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To Study the Medication Errors and Its Outcome in Geriatric Patients in a Tertiary Care Hospital



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ABSTRACT

A prospective observational study was carried out for a period of 6 months in a 450 bedded tertiary care hospital. A total of 100 geriatric cases were collected from the selected departments. The aim was to study the medication errors and its outcome in geriatric patients in a tertiary care hospital. Objectives were to assess the incidence of different types of medication error, to highlight the sources of recurrent errors, to assess the outcomes of medication error and to institute changes in practice to prevent their recurrence. On analyzing the data, it was found that 81% were aged in group >65-80 years and 19% were above 80 years. Majority of the cases that is 69% had medication errors and 31% were free of errors. Out of the total errors, 51% were prescription errors. 6 out of 69 errors were found to be serious. About 67% errors were physician induced followed by 27% nurse induced and 6% patient induced. The study found that 69% of the collected cases had medication error. Prescription error was found to be the most common error in all the departments. Only minority of errors were serious. We conclude that implementation of strict check over the medication use practice and also providing appropriate patient counselling will help to reduce medication errors thereby improving the quality and outcome of the healthcare provided.

INTRODUCTION

DEFINITION

A medication is a product that contains a compound with proven biological effects, plus excipients or excipients only; the active compound is usually a drug or prodrug, but may be a cellular element.(1)

An error is ‘something incorrectly done through ignorance or inadvertence; a mistake, e.g. in calculation, judgement, speech, writing, action, etc.’ or ‘a failure to complete a planned action as intended, or the use of an incorrect plan of action to achieve a given aim’. A medication error can be defined as ‘a failure in the treatment process that leads to, or has the potential to lead to, harm to the patient.(2) The use of the term ‘failure’ signifies that the process has fallen below some attainable standard. The ‘treatment process’ includes treatment for symptoms or their causes or investigation or prevention of disease or physiological changes. ‘Harm’ in the definition also implies ‘lack of benefit’, a form of treatment failure.(3)(4)

EPIDEMIOLOGY

The overall incidence of drug reactions in geriatric patients is estimated to be at least twice that in younger population. Despite that, there is deficiency of geriatric specialists among health care providers. In developed countries, elderly use at least three prescribed medications concurrently.(5) In developing countries, 85–90% of elderly use at least one medication daily. It has also been estimated that 30% of hospital admission in elderly patients are due to drug-related problems.(6) In the US, 30 percent of all medications are prescribed for people over the age of 65. An Institute of Medicine study identified \$21 billion in annual US healthcare spending caused by medication errors. Outpatient preventable medication errors cost \$4.2 billion per year.(7)

TYPES OF MEDICATION ERROR

The American Society of Hospital Pharmacists (ASHP) have classified errors into eleven types.

Prescribing error

A prescribing error occurs at the time a prescriber orders a drug for a specific patient. Error may include the selection of an incorrect dose, dosage form, route of administration, length of therapy or number of doses.(8)

Omission error

Failure to administer an ordered dose to a patient in a hospital, nursing home, or other facility before the next scheduled dose is considered as an omission error. Omission is not an error if there is any medical reason. When patient cannot take anything by mouth (NPO) prior to a procedure or patient refuses to take them.(9,10)

Improper dose error

It occurs when a patient is given a dose that is greater (extra dose error) or less than the prescribed dose. Cause: delay in documenting a dose or absence of documentation inaccurate measurement of an oral liquid is also an improper dose error. Excluded from this category are:

- (i) Doses that cannot be accurately measured
- (ii) or not specified as in topical application.
- (iii) Metric conversions are excluded as well.(11)

Unauthorized drug error

Administration of a medication to a patient without proper authorization by the prescribers categorized as an unauthorized drug error. It includes a medication for one patient given mistakenly to another patient, nurse giving a medication without a physician order, sharing of prescription, refilling a prescription that has no refills remaining without authorization from the physician, administering medication on the basis of specific patient parameters by nurses may be wrong, administration of medications outside the established guidelines.(12,13)

Deteriorated drug error

Medications that are dispensed or administered beyond their expiration date may have lost potency or less effective or ineffective. Refrigerated drugs stored at room temperature may

decompose to the point where efficacy is less than optimal. So, monitoring expiration date of product and storage of products are very important.(14)

Wrong time error

Medications that are dispensed or administered beyond their expiration date may have lost potency or less effective or ineffective. Refrigerated drugs stored at room temperature may decompose to the point where efficacy is less than optimal. So, monitoring expiration date of product and storage of products are very important.(15)

Wrong dosage form error

Doses administered or dispensed in a different form from that ordered by the prescriber are classified as wrong dosage form errors. Depending on the state law and health care facility guidelines, dosage forms changes may be acceptable to accommodate particular patient needs. For example: Dispensing a liquid formulation without specific prescription to a patient who has difficulty swallowing tablets might be an acceptable dosage form change.(17)

Wrong drug preparation error

Drugs requiring reconstitution, dilution or special preparation prior to dispensing or administration of drug. But, fail to do such type of procedure leads to wrong drug preparation error. Using a wrong base product when compounding an ointment is another.

Wrong drug administration technique error

Doses that are administered using an inappropriate procedure or incorrect technique are categorized as wrong administration technique errors. A subcutaneous injection that is given too deep. An I.V drug that is allowed to infuse via gravity instead of using an I.V pump. Instilling the eye drops in the wrong eye is another example.(18,19)

Monitoring error

Monitoring errors result from inadequate drug therapy review. Prescribing an anti-hypertensive agent which lowers blood pressure, and failing to check blood pressure.

Compliance error

Medication errors are committed by patients when they fail to adhere to a prescribed drug regimen.(20)

METHODOLOGY

STUDY DESIGN

A prospective study was carried out.

STUDY LOCATION

The study was conducted in 5 departments of a 450 bedded tertiary care teaching hospital.

STUDY DURATION

The study was conducted over a period of 6 months.

STUDY POPULATION

100 patients were selected from the departments except OP, OBG, Pediatrics, Psychiatry.

STUDY TOOLS

Data Entry Form, Medication Error Reporting Form

STUDY METHOD

• LITERATURE SURVEY

A computerized and manual search was conducted to identify relevant studies for the evaluation of cases to screen for medication errors. Literatures which support the study were collected and properly reviewed for conducting the study.

• DATA COLLECTION

A data entry form was specially designed for collecting patient details relevant for the study. Data including age, gender, comorbid conditions, current diagnosis, drug therapy, lab investigations, type of error, severity, outcome of error, were recorded in the data entry form.

• EVALUATION OF CASES

All the cases collected from the selected departments were evaluated for patient demographics, treatment details and medication errors.

• REPORT SUBMISSION

The results obtained from the study were evaluated and made as a report.

STUDY APPROVAL

The protocol of the study submitted to Institutional Human Ethics Committee of hospital (IHEC, SJH). The protocol was approved by the committee with approval number SJPCEC/P25/PP/2016/031 and hospital approval number SJCP/DIR/A.10/2018-2019.

STUDY CRITERIA

Inclusion criteria:

o All geriatric patients (above ≥ 65 years) in the IP department of General Medicine, Orthopedics, Cardiology, Surgery, Neurology.

Exclusion criteria:

o Patients in the OP department o Patients in the IP department of OBG, Pediatrics, Psychiatry.

RESULTS

This study aimed to find the different medication errors that occurs in geriatric patient. A total of 100 patients were included in the study and their demographic characteristics, length of stay, comorbidities, types of errors, severity of errors and persons involved in error were analyzed.

1. DISTRIBUTION BASED ON AGE

The geriatric patients included in the study were grouped according to their age into 2 categories for analyzing as table 1. The majority of the patients (81%) comes under the category of >65 -80. About 19% were above 80 years.

DISTRIBUTION OF PATIENTS BASED ON GENDER (N = 100)

Table 1: Distribution based on age

AGE	FREQUENCY	PERCENTAGE (%)
>65-80	81	81
>80	19	19

All individuals participated in the study (100) were build according to the gender for analysis as in the table. Majority of people in the study population were female, i.e. about 54 %. Remaining 46 % was male population.

Table 2: Distribution based on gender

Gender	Count of Gender
Female	54
Male	46

DISTRIBUTION BASED ON LENGTH OF STAY (N=100)

The figure 1 depict the length of stay of the study subjects. Majority of them (71%) stayed for ≤5 days in the hospital.

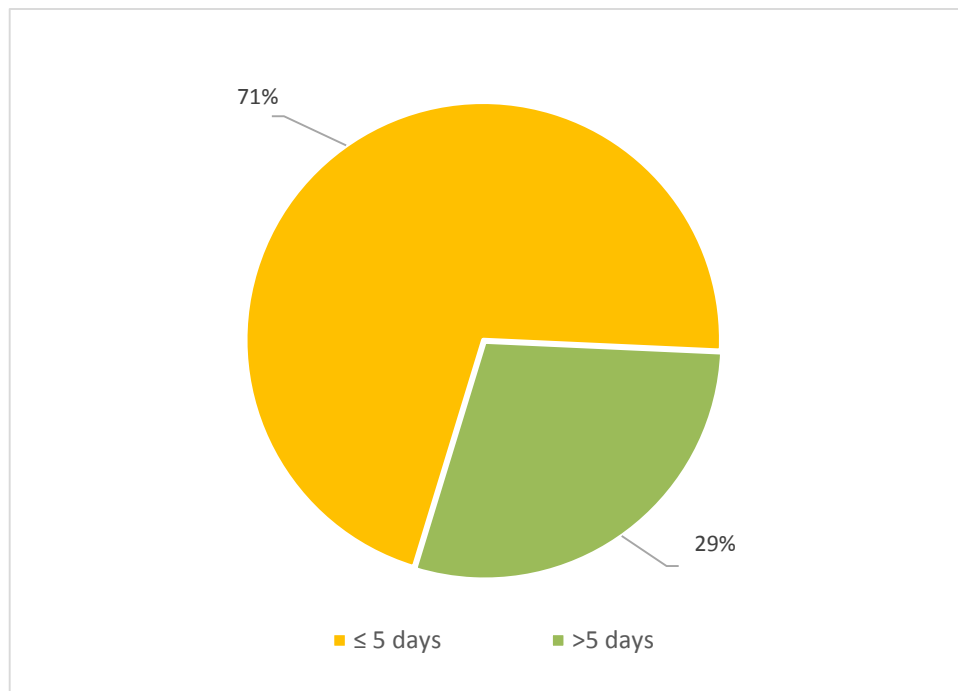


Figure 1: Percentage of distribution based on length of stay

DISTRIBUTION BASED ON PRESENCE OF ERROR (N = 100)

Table 3 shows that out of the 100 geriatric cases collected from various departments 69% cases had an error. The remaining 31% were free of any error.

Table 3: Distribution based on presence of error

CASES	FREQUENCY
Error	69
No Error	31

DISTRIBUTION BASED ON TYPES OF ERROR (N = 69)

The errors were classified according to the ASHP and is depicted in figure 2. 51% errors were prescription errors.

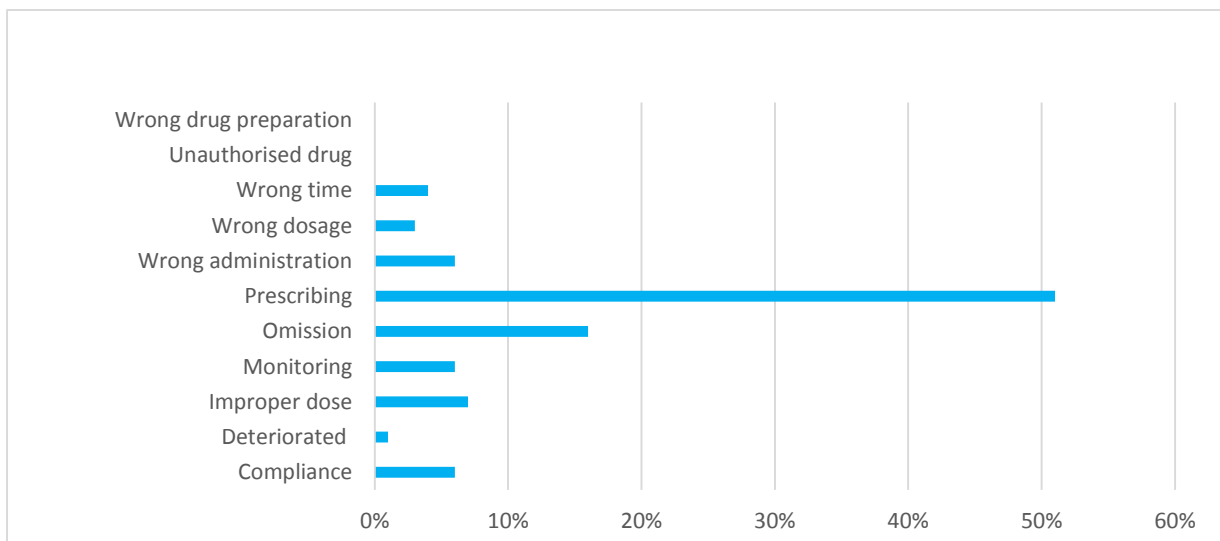


Figure 2: Frequency based on types of error

DISTRIBUTION OF DIFFERENT MEDICATION ERRORS IN EACH DEPARTMENT (N = 69)

The different errors that have been observed in geriatric patients during the study period in various departments.

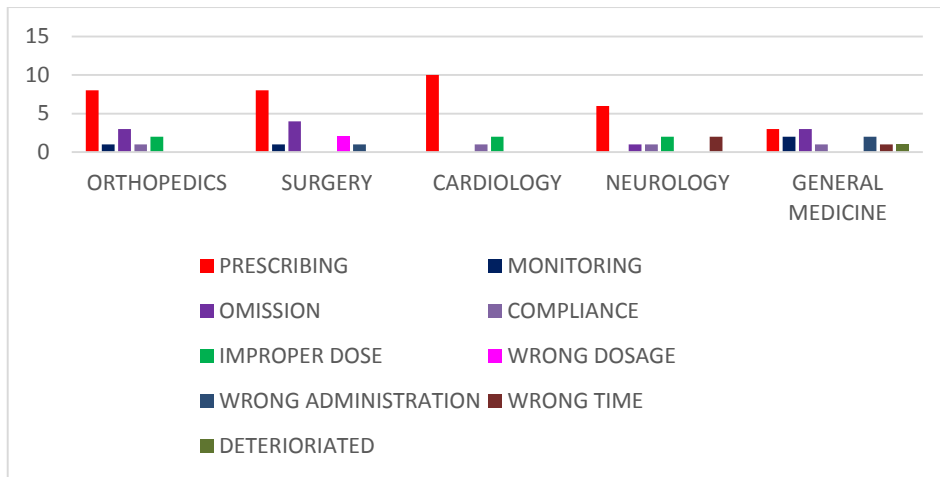


Figure 3: Number of different medication errors in each department

DISTRIBUTION BASED ON OUTCOMES OF ERROR

Table 4 depict that the most frequent outcome of error is ‘A’ which corresponds to - ‘No error, capacity to cause error’.

Table 4: Distribution based on outcomes of error

Category of error	Frequency
A	28
B	19
C	14
D	5
E	1
F	2

DISTRIBUTION BASED ON SEVERITY OF MEDICATION ERROR (N=69)

The errors were analyzed using Hartwig et al. categorization and found that 6 errors were serious and 63 errors were not serious.

Table 5: Distribution based on severity

Severity	Count of Severity
Not Serious	63
Serious	6

DISTRIBUTION OF PERSONS INVOLVED IN ERROR (N=69)

Figure 4 shows that 67% of the errors involved a physician and 27% involved a nurse and 6% involved patient.

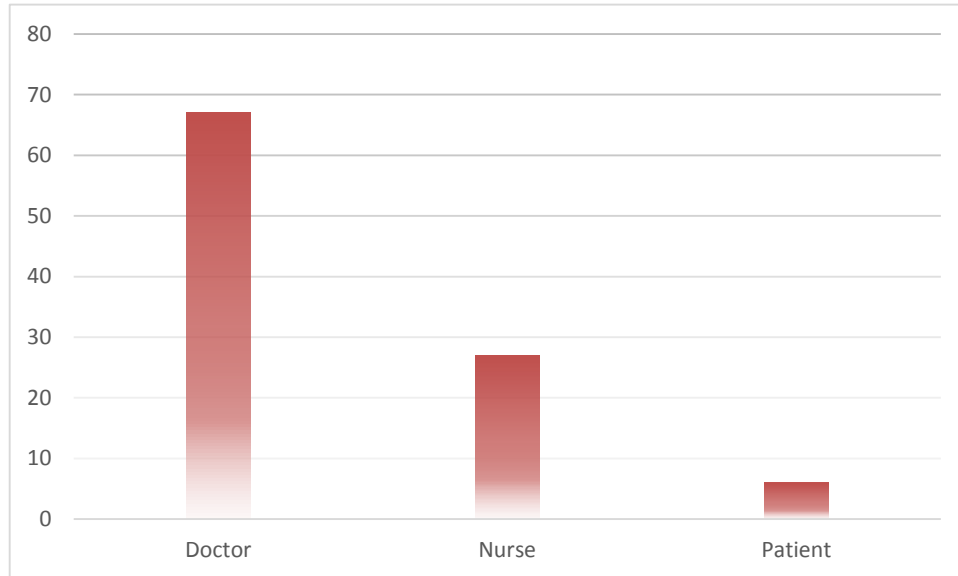


Figure 4: Frequency of persons involved in committing error

DISCUSSION

The goal of medication use is to achieve defined therapeutic outcome with the improvement in quality of life and to minimize patient risk. ME can occur at any face of medication use cycle from prescribing, dispensing and administration of a drug to the patient. It increases morbidity and mortality of the population along with the increase in the cost of the treatment. Further it also affects patient's confidence in medical care.

On analyzing the data, it was found that 81% were aged in group >65-80 years and 19% were above 80 years. Gender analysis found that 54% of the study subjects were females. Grouping the subjects based on length of stay found that 71% of the subjects stayed for <5 days in the hospital and 29% stayed for more than 5 days. Considering the comorbid conditions, it was found that Hypertension was the most common comorbid condition. Majority of the cases that is 69% had medication errors and 31% were free of errors. Out of the total errors, 51% were prescription errors. 6 out of 69 errors were found to be serious. About 67% errors were physician induced followed by 27% nurse induced and 6% patient induced.

Medication errors are only occasionally be serious, however, it is important to detect them, since system failures that result in minor errors can later lead to serious errors.

CONCLUSION

A medication error is a failure in the treatment process that leads to, or has the potential to lead to harm to the patient. Medication errors can occur in deciding which medicine and dosage regimen to use, writing the prescription, manufacturing the formulation, dispensing the formulation, administering or taking the medicine, monitoring therapy. Age is a risk factor for many of the chronic diseases, making the elderly more likely to be diagnosed and treated for multiple comorbidities. Due to the increase in the number of concurrent medications taken by those aged >65 years, there is also an increase in the risk of medication error in them. Added to this is the physiologic changes in organ function related to aging. These changes can affect drug pharmacokinetics and pharmacodynamics in the older adults.

In this study we have evaluated the medication errors that occurred in geriatric patients in a tertiary care hospital and found that there is predominance of prescription error followed by omission error. Although the categorization based on severity showed only a minority of the errors to be serious, it is important to consider the medication errors with high priority as all errors have a potential for patient harm.

We think that there is a need that the hospital administration system strictly enforces close monitoring to identify the errors occurring in the medication use process. Reporting of errors should be encouraged by creating a blame-free, non-punitive environment. Reporting of errors is the best way to identify and rectify the errors at the earliest. Prescribing in block letters should be encouraged and Prescribers should ensure that all details (Dosage form, Dose, Frequency, Route, Duration) are written. Double checking of the case charts could be done to avoid any omissions and also to avoid wrong administration. The geriatric patients have a tendency to be drug defaulters. They should be counselled on the importance and benefits of taking medicines as per doctor's order. They should also be taught on taking medicines properly (time, route, frequency, what to do if a dose is missed). And, when necessary the medication counselling should be given to the patient caregivers.

Our study has its own limitations. Firstly, appropriateness of prescribing was not assessed using any criteria. Secondly, the drug interactions were not checked. Thirdly, adverse drug reactions (ADR) were not included in the study.

We hope that our study will have a benefit the healthcare system and the patients equally. The results of this study could be used to implement regulatory changes in the hospital which in turn would enhance the quality of treatment and care given to the patients, particularly the elderly.

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