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Review Article

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An Observational Study of Dispensing Errors in a Multispecialty Hospital

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Abstract

The study aims to analyze and identify the frequency, types, and contributing factors of dispensing errors in a multispecialty hospital setting. By observing real-world dispensing practices, it seeks to evaluate their impact on patient safety, assess existing preventive measures, and propose strategies to improve medication dispensing accuracy. The findings will help develop enhanced protocols to minimize errors and optimize pharmaceutical care. Additionally, the study aims to comprehensively examine the nature and causes of medication dispensing errors, with a particular focus on effective monitoring systems that enhance medication safety and reduce associated risks.

Keywords: Dispensing error, Real world dispensing practice, Dispensing accuracy

1. Introduction

A dispensing error refers to any mistake that occurs during the preparation and distribution of medications in a hospital setting. These errors may be identified while the medication is still within the pharmacy or after it has been delivered to other hospital departments. This definition supports research that examines the nature, frequency, and causes of dispensing errors. [1]

The hospital medication process involves multiple steps, each vulnerable to errors—especially the dispensing phase. Minimizing mistakes requires robust, well-structured systems to ensure medications are accurately provided according to prescriptions.

Even minor oversights in medication handling, while seemingly negligible in isolation, can collectively result in serious outcomes. These issues are dynamic, evolving with various hospital conditions. Healthcare institutions must establish comprehensive monitoring systems to detect both individual incidents and cumulative error patterns.

Medication errors rarely result from a single, dramatic event; rather, they often arise from multiple, smaller issues. Understanding this complexity allows hospitals to design preventative measures addressing both visible and subtle problems.[2]

Several factors contribute to dispensing errors. Physical layout and pharmacy design can significantly influence error rates. Human factors, including inadequate staff training, workflow disruptions, and a culture that discourages error reporting, also play major roles. Technical challenges, such as poorly organized medication storage areas and inefficient workflows, further increase the risk.[3]

2. Objective

To comprehensively examine the nature and causes of medication dispensing errors in hospital settings, with an emphasis on effective monitoring systems to enhance medication safety and minimize risks.

This process is repeated after evening rounds at 5 PM. For the Emergency Ward and ICU, the system operates 24/7

3.4 Data Collection Process:

The study team tallied indents with their corresponding medication pouches. Each indent was carefully compared against the physical pouch for accuracy in drug name, dosage, quantity, and patient details. Discrepancies were documented using a specially designed data collection form (Figure 2) that recorded the type of error, including:

- Incorrect drug
- Incorrect dose
- Incorrect formulation
- Incorrect quantity
- Delayed dispensation
- Incorrect labelling
- Omission of items
- Unauthorized generic/class substitutions
- Deteriorated medications

This verification process served as a quality control mechanism to identify patterns and implement improvements.

Oral solutions, elixirs, syrups, suspensions, creams, ointments, and lotions were dispensed as unit doses. Parenteral medications, sterile liquids, suppositories, ophthalmic/auricular/nasal preparations, aerosols, and inhalants were dispensed in original packaging.

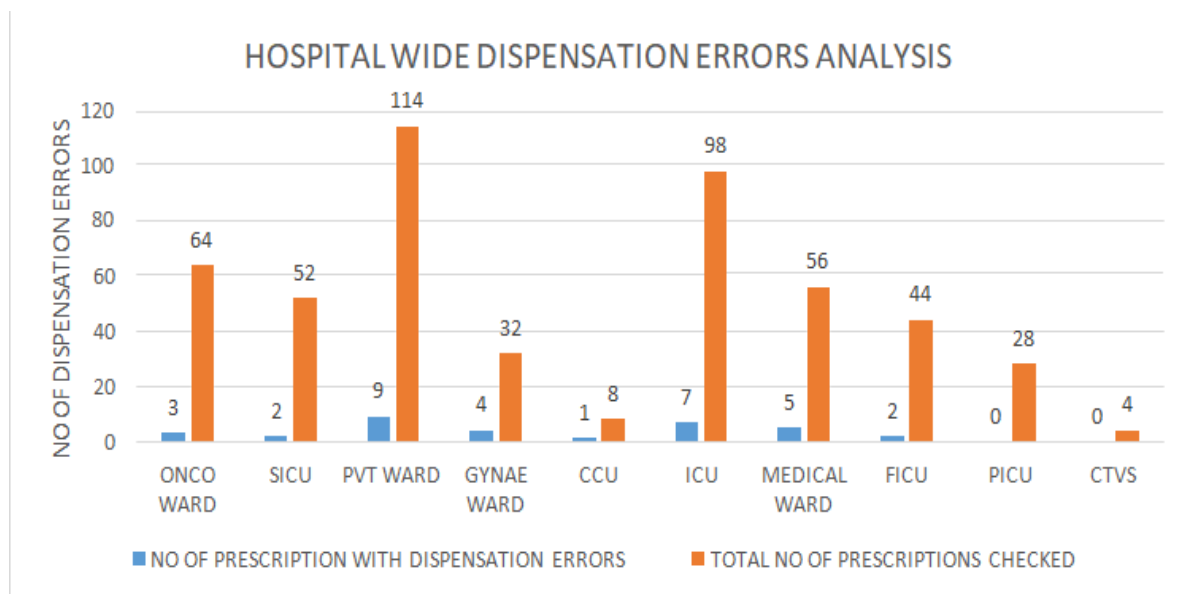
3.5 Data Collection Template

Auditor:	Date of Audit:					Location:				
UHID:	Date of Admission:					Primary Consultant:				
GENDER:	AGE:					TIME OF RX:				
OPPORTUNITIES OF ERRORS (PHARMACIST)	DRUG 1	DRUG 2	DRUG 3	DRUG 4	DRUG 5	DRUG 6	DRUG 7	DRUG 8	DRUG 9	DRUG 10
INCORRECT DRUG DISPENSED										
INCORRECT DOSE DISPENSED										
INCORRECT FORMULATION DISPENSED										
INCORRECT QUANTITY OF DRUG DISPENSED										
DELAY IN DISPENSED TIME										
INCORRECT LABELLING OF DRUG										
OMISSION OF ITEMS										
GENERIC OR CLASS SUBSTITUTED DONE WITHOUT CONSULTATION WITH THE PRESCRIBING DOCTORS										
DETERIORATED MEDICATIONS										

(FIGURE- 2)

4. Results

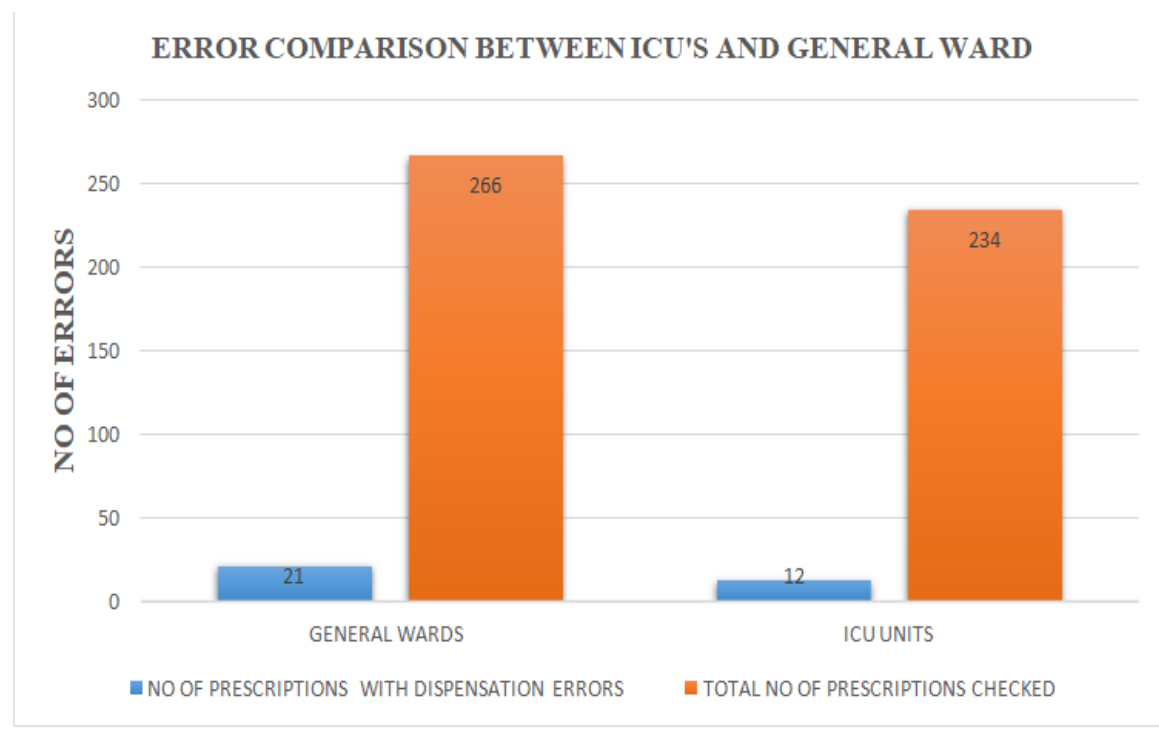
Hospital-Wide Dispensation Error Analysis



(FIGURE 3)

The (FIGURE-3) hospital-wide analysis reveals varying dispensation error rates: GYNAE WARD (12.5%) and CCU (12.5%) show the highest rates, followed by MEDICAL WARD (8.9%), PVT WARD (7.9%), and ICU (7.1%). Lower rates were found in ONCO WARD (4.7%), FICU (4.5%), and SICU (3.8%), while PICU and CTVS recorded zero errors. The findings suggest targeted medication safety interventions are needed in departments with higher error percentages.

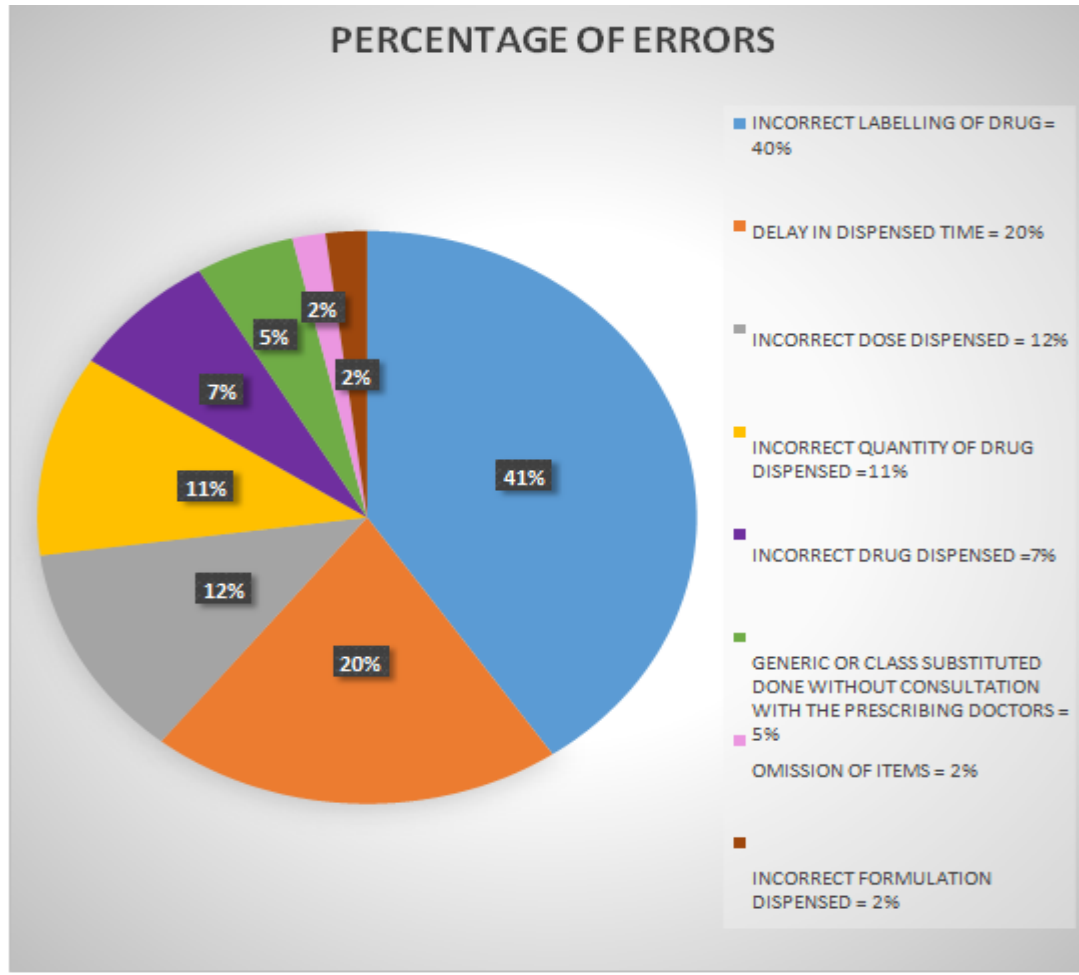
Error Comparison Between ICUs and General Wards



(Figure 4)

The (FIGURE-4) shows comparative analysis reveals General Wards experienced a 7.9% dispensation error rate (21/266 prescriptions), exceeding ICU Units' 5.1% rate (12/234 prescriptions). This 2.8 percentage point difference suggests General Wards may require enhanced medication safety protocols despite similar prescription volumes reviewed in both settings.

Percentage of Errors by Type



(Figure 5)

- Incorrect labelling: **41%**
- Delayed dispensation: **20%**
- Incorrect dose: **12%**
- Incorrect quantity: **11%**
- Incorrect drug: **7%**
- Unauthorized substitution: **5%**
- Omission and incorrect formulation: **2% each**

These findings highlight the need for improvements in labelling and workflow.

Comparative Analysis with Previous Studies

Error rates at IIH (7.9% in wards, 5.1% in ICUs) were significantly higher than previous Indian studies (e.g., Patel et al., 3.1%; Kumar et al., 6.5%). Labelling errors align with Singh et al. (38%) but differ from Mehta et al., who found dosage errors (35%) more prevalent. Unlike Gupta et al. (2023), who reported higher errors in ICUs, IIH found similar rates across departments. Recommendations mirror Verma et al. (2021) on workspace redesign but lack technological enhancements like computerized physician order entry systems (Desai et al., 2024).

5. Discussion

The data suggests that dispensing errors can be significantly reduced through environmental and personnel-based interventions.

Key Interventions:

1. Regular Staff Training

- Refresher courses
- High-risk scenario simulations
- Peer mentoring
- Review of real errors

2. Optimized Pharmacy Layout

- Segregated zones for review, preparation, and verification
- Adequate lighting and ergonomics
- Organized storage to reduce labelling errors

3. Standard Operating Procedures (SOPs)

- Detailed checklists
- Verification steps at each stage
- SOPs regularly updated based on observed error patterns

4. Recognition Program for Accuracy

- **Bronze Certificate:** Fewest monthly errors
- **Silver Certificate:** Six months of error-free work
- **Gold Certificate:** Year-long error-free performance

These measures promote a proactive approach, encouraging staff performance while fostering a culture of accountability and continuous improvement.

5. Conclusion

This cross-sectional study at IHH, a 200-bed multispecialty hospital, revealed high medication dispensing error rates (7.9% in general wards, 5.1% in ICUs). Labelling errors (41%) and timing delays (20%) were the most common, pointing to systemic weaknesses across departments. The error rate challenges previous assumptions that critical care units have significantly higher errors than general wards.

To address these findings, the study proposes:

- Ergonomic workspace redesign
- Staff training in proper handling and labelling
- SOPs with checklists and verification
- Reward systems for consistent accuracy

These strategies, combined with potential digital enhancements like computerized physician order entry systems, could shift the institution from reactive error management to a proactive safety culture.

7. Confidentiality Statement

All patient data were kept confidential throughout and after the study. The data were used solely for scientific purposes.

8. Conflict of Interests

Authors have no conflict of interests.

9. Authors' Contributions

The research was initiated by HKS, who established the methodological framework and guided the analytical process and results interpretation. Documentation of pharmaceutical dispensing errors and data acquisition were jointly executed by HKS and NG. DSL collaborated in the assessment of compiled findings and formulation of departmental error mitigation approaches. Dr. PKG offered essential expertise for protocol formulation, authored the manuscript, and executed a thorough examination of the analytical procedures and conclusions. The final document has been examined and endorsed by all contributing authors.

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