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Applying Airline Safety Practices to Medication Administration

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Medication administration errors (MAE) continue as major problems for health care institutions, nurses, and patients. However, MAEs are often the result of system failures leading to patient injury, increased hospital costs, and blaming. Costs include those related to increased hospital length of stay and legal expenses. Contributing factors include distractions, lack of focus, poor communication, and failure to follow standard protocols during medication administration.

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Limited research exists addressing human factors and work redesign to reduce medication errors. Most available studies identify causes and possible resolutions to medication errors, but few have provided practical interventions. Standard protocols for medication administration have been taught for years. However, health care organizations and nurses continue to use trial and error approaches rather than recommended or researched practices.

Evidence-based practice (EBP) uses the most current evidence-based research outcomes to establish policies and procedures for everyone to follow. The use of best practices for multiple clinical situations has recently become an important issue; however, medication administration processes have been virtually ignored in the search for EBP. In addition, the entire domain of patient safety in terms of EBP has been overlooked. This research study helped resolve that problem by providing significant evidence of safe medication administration practices. This new knowledge provides nurses and health care organizations with the evidence to establish EBP guidelines and standard operating procedures for medication administration, which can ultimately reduce medication administration errors (MAEs).

The key to prevention lies within other industry standards, in which safety measures have shown decreases in errors. One such industry is the airline industry with efforts in place that improve pilots' focus when preparing to fly a plane. For example, pilots are not allowed to engage in conversation unrelated to the flight checklist (sterile cockpit situation) when the plane is below 10,000 feet. This allows for increased focus during critical periods and reduces crashes (Cohen, 1999). Medication administration should be considered as critical as piloting a plane, because patients place their lives in the hands of health care professionals.

This study was conducted to measure the effect of two targeted interventions based on airline industry safety measures for decreasing nurses' distractions during medication administration. The study involved three groups of nurses, with those in the control group using customary medication administration procedures. Nurses in the second group used a focused protocol, and the third group used the Medsafe© protocol. Significant reductions in distractions were found with both the focused protocol and the Medsafe protocol, with the largest mean difference between the control and the Medsafe group.

Background

MAEs remain third in the list of causes of sentinel events leading to patient death or loss of function. Most MAEs occur in general hospitals as opposed to behavioral hospitals, outpatient facilities, long-term care facilities, or home care settings (Joint Commission on Accreditation of Healthcare Organizations [JCAHO], 2002). The term "sentinel event" is used because it sounds a warning that something needs to be done to prevent future similar incidents. The new criteria for determining whether a medication error is considered sentinel include patient death, paralysis, or coma associated with a medication. Any "near miss" medication error is now considered nonreportable (JCAHO, 2001). An estimated 10 to 20 sentinel events occur in every U.S. hospital annually (Kobs, 1999). Nevertheless, complex systems rather than humans are frequently the source of MAEs in health care settings. Medication administration involves a complex set of steps in achieving the desired goal of getting the medication to the patient in a timely manner. A multitude of contributing factors often lead to medication errors as nurses encounter constraints within the system, work design problems, and human and environmental factors.

Recently the Agency for Healthcare Research and Quality (AHRQ) and the Institute of Medicine (IOM) recommended using teamwork, decision support, and checklists borrowed from the aviation industry to improve medication safety (AHRQ, 2001; IOM, 2001). There is a need to simplify systems, use standard protocols, improve communication and teamwork, and build in redundancy to defend against system errors. Also, basic psychological limitations should be considered for those involved in the task (IOM, 2000). These include a person's ability to focus in the face of distractions, conversation, and noise while trying to administer medications efficiently and safely.

According to the IOM (2000), preventable events resulting from medical errors cause nearly 100,000 deaths in hospitals annually, with almost 2% of these being medication related. This finding translates to 2,000 medication-related deaths annually. Regardless of the reported number, medication error reduction is critical to patient safety and the viability of the health care industry. An increased interest in identifying and implementing MAE safety measures has followed the IOM's 1999 report. However, more needs to be done to improve medication safety.

Medication Errors

Medication administration errors occur when there is a breach of one of the seven rights of medication use: right patient, right drug, right dose, right time, right route, right reason, and right documentation. MAEs often result in patient injury, increased hospital costs, and nurses being blamed for the incident.

Based on a 1999 study involving 56 hospitals, most medication errors occur at the point of administration (United States Pharmacopeia [USP], 2000). Furthermore, as much as 1.6% to 38% of all medications administered are in error, excluding about 25% of those that are not reported (Osborne, Blais, & Hayes, 1999). With millions of doses of medications administered in the United States annually, error rates as small as 0.1% would produce error totals that exceed other industries. An equivalent in other industries would include two plane crashes at a major airport per day, and 16,000 pieces of mail lost per hour (Beardsley & Woods, 1999). These staggering numbers cause great concern for organizations struggling to remain viable in today's health care market.

System Issues

Medication administration is an example of a complex system involving several phases and steps. When such elaborate systems are faulty, the potential for multiple errors accumulate over time and finally result in a major accident. Even with systems of verification in place, most medication administration processes are convoluted and error prone. System failures include both design failures and environmental failures. High noise levels, interruptions, difficult-to-read equipment displays, illegible dosage labels, and similar shapes, colors, and sizes of bottles are all system failures in the hospital work environment (Moray, 1994). Medication administration, in fact, involves countless environmental elements continually interacting with one another.

Design Failures

Design failures involve problems with processes, tasks, or equipment. In the past nurses were more identifiable due to the presence of nurses' caps and distinctive white uniforms. The assigning of only one or two medication nurses reduced the problems with distractions from other personnel. Other staff simply left the medication nurses alone to perform their job.

Many hospitals today use the modified case method in which several nurses have responsibility for and deliver medications to a group of assigned patients. Consequently, it is often challenging to

tractions, (c) use visible symbols during medication administration times, (d) use checklists that serve as reminders to improve focus, and (e) limit other sources of distractions such as other personnel interruptions and external noise.

Implications

Many of the constraints inherent in medication administration can be reduced by changes in work design, including providing no interruptions in a noise-free environment. Educational interventions and teamwork should be used to decrease nurses' distractions during medication administration. Standard protocols for medication administration should be established based on evidence-based guidelines. Medication administration methods should be modified to include standard protocol checklists as safety reminders. A visible symbol is needed that identifies nurses, indicates to others that nurses are administering medications, and signifies that distractions are unwanted. Large-print name tags and differences in uniforms for hospital personnel could help identify nurses from other persons to preclude fewer interruptions during medication administration. In light of the nursing shortage and the results of this study, hospitals should again consider adopting the team nursing model in which the nurse is the team leader. Well-trained medication aids and other assistive personnel could alleviate some of the stress currently placed on nurses in an often chaotic environment. These practical and inexpensive approaches to medication safety offer health care organizations evidence-based practice guidelines for medication safety.

Recommendations For Further Study

The research study should be replicated in multiple settings with varied days and time frames, and used with other nursing models. Further research should investigate the use of various types of visible symbols to identify nurses during medication administration, and varied educational interventions. Further research should investigate the use of various nursing models to decrease distractions.

Summary

The increased costs of medication errors, societal pressures, and government agency support have provided the impetus for current patient safety research. As a result, a considerable amount of medication error literature has erupted. Yet few studies provide evidence-based practices so health care organizations can establish best practice guidelines for medication safety. This study helped close this research gap by examining the effect of two targeted interventions on the medication administration practices of nurses.

This quasi-experimental study measured the effect of two targeted interventions based on airline industry safety measures for decreasing nurses' distractions during medication administration. The safety checklists outlined an optimal EBP medication administration procedure. Conversation was limited and a visible symbol was used. Significant reductions in distractions were found with both the focused protocol and the Medsafe protocol with vest. The largest mean difference was between the control and the Medsafe group, demonstrating that a visible symbol, worn during medication administration as a sign that distractions are unwanted, can make the greatest difference for nurses in preventing interruptions. Nevertheless, the study also revealed that staff education increased their awareness and cooperation with reducing the potential hazards of distractions, noise, and unnecessary conversation.

The study results infer that changes in work design using teamwork and targeted interventions can significantly reduce nurses' distractions during medication administration, ultimately reducing medication errors. Nurses' satisfaction and morale may improve as a result of increased efficiency of medication delivery and fewer errors. Therefore, redesigning systems using these research findings should be done immediately to prevent distractions and improve patient safety. Environmental factors such as high noise levels and conversation should be reduced as much as possible. Protocols used should be specific to the most frequently occurring sources of nurses' distractions in order to improve focus and reduce medication errors. Ultimately, establishing a safety culture during medication administration will save lives. ■

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