 (26.6%), and wrong quantity5 (16.6%).

Table 07: Administration Centered- Medication Errors (n=74).

Types of MEs	**No of MEs (n=74)**	**Percentage (%)**
Incorrect dose/ strength	**7**	**9.4%**
Incorrect dosage form	**18**	**24.3%**
Incorrect time	**26**	**35.2%**

Incorrect route	**8**	**10.8%**
Incorrect drug	**6**	**8.1%**
Omission error(missed dose)	**9**	**12.2%**

Out of 426 MEs, 74 administration errors were identified. Among them error regarding incorrect time 26 (35.2%), incorrect dosage form18 (24.3%), omission error (missed dose) 9 (12.2%), incorrect route8 (10.8%), Incorrect dose/ strength7 (9.4%), incorrect drug6 (8.1%).

Table 08: Severity level assessment of medication errors according to NCC MERP scale.

Category	Level of severity	Description of category	Number of errors (n=426)	Percentage (%)
Category- A	No Error	Circumstances or event that has a capacity to cause error.	**140**	**32.86%**
Category-B	Error No Harm	Error occurred but didn't reach the patient	**130**	**30.51%**
Category-C	Error No Harm	An error occurred that reached the patient but did not cause any harm	**90**	**21.12%**
Category-D	Error No Harm	An error occurred that reached the patient and required monitoring to confirm that it resulted in no harm to the patient and /or required intervention to preclude harm	**66**	**15.49%**

Categorization of errors in our study was done according to NCCMERP Index for Categorizing Medication Errors. Among 426 MEs, Category- A (No Error) were found in 140 (32.86%), Category-B (Error No Harm) were130 (30.51%), Category-C (Error No Harm) were 90(21.12%), Category-D (Error No Harm) were 66(15.49%). Catagory- E,F,G,H and I were not identified.

DISCUSSION

Our study showed that out 426 medication errors, maximum number of Prescription centered MEs were identified 322(76%) followed by Administration centered MEs 74(17%) and Dispensing centered MEs were 30 (7%) **(Table 04)** where as similar study conducted by **Eisa Zaei *et al*[12]** that showed (52.33%) were prescribing errors, (41.66%) were administration errors, (4.66%) were monitoring errors and (1.33%) were dispensing errors. Under Prescription writing errors category, higher number of Errors of omission were identified then errors of commission. Errors of commission like Wrong strength, Wrong

dosage form, and incorrect drug name may produce harmful effects as medication available in different strength and dosage form. Out of 426 MEs, 74 administration errors were identified **(Table 07).** Categorization of errors in our study was done according to NCCMERP Index for assessing the severity of Medication Errors. Most of the errors in the study resulted in No Harm. No death was reported due to medication errors.

CONCLUSION

MEs have a considerable impact on the health-care system because they extend hospital stays, induce discomfort and disability, or increase mortality. Early detection will improve the therapeutic outcomes.The study results indicated that the medication errors are significant at study site which highlights the need of conducting the educational programs regarding medication errors and its prevention strategies.

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