

ICU NURSE MEDICATION MANAGEMENT: DECISION-MAKING IN A COMPLEX ENVIRONMENT

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TOPICS

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1. INTRODUCTION

1.1 Nursing work

Intensive care units (ICUs) are dynamic environments in which patient status can change rapidly and decisions are often made under stress and time pressure. ICU nurses play an important role in patient safety because of their responsibility in direct care. Nurses' main tasks are to assess patients, identify desired outcomes for these patients, plan and implement treatment protocols to achieve these outcomes, and re-evaluate patients to ensure that the treatment achieves the intended outcomes⁶.

Nurses' work is facilitated by various factors in the healthcare environment, among which are the quality and performance of staff, characteristics and availability of tools and equipment, and effective inter-provider communication¹. Conversely, there are several factors in the ICU nurses' work system that can hinder nurses' activity. The most frequent performance obstacles experienced by ICU nurses include a noisy work environment, distractions from families, and delay in getting medications from pharmacy⁵. These performance obstacles may affect the quality and safety of care provided by nurses by, for instance, creating opportunities for errors^{2,7,8}.

In the face of performance obstacles, such as operational failures and interruptions, nurses develop problem-solving behaviors and tactics in order to achieve their goals^{10,11}. Therefore, decision-making appears as a major component of nurses' activity.

1.2 Nursing decision-making

Clinical decision-making is the process nurses use to gather patient information, evaluate the information and make judgments

that result in the provision of patient care¹². This complex cognitive process, essential to nursing practice, involves six different thinking processes: description, selection, representation, inference, synthesis and verification⁹.

In order to understand the work complexity of nurses, factors that influence expert nurses' decision-making in acute care units were assessed. Patterns of cognitive factors that affect performance and decision making were also identified; these include maintaining patient safety, knowing individual patient information, and knowing typical patient profiles. In order to cope and adapt to the complexity of work situations, nurses develop care management strategies such as proactively monitoring patient status⁴.

Because of the complexity of medications administered to ICU patients and the acuity of patients' conditions, medication errors can lead to serious and even fatal outcomes³. Therefore, understanding decision-making during medication management appears to be an essential research question.

1.3 Objective of the study

The objective of this study is to describe system factors that influence ICU nurses' work and role in medication management. In this paper, we focus on the influence of the patient on nurses' decision-making regarding medication management.

2. METHODOLOGY

2.1 Study design

Nurses working in an ICU were observed.

2.2 Study setting

The study was conducted in a 10-bed cardiovascular intensive care unit (CVICU) of a tertiary referral hospital.

Patients are admitted to the CVICU primarily from the cardiac operating room. A patient's typical stay in the CVICU is roughly 24 hours; however, this stay can be extended as long as one month depending on the patient's status. Once patients have recovered sufficiently in the CVICU, they are usually transferred to the cardiovascular intermediate care unit.

In this CVICU, the healthcare team does not perform bed-side rounds, but rather they conduct collective sit-down rounds. This type of rounding unfortunately excludes any registered nurses from participating. Instead, the charge nurse represents each registered nurse. Physicians individually consult their own patients.

The pharmacy at this particular hospital is open 24 hours a day, 7 days a week. The CVICU shares services provided by the pharmacy with another unit.

Most nurses work 12-hour shifts and in charge of 1 to 2 patients.

Families are allowed to visit patients at any time, day or night.

2.3 Data collection

Institutional Review Board (IRB) approval was obtained by both the University of Wisconsin-Madison and the hospital in which the study took place. Participation in the study was voluntary. The research study was first presented to nurses in staff meetings; a one-page description of the study was also handed out.

The researchers, trained industrial engineering observers, scheduled observations at different times throughout the day shift. Upon arrival in the unit, the observer would approach a nurse, explain the study, discuss what their participation would entail, and hand out the IRB-approved information sheet. After having obtained the nurse's oral informed consent, the observer began to collect data. The data collection method consisted of observing a nurse by shadowing him/her for 2 to 4 hours and writing down all tasks performed by the nurse with as many details as possible. No patient or nurse identifiers were recorded, thus ensuring the anonymity of the collected data. To reduce the burden of being observed, nurses could at anytime ask the observer to stop or suspend observations. A total of 10 nurses were observed during 36 hours of observation.

2.4 Data analysis

Handwritten notes were typed into a computerized format. Specific observations related to medication management were highlighted and then categorized.

3. RESULTS

The healthcare environment is a dynamic environment in which nurses strive to achieve quality of care and patient safety. Therefore, nurses make decisions based on different external parameters, and informed by different types and sources of information.

In order to perform the process of medication management, nurses make multiple decisions using information related to patients, including patient's characteristics, patient's clinical condition, changes in patient's status, and patients' perceptions and needs. For each category of patient-related information, examples of observation data are provided as vignettes.

3.1 Patient's permanent characteristics

Nurses need to know patients' characteristics that may influence medication management. These are permanent characteristics inherent to patients and independent from their temporary clinical status.

A nurse has to administer insulin to a diabetic patient in addition to post-surgery related medication. A nurse also needs to pay attention to contra-indications when managing medication for a patient with allergies.

3.2 Patient's temporary or clinical condition

Medication management, in particular medication administration, is influenced by the patient's clinical condition, i.e. their temporary condition.

The medication to be administered by the nurse comes in a pill form; the nurse asks the patient whether s/he is able to swallow pills. The patient's answer will then influence the way the nurse will administer the medication: in the form of a pill if the patient is able to swallow the pill, or in a crushed form mixed with liquid if the patient is not able to swallow the pill.

Nurses have to adapt to the external physical constraints related to the patient.

Because there are so many intravenous (IV) lines connected to the patient, the nurse prefers to use a line that is not already connected to an IV bag, that way the nurse does not need to take the extra step of temporarily shutting off an IV medication, to administer this medication through the occupied IV line.

3.3 Evolution of patient's status

Nurses frequently assess how the status of a patient changes. Nurses also anticipate changes in patients' status, which affects their medication management-related decision-making.

A nurse anticipates that his/her patient's blood sugar level is going to increase because of breakfast. Therefore, s/he administers the appropriate dose of insulin. The nurse also takes into account the fact that blood sugar levels increase after surgery.

The nurse updates his/her patient's family about the patient status and the fact that the patient will probably have most IV lines out the next day.

3.4 Patient's perceptions and needs

The administration of some medications can be triggered by the patient him/herself. For instance, the administration of pain medication depends on the patient's pain tolerance threshold.

Nurses usually ask patients to evaluate their pain on a scale ranging from 0 (no pain) to 10 (worst pain possible). According to the patient's answer, the nurse decides whether to administer pain medication.

Nurses deal with medication management-related conflicts that need to be solved on a case-by-case basis according to patients' characteristics. In other words, nurses have to make compromises between medications which have contradictory effects.

When patients are in pain, their blood pressure tends to increase. In order to avoid this, nurses may choose to administer pain medication. However, some pain medications depress respiration. Therefore, nurses must assess the patient to decide (according to the patient's condition and status) which outcome is less likely to affect the patient's recovery.

4. CONCLUSIONS

The preliminary results of this study indicate that in order to manage medication, nurses must take into account multiple factors related to the patient, including but not limited to patient's characteristics, patient's clinical conditions, the evolution of patient's status and patient's perceptions and needs. Therefore, decision-making during the medication management process requires nurses to consider patients on an individual basis.

The patient is a significant element of complexity in the system. Because the patient's status changes over time, nurses have to iteratively update their assessments accordingly; hence decision-making regarding medication management is a dynamic process. Additionally, patient-related factors cannot be fully controlled nor predicted. Nurses assess patients and evaluate patient-related information in order to make decisions regarding medication

management. This result is consistent with findings from Ebright et al.⁴ who highlighted that "knowing specific information about patients and typical profiles enabled RNs to anticipate likely outcomes, which, in turn, guided decision making" (p.638). Simply implementing the medication order without taking the patient into consideration would be dangerous in the sense that it could cause potential for harm.

Therefore, nurses' role in medication management goes beyond administering medications ordered by a physician: although often initiated by a medication order written by the physician, it also involves many activities of the nurses that can lead to new medication orders or changes in the medication regimen.

Nurses' role in medication management is complex. Patient-related information is only one of the many uncontrollable and unpredictable parameters nurses must take into account in order to make decisions regarding medication management.

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