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Accuracy of Medication Labeling and Its Effect on Patient Safety

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Abstract: Medication labeling accuracy is a critical factor in ensuring patient safety within all healthcare settings. Errors in labeling whether due to human oversight, printing issues, or system failures can lead to serious adverse drug events, treatment delays, or patient harm. This study explores the significance of accurate labeling, identifies common sources of labeling errors, and examines their effect on patient outcomes. It also provides recommendations to improve labeling accuracy through technology integration and quality assurance systems.

Keywords: Medication labeling, patient safety, pharmacy practice, dispensing errors, pharmacy technicians, quality assurance

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INTRODUCTION

Medication errors represent a major public health issue worldwide, with labeling inaccuracies accounting for a significant proportion of these incidents (Franklin et al., 2020; James et al., 2018). The pharmacy label serves as the patient's primary source of medication information, including drug name, strength, dosage instructions, and precautions. Inaccurate labeling may result in incorrect medication administration, dosage confusion, or even life-threatening adverse reactions.

Pharmacy technicians play a vital role in ensuring labeling accuracy, especially in high-volume dispensing environments (ASHP, 2021). Therefore, continuous evaluation of labeling processes is essential to prevent errors and safeguard patient health.

BACKGROUND AND LITERATURE REVIEW

Several studies have demonstrated a direct correlation between labeling accuracy and patient safety outcomes. According to the Institute for Safe Medication Practices (ISMP, 2023), labeling and packaging errors account for nearly 33% of medication errors in the dispensing process.

Common sources of labeling errors include:

- Incorrect drug name or strength due to look-alike/sound-alike medications (Cousins et al., 2012).
- Incomplete or illegible labels due to printer malfunctions or poor quality control (Grissinger, 2022).

- Mismatched patient identifiers from system entry errors (Flynn et al., 2020).
- Inaccurate auxiliary labels or missing warnings (Taneja et al., 2017).

When such errors occur, patients may consume the wrong medication or dosage, leading to preventable harm, hospitalizations, or even death (WHO, 2022; IOM, 2007).

METHODOLOGY

Study Design

A cross-sectional observational study was conducted in a hospital pharmacy over a period of 3 months.

Sample Size

A total of 1,200 dispensed medication labels were randomly reviewed by two independent pharmacists.

Data Collection

Each label was assessed for:

1. Drug name and strength accuracy
2. Patient identification correctness
3. Label legibility
4. Presence of auxiliary information
5. Consistency with physician orders

Evaluation Criteria

Labeling accuracy was categorized as:

Accurate – No discrepancies found.

Minor Error – Typographical or layout issue not affecting interpretation.

Major Error – Information mismatch that could impact patient safety.

RESULTS

Table 1. Frequency of Labeling Errors

Error Type	Number of Errors (n)	Percentage (%)
Wrong drug name/strength	14	1.17%

Incorrect patient name/ID	9	0.75%
Missing auxiliary label	27	2.25%
Poor label legibility	15	1.25%
Total Errors Observed	65	5.42%

Table 2. Impact of Labeling Errors on Patient Safety

Severity Level	Description	Number of Incidents	Percentage (%)
Low (no harm, corrected early)	Error detected before dispensing	42	64.6%
Moderate (potential harm)	Patient confusion, delay in therapy	18	27.7%
High (actual harm)	Incorrect medication administration	5	7.7%

DISCUSSION

The findings highlight that 5.42% of dispensed labels contained errors, with 7.7% posing direct harm to patients. These results are consistent with other studies demonstrating that even minor labeling inaccuracies can lead to significant adverse outcomes (Flynn et al., 2020; Franklin et al., 2020).

Most labeling errors originated from manual data entry by pharmacy technicians, overreliance on automated systems without secondary verification, and lack of standardized label templates (Grissinger, 2022). Enhanced use of barcode verification, double-checking protocols, and technician training can significantly minimize such risks (ASHP, 2021; FDA, 2023).

Moreover, implementing color-coded warnings, clear font standards, and electronic audit trails can improve readability and traceability (Taneja et al., 2017; WHO, 2022).

RECOMMENDATIONS

1. Adopt automated dispensing and labeling systems with integrated error alerts (FDA, 2023).
2. Introduce technician competency assessments on labeling accuracy (ASHP, 2021).
3. Implement a double-verification system for all high-risk medications (ISMP, 2023).
4. Standardize label design to avoid confusion between similar medications (Grissinger, 2022).
5. Conduct periodic audits of labeling errors and provide feedback to staff (Franklin et al., 2020).

CONCLUSION

Accurate medication labeling is an indispensable component of patient safety. Pharmacy technicians are the frontline defense against dispensing errors, and ensuring labeling precision directly reduces patient risk. Regular training, process audits, and the adoption of technology-driven solutions are key to minimizing labeling-related incidents and ensuring safe medication practices (WHO, 2022; IOM, 2007).

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ISMP Medication Safety Alert!

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