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Managing Medication Errors – A Qualitative Study

Medication errors continue to be a significant issue affecting patient safety in United States hospitals. The researchers conducted a qualitative study to explore the understanding and management of medication errors by practicing nurses. The results indicated a belief that late medication administration does not always constitute an error, the use of nursing judgment helps determine when and if medication should be given, and an increased reliance upon computerized and systematic checks put into place in health care systems.

The Institute of Medicine reports 44,000 to 98,000 people die in hospitals annually as a result of medical errors that could have been prevented (Kohn, Corrigan, & Donaldson, 2000). Medication errors accounted for 7,391 deaths in 1993, compared to 2,876 deaths in 1983 (Kohn et al., 2000). These medication errors and the adverse reactions connected with them result in increased length of stay, increased cost, patient disability, and death.

The medication delivery process is complex and involves hand-offs between many individuals and departments. Errors may occur at any of the process steps: prescription, transcription, dispensing, or administration. Most error-reporting systems rely on voluntary self-reporting and are imbedded into what remain largely punitive management systems. Nurses widely report reluctance to disclose medication errors, particularly if an error does not result in patient harm (Wakefield, Wakefield, Uden-Holman, & Blegen, 1996; Walker & Lowe, 1998). The purpose of this phenomenologic study was to explore the management of medication errors by practicing nurses by examining the ways that nurses define medication errors and make decisions regarding the reporting of medication errors, and how medication errors affect nurses' day-to-day practice. Results from this study may help nurses and hospital administrators understand the reluctance to report medication errors.

Review of the Literature

Several studies have explored nurses' experience with medication errors. These studies demonstrate inconsistency with the definition of

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medication errors and with the likelihood of reporting some events even when they are identified as errors. Osborne, Blais, and Hayes (1999) surveyed registered nurses on medical-surgical units in a 700-bed community hospital in Florida. The study was approved by institutional review boards of the hospital and the affiliated university of the researchers. Surveys were distributed to 92 full-time and part-time RNs who administered medication at the hospital; 57 surveys were returned (61.9%). Participants were asked to rank 10 perceived causes of medication errors. The authors found that the top three perceived causes of medication errors were failure to compare the patient identification band with the medication administration record (35.7%, $n=20$), nurse fatigue (24.6%, $n=14$), and illegible handwriting by the prescriber (12.3%, $n=7$). Additionally, the authors demonstrated that given five administration scenarios about a missed medication dose (a late dose, a purposely omitted dose, a wrong intravenous total parenteral nutrition rate, and a pain medication 1 to 2 tablet dose range where the nurse gave a second tablet prior to the schedule time), participants were unable to reach universal agreement regarding the identification of the scenario as a medication error.

In another study of 43 nurses from six clinical areas originally selected to trial a new medication incident reporting form in an Australian hospital, participants were presented with 12 scenarios and asked to identify whether they would report a medication incident (Walker & Lowe, 1998). Only one scenario (giving metoprolol [Lopressor[®]] to the wrong patient) was identified as a medication error by all participants. Administering aspirin to the wrong patient (98%), giving the wrong dose of furosemide (Lasix[®]) (97%), giving penicillin to a patient with an allergy to the drug (97%), and giving a drug via the wrong route (95%) also ranked as reportable incidents. Only 53% of the nurses surveyed indicated that giving IV digoxin

(Lanoxin[®]) an hour late constituted a reportable medication incident.

The participants also were asked to participate in focus group discussions. Themes that emerged from the discussions included *self-preservation* and *it depends* (on the circumstances). Comments related to self-preservation involved fear of being reprimanded and concerns about incriminating a colleague. Comments about circumstances involved nurses' assessment of the entire situation to determine if an incident truly existed.

Wakefield et al. (1996) studied 1,384 nurses in 24 acute care hospitals in Iowa using a 16-item Likert survey designed to indicate level of agreement (1 to 6, from strongly disagree to strongly agree) about why medication errors may not be reported. The surveys were distributed by the individual hospitals, but returned directly to the investigators. Result analysis identified four possible barriers to the reporting of medication errors by nurses. Errors may not be reported if the nurse is fearful of reporting consequences, if there are negative responses or the absence of positive responses from administrators, or if the effort required to report the error is too great. The nurse's perception of the event as an error also was implicated as a barrier to reporting.

Using an ethnomethodologic approach, Baker (1997) studied nurses on three different nursing units in New South Wales, Australia, over an 18-week period. The study involved observation, documentation, analysis, and validation of results. Baker discovered that nurses believed it was not an error if the nurse could correct the situation safely, if the patient status required a change, or in emergency situations. Correcting the situation involved altering time frames in order to get the patient back on schedule or to resolve clerical errors. Patient status included situations such as patients who needed medications adjusted because of tests or because the patient needed uninterrupted sleep. Finally, it

was well understood that medications may be given late if the nurse was in an emergency situation.

Cohen, Robinson, and Mandrack (2003) analyzed 775 responses to a poll. The authors noted 36% of nurses indicated that they had not reported a medication error because they felt that to do so would have been personally or professionally damaging. Also, nurses evidently interjected judgment into the decision to report errors. If the nurse believed that the practice deviation was "reasonable" given the circumstances and the patient suffered no harm, then the event was likely not to be perceived as an error and would not be reported. An example of a deviation that was unlikely to be reported was the administration of an antibiotic shortly after the expiration of the agency-imposed timeframe for "on-time" administration. Nurses were also somewhat unlikely to report the errors of others, indicating that they would "never" report the error of physicians (19% of the time), pharmacists (14% of the time), or other nurses (9% of the time).

Purpose

The intent of the current study was to forge a more intense understanding of how nurses experience making or being involved in medication errors, what process is used to decide what constitutes a medication error, and what action to take when an error occurs. Investigators conducted interviews with nurses working in a variety of settings. While other qualitative studies focused on perceptions and barriers to reporting medication errors, this study sought to gain broader perspective by exploring the management of medication errors by practicing nurses.

Methodology

A Heideggerian phenomenologic method was used to discover how nurses address medication errors. Heidegger, who sought to uncover phenomena and meaning of phenomena, stated, "The meaning of phenomenological description as a method lies

in interpretation” (1927/1962, p. 61). Heidegger characterized understanding of phenomena and interpretation as a circle. Interpretation helps develop understanding, understanding then has meaning, and *visa versa*.

Polit and Hungler (1999) stated phenomenologists look for how people experience phenomena; lived experiences provide meaning to individual perceptions of phenomena. Phenomenology examines subjective experiences and gives meaning to perceptions. Medication errors are often part of the nurses’ world. Inquiring about nurses’ lived experiences and perceptions of how nurses manage medication errors is consistent with the goal of phenomenologic investigation.

Procedure. The researchers were nursing doctoral students who began the study as a group assignment for a course in qualitative research. Following approval by the university’s institutional review board, six nurses in southeast and south Texas were interviewed. The researchers obtained informed consent from each participant, and each interview was recorded and transcribed verbatim. The one-on-one interviews were 30 to 90 minutes in length. The research team devised the interview questions to focus on the process of medication administration, the concept of what constituted a medication error, and factors associated with errors (see Table 1). Interview questions were validated by qualitative nursing faculty experts at Texas Women’s University. Probe questions were used to solicit further information.

Sample. Nurses currently working in clinical settings in southeast and south Texas were asked to participate in the study. Researchers did not specifically seek nurses who had made medication errors. Nursing experience of participants ranged from 6 months to 34 years in a wide variety of settings, including labor and delivery, medical-surgical nursing, emergency room nursing, faculty, and school nursing. All of the participants were female.

Analysis. Analysis was conducted using Benner’s (1985) inter-

Table 1.
Nurse Management of Medication Errors Semi-Structured Interview Schedule

1. Number of years in nursing.
2. Current work setting (for example, ICU, medical unit, etc.).
3. Tell me about the process for administering medications at your institution.
4. How has this process changed since you entered nursing?
5. What do you consider a medication error?
6. How do medication errors affect your day-to-day practice?
7. What procedures are in place to decrease the number of medication errors on your unit?
8. What do you feel the role of the pharmacy/technology is in preventing medication errors?
9. What is the process for reporting medication errors at your institution?
10. If you have made a medication error, please respond to the following:
 - How do you decide when to report a medication error?
 - Give an example of a time you found a medication error and reported the error.
 - How do you decide not to report a medication error?
 - Give an example of a time you found a medication error and did not report the error.
11. How would you change the process of reporting errors in nursing today?

pretive methodology. First, researchers systematically reviewed the content of the transcribed interviews both individually and in research team meetings for patterns. Next, an overview chart was created to identify commonalities within the data. Interview questions were revised twice during the study to reflect information gathered from early study participants. General themes were described by the researchers following analysis of these data. Each case was then examined for exemplar and paradigm cases. Relevant quotes were incorporated into themes generated by the research team. Themes were validated by each member of the research team and by experts on the nursing faculty at Texas Women’s University.

Results

Analysis of the participants’ transcribed responses revealed three key themes: *Time is on our side*, *Context counts*, and *Reliance on systems*.

Time is on our side. Participants readily identified the “five rights” as the process of medication administration and prevention of medication errors. Most nurses stated a violation of the five rights constitutes a medication error. Yet, nurs-

es consistently acknowledged not consciously utilizing the five rights for medication administration. An experienced oncology nurse stated, “...I am just about to do a, uh, an inservice on five rights. I think one of the things we get, as you get to be a more seasoned nurse, you don’t follow all of the steps of the five rights.”

The philosophy of not using the five rights consistently was especially evident when it came to the “right time.” Nurses did not feel administering medication at the right time was as critical as the other elements of the five rights (patient, dose, drug, route). An experienced medical-surgical nurse stated:

Well, I have to say, I’ve been aware of other people that’ll say, ‘I found this, you know, hanging and the med didn’t infuse.’ That happens sometimes, it’s like spiked, but it’s clamped so it never goes through. So, I mean it’s still an omission because it’s time to hang the next dose and that one’s still there...You know, and I have to say that sometimes we’ll say, Oh, okay, well, we’ll just keep an eye you know which nurse was it and if you see it happening a lot then you’d start reporting it. But

sometimes we (pause) just, you know, bypass it. 'By the way, doc, he missed this order,' and 'Okay, well, just try to make sure they get 'em.' You know. So, I have to say not all not – we'd be forever writing (incident report) papers sometimes (laughs)...I think the errors that get documented is when I give the wrong dose to the wrong patient. I'm not sure necessarily that the wrong time always gets documented.

Nurses especially believed that administering medications at the wrong time was not truly a medication error if other things were happening on the unit, if the nurse perceived timing was not critical for certain drugs, and if there was a general lack of time to administer medications in a timely fashion. A nurse educator stated, "There were ones I didn't give because I was giving so many meds that some of them just didn't get given because of time. Umm, sleeping pills – things like that."

Here is an example of an experienced medical-surgical nurse who felt late medication administration was not critical when there were other kinds of emergencies happening on the unit.

Well, if it was being 15 minutes late for a medication that was a non-threatening situation like an antibiotic, you know, 15 minutes outside of our window because we have a little bit of flexibility. To me, that's not as severe as patient having a blood sugar crash or, you know, if you did an insulin is a big deal...

The above statement indicated there was flexibility in medication administration times when emergencies were occurring on the unit. A labor and delivery nurse believed flexibility in medication time was imperative to the type of unit:

Wrong dose, wrong route, wrong, um, patient definitely, and normally on most floors if you give it, you know, more than an hour late, however again in labor and delivery we have a little more flexibility because sometimes, um, it's harder to predict time scales in

labor and delivery...but still the 1-hour window is what we look at for giving it if it's late.

Context counts. Medication administration is one piece of the nurse's very complex role. If something else going on in the unit or in the clinical setting had greater importance or required all the nurses' attention to avert catastrophe, late medications and omitted medications were accepted as part of nursing judgment.

A relatively new labor and delivery nurse described two situations arising on a specialty unit. The first situation related to purposely omitting a drug because of possible harm to the patient. The second situation similarly involved administering a drug late because emergencies took precedence over medication administration.

Like with Pitocin[®] we have an (pause) orders to increase it by so much every 20 minutes, but if the baby's not tolerating it, we don't do it. And that's nursing judgment. We have to use a lot of nursing judgment. But antibiotics we try to give within an hour, but if you're having an obstetrical emergency sometimes, that takes precedence over the antibiotic – especially if we're doing it prophylactically. So, you just have to use a lot of nursing judgment.

An experienced emergency room nurse also expressed the risk for medication errors when emergencies are occurring: "The reality of practice in the ER is that there are times when all hell is breaking loose in a hand basket and you don't get to do the fine points with patients that you would like to do. That's just real. But that can't happen with medication administration." In contrast, an experienced medical-surgical nurse felt the procedure for taking off orders created a double-check despite chaos: "...a lot of days it's really hectic and, you know, (the charts) stack up so they're pretty good about keeping up with their orders themselves and then when I get to the chart and I'm noting it, I make sure it's on (the MAR) too. So it's like a double-check."

Reliance on systems. Nurses

have come to rely on the systems put in place by hospitals to assist them in preventing errors. Participants in the study frequently mentioned the use of medication administration records (MARs) and automated medication dispensing machines (AMDMs) as typical examples of these assistive systems. Additionally, a nurse educator mentioned the increased dependence on the pharmacy staff to prevent drug incompatibility issues.

One participant from labor and delivery described the AMDM as "kind of watching over" the nurse, stating that "now it's actually catching you." In describing the pending implementation of an AMDM, one medical-surgical nurse indicated what could be an unrealistic expectation of this machine: "...the [AMDM] is going to be computerized with all the allergies in there and then supposedly the machine is not going to administer the medication if there is an allergy to it."

Study participants described errors or potential errors caused by this reliance on assistive systems. In one instance, the section of the AMDM intended for ampicillin was filled with amoxicillin. The facility was unable to determine with complete certainty whether or not the incorrect medication had been administered. In another instance, an additional dose of an antibiotic was administered simply because an additional, erroneous scheduled time was present on the MAR. These examples of actual and potential errors demonstrate that over-reliance on any single system to prevent error may engender additional error potential.

Discussion

While this study originally was undertaken specifically to understand and explore medication errors, a new view of nursing practice emerged. In addition to variance from the five rights, nurses showed an increased reliance upon computerized and systematic checks put into place in health care systems. Nurses viewed the systems as infallible and as a relief from the duty of systematic checking against error. Experienced nurs-

es easily recalled the “old” way of scrutinizing and double-checking medications, MARs, and systems, while the newer nurses did not even mention these measures that were once standard nursing practices. Interviewees consistently stated that errors were made due to failure to check doses, allergies, drugs, and interactions because the computerized MARs and AMDM did not note such potential problems; the very systems implemented to reduce error and cost actually may contribute to increases in both.

While the five rights of medication administration were recalled easily by all nurses, further exploration of the subject yielded great variance, specifically in time of administration; it may be difficult to isolate and examine the practice of medication administration without consideration and examination of the broader scope of nurses’ responsibilities and capabilities in day-to-day practice. The gold standards of medication administration, such as the five rights, were cited in respondents’ practice. Nurses used the five rights, but were more flexible in their application of the five rights based on the situation and their judgment. The perception was that compliance with standards of practice for medication administration were increasingly difficult given the increased patient acuity and workload of the nurse. Medication errors could not be considered in isolation but had to be considered as a part of nursing practice in an increasingly complex system.

Nursing Implications

Reducing medication errors is a key element to improving patient safety in health care. Medication errors can occur in prescribing, dispensing, administering, and monitoring medication processes (Kohn et al., 2000). This study discovered a belief that late medication administration does not always constitute an error, and the use of nursing judgement helps determine when and if medication should be given. These perceptions reflect a need for ongoing research about what constitutes a medication error. Osborne et al.

(1999) recognized a need for clarification of policies regarding medication errors. The need is reinforced by this study.

Education is also needed for any personnel involved in the process of prescribing, dispensing, administering, and monitoring medications. Education may include the facility definition of what constitutes medication errors, the process of reporting medication errors, medication updates, the use of AMDMs, and rules and regulations about patient safety regarding medication administration.

The process of medication administration and improving patient safety involves an entire system. “Safety does not reside in a person, device, or department, but emerges from interactions of components of a system” (Kohn et al., 2000, p. 57). Nurses stated technology and double-checking orders helped to prevent medication errors. Strategies such as bar coding, patient monitoring, order read back, and medication alert systems are recommended in the Institute of Medicine report (Kohn et al., 2000), but they do not preclude nurses from using the five rights along with technology. Nurses and hospital administrators should evaluate the effectiveness of AMDMs as well as their appropriate utilization.

Medication error reporting is another element of the system. The process of reporting medication errors should be evaluated for whether it truly obtains data needed to improve patient safety as well as ensures assessment of medication errors in a nonpunitive fashion (Osborne et al., 1999).

Recommendations

Future research may include studies of a more geographically diverse population. In addition, they may explore specifically how nurses vary their practice according to patient load, patient acuity, and the circumstances of their day-to-day practice environment. Medication administration may be part of that study, but should be explored contextually rather than as an isolated phenomenon. Quantitative studies, such as those conducted by Osborne et al.

(1999), Wakefield et al. (1996), and Walker and Lowe (1998), may provide more information to facilitate determining nurses’ perceptions and definitions of medication errors. Additional research about the use of AMDMs in improving patient safety also should be conducted.

This study discovered that, although nurses use the five rights, nurses have the perception that late medication administration does not always constitute a true medication error, that context counts regarding medication administration, and nurses have an increased reliance on the system. Nursing judgment was paramount to survey participants when making a decision about the application of the five rights. With continued research, education, and clarification of policies in relation to the process of medication administration, nurses will be able to play an active role in improving patient safety. ■

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