MEDICATION ERRORS, GERIATRIC MEDICINE

Evaluation of Medication Errors in Geriatric Patients: A Prospective Observational Study in a Tertiary Care Hospital

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Abstract

Background: Between 25% and 40% of hospital admissions in elderly patients may be linked to drug-related problems. Therefore, prevention and recognition of medication errors in elderly patients is one of the principal healthcare quality and safety issues.

Aim: To evaluate medication errors in geriatric patients.

Materials and Methods: A prospective observational study on 154 prescriptions of aged (≥65) patients. Data was collected from patients' admission sheets, nursing charts, and doctor's order sheets for a period of 8 months and evaluated for results.

Results: Among a total of 154 prescriptions, 30 (19%) of prescriptions were showing medication errors, so the percentage of errors being significantly less. Among 30 error prescriptions, omission errors were found to be 11 (37%), prescribing errors were found to be 9 (30%), dose errors were found to be 6 (20%), and administering errors were found to be 4 (13%).

Among 154 prescriptions, it was found that 38 prescriptions were having six or more drugs. According to WHO guidelines, the 38 prescriptions come under the poly-pharmacy category, and 30 prescriptions were showing drug-drug interactions.

Conclusion: Male patients are predominantly affected (53%), and the number of male patients is also high in this study when compared to female patients (47%). Male patients are the worst sufferers of medication errors. Almost all the drugs are prescribed by their brand names rather than generic names.

Keywords: geriatric medication errors; geriatric research; medication use in the elderly; nursing care; observational studies

1 Introduction

Geriatric patients represent a population that is particularly vulnerable to medication-related problems because of age-associated physiological changes, multiple chronic diseases, and the use of several medications concurrently. Changes in renal function, hepatic metabolism, body composition, and drug sensitivity may alter pharmacokinetic and pharmacodynamic responses in older adults, increasing their susceptibility to adverse drug events.

Medication errors are preventable events that may lead to inappropriate medication use or potential harm to patients. Medication errors may occur at different stages of the medication-use process, including prescribing, dispensing, administration, and monitoring. These errors may result in inappropriate medication use, prolonged hospitalization, increased healthcare expenditure, patient

morbidity, and, in severe cases, mortality. In elderly patients, polypharmacy and age-related changes in drug metabolism and elimination further increase the likelihood of such errors.

The management of geriatric patients often requires the treatment of multiple comorbid conditions. Consequently, polypharmacy, ADRs and potential drug–drug interactions may further complicate medication management. Appropriate medication review and monitoring are therefore essential components of safe healthcare delivery.

Identifying medication errors is essential to improving medication safety and promoting rational drug use among older adults. Therefore, this study focuses on evaluating medication errors in geriatric patients, identifying their occurrence and contributing factors, and highlighting the importance of appropriate medication monitoring to improve patient safety.

Identification and classification of medication errors can help healthcare professionals recognize areas requiring improvement in clinical practice. The present study and research were undertaken to evaluate the incidence and types of medication errors among geriatric patients admitted to a tertiary-care hospital in Hyderabad, India.

2 Materials and methods

2.1 Study design

A prospective observational study was conducted to evaluate the incidence, types, and nature of medication errors among geriatric patients admitted to a tertiary-care hospital.

2.2 Study site and duration

The study was conducted at a tertiary-care hospital in Hyderabad, India, over a period of eight months, from December 2015 to July 2016.

2.3 Study population

The study included 154 geriatric patients of both sexes with different diseases and comorbid conditions.

2.4 Data collection

Patient information and medication-related data were collected from the following sources:

- Patient admission charts
- Nursing charts
- Patient history sheets
- Physician order sheets

The collected information was evaluated to identify medication errors and assess their distribution among the study population.

2.5 Inclusion criteria

- Geriatric patients.
- Patients admitted to the general wards of the tertiary-care hospital.
- Patients with comorbid conditions.

2.6 Exclusion criteria

- Patients receiving palliative care.
- Terminally ill patients.
- Patients admitted for day-care surgery.
- Patients admitted for day-care chemotherapy.

2.7 Classification of medication errors

Medication errors identified during the study were categorized into:

- Omission errors
- Prescribing errors
- Dose errors
- Administration errors

The frequency and distribution of medication errors were evaluated according to the patient records reviewed.

3 Results and findings

3.1 Distribution of medication errors

A total of 154 geriatric prescriptions/records were evaluated during the study. Medication errors were

identified in 30 records (19%), while 124 records (81%) were reported without identified medication errors.

Table 1. Distribution of prescriptions/records with and without medication errors

Characteristics	Number	Percentage
Records with medication errors	30	19%
Records without identified medication errors	124	81%
Total	154	100%

3.2 Frequency of medication error types

Among the 30 records containing medication errors, omission errors were the most frequently identified category, followed by prescribing, dose, and administration errors.

Table 2. Distribution of medication error types

Type of medication error	Number	Percentage
Omission errors	11	37%
Prescribing errors	9	30%
Dose errors	6	20%
Administration errors	4	13%
Total	30	100%

Omission errors accounted for the highest proportion of identified medication errors (37%), while administration errors represented the lowest proportion (13%).

3.3 Gender-based distribution of medication errors

Medication errors were identified in 16 male patients' records (53%) and 14 female patients records (47%).

Table 3. Gender-based distribution of medication errors

Gender	Number	Percentage
Male	16	53%
Female	14	47%
Total	30	100%

3.4 Distribution of medication error types according to gender

The distribution of medication errors according to gender is presented in Table 4.

Table 4. Types of medication errors according to gender

Type of error	Male	Female	Total
Omission errors	6	5	11
Prescribing errors	4	5	9
Dose errors	4	2	6
Administration errors	2	2	4
Total	16	14	30

Omission errors were more frequently observed among male patients, while prescribing errors were more frequently observed among female patients. Dose errors were more common among male patients, whereas administration errors were equally distributed between the two genders.

3.5 Polypharmacy

Among the 154 prescriptions evaluated, 38 prescriptions contained six or more medications and were classified as polypharmacy in the original study.

The distribution reported in the thesis was:

- 14 prescriptions containing 6–10 medications
- 20 prescriptions containing 10–15 medications
- 4 prescriptions containing 15–20 medications

These findings indicate the presence of multiple medication regimens among the geriatric study population.

3.6 Drug-drug interactions

Drug–drug interactions were reported in 30 prescriptions. The distribution of interaction categories reported in the original thesis is summarized below.

Table 5. Distribution of drug-drug interaction categories

Category	Number of prescriptions
Major interactions	1
Moderate interactions	6
Minor interactions	14
No interactions	9
Total	30

It has been found that drug–drug interactions were observed in prescriptions containing multiple medications.

4 Discussion

The present prospective observational study evaluated medication errors among geriatric patients admitted to a tertiary-care hospital in Hyderabad. Medication errors were identified in 30 of the 154 records reviewed, corresponding to 19% of the study population.

Medication errors are an important healthcare concern, particularly among older adults who frequently have multiple comorbidities and require complex medication regimens. The identification of medication errors in approximately one-fifth of the reviewed records highlights the importance of medication safety practices in geriatric care.

Among the different types of medication errors identified in this study, omission errors were the most frequent, accounting for 37% of the total errors. Prescribing errors accounted for 30%, dose errors for 20%, and administration errors for 13%. The predominance of omission errors suggests the importance of ensuring that prescribed medications are appropriately documented, available, and administered according to the physician's orders.

Gender-based analysis showed that medication errors were identified in 53% of male patients/records and 47% of female patients/records. Omission errors were more frequently observed among male patients, whereas prescribing errors were more frequent among female patients. Dose errors were also more frequently observed in male patients, while administration errors were equally distributed between males and females.

The study also identified a considerable number of prescriptions containing multiple medications. Thirty-eight prescriptions contained six or more medications, highlighting the complexity of pharmacotherapy in the geriatric population. The concurrent use of multiple medications may increase the potential for drug–drug interactions and medication-related complications. Medication reconciliation and regular review of medication regimens may therefore be important in minimizing medication-related risks.

It has also been found that most medications were prescribed using brand names rather than generic names. Generic prescribing may facilitate medication identification and promote rational and cost-effective medication use, particularly among patients requiring long-term treatment.

The findings of the study emphasize the importance of coordinated medication management involving physicians, pharmacists, and nursing professionals. Appropriate prescription review, accurate

medication documentation, monitoring of medication administration, and identification of potential drug interactions may help reduce medication errors among geriatric patients.

The study was conducted in a single tertiary-care hospital for a period of 6 months and included a relatively limited sample size. Furthermore, the observational design did not permit evaluation of the clinical outcomes associated with individual medication errors. These limitations should be considered when interpreting the findings.

5 Conclusion

Medication errors were identified in 30 of the 154 geriatric records reviewed in this study, representing 19% of the study population. Omission errors were the most frequently identified medication error category, followed by prescribing errors, dose errors, and administration errors.

The findings highlight the importance of medication safety in geriatric patients, particularly those receiving multiple medications for different comorbid conditions. Regular medication review, rational prescribing, accurate documentation, and appropriate monitoring of medication administration may help reduce medication errors and improve patient safety.

Further studies involving larger populations and multiple healthcare institutions are recommended to evaluate medication errors more comprehensively and identify effective strategies for prevention.

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