

# A Prospective Observational Study on Medication Reconciliation at Discharge in A Tertiary Care Hospital

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## ABSTRACT

**Introduction:** Medication reconciliation is crucial in healthcare to reduce medication discrepancies especially during transitions in care such as during discharge. This process aims for accurate medication management and improve patient safety by addressing discrepancies such as omissions and unclear instructions, ultimately reducing morbidity and enhancing patient well-being. **Objectives:** To evaluate the number and type of medication discrepancies identified during discharge medication reconciliation. **Materials and Methods:** A prospective observational study was carried out from January 2023 to June 2023 in a Tertiary care hospital. **Results:** Of the 255 patients (132 men, 123 women) included in the study a total of 412 discrepancies were identified of which 191 were unintentional. Majority occurred due to drug omission (53.92%), other include, altered dose (26.72%), altered frequency (7.8%), drug duplication (4.1%). Majority of the errors were identified from general medicine (49.74%) and cardiology department (17.28%). Majority of unintentional errors, were under category C (52.54%). **Conclusion:** Medication discrepancies at discharge were prevalent for patients admitted in hospital. Medication reconciliation processes have a high potential to identify clinically important discrepancies for all patients.

**Keywords:** Medication reconciliation, Medication discrepancies, Discharge, Errors.

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## INTRODUCTION

Medication reconciliation is an important process in healthcare that requires effective communication between patients, clinicians, and families to reduce medication discrepancies.<sup>1,2</sup> International patient safety organizations, including the Institute for Health Care Improvement (IHI), Joint Commission International (JCI), and World Health Organization (WHO), have promoted the establishment of medication reconciliation procedures at each hospital patient transition.<sup>3,4</sup> The Joint Commission on Accreditation of Healthcare Organizations (JCAHO) defines medication reconciliation as “the process of comparing the medications a patient is taking (and should be taking) with newly ordered medications” to straighten out disparities or potential problems.<sup>5</sup> Healthcare providers should complete the reconciliation process when transferring patients between facilities or modifying medications to ensure accurate management and patient safety.

The National Coordinating Council for Medication Error Reporting and Prevention (NCCMERP) defines medication

discrepancy 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”.<sup>6</sup> Discrepancies in medication during the transition from hospital to home care are a serious problem. During discharge from the hospital, 20%-66% of patients experience at least one medication error.<sup>7</sup> To improve patient safety, lower morbidity during this delicate transition of care, it is imperative to identify the precise types and numbers of discrepancies, which makes this study necessary. The most frequent medication discrepancies at discharge are medication omissions and defective, illegible discharge instructions.<sup>8</sup> The primary objective of this process is to ensure accuracy and consistency in patient medication management. Reconciling all medications at every stage of care aims to eliminate both intentional and unintentional discrepancies, thereby enhancing patient safety and well-being.<sup>9</sup>

Medication discrepancies occurs due to lack of knowledge, inadequate performance and psychological mistakes.<sup>10</sup> In order to assess and enhance the healthcare system and secure patient safety, pharmacists should work together with physicians, nurses, and administrators.<sup>11</sup> Medication discrepancies constitute a significant public health issue and are a leading cause of morbidity, with clinical and financial ramifications for patients as well as society.<sup>12,13</sup> The objective of this study was to evaluate the number and types of medication discrepancies identified during



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discharge medication reconciliation for inpatients of various departments at a tertiary care hospital.

## MATERIALS AND METHODS

**Study Design:** A prospective observational study was conducted on discharge medication reconciliation for inpatients of various departments at a tertiary care hospital.

**Study Duration:** The study was carried out over 6 months from January 2023 to June 2023.

**Sample Size:** The study sample was limited to 255 based on the allotted time for the project.

**Ethical Clearance:** Ethical clearance was obtained from the Institutional Ethics Committee (IEC) of Srinivas Institute of Medical Science and Research Center (SIMS & RC), Mangalore

### Study Criteria

#### Inclusion criteria

- Patients aged  $\geq 18$  years of any gender, discharged from the hospital.
- Using any medications before admission.

#### Exclusion criteria

- Patients from vulnerable populations, unconscious patients.
- Patients unwilling to participate.
- Patients unable to provide medication history.

**Data collection:** Data were collected using a data collection form which included the patient's age, gender, discrepancies found in the discharge medication list, and its severity. For the assessment of the severity of the error, the National Coordinating Council for Medication Error Reporting and Prevention (NCC MERP) classification was used.

### Study Procedure

- Eligible patients were identified based on inclusion/exclusion criteria.
- Best Possible Medication History (BPMH) was obtained through a patient or caregiver interview, review of the

patient's medication records, review of previous medical records, and contacting the patient's community pharmacies or primary caregiver, if necessary.

- Demographic data and discharge medication lists were obtained from patient discharge summaries.
- The BPMH and discharge medication list were compared to identify discrepancies.
- Discrepancies were categorized as either intentional or unintentional.
- Unintentional discrepancies were further classified (e.g., omission, addition, dose change, frequency change).
- For unintentional discrepancies, the treating physician was notified for clarification or correction. Detected discrepancies were documented.

### Statistical Analysis

The collected data were analyzed using Microsoft Excel 2016. Descriptive statistics were used to analyze the data, including frequencies and percentages of medication discrepancies.

## RESULTS

### Patient demographics

A total of 600 discharged patients were included in the study, of which 255 (42.5%) patients had discrepancies. The majority of the patients were males aged 60 & above (56.81%) (Table 1).

### Category of Discrepancies

In this study, medication discrepancies were classified as intentional or unintentional. Intentional discrepancies involved medication changes based on evolving clinical status, while unintentional discrepancies included issues like omissions or duplications. Out of the 412 discrepancies identified during discharge, 53.64% (221 discrepancies) were intentional, and 46.35% (191 discrepancies) were unintentional. Table 2 provides a breakdown of these categories, offering insight into the nature and origins of medication discrepancies in the study.

### Type of Unintentional Discrepancies Observed during discharge

A total of 191 unintentional discrepancies were noted, with drug omissions like prescription not administered, missed dose,

**Table 1: Demographics of Subjects.**

Age (yrs.)	Male (n=132)		Female (n= 123)		Total (n=255)	
	n	%	n	%	n	%
18-39	21	15.90	15	12.19	36	14.11
40-59	36	27.27	42	34.14	78	30.58
60 & above	75	56.81	66	53.65	141	55.29

delayed administration, and documentation error being the most prevalent type, constituting 53.92% of the errors. Detailed information regarding the errors observed in this study is presented in Table 3.

### To Compare the Incidence of Unintentional Medication Discrepancies in Various Departments

In this study, out of a total of 191 discrepancies identified, a substantial portion, specifically 95 discrepancies (49.74%), occurred in the General Medicine department, while 33 discrepancies (17.28%) were observed in the cardiology department. This observation holds significance as it highlights the departments with higher patient intake, indicating that these areas may be more prone to medication discrepancies. Justifying the importance of this finding, it emphasizes the need for enhanced medication reconciliation processes and interventions

**Table 2: Category of Discrepancies During Discharge.**

Discrepancies	No. of discrepancies during Discharge (n=412)	
	n	%
Intentional	221	53.64
Unintentional	191	46.35

**Table 3: Number of Unintentional Discrepancies Per Patient Prescription During Discharge.**

Type of discrepancies	Unintentional discrepancies at discharge (n=191)	
	n	%
Drug omission	103	53.92
Altered medication	11	5.7
Drug Duplication	08	4.1
Altered frequency	15	7.8
Altered dose	51	26.7
Altered route	03	1.57

**Table 4: Incidence Of Unintentional Discrepancies in Various Department.**

Department	No. of Unintentional Discrepancies (n=191)	Percentage (%)
General medicine	95	49.74
General surgery	21	10.99
Cardiology	33	17.28
Pulmonology	12	6.28
Orthopaedics	16	8.38
Others	14	7.33

in these departments to improve patient safety and reduce the likelihood of medication discrepancies during discharge. (Table 4).

### Severity of Unintentional Discrepancies

Assessing the severity of medication errors is vital for patient safety. The National Coordinating Council for Medication Error Reporting and Prevention (NCC MERP) was used to categorize the severity of the unintentional discrepancies. The findings showed that majority of unintentional errors, were under Category C accounting for 52.54%, indicating errors that reached the patient but did not cause harm. Additionally, Category D, representing errors that reached the patient but required monitoring to confirm no harm, made up 36.07% of observed errors. (Table 5).

## DISCUSSION

This study revealed that more than half of the medication discrepancies were deliberate, with drug omission emerging as the most common type of error. These intentional errors highlight the complex decision-making processes involved in medication management, suggesting a need for targeted interventions to address underlying causes such as patient non-adherence or clinical judgment errors.

The majority of the patients were males aged above 60 years, further emphasizing the importance of addressing the healthcare needs of older individuals. Meda VS *et al.* found similar results. This indicates a greater number of patients getting admitted were males above 60 years.<sup>14</sup>

Alanazi A S *et al.* identified 237 medication discrepancies, with 26.6% being unintentional and 73.4% intentional. Similarly, the present study also found a mix of intentional and unintentional discrepancies, the proportions differ significantly. This variation could be due to differences in study settings, patient populations, or reconciliation processes, highlighting the need for context-specific medication reconciliation strategies.<sup>15</sup>

**Table 5: Level of Severity of Unintentional Discrepancies.**

Severity of Errors	No. of Discrepancies	Percentage (%)
Category A	0	0
Category B	15	5.88
Category C	134	52.54
Category D	92	36.07
Category E	12	4.71
Category F	2	0.78
Category G	0	0
Category H	0	0

Our study revealed that drug omission was the most common type of unintentional discrepancy, accounting for 53.92% of errors. Similarly, Alanazi A S *et al.* found medication omission to be the most frequent type of unintentional discrepancy at 33.3%, followed by dose changes at 28.6%. The higher rate of omissions in our study suggests a potential area for focused improvement in our medication reconciliation process.

Regarding departmental distribution of discrepancies, our study found that the general medicine department accounted for 49.74% of unintentional discrepancies, followed by the cardiology department at 17.28%. This distribution likely reflects the higher patient intake and potentially more complex medication regimens in these departments. Mazhar *et al.* had a different focus looking at admission discrepancies across medical services (41.2%) and surgery (58.8%). Both studies underscore the importance of department-specific approaches to medication reconciliation.<sup>16</sup>

Medication discrepancies were classified based on their severity using a standard system called the National Coordinating Council for Medication Error Reporting and Prevention (NCC MERP) classification. The current study revealed that the majority of discrepancies fell into Category C, which means errors reached the patient but didn't cause any harm. The next most common category was Category D, where errors reached the patient but required monitoring to ensure no harm occurred. In contrast, S Sharma *et al.* study found that a majority of errors belonged to Category C (61%). This category suggests that these errors may result in temporary harm to the patient.<sup>3</sup>

The prevalence of discrepancies, particularly in departments with high patient intake, emphasizes the need for robust medication reconciliation processes. However, it's important to note that our study did not directly assess the impact of these discrepancies on patient outcomes or safety. Future research should investigate this relationship to better understand the clinical significance of these findings.

A major strength of this study is its prospective design, which provided the opportunity to promptly identify unintentional errors. However, the study has several limitations: it was conducted in a single hospital, which may limit the generalizability of the findings to other healthcare settings with different patient populations and practices. Additionally, the study was conducted over a relatively short period of six months; longer-term studies might reveal seasonal variations or trends in medication discrepancies. Moreover, the reliance on patient interviews and medical records for data collection introduces the possibility of recall bias or incomplete information, which could impact the accuracy of the results.

Furthermore, while our study focused on discrepancies at discharge, it's crucial to recognize that post-discharge errors,

such as patient misunderstandings, can lead to additional discrepancies. This limitation suggests the need for more comprehensive reconciliation programs that extend beyond the point of discharge.

## CONCLUSION

Medication reconciliation plays a crucial role in patient safety and healthcare quality. The prevalence of medication discrepancies at discharge highlights the critical need for an effective medication reconciliation process. Pharmacists, with their specialized knowledge and expertise, are well-positioned to conduct thorough medication reconciliations. Their involvement can significantly enhance patient safety, optimize prescription patterns, and reduce medication-related errors.

By implementing medication reconciliation programs, healthcare institutions can address a major source of preventable harm and improve overall patient outcomes. Future research should focus on quantifying the impact of such programs and developing standardized best practices for medication reconciliation across various healthcare settings. Ultimately, prioritizing medication reconciliation and leveraging the skills of qualified pharmacists represents a valuable strategy for enhancing medication safety and improving the quality of patient care.

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## CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

## ETHICS APPROVAL AND CONSENT TO PARTICIPATE

Ethical clearance was obtained from the Institutional Ethics Committee (IEC) of Srinivas Institute of Medical Science and Research Center (SIMS & RC), Mangalore. Written informed consent was obtained from the patient for both publication and participation in this study.

## ABBREVIATIONS

**JCI:** Joint Commission International; **WHO:** World Health Organization; **ICI:** Institute for Health Care Improvement; **JCAHO:** Joint Commission on Accreditation of Healthcare Organizations; **NCCMERP:** National Coordinating Council for Medication Error Reporting and Prevention; **IHI:** Institute for Health Care Improvement; **IEC:** Institutional Ethics Committee; **BPMH:** Best possible medication history.

## SUMMARY

Medication reconciliation is crucial in healthcare to reduce medication discrepancies, especially during transitions in care such as during discharge. Of the 255 patients included in the study a total of 412 discrepancies were identified of which 191 were unintentional. Majority occurred due to drug omission (53.92%), other include, altered dose (26.72%), altered frequency (7.8%), drug duplication (4.1%). Majority of the errors were identified from general medicine (49.74%) and cardiology department (17.28%). Majority of unintentional discrepancies, were under Category C accounting for (52.54%), indicating errors that reached the patient but did not cause harm. Additionally, Category D, representing errors that reached the patient but required monitoring to confirm no harm, made up (36.07%) of observed errors. Some of the limitations of the present study includes the short study period and single hospital study design which hinders the generalizability of the study findings. The current study was conducted during short study period and single hospital study design that may hinder the generalisability of the study findings. The present study concluded that discharge medication reconciliation is crucial in health care institutions to reduce medication discrepancy that will lead to and avoid morbidity and improvement in overall patient well-being.

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