



## RESEARCH ARTICLE

### **Identification and Documentation of various Medication Related Errors developed in Hospitalized Patients of a Tertiary Care Teaching Hospital**

Divya A<sup>\*1</sup>, Sohail M<sup>2</sup>, Ziauddin M<sup>3</sup>, Sushanta KD<sup>4</sup>, Vasudha Bakshi<sup>5</sup>

<sup>1</sup>Assistant Professor, Department of Pharm. D, Anurag Group of Institution-School of Pharmacy, Ghatkesar, Hyderabad -500088, Telangana State, India. <sup>2</sup>Chief Pharmacist, New Sunny Medical Centre LLC, Rolla Square Park, P.O. Box: 64684 Sharjah, United Arab Emirates. <sup>3</sup>Senior Clinical Pharmacist, Omega Hospitals, Road Number 12, Banjara Hills, Hyderabad- 500034, Telangana State, India.

<sup>4</sup>Associate Professor & Coordinator, Department of Pharm. D, CMR College of Pharmacy, Kandlakolya (V), Hyderabad – 501401 Telangana State, India. <sup>5</sup>Dean, Anurag Group of Institutions-School of Pharmacy, Ghatkesar, Hyderabad -500088, Telangana State, India.

Manuscript No: IJPRS/V7/I4/00001, Received On: 09/10/2018, Accepted On: 15/10/2018

## **ABSTRACT**

Medication Related errors are serious problems in health care and can be a source of significant mortality and morbidity. Hence, reporting is encouraged to know the incidence rates which helps in preventing them. The aim of this study was to identify and document Medication Related errors in hospitalized patients at a tertiary care center and to review the updated case sheets on prescribed medications, regularly. A prospective observational case analysis study was conducted between November 2013 and April 2014 at Gandhi Hospital, Secunderabad. A structured data collection form was prepared to document the case details for identification and documentation of drug(s) involved in Medication Related errors. Collected data was summarized categorically and analyzed to conclude the final outcome. Total of 71 of Medication Related errors were observed and documented. Patients with maximum Medication Related errors were male (70.42%). The study reported maximum errors of untreated indication (18) followed by a wrong dose (14). Route of administration showing maximum errors was in case of tablets 28 errors followed by 19 errors due to injections. Seven Point Severity scale (0-6) showed maximum Medication Related errors found to be of level 1 and level 2 (21 errors each). The study showed Medication Related Errors occur frequently in inpatient medical wards. Clinical pharmacist's interventions can effectively prevent these errors by identification and documentation at the early stage. This indicates the need for a continuous educational program to healthcare professionals on drug therapy problems which will help for better patient safety.

## **KEYWORDS**

Medication Related error (MRE), Documentation, Identification

### **\*Address for Correspondence:**

**Divya Amaravadi**

Assistant Professor,  
Department of Pharm. D,  
Anurag Group of Institution,  
Ghatkesar, Hyderabad-500088  
Telangana State,  
India.

## **INTRODUCTION**

Improving medication safety has been part of the professional attention of pharmacists for several decades, even though this has been a subject of public interest only recently. Medication errors often do not result in injury and are often associated with blame and punishments<sup>1</sup>. Physicians traditionally decide the medication to be used and then prescribe it

so that pharmacists and nursing staff implement their decisions. Thus, the prescription is documented that guides and influences other stages of the management process. Prescriptions have an important role in the occurrence and prevention of errors. Ambiguous, illegible or incomplete prescriptions, use of abbreviations, obscured writing and lack of a standardized medication nomenclature (brand name or generic) are factors that can add to medication errors<sup>2</sup>. According to the American Society of Health-System Pharmacists (ASHP) definition of Medication Related errors (MREs) includes prescribing, dispensing, medication administration and patient compliance errors. Medication error is not only clinically significant on many occasions; it has serious economic consequences like a longer hospital stay, additional treatment and malpractice litigation<sup>3</sup>. Approximately 1 in 10 patients are harmed by healthcare. In the ICUs on average patient exposed to 1.7 errors per day and medication errors account for 78% of serious medical errors<sup>4</sup>. Causes of medication errors include; incorrect diagnosis, prescribing errors, possible drug-drug interactions, dose miscalculations, incorrect drug administration and lack of patient education. Other factors that can also throw in are; job-related stress of healthcare professionals, improper training or education and sound-alike & look-alike medications<sup>5</sup>. With the increasing number of available drugs and drug users along with more complex drug regimens lead to additional side effects & drug interactions and complicates follow-up. MREs lead to substantial morbidity and mortality additionally leading to increased healthcare expenditure, which in turn affect both patients and society<sup>6</sup>. There are certain risk factors associated with MREs<sup>7</sup> and are listed as:

- Work shift (higher error rates typically occur during the day shift)
- Inexperienced and inadequately trained staff
- Medical service (e.g., special needs for certain patient populations, including geriatrics, pediatrics, and oncology)

- Increased number or quantity of medications per patient
- Environmental factors (lightening, noise, and frequent interruptions)
- Staff workload and fatigue
- Poor communication among health-care providers
- Dosage form (e.g., injectable drugs are associated with more serious errors)
- Type of distribution system (unit dose distribution is preferred; floor stock should be minimized)
- Improper drug storage
- The extent of measurements or calculations required
- Confusing drug product nomenclature
- Packaging, labeling and drug category
- Poor handwriting
- Verbal (orally communicated) orders
- Lack of effective policies and procedures
- Poorly functioning oversight committees.

Improved medication safety can be accomplished by optimizing the safety of the medication process, eliminating situational risk factors and providing strategies to both intercept errors and mitigate their consequences.

Several interventions have been shown to decrease medical error. These simple strategies are listed below:

Optimize the medication process: Medication standardization, computerized physician order entry (CPOE) and clinical decision support, barcode technology, computerized intravenous infusion devices, medication reconciliation.

Eliminate situational risk factors: Avoid excessive consecutive and cumulative working hours, minimize interruptions and distraction, trainee supervision and graduated responsibility.

Oversight and error interception: Adequate staffing, pharmacist participation, and incorporation of quality assurance into academic education.<sup>8</sup>

Therefore the Medication Related errors should be minimized as far as possible and nature should be identified so that effective systems can be implemented for prescribing, transcribing, dispensing and administering the medications<sup>9</sup>. Even though the literature reports a number of studies on identifying IV medication errors in various hospitals abroad, the data available on such situation in India are limited. This prompted the necessity of conducting this study. We aimed to identify and document Medication Related errors in the hospitalized patients at tertiary care super specialty hospital.

## MATERIALS AND METHOD

This prospective observational case series analysis study was conducted between November 2013 and April 2014 (6 months) in in-patient units of Gandhi Medical College and Hospital, Secunderabad. The study was conducted after obtaining the approval from the Institutional Ethical Committee, CMR College of Pharmacy, Hyderabad. Permission was also obtained from hospital authority and various department heads of Gandhi Hospital which is a well-known government medical institution for its various healthcare services & patient care in Telangana State and also surrounding states. Cases were included for the study based on certain inclusion criteria such as; cases admitted in in-patient departments of General Surgery, General Medicine, Gastroenterology, Pediatrics and Nephrology for both genders, of any age with a complete report including discharge summary and cases in which MREs were identified & also confirmed by attending doctors. Furthermore, cases of pregnant women, lactating mothers, terminally ill patients, outpatients and cases with incomplete information were excluded from the study. A total of 200 cases were observed/assessed during the study period.

### Study Procedure

In-patient case sheets of the study departments were selected after a thorough review on a daily basis. A structured data collection form was prepared to document the case details, which includes; patient demography, diagnosis & prescription drug details and criteria for identifying errors with its categorization & description of a drug(s) involved in errors. Complete detail of patients and medications were recorded through medication chart review. Collected case information was then summarized categorically and lastly analyzed to conclude the final outcome.

### Data handling and management

Cases were assigned a specific case code along with their initials and only this code was used while collecting relevant information. Patient name and other personal details were kept confidential. Strict privacy and confidentiality were maintained during data collection. Descriptive statistics was used such as frequency, percentage and mean.

## RESULTS AND DISCUSSION

A total of 200 cases were collected in a study period of 6 months and out of which 61 cases consisted of a total of 71 types of different Medication Related errors.

In our study, it was observed that out of 61 patients, males were 68.85% comprising of 70.42% MREs, followed by females 31.14% comprising MREs of 29.57% as in Table-1.

Table 1: Gender Wise Distributions of MRE's

| Gender | No. of Patients (N=61) | No. of Error | MREs Percentage (%) |
|--------|------------------------|--------------|---------------------|
| Male   | 42                     | 50           | 70.42               |
| Female | 19                     | 21           | 29.57               |

In our study, it was observed that more population in the hospital was of age group 18-59 years and they constituted the highest number of Medication Related errors of 63.38%, followed by more than 60 years

29.57% MREs and the least of 7.04% in age group less than 18 years, as in Table-2.

Table 2: Age Wise Distribution of MRE's

| Age group (yrs) | No. of patients | No. of errors | MREs Percentage (%) |
|-----------------|-----------------|---------------|---------------------|
| <18             | 4               | 5             | 7.04                |
| 18-59           | 40              | 45            | 63.38               |
| >60             | 17              | 21            | 29.57               |
| <b>Total</b>    | <b>61</b>       | <b>71</b>     |                     |

On assessing the ward-wise distribution of Medication Related errors, it was observed that General Medicine Ward constituted maximum MREs of 80.28%, owing to excessive number of patient inflow of various medical conditions, followed by Gastroenterology ward (9.85%), Pediatrics ward(7.04%) and Nephrology and General surgery ward comprising of 1.04% MREs each as in Table-3.

Table 3: Ward Wise Distribution of MRE'S

| Ward             | No. of Error | Percentage (%) |
|------------------|--------------|----------------|
| General Medicine | 57           | 80.28          |
| Gastroenterology | 7            | 9.85           |
| General Surgery  | 1            | 1.40           |
| Nephrology       | 1            | 1.40           |
| Pediatrics'      | 5            | 7.04           |
| <b>TOTAL</b>     | <b>71</b>    | <b>100</b>     |

In our study, Medication Related errors of different types were observed. The most prevalent type of error was untreated indication of (25.35%), followed by Wrong Dose (19.71%), and the failure to receive medication being (11.26%), which could be due to nurse not administering the dose on time, patient non-

compliance or patient unable to afford the medication as given in Table-4.

Table 4: Types and Frequency of MRE'S

| Types of MRE'S                   | No. of Errors |
|----------------------------------|---------------|
| Untreated Indication             | 18            |
| Failure to receive medication    | 8             |
| Wrong Dose                       | 14            |
| Omission Error                   | 5             |
| Duplication                      | 4             |
| Drug without Indication          | 3             |
| Misdiagnosis                     | 1             |
| Improper Route of Administration | 2             |
| Failure to follow direction      | 3             |
| Administration Error             | 2             |
| Prescribing Error                | 5             |
| Improper drug selection          | 3             |
| Incompatibility                  | 1             |
| Inappropriate duration           | 2             |
| <b>Total No. of Errors</b>       | <b>71</b>     |

The different types of dosage forms that are involved in the Medication Related error observed in our study. The most common route of administration caused the most number of errors which was Tablet (39.43%) followed by intravenous dosage form (26.76%) of Medication Related errors as in Table-5.



Table 5: Type of Dosage Forms Involved in MRE'S

| Drug Route                 | No. of Error |
|----------------------------|--------------|
| Tablet                     | 28           |
| Injection                  | 19           |
| Syrup                      | 3            |
| Capsule                    | 1            |
| Oral                       | 1            |
| Others                     | 19           |
| <b>Total No. of Errors</b> | <b>71</b>    |

Table-6 depicts the Seven Point Severity Scale along with the definition and various levels of severity along with the various MREs with respect to the specific level. From the observed errors, the severities were assessed on basis of Seven Level Severity Scale. Level 1 and Level 2 comprised of 21 (29.57%) Medication Related errors each, followed by level 4 (22.53%) and Level 3 (18.30%).

The findings of this study have provided an understanding of the process and importance of identification and documentation of Medication Related errors (MREs), in hospitalized patients. Hence, it was inferred that MREs may happen at any stage of patient care like prescribing, transcribing, dispensing, and administration. Spontaneous reports of errors or potential error situations may help identify failures and weaknesses in the medication system in an Institution. If the spontaneous reporting system is well-structured and adequately managed, it may gradually ensure the participation of all collaborators in an Institution<sup>10</sup>. From the 200 cases collected during the study period, the following interpretations were made from the observed data.

Out of the 200 cases, 61 (30.5%) of the cases showed 71 types of Medication Related errors.

In our study, we found that male is predominant

to female in developing MREs. This may be due to a lack of awareness about the disease in female and male dominating society which prohibit female to go for treatment purpose. Socio-economic burdens are also an important factor which limits female from treatment. This result was comparable to the study conducted by Akram Ahmed<sup>3</sup> which shows out of 202 patients, 130 (64.35%) were male patients and the rest were female.

In our study, we found that maximum patients fall into the age group of 18-59 years. Certain factors such as; improper diet, lack of exercise, chronic diseases and social habits lead to the exacerbation of condition mainly during this age group. A similar report has also been published by Sayali Pote<sup>9</sup> who reported that only 25 patients were below the age of 18 years out of 198 patients.

From our study, we found a total of 61 cases with 71 different MREs. From the documented errors; we found that most prevalent are Untreated Indication (18, 25.35%) & Wrong Dose (14, 19.71%). This data was comparable to the study done by Hossein Khalili<sup>11</sup> which indicates errors associated with Dosing Problem (44, 39.3%), Drug Choice Problem (44, 39.3%), Drug Use Problem (22, 19.7%).

In our study, we found that Level-1 & Level-2 errors are most frequent. Our study data was found to be Comparable with the results obtained from the study conducted by Camilla Haw<sup>12</sup> who demonstrates that Grade-I caused 255 errors (69.1%) due to doubtful or negligible importance, followed by Grade-II with 27 errors (7.3%) due to minor adverse effects or worsening of the condition.

From these observations, we can state that the types of medication preparation and administration errors occurrence vary with different studies and study sites, therefore, the results of our study cannot be generalized to other populations.

Due to the limited time period and only limited case observation, we cannot correlate the data for general comparison. Furthermore, the study can be extended for a longer period with more

Table 6: Seven Point Severity Scale

| Levels         | Definition  | No. of MREs | Percentage (%) |
|----------------|---|-------------|----------------|
| <b>Level 0</b> | No medication error occurred  | 0           | 0              |
| <b>Level 1</b> | An error occurred that did not result in patient harm.  | 21          | 29.57          |
| <b>Level 2</b> | An error occurred that resulted in the need for increased patient monitoring but no change in vital signs and no patient harm.  | 21          | 29.57          |
| <b>Level 3</b> | An error occurred that resulted in the need for increased patient monitoring with a change in vital signs but no ultimate patient harm, or any error that resulted in the need for increased laboratory monitoring. | 13          | 18.30          |
| <b>Level 4</b> | An error occurred that resulted in the need for treatment with another drug or an increased length of stay or that affected patient participation in an investigational drug study.                                 | 16          | 22.53          |
| <b>Level 5</b> | An error occurred that resulted in permanent patient harm.  | 0           | 0              |
| <b>Level 6</b> | An error occurred that resulted in patient death.   | 0           | 0              |
| <b>Total</b>   |   | <b>71</b>   | <b>100</b>     |

number of cases to review and find a definite answer.

## CONCLUSION

We have concluded from this study that, Medication Related errors are quite frequent in hospitalized patients. This situation may be improved by creating awareness among the healthcare professional to encourage them to prescribe rational drugs and also to increase the supervision by clinical pharmacist so as to improve better patient care outcome by constant monitoring and discussion with doctors to further strengthen the drug use.

## ACKNOWLEDGEMENTS

Authors convey their wholehearted regards to the medical and paramedical staffs of Gandhi

Hospital, who have constantly supported and provided valuable suggestions to complete this work.

## CONFLICT OF INTEREST

None declared

## SOURCE OF FUNDING

Nil

## REFERENCES

1. Krishna, D. R. (2004). Clinical Pharmacy Practice-Essential Concepts and Skills. *Indian Journal of Pharmaceutical Sciences*, 66(3), 368.
2. Gimenes, F. R. E., Marques, T. C., Teixeira, T. C. A., Mota, M. L. S., Silva, A. E. B. D.

- C., & Cassiani, S. H. D. B. (2011). Medication wrong-route administrations in relation to medical prescriptions. *Revista latino-americana de enfermagem*, 19(1), 11-17. <https://doi.org/10.1590/S0104-11692011000100003> , PMid:21412624
3. Ahmad, A., Patel, I., & Parimalakrishnan, S. (2013). Assessment of medication errors in among patients visiting community pharmacies in rural areas of Chidambaram, Tamilnadu at south India: A prospective study. *Int J Pharm*, 3(1), 53-58.
4. Farzi, S., Irajpour, A., Saghaei, M., & Ravaghi, H. (2017). Causes of medication errors in intensive care units from the perspective of healthcare professionals. *Journal of research in pharmacy practice*, 6(3), 158-165. <https://doi.org/10.4103/jrpp.JRPP.17.47> PMid:29026841 , PMCID:PMC5632936
5. Reddy, L. K. V., Modi, A. G., Chaudhary, B., Modi, V., Patel, M. (2009). Medication Errors – A Case Study. *Journal of the Academy of Hospital Administration*, 21, 1-5.
6. Ruths, S., Viktil, K. K., & Blix, H. S. (2007). Classification of drug-related problems. *Tidsskrift for den Norske laegeforening: tidsskrift for praktisk medicin, ny raekke*, 127(23), 3073-3076.
7. American Society of Health-System Pharmacists. (1993). ASHP guidelines on preventing medication errors in hospitals. *American Journal of Health-System Pharmacy*, 50(2), 305-314.
8. Tiwari, A., Kumar, N., Kothiyal, P. (2012). Clinical Review: Medication error prevention through prescription auditing. *Novel Science International Journal of Pharmaceutical Science*, 1(10), 686 -692.
9. Pote, S., Tiwari, P., & D'cruz, S. (2007). Medication prescribing errors in a public teaching hospital in India: A prospective study. *Pharmacy Practice (Internet)*, 5(1), 17-20. <https://doi.org/10.4321/S1886-36552007000100003>
10. Dalmolin, G. R. D. S., Rotta, E. T., & Goldim, J. R. (2013). Medication errors: classification of seriousness, type, and of medications involved in the reports from a University Teaching Hospital. *Brazilian Journal of Pharmaceutical Sciences*, 49(4), 793-802. <https://doi.org/10.1590/S1984-82502013000400019>
11. Khalili, H., Farsaei, S., Rezaee, H., & Dashti-Khavidaki, S. (2011). Role of clinical pharmacists' interventions in detection and prevention of medication errors in a medical ward. *International journal of clinical pharmacy*, 33(2), 281-284. <https://doi.org/10.1007/s11096-011-9494-1> , PMid:21394569
12. Haw, C., Stubbs, J., & Dickens, G. (2007). An observational study of medication administration errors in old-age psychiatric inpatients. *International Journal for Quality in Health Care*, 19(4), 210-216. <https://doi.org/10.1093/intqhc/mzm019> , PMid:17562662

## HOW TO CITE THIS ARTICLE

Divya, A., Sohail, M., Ziaunddin, M., Sushanta, K. D., Bakshi, V. (2018).  
Identification and Documentation of various Medication Related Errors  
developed in Hospitalized Patients of a Tertiary Care Teaching Hospital.  
*International Journal for Pharmaceutical Research Scholars*, 7(4), 1-9.



THIS PAGE IS INTENTIONALLY LEFT BLANK.

