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Identifying Medication Errors in a Tertiary Care Teaching Hospital: A Prospective Observational Study

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ABSTRACT

Background: Medication error is defined as 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 professional, patient and consumer. Medication errors may occur at any stage of the medication use process including ordering, transcription, dispensing, administering and monitoring. The pharmacist has a key role along with physicians, nurses, administrators to examine and improve health care system in order to ensure the patient safety.

Objective: The objective of the study is to assess the medication errors in a tertiary care hospital and to categorize them based on their nature and type.

Methodology: A prospective observational study was conducted over a period of 3 months in a tertiary care teaching hospital. This study was carried out among 240 inpatients, admitted in General Medicine department of the hospital, who were selected randomly. During the study, inpatients case records were reviewed, which includes patient's case history, diagnosis, medication order sheets, progress chart, laboratory investigations. The data collected were analyzed for identifying medication errors such as prescribing errors and administration errors. Each reported medication error was assessed using the National Coordinating Council for Medication Error Reporting and Prevention (NCCMERP) proposed index for categorizing medication errors.

Results: A total number of 240 inpatients were enrolled in the study, out of which 82 patients have developed medication errors. The overall percentage of observed medication error was 34.16%. In our study medication errors were found more in males (70.7%) than in the females (29.3%). Prescribing errors (62.19%) were the most frequently occurring type of error, which was followed by administration errors (37.8%). In our study, we found that medication errors were more with antibiotics (37) followed by NSAIDs (19). 96 prescriptions were found having drug interactions. Conclusion: This study concludes that the overall incidence of medication error was found to be 34.16%. Most of the medication errors are clinically significant and it can prevent by working together in a health care team.

Keywords: Medication Errors, Drug interactions, Patient Safety.

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INTRODUCTION:

Nearly everybody in the world takes medication at one time or another. Most of the time the medications are favorable or at least they root no harm but on occasion they do harm the person taking them.[1] Rational pharmacotherapy involves the appropriate use of medications for the patients to their clinical needs, in doses that meet their own individual requirements, for an adequate period of time and at the lowest cost to them and their community[2].Pharmaceutical care is the responsible provision of drug therapy for purpose of achieving definite outcomes that improve patients quality of life[3].The National Coordinating Council for Medication Error Reporting and Prevention (NCCMERP) has defined medication error as "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 professional, patient and consumer". The medication error increases morbidity, mortality, cost burden and decreases the patient's confidence in the health care systems[4, 5].Medication errors may occur at any stage of the medication use process including ordering, transcription, dispensing, administering and monitoring.[6] Factors that may contribute the increased risk of medication errors are those with serious health conditions, older patients, pediatrics, those taking multiple medications, those using high risk medicines and those being transferred between community and hospital care[2].Errors happen due to lack of knowledge, poor

performance and psychological lapses. The pharmacist has a key role along with physicians, nurses, administrators to examine and improve health care system in order to ensure the patient safety[1].The American Hospital Association lists some common types of medication problems such as incomplete patient information, miscommunication of drug orders, which can involve poor handwriting, confusion between drugs with similar names, misuse of zeros and decimal points, confusion of metric and other dosing units, inappropriate abbreviations, lack of appropriate labeling as a drug is prepared and repacked into smaller units, environmental factors such as lightening, heat, noise and interruptions that can distract health professionals from their medical tasks[4].When patients having intercurrent diseases receive multiple medications their chances of Drug Related Problems (DRPs) like drug interactions and adverse drug reactions tend to increase. Drug related problems include medication errors (involving an error in the process of prescribing, dispensing or administering a drug, whether there are adverse consequences or not) and adverse drug reactions[7].India alone records around 5.2 million injuries each year due to medical errors and adverse events of which one of the biggest contributions seems to arise from medication errors[8].

METHODOLOGY:

A prospective observational study was conducted over a period of 3 months in a tertiary care teaching hospital. This study was carried out among 240 in patients, admitted in General Medicine department of the hospital, who were selected randomly. It was approved by Institutional Ethics Committee, MNR Hospital, Fasalwadi, Sangareddy district, Telangana. During the study, inpatients case records were reviewed, which includes patient's case history, diagnosis, medication order sheets, progress chart, laboratory investigations. The description of the drugs such as name of the drug (generic/brand), its strength, dosage form, quantity, dose, frequency, route and direction of administration were included. The data collected will be analyzed for identifying medication errors such as prescribing errors and administration errors. Each prescription was checked twice (once for identifying any medication errors and then for possibility of drug-drug interactions). Each reported medication error was assessed using the National Coordinating Council for Medication Error Reporting and Prevention (NCCMERP) proposed index for category medication errors.

RESULTS:

A total number of 240 inpatients were enrolled in the study. Out of 240 patients, 82 patients have developed medication errors. The overall percentage of observed medication error was 34.16%. In the present study most of the patients were in the age group above 61 years followed by 46-60 years.

Table 1- Age wise distribution of the patients and medication errors

Age Group	Number of Patients(n=240)	Number of Patients with Medication Errors(n=82)
18-30	45 (18.75%)	8 (9.75%)
31-45	48 (20%)	16 (19.5%)
46-60	68 (28.33%)	27 (32.9%)
≥61	79 (32.9%)	31 (37.8%)

Table 2- Gender wise distribution of the patients and medication errors

Gender	Number of Patients(n=240)	Number of Patients with Medication errors(n=82)
Male	157 (65.4%)	58 (70.7%)
Female	83 (34.58%)	24 (29.3%)

In our study medication errors were found more in male patients (70.7%) than in the female patients (29.3%).

Table 3- Distribution of errors according to types

Types of Errors	Number of Errors(n=82)
Prescribing Error	51 (62.19%)
Administration Error	31 (37.8%)
Total	82

The total number of errors found to be was 82, among which prescribing errors (62.19%) were the most frequently occurring type of error, which was followed by administration errors (37.8%).

Table 4- Types of Prescribing Errors

Types of Prescription Errors	Number of Prescription Errors(n=51)
Writing Error	17(33.33%)
Dose/Strength Error	11(21.56%)
Frequency Error	11(21.56%)
Generic/Brand name Error	09(17.64%)
Prescribing a drug without informing patients its use and side effects	03(5.88%)

Among prescribing errors writing error (33.33%) was observed at larger extent, followed by dose/strength error and frequency error (21.56%) each, generic/brand name error (17.64%) respectively.

In administration errors, underlying cause of medication errors was omission error(45.16%) followed by wrong time(19.35%), drugs not prescribed but given(16.12%), wrong duration(9.67%), wrong frequency(6.45%) and wrong drug(3.22%).

Table 5- Types of Administration Errors

Types of Administration Errors	Number of Administration Errors(n=31)
Omission Error	14(45.16%)
Wrong Time	06(19.35%)
Drugs not prescribed but given	05(16.12%)
Wrong duration	03(9.67%)
Wrong frequency	02(6.45%)
Wrong drug	01(3.22%)

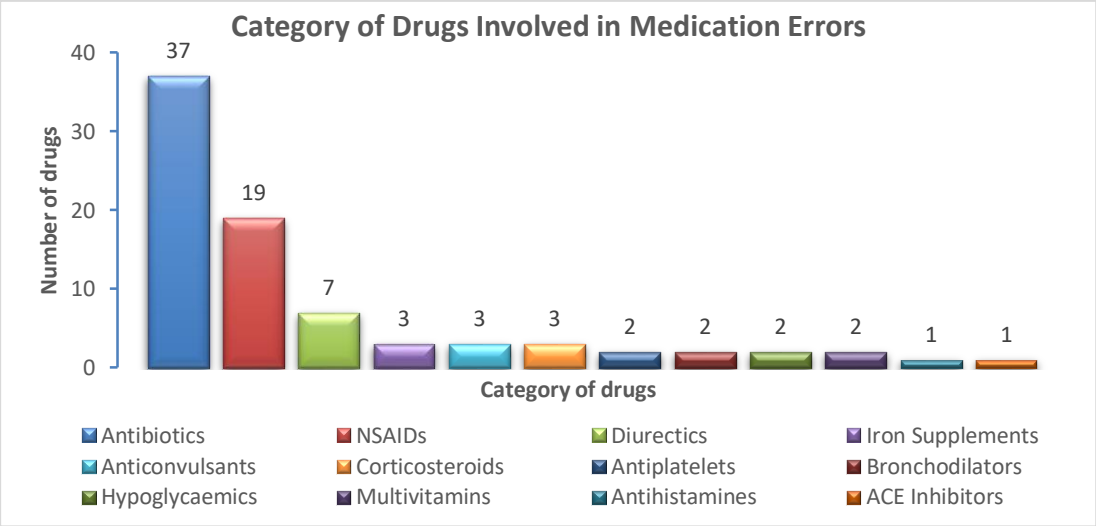

Figure no: 01 Category of Drugs Involved in Medication Errors

In our study, we found that medication errors was more with antibiotics(37) followed by NSAIDs(19), Diuretics(7), Iron supplements(3), Anticonvulsants(3), Corticosteroids(3), Antiplatelets (2), Bronchodilators(2), Hypoglycaemics (2), Multivitamins(2), Antihistamines(1), ACE Inhibitors(1) respectively.

Table 6-Identified interactions

Types of interactions	Number of interactions(n=96)
Major	17(17.7%)
Moderate	21(21.87%)
Minor	58(60.41%)

Out of 240 prescriptions considered in our study, 96 prescriptions were found having drug interactions. Majority of the drug interactions were Minor (60.41%) followed by Moderate(21.87%) and Major(17.7%).

DISCUSSION:

The overall percentage of medication errors observed in our study was 34.16% whereas in a study conducted by Reddy P[9] et.al the incidence of medication errors were found to be 66.32%. The age wise distribution of medication errors in this study shows that patients who aged ≥61 years experienced 37.8% medication errors. Similar results were carried out in a study done by Dilnasheen Sheikh[1] et.al where it was found as 40%. Majority (70.7%) of the male patients were found to have medication errors in their prescriptions followed by (29.3%) female patients, which was similar to the study done by Elna Babu[7] et.al. In the overall medication errors, prescribing errors constituted to a higher percent of 62.19% which is compared to the study conducted by Gabriella RD[10] et.al. Among different prescribing errors, writing error (33.33%), dose/strength error (21.56%), frequency error (21.56%) generic/brand name error (17.64%) were the most frequently occurring errors. The consequences of prescribing errors may lead to a reduce probability of effective treatment. In our study administration errors were found as 31.8% which was similar to the study done by Nrupal Patel[11] et.al. Among the different administration errors, omission error (45.16%) was the most frequently occurring error. In our study, we found that medication error was more with Antibiotics class of drugs (45.1%) followed by NSAIDs (23.17%), diuretics (8.53%). A study done by Kadir A[2] et.al also found that antibiotics class of drugs were more involved in medication errors. Out of 240 prescriptions included in our study, 96 prescriptions were found to have drug interactions among which minor drug interactions (60.41%) contributed to a higher extent followed by moderate type of drug interactions (21.87%) and major drug interactions (17.7%) respectively.

CONCLUSION:

This study concludes that the overall incidence of medication error was found to be 34.16%. Most of the medication errors are clinically significant and it can be prevented by working together in a health care team. Patient education is an important aspect of any program to prevent medication errors. The collection of error data and analysis on the health care delivery process will minimize the risk errors and improve patient safety. Clinical pharmacist can play an important role in prevention of these errors by working with the health care professionals which is highly considerable.

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CONFLICT OF INTEREST:

The authors declares no conflicts of interest.

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