Original Article

A Retrospective Observational Study on the Effects and Severity of Medication Errors in A Tertiary Care Hospital of West Bengal

Tushar Chakraborty[1], Dr Arpan Dutta Roy[2], Soumyadip Ray[3], Ashmita bhatttachariya[4], Arpita Biswas[5], Anusuya Naskar[6], Dr SR Deb[7], Asima Bhattachariya[8]

1. Senior Clinical pharmacist, (In-charge) DESUN Hospital Kolkata, West Bengal, India.
2. Consultant HOD of Clinical Pharmacologist, NABH Assessor (HOPE) DESUN Hospital, West Bengal, India.
3. Clinical Pharmacist DESUN Hospital, West Bengal, India.
4. MBBS Student KPC Medical College, West Bengal, India.
5. GM Quality & accreditation DESUN Hospital, West Bengal, India.
6. Clinical Pharmacist DESUN Hospital, West Bengal, India.
7. Medical Director DESUN Hospital, West Bengal, India.
8. Nursing Director DESUN Hospital, West Bengal, India.

***Corresponding author's E-mail:** tushar140494@gmail.com

Received: 10-02-2026; **Revised:** 23-03-2026; **Accepted:** 09-04-2026; **Published online:** 20-04-2026.

ABSTRACT

Background: Medication errors (MEs) are preventable events that may lead to inappropriate medication use or patient harm and remain a major concern in healthcare systems worldwide.

Objective: To assess the prevalence, types, and severity of medication errors in a tertiary care teaching hospital in West Bengal and to evaluate their potential impact on patient safety.

Methods: A retrospective observational study was conducted using data collected from January 2021 to September 2022 at a tertiary care hospital in Kolkata. Medication errors were initially identified prospectively by clinical pharmacists through direct observation during ward rounds and review of prescription charts, pharmacy indenting records, and patient case files. All identified errors were documented in a standardized medication error reporting form and subsequently analysed retrospectively. The severity of errors was classified according to the National Coordinating Council for Medication Error Reporting and Prevention (NCC-MERP) harm index.

Results: A total of 306 medication errors were identified during the study period. Prescription errors were the most frequent type (n = 152, 49.7%). Severity assessment revealed that the majority of errors fell under NCC-MERP categories B and C, indicating that most errors were intercepted before reaching the patient or did not result in harm.

Conclusion: Medication errors remain a significant threat to patient safety in hospital settings. The active involvement of clinical pharmacists in medication review, monitoring, and clinical rounds plays a crucial role in the early identification and prevention of such errors. Strengthening clinical pharmacy services may substantially reduce the incidence of medication errors and enhance patient care outcomes.

Keywords: Medication errors; Patient safety, Clinical pharmacy, NCC-MERP, Harm score, Prescription errors.

INTRODUCTION

According to the United States National Coordinating Council for Medication Error Reporting and Prevention (NCC-MERP), a medication error (ME) is defined as "any preventable event that may cause or lead to inappropriate medication use or patient harm while the medication is under the control of a healthcare professional, patient, or consumer"[1].

This retrospective observational study aims to investigate the prevalence, types, and severity of medication errors in a tertiary care hospital setting[2]. Medication errors are among the most frequent and preventable causes of patient harm in healthcare systems. They can occur at various stages of the medication use process, including prescribing, transcribing, dispensing, and administration[3]. A medication error is defined as a failure in the treatment process that leads to, or has the potential to lead to, harm to the patient[4].

1. STUDY METHOD

Study Design and detailed procedures

The study was conducted in a tertiary care, bedded teaching hospital in Kolkata. Using the direct observation method, data were initially collected prospectively in the form of daily reports for admitted patients by clinical pharmacists during ward rounds. All relevant demographic and clinical data were systematically collected and documented.

Prescription charts of inpatients and pharmacy indenting records were thoroughly reviewed on a regular basis until patient discharge. Medication errors were identified and recorded in a standardized medication error reporting form (Annexure 1) and subsequently entered into an electronic database.

The data collected over a period of one and a half years (January 2021 to September 2022) were later analysed

retrospectively. Medication errors were evaluated for severity using the NCC-MERP harm index. All identified errors were further verified using standard drug information resources, including Medscape, 1mg, Drugs.com, Micromedex, Drug Digest, and the CIMS database.

- **Data Collection**

All data were collected using a structured data collection form and subsequently transferred to an electronic database for detailed analysis. The sources of data included electronic medication charts, patient case files, and discharge summaries.

Data management and analysis were performed using Microsoft Excel 2010, Microsoft Word 2010, and SAS software. Medication errors were identified, reported, and documented using a standardized medication error reporting and documentation form (Annexure 1). All identified errors were categorized based on their severity according to the NCC-MERP harm classification.

RESULTS

Based on this retrospective observational study, analysis of data collected over the study period revealed a considerable number of medication errors. The identification of these errors was largely attributed to the implementation of a robust monitoring system and an active pharmacovigilance program.

Further analysis demonstrated variation in the types of medication errors, which are graphically represented in Figure 1. Prescription errors were the most frequently observed type, with a total of 152 cases reported. The higher incidence of prescription errors may be attributed to the rigorous monitoring of prescriptions across inpatient, outpatient, and discharge summary records.

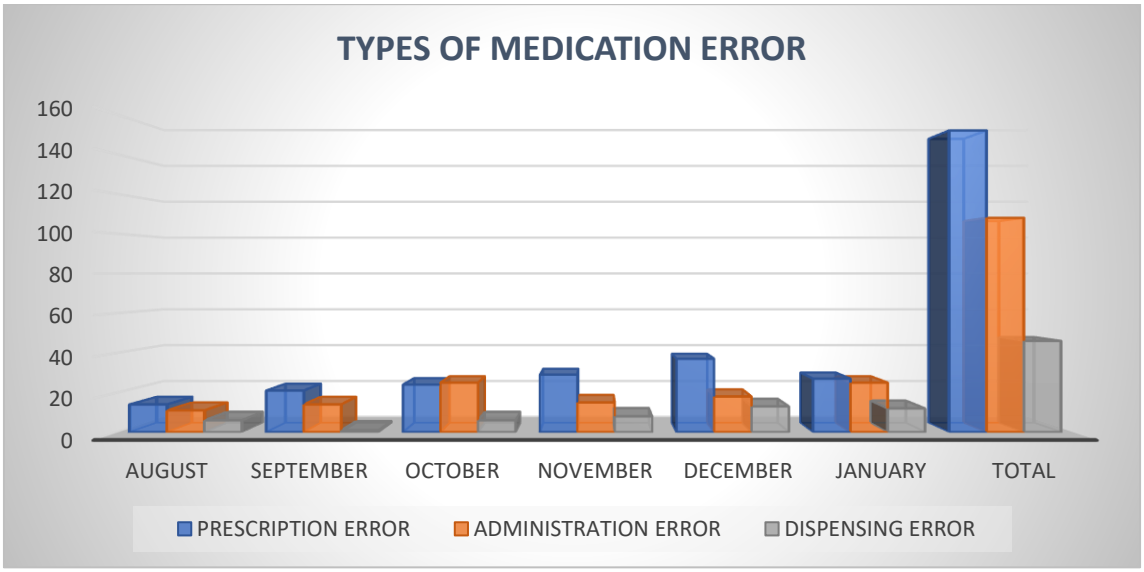

Figure 1: Types of medication error (August 2026-January 2026)

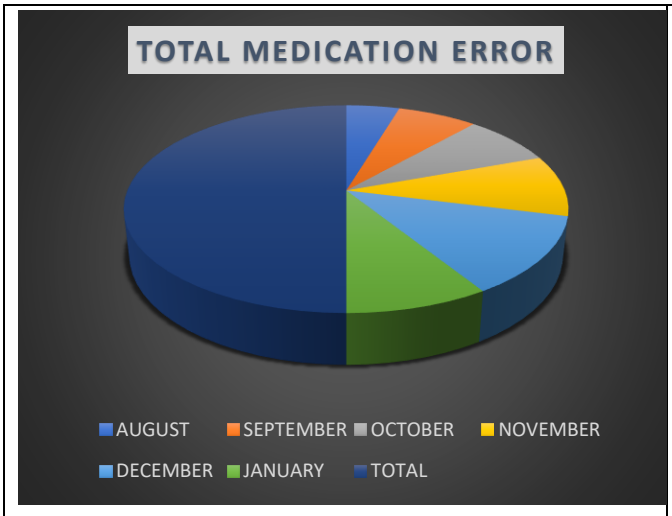

Figure 2: Total no. of medication error of August 2026-January 2026

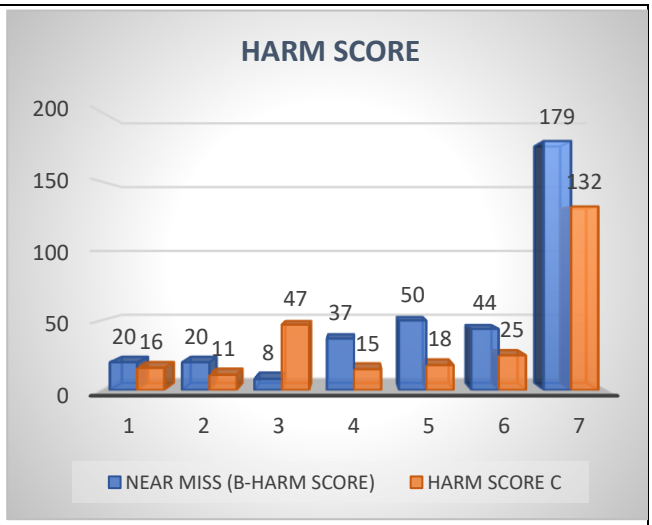

Figure 3(A): Total no. of Harm score B and C of August 2026-January 2026

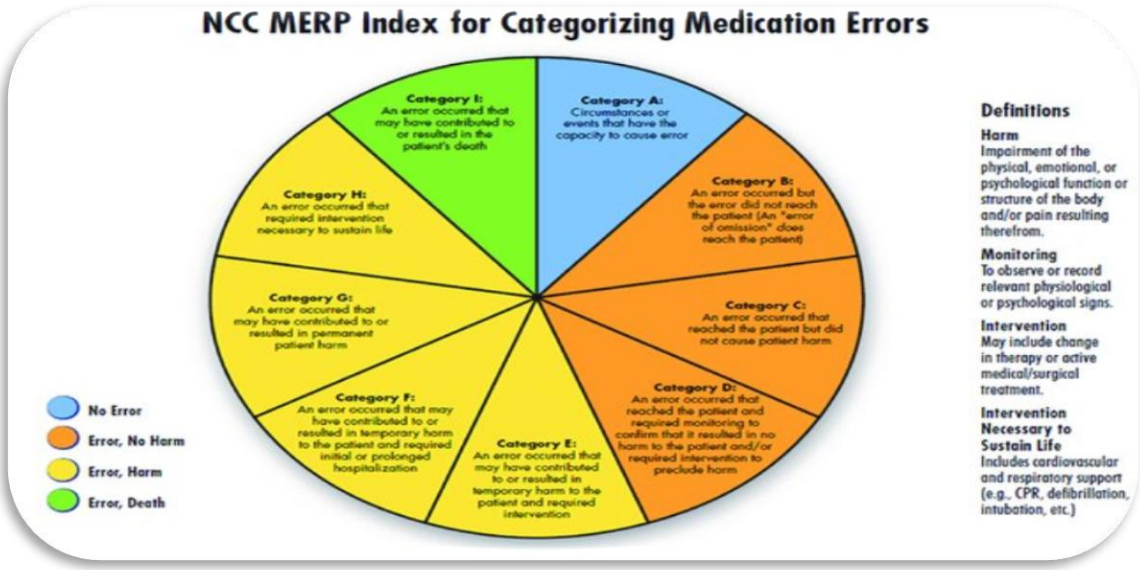

Figure 3(B): Medication errors categorization

As discussed, based on this research it was found total no. of medication error **306** has been identified with CAPA, pleased find that graphical representation below. (Fig:2)

During the study, severity analysis of all reported medication errors was performed using data from the clinical pharmacy department. Based on the graphical representation of the harm score analysis (Figure 3), the majority of errors were categorized under NCC-MERP harm categories B and C.

The higher frequency of category B errors can be attributed to regular clinical pharmacist rounds, which facilitated the identification of medication errors before they reached the patient. The high occurrence of category C errors may be associated with improper handover during shift changes and a lack of awareness among healthcare staff.

CONCLUSION

This retrospective observational study highlights the prevalence and severity of medication errors in a tertiary care hospital in West Bengal. The findings indicate that medication errors remain a significant concern for patient safety and the quality of healthcare delivery.

However, the active involvement of clinical pharmacists plays a crucial role in the early identification and prevention of such errors before they reach the patient. The analysis of harm scores demonstrates that many medication errors can be effectively detected and managed through regular clinical pharmacist interventions, including medication review and participation in clinical rounds.

Therefore, strengthening clinical pharmacy services by increasing the number of trained clinical pharmacists in tertiary care hospitals is essential. Their involvement can significantly reduce medication errors, enhance patient safety, and improve overall patient care.

In conclusion, integrating clinical pharmacists as an integral part of the healthcare team is vital for promoting rational drug use, minimizing medication-related harm, and ensuring improved therapeutic outcomes for patients.

Source of Support: The author(s) received no financial support for the research, authorship, and/or publication of this article

Conflict of Interest: The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

REFERENCES

1. https://ijpbs.net/counter.php?aid=6618 DRUG-FOOD INTERACTION MOST IMPORTANT AND HIGHLY UNDERAPPRECIATED ASPECT OF THERAPEUTICS IN A HEALTH CARE CENTRE: A PROSPECTIVE OBSERVATIONAL STUDY
2. Dr. Arpan Dutta Roy, Abhijit Sasmal, A retrospective observational study on impact of medication errors and its severity in a tertiary care teaching hospital in India, Received: 01-12-2023. https://www.allmedicaljournal.com/uploads/archives_upload/20240203191004_A-24-12.1.pdf
3. Rayhan A. Tariq; Rishik Vashisht, Medication Dispensing Errors and Prevention: February 12, 2024. https://www.ncbi.nlm.nih.gov/books/NBK519065/
4. J K Aronson, Medication errors: what they are, how they happen, and how to avoid them, DOI: 10.1093/qjmed/hcp052, https://pubmed.ncbi.nlm.nih.gov/19458202/