Medication Error Prevention for Healthcare Providers

Faculty and Disclosures

CE Information
There are between 44,000 and 98,000 individuals who die every year in hospitals due to preventable medical errors.[1] It has also been reported that this is only part of the problem, as thousands of other patients are adversely affected by medical errors or barely avoid injuries that are nonfatal.[2] These medical errors not only cost the loss of lives, but carry a financial burden that is estimated to be in a range of $17 billion to $29 billion annually. Additionally, there is physical and psychological pain and suffering related to these errors.[3] Another consequence is that medical errors diminish trust and satisfaction in the healthcare system and in healthcare professionals.[1]

Ginette A. Pepper, PhD, RN, FAAN, a Professor and Helen Lowe Bamberger Colby Presidential Endowed Chair and Associate Dean for Research, University of Utah College of Nursing, Salt Lake City, spoke on medication safety for the geriatric nurse practitioner (GNP).[3] Dr. Pepper was trained as a pharmacologist with a nursing focus. She was one of the first NPs to add "geriatric" to her title as well as one of the first NPs to have prescriptive authority.

Safety Principles and the Medication Use Process

Dr. Pepper noted that safety issues are of the utmost importance for all healthcare providers.[3] Nursing as a profession has a long history of regarding patient safety as a primary precept of the profession. Florence Nightingale stated in her book entitled Notes on Hospitals, published in 1859, "the very first requirement in a hospital that it should do the sick no harm."[4]

Nursing schools have long taught that there are "5 Rights" to safe medication delivery to patients. These include the following: right drug; right patient; right dose; right route; and the right time. Dr. Pepper[3] noted that there are several things wrong in teaching medication error prevention this way. The 5 rights are goals, not procedures. They do not recognize the complexity of the nursing role, and they focus on the individual rather than system factors. Further, there is lack of evidence-based best practices on this teaching. Dr. Pepper offered an analogy of the 5 rights for medication as the equivalent of giving airplane pilots the following instructions to avoid crashes: have the right plane; the right passenger; the right airport of origination; the right destination; and the right time.[3]

Cognitive psychologists report that the human brain is creative and is wired to make errors. Dr. Pepper pointed out that if nurses and others in healthcare institutions would start with this assumption, it would be clear that the way to approach error prevention is a systems approach. This method would avoid the "blame game," in which, typically, the last person in the chain of caregivers gets the blame. Usually, this is the nurse who is administering the medications, even though other caregivers may have had a role in the error.

Nurses have 2 roles in medication error prevention: (1) they must check to see that other healthcare providers have not made any errors in any part of the medication order chain; and (2) they must ensure that they themselves do not make an error.[3]

Medication Use Process

There are several nodes or parts of the medication use process where errors can occur. These include prescribing, documenting, transcribing, dispensing, administering, and monitoring.[3] Ordering or prescribing the wrong drug, dosage, or route contributes to 48% of medication errors. Nurses intercept 48% of these types of
ordering errors. Transcription errors account for 11% of all errors, of which 23% are intercepted by nurses. Dispensing errors comprise 14% of all medication errors; however, nurses intercept 37% of them. Overall, nurses intercept 58% of all medication errors. Administration errors account for 28% of all errors, but once the medicine has been given, there is no way to intercept it.

**Systems-Based Approach vs a Person-Based Approach to Errors**

There are 2 basic ways of viewing human error. The first is a "person approach," which has been traditionally used in analysis of medication errors. The person approach looks at medication errors as occurring due to human frailty, including forgetfulness, poor motivation, carelessness, not paying attention, or even negligence. Solutions to errors when viewed from this perspective include disciplinary actions, blame and shame, and even threats of lawsuits.

Alternatively, a systems-based approach expects that errors will occur. Errors are viewed as the end result and not the cause. There is potential for error and recurring errors in every system, and even the best systems fail. Solutions are based on the belief that conditions can be changed, rather than focusing on changing humans. Barriers and safeguards should be implemented to help prevent errors. It is essential to focus on how and why the system failed and not on which individual failed.

It is important to note that many times, some of the best people make the worst mistakes. Errors fall into recurring patterns with the same set of events, no matter which individuals are involved. Approximately 90% of all errors are actually blameless.

**The Swiss Cheese Model of Systems Errors**

Defenses and barriers are the best ways to prevent errors in a systems-based approach. Each barrier could be viewed as a slice of cheese. In an ideal word, there would be no holes in the barriers. However, in the real world, the various defenses line up like slices of Swiss cheese. When the holes line up, there is a system failure or an error.

The holes emerge due to either active or latent failures in the system, but usually it is a combination of both. Active errors are unsafe acts committed by those on the front lines. In healthcare, this includes nurse practitioners, physicians, nurses, and pharmacists.

Latent errors focus on the conditions surrounding the error. There may have been flaws in the systems that were longstanding. These holes may become apparent when there are local triggering factors based on active errors. In healthcare, types of latent errors include management decisions and organizational processes. Latent failures may be identified and prevented before an error occurs.

**Strategies to Help Prevent Errors**

According to Dr. Pepper, there are several individual strategies that can be used to help prevent medication errors. Always double check "high-alert drugs" by doing independent calculations. High-alert drugs are those medications that have an increased risk of causing harm to patients when used in error. A list of these drugs has been put together by the Institute of Safe Medication Practices. Another helpful strategy is to take time out between rechecking calculations. Healthcare professionals are more likely to find their own errors when there is time between rechecks. Dr. Pepper stated that even with the practice of double checking medications with another nurse, as is often done with IV drugs, there is a great chance for error. Individuals see what they expect to see. So whatever medication or patient name one nurse may read, the second nurse has a tendency to see as well. A better way to implement double checks would be to have one nurse read what is on the medication package or dose and have the other nurse check it against the order, and then reverse the process.

There are some specific abbreviations that have been frequently mistaken and caused medical errors. These symbols or abbreviations should never be used in any form of communication, including writing prescriptive orders. An example would be writing "qd" for a daily order that can be misinterpreted for "qid," which would quadruple the dose. Another error-prone abbreviation would be to use "U" for a unit. U has sometimes been
misinterpreted as a zero, causing an overdose of 10 times the amount of medication that was intended for a patient. The bottom line is that healthcare professionals should write out the words rather than using commonly misread symbols or abbreviations.[8]

Healthcare professionals should put safety ahead of timeliness. Clinicians should exercise caution when out of the normal safety zone of practice. And if an error should occur, the healthcare professional should take the time to report it. If an error happened in one situation for a patient, it is likely that it could happen again in similar circumstances.[9]

**Top Reasons for Prescription Errors**

Dr. Pepper listed the top reasons for medication errors that nurse practitioners should be aware of when writing prescriptions, especially for older adults.[9] First, illegible or poor handwriting is a cause of error when writing orders. Use of dangerous abbreviations, such as those on the ISMP list, should be avoided.[9] Drug selection is important. Nurse practitioners should avoid ordering drugs listed on the Beers Criteria for patients aged 65 years and older.[9] (The Beers Criteria was developed in 1997 and updated in 2002. It lists drugs with the most potential for causing adverse reactions for older adults.) Another table developed for the updated Beers Criteria includes lists of drugs to avoid when older adults have certain diseases or conditions.[9]

Another key reason for prescription error is using a "trailing zero" after a decimal point when writing a dosage. This can lead to a 10-fold medication error. For example, writing a medication dosage as 1.0 mg may be misinterpreted as 10 mg, if the decimal point is not seen. However, a zero should always precede a decimal point. For example, a medication written as .1 mg could be misinterpreted as 1 mg if the decimal point is missed, leading to a patient receiving 10 times the amount of medicine needed. In this case, the zero should precede the decimal point, as in 0.1 mg. The rule of thumb is that a zero should precede a decimal point but not follow one when writing prescriptions. A way to remember this rule is "Always lead, never follow."[9]

Other common reasons for medication errors include not considering renal dosing and not adjusting for decreased liver blood flow. The patient should be included in any medical decision and informed of what is being ordered. Two final sources of medication errors include not writing the purpose of the medication on the prescription and inadequate contact information for the pharmacist to follow up with the prescriber. An example of a potential error that could be caused by not writing the purpose of the medication on the prescription and not writing adequate contact information on the order would be ordering calcium for a patient with osteoporosis vs a patient with Addison’s disease. The dose may be changed to the lower dose if there is no way to consult or to verify the reason with the prescriber.[9]

References

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**References**

3. Pepper G. Do no harm: medication safety for the GNP. Program and abstracts of the National Conference of Gerontological Nurse Practitioners 25th Annual Conference; September 27-October 1, 2006; Jacksonville, Florida.