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Review Article

From Prescription to Patient: Measuring Success in Reducing Medication Errors

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ABSTRACT
Throughout the whole medication-use cycle, including prescription, transcription, dispensing, administration, and monitoring, medication errors continue to pose a persistent and avoidable risk to patient safety. The evidence on medication-error patterns, contributing factors, and interventions meant to lessen medication-related harm is summarized in this review. With a stated publication window of 2010–2024, the source review took into account secondary evidence from peer-reviewed literature, hospital and clinical safety reports, WHO and national health authority publications, pharmacovigilance and medication safety bulletins, and systematic reviews and meta-analyses found through PubMed, Scopus, Google Scholar, Web of Science, ResearchGate, and official WHO and PvPI repositories. Errors in dose selection, incorrect drug selection, omissions, timing errors, documentation issues, and confusion between look-alike and sound-alike medications were common in prescribing and administration.
Risk is influenced by human factors, communication gaps, workload, non-standardized procedures, disruptions, personnel constraints, insufficient automation, and low pharmacist participation. Technology-based treatments, clinical pharmacist involvement, organized training, better labelling and storage, and non-punitive reporting systems can all lower medication-related risk, according to evidence in the source review. When technology, pharmacist involvement, staff training, monitoring, and a supportive safety culture are used in tandem, the greatest and longest-lasting benefits take place.

Keywords: Medication Errors, Medication Safety, Prescribing Errors, Dispensing Errors, Administration Errors, Clinical Pharmacist, CPOE, Barcode Medication Administration, Patient Safety, Medication Management.

INTRODUCTION

Despite being a vital part of contemporary healthcare, medication therapy continues to be a significant cause of avoidable patient damage. An inadvertent breakdown in the therapeutic process that could or does result in harm is called a medication error. Errors can occur when preparing, administering, monitoring, transcribing, prescribing, or dispensing. Every medication error indicates a breakdown or vulnerability in the medication-use cycle and, thus, a possible opportunity for prevention, even though not every medication error results in an adverse drug reaction.
Medication mistakes can happen at long-term care facilities, hospitals, community pharmacies, outpatient clinics, and at-home self-administration. Polypharmacy, complicated treatment plans, heavy workloads, a lack of qualified personnel, poor communication, disruptions in workflow, and the lack of standard operating procedures all raise the risk. The source article emphasizes that personal attention should not be the only factor in determining pharmaceutical safety. System vulnerabilities like imprecise labels, ambiguous abbreviations, limited computerized prescription, and insufficient staffing interact with human variables like weariness, task pressure, and cognitive stress.
There are several shifts in accountability and communication along the drug pathway, from prescription to patient. Therefore, multidisciplinary involvement from doctors, nurses, pharmacists, and patients is necessary for safe pharmaceutical usage. A safer pharmaceutical system's key elements include a culture of non-punitive reporting, ongoing education, standardized procedures,

technology, patient education, and frequent quality evaluation.

Global and Indian Context

Medication safety is becoming a top priority for patient safety worldwide. The source review mentions the global Medication Without injury project, which aims to significantly reduce serious avoidable medication-related injury, and gives WHO estimates of about 1.3 million injuries per year from medication errors, which primarily affect low- and middle-income nations. Technology complexity, polypharmacy, and managing chronic diseases are issues that high-income settings must deal with, while resource-constrained settings may also have trouble finding pharmacists, poor supply chains, heavy workloads, and limited automation. System reliability is still crucial in all situations.

High patient loads, a lack of qualified medical personnel, non-standardized prescription formats, and a lack of clinical pharmacy services all pose problems for pharmaceutical safety in India. Errors in the prescription, dispensing, and administration stages—such as illegible prescriptions, incorrect dosages, LASA medications, incomplete paperwork, a lack of drug reconciliation, and insufficient monitoring—are described in the reviewed literature. Time constraints, weight-based dosing, multiple pharmaceutical orders, and complicated treatment plans make critical-care, pediatric, and emergency settings especially vulnerable.

Through pharmacovigilance programs, medication-error reporting systems at certain hospitals, NABH accreditation programs, clinical pharmacy services, and electronic health records, India's medication-safety ecosystem is progressively becoming stronger. Underreporting is still a significant obstacle, though, especially when employees are afraid of being blamed or facing punishment. Therefore, it is crucial to have a reporting culture that is non-punitive and learning-focused.

Medication Errors and Contributing Factors

Prescription mistakes are constantly prevalent throughout the medication-use cycle. Incomplete prescriptions, unclear handwriting, choosing the wrong medication, choosing the wrong dose, and failing to take allergies into account are common issues. One of the main causes of prescription errors, according to the source review, is dose-calculation errors. Due to weight-based dosing, polypharmacy, and physiological variations that impact medication therapy, elderly and pediatric patients are especially at risk.

Inaccurate dosage forms, erroneous amounts, and wrong medications are examples of dispensing errors. Dispensing risk can be increased by LASA medications, comparable packaging or shelving, interruptions, and inadequate double-checking. Errors in administration include inappropriate dosage, omission, timing, route, and premature withdrawal; these risks are particularly significant in critical-care and emergency situations.

There are several different contributing elements. Fatigue, extended work hours, insufficient training, cognitive overload, and poor communication during shift changes are examples of human factors. Non-standardized prescription formats, a lack of automated dispensing or electronic prescribing, disorganized storage, and a lack of personnel are examples of system factors. Interruptions, high patient-to-staff ratios, and insufficient pharmacist engagement are examples of environmental and workflow variables. Another significant hazard is incomplete medication reconciliation at admission and discharge.

Medication-Safety Interventions

Medication mistakes can be avoided, and interventions can lower risk when used consistently, according to the evidence evaluated in the source article. Barcode drug administration, electronic prescribing, and computerized physician order entry (CPOE) enhance patient identification, decrease transcribing errors, and improve prescription clarity. When paired with staff training and feedback, these technology-based approaches demonstrated especially consistent results.

Another crucial step is the involvement of clinical pharmacists. Reductions in dose-related and drug-selection errors were linked to participation in medication reconciliation, medication rounds, high-risk medicine double-checking, and discharge planning, particularly in high-risk settings like critical-care and pediatric wards. Additionally, pharmacist involvement promotes continuity and communication throughout care transitions.

Awareness and adherence to safe procedures are enhanced by education and competency-based training. But without reinforcement, training might not be as durable as it could be. Checklists and standard operating procedures aid in lowering process variation. Confusion

linked to LASA is lessened by Tall-Man lettering, color coding, standardized labeling, and organized storage. By encouraging employees to report mistakes and near misses, anonymous or non-punitive reporting systems enable organizations to learn from incidents rather than hide them.

The benefit of combined therapies is the strongest pattern in the examined evidence. When combined, technology, pharmacist support, training, monitoring, and a strong safety culture are more beneficial than when used separately.

REVIEW METHODOLOGY AND SYNTHESIS

Only secondary data served as the basis for the review. Peer-reviewed journal papers, clinical and hospital safety reports, WHO and national health authority publications, pharmacovigilance and pharmaceutical safety advisories, systematic reviews, and meta-analyses were among the sources. PubMed, Scopus, Google Scholar, Web of Science, ResearchGate, and official WHO and PvPI repositories were used to find the literature. The specified time frame for publishing was 2010–2024.

Medication error, prescription error, dispensing error, administration error, barcoding, computerized physician order entry, clinical pharmacist interventions, and patient safety programs were among the keywords. The study environment, patient population, mistake types, contributing factors, interventions, impact assessment techniques, and reported outcomes were all taken into account in a structured extraction methodology.

To find consistent intervention effects and any gaps, the evidence was synthesized both conceptually and comparatively.

According to the review, errors in prescription and administration are common, and system flaws play a significant role. While training was beneficial but needed ongoing reinforcement, technology-based interventions and pharmacist engagement demonstrated the most consistent results. Continuous monitoring and non-punitive reporting were also linked to sustained safety improvement.

DISCUSSION

The results lend credence to a systems-based theory of drug safety. Recurring mistakes in various healthcare environments imply that human attention to detail is insufficient to make up for unreliable procedures. Illegibility, transcription issues, and patient identity hazards can all be decreased by digital transformation, but technology must be used with proper workflow integration, monitoring, and training. In a similar vein, pharmacist participation is most beneficial when incorporated into direct patient-care procedures including clinical review, medication reconciliation, and high-risk medication management.

Another issue with underreporting in the Indian setting is the fear of blame. Because reported events and near misses offer crucial information about hidden system weaknesses, this restricts organizational learning. For safety initiatives to be sustainable, non-punitive reporting and leadership support are crucial.

For safety initiatives to be sustainable, non-punitive reporting and leadership support are crucial.Instead of being a one-time endeavor, medication safety should be seen as an ongoing practice. To ascertain whether interventions continue to be effective, regular audits, feedback, competency assessments, and reviews of mistake trends are required. The best foundation for safe medication management is a multidisciplinary approach comprising doctors, nurses, pharmacists, patients, and organizational leaders.

CONCLUSION AND RECOMMENDATIONS

Medication errors remain a significant and preventable patient-safety concern. The review indicates that prescribing

Medication mistakes continue to be a serious and avoidable patient safety issue. According to the review, prescribing and administration are significant risk factors, and vulnerability is increased by workload, poor communication, non-standardized procedures, disruptions, insufficient automation, and low pharmacist engagement. The evidence is in favor of developing dependable systems that predict error and enable early identification rather than placing the blame on specific people.

Healthcare organizations should gradually implement electronic prescribing and other suitable digital systems; bolster clinical pharmacy services; offer frequent competency-based training on dose calculations, high-alert medications, and LASA drugs; put SOPs and checklists into place; enhance labelling and storage; maintain anonymous or non-punitive error reporting; carry out regular medication-safety audits; and inform patients about dosage, timing, adverse effects, and adherence.

Safety indicators should be tracked to assess the real-world effectiveness of therapies, and medication reconciliation should be reinforced during admission and release.

Combining technology, pharmacist engagement, training, monitoring, and safety culture results in the most long-lasting benefit. Therefore, dependable procedures, interdisciplinary accountability, openness, and ongoing organizational learning are necessary to safeguard the route from prescription to patient.

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