

MEDICATION SAFETY AND PREVENTION OF HEALTHCARE ERRORS

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Abstract

Introduction

Medication is one of the most common and important interventions used in healthcare. Medicines are given to stop, reduce, treat or control diseases and to make people feel better and have a better quality of life when they have chronic conditions. The process of medicines use is complex, however, with multiple steps involved in the prescribing, transcribing, dispensing, giving, and monitoring of medicines. These steps can all go wrong, and can lead to harm to the patient. Medication errors thus are an important patient-safety issue in health care systems all over the world. Medication safety is the practices and systems used to ensure that medicines are used safely and appropriately throughout the medication use process. It is about choosing the right medicine, giving the right dose, giving the right medicine to the right person in the right way, observing its effects and giving patients the right information about the medicine they are taking. It is not only the healthcare worker's responsibility to ensure the safety of medicines. Instead, it demands a concerted effort of all the people involved in the delivery of the health system, including prescribers, nurses, pharmacists, patients, caregivers, healthcare administrators and other staff.

1. Introduction

Healthcare mistakes can happen for a multitude of reasons: poor communication, incorrect patient information, confusing medication names and packaging, incorrect calculations, workload pressures, lack of staffing, lack of training, and a variety of other weaknesses in healthcare systems. Errors can occur due to the individual or due to conditions at the system/organization

level. Therefore, it's not enough to just pinpoint people who make errors—the root of the problem to avoid them is to be found in a different place. Healthcare organizations need to implement risk detection mechanisms, minimize risk conditions, promote reporting, and facilitate ongoing enhancement. Many medication errors can be prevented; this is especially important. Some

effective strategies include accurate medication reconciliation, ensuring clear communication among healthcare professionals, proper prescribing, patient education, standardization, double checking of high risk medicines, the use of technology and ongoing monitoring of any medicines related incidents. But it's also critical to develop a culture of patient safety where staff members can report mistakes and "near misses" without fear of inappropriate punishment.

This paper covers medication safety, and how errors can be avoided in healthcare. It addresses typical medication errors, the factors that contribute to them, and the impact they have, and outlines what health care professionals are responsible for, as well as evidence-based strategies that can help minimize medication-related harm. It also reflects the importance of technology, communication, patient engagement, and

organizational systems in enhancing safer health care practices.

2. Concept of Medication Safety

Medication safety is an essential part of patient safety and is the avoidance of preventable harm arising from medicines use.

This covers the whole process of prescribing and using a medicine, from selecting and prescribing a medicine through transcription, preparation, dispensing, administration, monitoring and ultimately, medicine discontinuation. Several healthcare professionals and healthcare systems are involved in this process and medication safety is not dependent on a single person. According to the World Health Organization (WHO), unsafe medication practices and medication errors are significant contributors to avoidable harm in health care around the world.

A medication error is an error that happens in the process of prescribing, preparing, dispensing, administration or monitoring

medication. Errors can include the wrong medicine, wrong dose, wrong route, wrong frequency or the wrong patient. They can also be related to inadequate communication of important allergy or existing medication information, medical or treatment status changes. Not all medication errors lead to harm of the patient is important to point out. Errors are detected and corrected at an early stage which is known as near miss, and this is a common error type. Studying both harmful incidents and near misses will be informative in that it will be able to identify potential weaknesses in healthcare processes and allow for the opportunity for prevention. Ensuring medication safety is especially critical during transitional care, from admission to hospital, transfer to other departments and discharge. These transitions may cause incomplete or inaccurate information about medications to be given, or information to be duplicated. Therefore, medication reconciliation is used to compare

a patient's current medication to new medication orders to find discrepancies that need to be clarified.

According to WHO, there are three key areas that need special attention – high-risk situations, polypharmacy and transitions of care. High risk situations can be a result of high alert medicines, vulnerable patients or unsafe working environments. Treatment multiple problems may occur, especially if patients take multiple medications for multiple conditions, and treatment may become more complex. Drug safety must be addressed in a systems approach. Healthcare workers' memory is not a reliable way for healthcare organizations to ensure adherence to safety procedures. Policies, standardized processes, staffing, communication, training, reporting systems and technology should instead collaborate on minimizing opportunities for error. WHO's Global Patient Safety Action Plan 2021–2030 also highlights coordinated action to close the gap

on avoidable harm and boost patient safety in health care systems.

3. Common Types of Medication Errors

Medication errors may happen at any point during the medication-use process. It is important to know about the various error types as they might need different preventative measure. The possibility of errors that can arise during the prescription, transcription, dispensing, administration, monitoring and communication between healthcare professionals and patients.

3.1 Prescribing Errors

Prescribing errors are when a health professional chooses or prescribes an inappropriate medicine, dose, route, frequency or duration of treatment. For instance, a patient could be prescribed a medication that is not appropriate due to allergy, medical history, drug interaction or contraindication. Prescription errors can also happen when a prescription has unclear or incomplete instructions. The risk of

prescribing errors can be increased when there are incomplete patient details, ambiguous abbreviations, incorrect calculations and poor handwriting. Particularly prescribing care is important since a mistake at this stage may be passed on to later stages in medication process. These risks can be minimized by careful evaluation of the patient, careful review of medical information, and careful documentation.

3.2 Dispensing Errors

Dispensing errors happen when the wrong medicine, dose, strength or formulation is dispensed or the distribution process is faulty. Drugs of similar names and packaging may be responsible for these errors. Look-alike, sound-alike (LASA) medicines are specifically identified by WHO as a medication-safety concern because of the potential for confusion due to similarities in name, packaging, appearance or pronunciation. Dispensing errors can be minimized by using appropriate storage

areas, clear labelling, careful verification of medicines and separation of medicines that are easily confused.

3.3 Administration Errors

Administration errors are when a medicine is administered incorrectly. These can be related to the wrong patient, wrong medicine, wrong dose, wrong route, wrong time, and wrong way of administering the medicine. For instance, giving a drug to one person to another person can do serious harm. Wrong calculations may also lead to over or under-dosing. It is the responsibility of nurses and other healthcare professionals working in administration to confirm medicines orders and patient identity before administering medicines. They should also take into account allergies, pertinent clinical data, and the capacity to take the prescribed medication safely.

3.4 Omission Errors

Omission error is a type of error that is committed when a medicine prescribed for

the patient is not given when it is needed. This can occur due to communication issues, out-of-stock medicines, instructions not clearly understood, workload pressures or lack of awareness of the need for a scheduled dose. An omitted dose can have minor impact at times, but when medicines are omitted when they are critical to a patient's condition, there can be serious consequences.

3.5 Monitoring Errors

The safe use of medicines doesn't finish when medicine has been given. Patients might need to be monitored for therapeutic efficacy, side effects, toxicity or clinical response. A monitoring error is when a health professional does not identify or act on a medication related problem. Patients taking high-risk medicines or more than one medicine should have regular monitoring especially.

3.6 Communication and Documentation Errors

Communication issues can be a root cause of medication errors at any point in the health-

care process. Discrepancies can develop due to incomplete handover, unclear prescriptions, inaccurate medication history and lack of communication between healthcare professionals regarding medication changes. This is particularly relevant when patients are transferred between health care facilities. Medication reconciliation is an attempt to decrease these differences by finding, confirming, and recording what medications the patient is currently taking and then verifying those with the medicines that were ordered. Overall, medication errors should be considered as a failure in a complex health care system. When a mistake is made, the name of the game is to determine its source, so that healthcare organizations go beyond simple individual vigilance and look to introduce specific interventions.

4. Identifies causes and contributing factors for medication errors.

Medication errors do not typically occur because of any one cause. Errors typically

occur when human, organizational, environmental and patient factors all play a role in most settings of health care. The medication-use process consists of multiple steps including prescribing, transcribing, dispensing, administering and monitoring. There are opportunities to make errors at each stage. According to the World Health Organization (WHO), medication errors can happen because of problems in the medication system or due to human factors like workers shortage, inadequate working conditions and staff fatigue. Thus, it is essential to have a broader perspective on how medication errors can occur, which includes both the human factors (individual) and the organizational factors (system) involved.

4.1 Human Factors

Medication errors can be caused by human factors, since healthcare workers have to make many decisions in their sometimes-challenging work environment. Fatigue,

stress, workloads, lack of knowledge or experience and distractions may diminish concentration and the potential for error. A healthcare provider could choose the wrong medication, calculate the wrong dose, provide a medication at the wrong time or miss a contraindication. Such risks can increase if the healthcare worker is caring for multiple patients or is tasked with completing multiple responsibilities at once. Medication errors have been identified by WHO as being caused by fatigue, staffing levels and working environment.

Medication safety is also related to knowledge and training. It is important that healthcare professionals understand the pharmacology, dosage calculations, potential drug interactions, contraindications, potential adverse effects, and procedures for appropriate administration. If health care providers don't know the medicine or aren't properly trained, there could be a higher chance of error. Therefore, it is important to

have continuous professional development as new medicines, treatment guidelines, technologies and safety practices are continually emerging. Training shouldn't be limited to just knowledge and should also be designed to inform healthcare workers how to recognize risk, report errors and near misses, communicate and apply available safety systems.

The use of medicines with similar names and/or similar appearance is another human factor. Prescribing, dispensing or administration of look-alike and sound-alike medicines may be confused. Even highly knowledgeable and experienced healthcare professionals can experience such confusion. Therefore, it is not good enough for people to remember which medicines are easily confused and rely on medication safety systems to do the rest. These are other ways to protect: Labeling, Separating similar medicines, Standardizing medicines prescriptions, and Electronic alerts. Look-

alike, sound-alike medicines are a priority medication safety issue in WHO's recommendations for systematic steps to mitigate the risks.

4.2 Communication and System Factors

Another significant cause of medication errors is communication breakdowns. The accurate communication of the information regarding medicines between doctors, nurses, pharmacists, patients and other health care professionals. Errors can happen when you don't have all the information, it is unclear, or you don't understand it. For instance, a prescription that is not written clearly could lead to the wrong medicine or dosage being given, or a patient not reporting an allergy might be given a medicine that could cause a severe reaction to the condition. The significance of communication is especially vital when patients are shifted from one department to another or when they are

moved from one health care facility to another.

Medication discrepancies can arise during transitions due to lack of accurate transfer of medication information. Medicines can be started, stopped or changed during a hospital stay, so it is important to record and report these changes. An important method that can be used to detect discrepancies between the patient's pre-admission medication and post-admission medication orders is medication reconciliation. Medication reconciliation is a process to establish the most accurate possible medication list and to compare that list with medication orders to detect discrepancies, according to the AHRQ definition.

Medication errors also can occur because of system-related problems. The design of the procedure, lack of staffing, ineffective medication storage, lack of standardized procedure and lack of access to reliable medication information may contribute to the

environment where errors are more likely to occur. High Alert Medicines are medicines that if a mistake is made, have the potential to cause serious harm to the patient. The Institute for Safe Medication Practices (ISMP) promotes extra precautions for high-alert medicines such as standardizing processes and putting in place appropriate safeguards across the medication-use system.

The system factor of a strong patient-safety culture is also key. Healthcare workers should be encouraged to report medication errors and near misses in order to investigate the cause of the errors. When staff feel they will be penalized unfairly for any mistake they make, they may not report incidents, as this will not enable the organization to learn from them. A safety organization considers what, why, and how things could be altered to ensure future safety. This way, they understand that mistakes in healthcare cannot be just a result of carelessness, but also from system shortcomings.

4.3 Patient and Environmental Factors

Patients may also find themselves in situations that make it more likely that a medication error will occur. Patients may be taking multiple medications, may not be able to follow the instructions for the medications they take, may have language barriers, or may have limited health literacy. Individuals who are older people and those who are more complex medically may be at more risk due to their need for multiple medications and frequent changes of medications. If patients are not aware of how or why to take their medications and what side effects should be treated if they occur, the risks of medication-related problems may rise.

Patient participation can thus play a major role in medication safety. Information on medicines should be given to healthcare professionals and patients should be encouraged to ask questions about medicines treatment. There are a variety of techniques

that can be employed to verify patient understanding of instructions, including teach-back. Patients can also be encouraged to keep a current list of medicines and share all allergy, previous reactions and medicines acquired from other healthcare providers. Medication lists and teach-back are patient engagement strategies that AHRQ considers to enhance communication and decrease risks in healthcare.

The physical and environmental factors within healthcare facilities also can impact medication safety. Medications may need to be prepared and administered, and concentration can be difficult due to noise, interruptions, poor lighting, poor organization of medicines and work areas, and frequent distractions. Healthcare professionals are more likely to make errors when they are frequently interrupted while working with their calculators to determine medication dosage, checking medication orders, and/or preparing medicines.

Healthcare organizations should therefore ensure that their work environment is conducive to concentration and safe medication practice.

5. Prevention of Medication Errors

All the members of the healthcare team, patients, healthcare organizations, and the entire healthcare system must work together to prevent medication errors. Medication errors can happen at several steps of the medication-use process, thus, there needs to be multiple safety measures taken to prevent medication errors. Adhere to the correct and appropriate prescribing of medicines is one of the most important strategies. Healthcare providers should inquire about the patient's medical diagnosis, allergies, current medications, past adverse reactions, and other pertinent health issues before prescribing a medication. Prescribed medicine, dose, route, frequency and duration should be well documented to

minimize the chance of misunderstanding or incorrect administration.

Another effective method to avoid medication errors is to conduct medication reconciliation, especially at the time of admission to a hospital, transfer between departments and discharge. The healthcare professional should check with the patient the difference between the medicines taken prior to admission and the medicines prescribed and clarify any differences. This can be an effective way to uncover unordered medicines, duplicate medicine ordering, dosage error and unexpected changes. Keeping an accurate medication history also helps facilitate communication between healthcare providers and ensure continuity of care.

Medication administration is also important and should be done safely. Healthcare professionals should always verify patient identity, medication, dose, route and when a medicine is prescribed, and should check for

known allergies and other relevant precautions. A medication record will be completed after medication is given which must include all necessary information for the other health care team members. Extra vigilance is required when giving medicines which are known as high alert medicines as mistakes in giving these medicines could cause serious harm. Further protection can be achieved by standardized procedures, clear labelling, suitable storage and more independent checks of selected high risk medicines.

Interprofessional working is also crucial to preventing medication errors. The information about the medication should be passed on during handover, patient transfers, consultation and discharge in a clear way. Healthcare workers should try to avoid using ambiguous abbreviations, and when in doubt, clarify instructions. All patients and their caregivers should also be engaged in preventing medication errors. They should be

given information that is understandable relating to why they are taking their medicines, how and when they should take them, what side effects they may experience and what precautions they need to take. Asking patients to bring questions and have a current list of medications can offer an extra layer of security.

Healthcare organizations must also have efficient mechanisms in place for reporting medication errors and near misses. Reporting will enable health care facilities to detect trends, study root causes, and implement strategies to prevent future occurrences. Near misses are important because they offer a chance to improve weaknesses without causing a patient harm. An effective safety culture should provide the incentive for health care personnel to report incidents and without fear of inappropriate penalty. Organisations should be concerned about the “why” of the error and enhancing the systems that led to the error. Ongoing staff training,

frequent medication-safety audits, appropriate staffing, effective supervision, and continual review of medication safety procedures can further minimize medication errors. These joint efforts can lead to less preventable patient harm and safer medication use processes in the healthcare sector.

6. Role of Healthcare Professionals in Medication Safety

Healthcare professionals have a key role to play in helping to keep medicines safe as they are directly involved in the prescribing, dispensing, administration, monitoring, and education of medicines to patients. There are various roles for doctor, nurse, pharmacist and health care workers, but they are interrelated. It is therefore crucial that medication safety is a joint responsibility, a team effort, and based on clear communication. Medication policies should be followed by healthcare professionals; medication records should be kept; the order

of medication should be checked and there should be a constant awareness of the potential risks of the medication-use process.

They should also be aware that safety of medications does not only depend on individuals, but on the collaboration of all those who provide care to the patient.

It is essential that prescribers choose the right medicines, based on the patient's diagnosis, medical history, allergies, current medicine use and clinical condition. They should prescribe the right medicine, dosage, method of administration, frequency and time of administration, and length of time, and communicate with other health care professionals involved with the patient's care. Pharmacists play a role in medication safety by performing prescription review, drug interaction checking, dose checking, giving medication information, and medicine checking/dispensing. If there is any doubt that a prescription may be ambiguous or otherwise unsafe, the pharmacist should

contact the prescriber prior to dispensing the drug. This is a team effort, which gives another chance to identify and avoid error.

A large responsibility for patient safety lies with nurses and other healthcare workers who dispense medication. They should check the order of medicines, check the identity of the patient, check for patient's allergies, administer medicines as prescribed and accurately document medicines. A nurse's first point of contact with a patient is likely one of the first people to observe a negative reaction or other unusual patient condition. If these issues are identified and communicated early, then avoid further damage. Pupils' healthcare professionals should also observe if medication is having the desired therapeutic effect and record any adverse reactions or concerns related to the medication.

Clear teamwork and communication is essential as sharing a patient's care without collaboration can be hazardous. Information

regarding medications, allergies, changes in care, and monitoring should be provided accurately during patient handovers and transfers. Healthcare professionals should make sure to clarify unclear directions and not assume anything. Work among professionals from multiple disciplines can also be helpful to understand risks that may not be detected by a single professional. Frequent meetings, medication reviews, case discussions, and standardized communication protocols can facilitate collaboration and enhance patient safety.

Conclusion

Medication safety is an integral part of quality health care and patient safety. Medications errors can happen throughout the medication use process from writing the prescription, dispensing the medication, administering the medication, monitoring the medication and communicating. Some may not cause harm while others can lead to serious complications, extended hospital

stays, permanent disability or death. Errors in medication administration can be complex and involve human factors, communication failure, insufficient staffing, poor working conditions, lack of patient information and failure within health care systems. As a result, it is essential that a range of measures be adopted to prevent medication errors, and that they are not the sole responsibility of individual members of the health care team.

To be effective, prevention requires correct prescription, proper medication reconciliation, medication administration safety, communication, patient education, and monitoring. Healthcare workers play a significant role in collaborating with each other, complying with hygiene protocols, recognizing risks and reporting any medication-related incidents or near misses. Patients and caregivers should also be strongly encouraged to engage actively in their treatment, asking questions, reporting medications accurately and following

prescribed instructions. Healthcare organisations should also foster safety culture where medication error is looked upon as a learning and improvement opportunity.

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