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Abstract- Objective: To investigate nurses' experiences with the goal of avoiding mistakes in the administration of medication.

Background: The experiences of insight nurses, the prevention of pharmaceutical administration errors are a crucial aspect that can be employed to customize and execute safety protocols.

Method: A qualitative interview study comprising twenty nurses in an academic medical center was carried out.

Results: This study revealed three themes: (1) The roles and responsibilities of nurses in medication safety: in addition to safe preparation and administration, nurses' clinical reasoning is crucial for medication safety; (2) The ability of nurses to work safely: their work circumstances and risk awareness affect this ability; and (3) The acceptance of safety practices by nurses. A safety practice's benefits, viability, and appropriateness are crucial inducements for adoption.

conclusion: The belief that nurses are in a prime position to facilitate safe medication management is consistent with their experience; yet, their capacity to carry out this responsibility effectively depends on their knowledge of the risks associated with drug administration as well as the conditions in which they operate.

Nursing management implications A professional practice setting and learning atmosphere that support the advancement of nursing knowledge and skills are necessary for safe drug administration.

Index Terms- nursing procedures, safety management, and quality enhancement

INTRODUCTION

Medication errors (MEs) are the most frequent kind of medical errors, so medication safety is crucial.

errors are linked to high medical costs (Bate et al., 1997; Committee on Identifying & Preventing Medication Errors, 2007). "Any preventable event that may cause or lead" is the definition of a ME.

Nurses' perspectives on medication safety procedure to improper drug usage or patient injury when the patient, healthcare provider, or consumer is in control of the medication (NCCMERP2012). According to various sources (Barker et al., 2002a; Committee on Identifying & Preventing medicine Errors, 2007; Krahenbuhl-Melcheret al., 2007; Hughes & Blegen,

2008), the incidence of MEs ranges from 5% to 25% of fall medicine administrations. Preparing and administering medications is when one-third of all MEs that injure patients occur (Leape et al. 1995, Barker et al. 2002b, Fijn et al. 2002).

Preparing and administering medications is when one-third of all MEs that injure patients occur (Leape et al. 1995, Barker et al. 2002b, Fijn et al. 2002). When one or more of these ven rights of medicine administration—the right patient, right drug, right amount, right time, right method, right cause, and right documentation—are broken, medication administration mistakes, or MAEs, result (Wakefield et al. 1999, Pape 2003). The numerous environmental and workload challenges that nurses face make the pharmaceutical administration process prone to errors (Pape 2001, Mayo & Duncan 2004, Tanget et al. 2007, Armutlu et al. 2008, Brady et al. 2009). Nonetheless, nurses hold a crucial role in recognizing, assessing, and rectifying mistakes prior to their impact on patients (Henneman et al. 2010). Research showed that, independent of the error's origin, nurses were in charge of 86% of all ME interceptions (Leape et al. 1995). According to Burston et al. (2013), MEs are also employed as a nurse-sensitive indication of the standard and safety of care.

A variety of techniques have arisen in the last ten years to improve the safety of the pharmaceutical administration process, in light of the increasing frequency of MAEs. Electronic systems, protocols and visual reminders, double-checking, interruption protection, e-learning, medication teaching, and dedicated medication nurses are some of these practices (Hodgkinson et al. 2006, Jones 2009, Poon et al. 2010). Bar-coded medication delivery is marketed as the most efficient way to lower MAEs, yet the research supporting this claim is often inadequate (Ioannidis & Lau 2001, Hodgkinson et al. 2006, Poon et al. 2010, Raban & Westbrook 2013). Hospital policies are increasingly incorporating these procedures, despite the paucity of high-quality research supporting them. However, there are issues with nurses adhering to safety procedures (Armitage

& Knopman 2003, Hughes & Blumen 2008, Gillet al. 2012, Kim & Bates 2013, Raban & Westbrook 2013). The experiences and viewpoints of nurses with regard to applying safety procedures and preventing MAEs are not well understood. Understanding these viewpoints and experiences is crucial to achieving an appropriate degree of implementation and customizing safety procedures to seasoned facilitators and barriers.

METHODS: Study Setting: The study was carried out in Amsterdam, Netherlands, at the Academic Medical Center (AMC), a tertiary care university hospital. Every 30-bed ward has a medication area where nurses prepare and store medications before giving them out. An electronic prescribing system is used by doctors to write prescriptions for medications. A paper-based drug administration file is used to record all prescriptions and administrations. Every nurse has a specific patient list for whom they create and give prescriptions.

Study participants: In nurses, we conducted a qualitative exploratory study. Purposive sampling with a high degree of variability was used to get a broad perspective on the topic from both the management and the operation level. The two researchers first contacted nurse managers, their quality and safety innovators, and nursing ward managers by email, inviting them to take part in a study on strategies to enhance medication safety. The names of more nurses from various departments were subsequently gathered using snowball sampling, which represented a range of seniority and training levels as well as viewpoints regarding medication safety procedures. Participants in the study had to be registered nurses in order to be accepted. An email was sent to all nurses asking them to take part. Until saturation was achieved, this process was carried out.

Data Collection: M.S. and A.O. conducted semi-structured individual interviews with 20 participants between March and December 2011, with an approximate duration of 60-90 minutes each interview. With the interviewer providing structured guidance based on a list of topics, the participants were able to speak freely during the semi-structured interviews. The literature by Grol, which claims that potential obstacles and facilitators regarding the nature of the innovation; professional characteristics involved; and the social and organizational context need to be addressed when planning changes in clinical practice, served as the basis for the topic list (Grol & Grimshaw 2003, Grol & Wensing 2004). After gathering and analyzing the data from 9 and 12 interviews, the initial issue list's scope was twice reduced (Appendix S1). The participants were asked to consider several safety practices at the conclusion of the interview (Appendix S1). An email outlining the goal of the interview, the promise

of confidentiality, and the option to withdraw at any moment was sent to each participating nurse. Participants received assurances that the study's purpose was not to assess the department but rather to gather the nurses' individual viewpoints and opinions regarding drug safety rules and practices. Every participant had their signed informed permission obtained after being fully told about the interview method. The interviews were completely transcribed and recorded with the approval of the nurses.

Data Analysis: M.S. and A.O. conducted data analysis concurrently with the interview procedure, utilizing MAXQDA10 software and adhering to guidelines for qualitative research (Boeije 2008, VERBI software 2010). Following each interview, the interviews were independently coded. The codes were then compared and reviewed until a coding tree was agreed upon. For the first fifteen interviews, consensus meetings and coding were done iteratively. For the final five interviews, coding was done in two halves, with one author coding and the other author reviewing. The most pertinent themes pertaining to nurses' experiences with and viewpoints on preventing MAEs were determined through consensus meetings. Ultimately, the detected themes were used to categorize and analyze the text fragments. The approach was confirmed, supported, and the outcomes were peer-reviewed by the other two co-authors.

RESULTS:

Twenty nurses in all were approached, and they all chose to take part voluntarily. A mean age of 43 years (range 27–61) was shared by 15 females and 5 males, representing a range of experience levels among the nurses: 2 were nurse directors, 2 were nurse quality innovators, 3 were nursing ward managers, 5 were senior nurses, and 8 were regular nurses. Only senior and regular nurses were directly involved in the preparation and administration of medications among the participating nurses. The material that was analyzed revealed three main themes: (1) the roles and duties of nurses in drug safety; (2) the ability of nurses to work safely in everyday practice; and (3) the acceptance of safety procedures by nurses.

The roles and duties of nurses in drug safety:

In addition to feeling accountable for appropriately preparing and administering medication, nurses believe they play a part in continuously evaluating a patient's status in connection to the prescribed medications. They are valued for playing this function, which is expected of them.

Strong sense of responsibility held by nurses: Every nurse felt accountable for the drugs they gave to patients as well as for themselves. Numerous nurses stressed the significance of working carefully and alertly when handling drugs.

"You just need to look closely; you always need to look closely at the medication order, what it says, what is prescribed, and which patient gets which dosage."

"It's critical to focus on the prescription and what you're pulling out of the drawers so that you can work uninterruptedly."

A number of nurses expressed that, although they are the ones who give drugs, this responsibility also leaves them feeling vulnerable because they feel personally accountable for MEs.(WN14)

Nurses Role:The crucial role that nurses play in the medication process and, by extension, drug safety, extends beyond their exact handling of pharmaceuticals. While the doctor is ultimately in charge of prescribing drugs, the nurses stated that they are expected to use clinical judgment; they thoroughly inspect and assess the prescribed drugs in light of the patient's actual condition. They added that the doctors are grateful that they took on this responsibility.

"But also the clinical reasoning: you cannot give the doctor full responsibility for that just because a patient's vitals are incidentally different if the patient is hypotensive and you, as a nurse, are just giving the medications groundless."(WN14)

This expectation is also endorsed by the nursing supervisors.

"People need to think for themselves, in my opinion. If a patient is vomiting, there's a good probability the medication won't work, therefore I expect the nurse to speak with the doctor. Therefore, I believe that in that regard, they need to be thoughtful and not merely provide a medication because the prescription specifies it."(NS3)

Nurses'ability to work safely: The conditions under which nurses operate and their knowledge of the possibility of error both affect their capacity to handle drugs safely.

Risk Awareness: Nurses differ in their awareness of the risk of MAEs. Their awareness stems from their own experiences, incident reports, and knowledge of the repercussions of acts of terror.A few nurses mentioned that inexperience or ignorance could be the cause of mistakes.

"I believe that people always want to provide the best care possible and handle medications in the best way possible." However, you never know what you don't know, so I suppose those kinds of mechanisms will have an impact. You have faith in your own abilities, expertise, and observations".(NS16)

Perceived risk of medicine administration appears to be determined by knowledge of the repercussions of an error. Nurses take into account various aspects, including the method of delivery, the nature of the drug, and the interaction between the medication and the patient's state. Because intravenous drugs have direct consequences and are more difficult to fix

than oral prescriptions, they are generally seen as being riskier than oral medications.

"A protocol is a decision that has been made and, in my opinion, must be followed at all costs, particularly when it comes to chemotherapy, which is truly sacred in our department and requires the utmost attention to detail, punctuality, and minimization of errors."(WN15)

The nurses noted that more awareness of the dangers of administering medication is established when an error happens. This knowledge could (temporary) increase focus on or urgency for safe working conditions and support programs for quality improvement. When multiple event reports are available on the same topic, this attentiveness also happens.

"Who ensures you have the proper pump settings? Perhaps you over-inputted a zero." Those are actual occurrences. And again, there is heightened vigilance when they occur.(WN10)

Circumstances

The demands of the job, the environment in which nurses operate, and the reliance of others all have an impact on how well nurses are able to carry out their duties. The majority of nurses said that multitasking or excessive work pressure can occasionally impair their ability to operate safely, perhaps leading to a lack of focus and hasty work.Nurses may choose in certain situations to disregard established safety protocols if they believe there is no risk to patients or consequences for their care.

"Busy times are the one when things can go wrong since you need to double check and you can't find anyone. And then, occasionally, you consider;

"Someone made the error of confusing morphine with an epidural. It's actually best to link all of the syringes together, but it isn't practical.You simply cannot check jointly if you have 10 patients on pain medication during the night shift and the pump starts to sound while your colleague is changing a bed".(WN6)

"People get distracted in our medication room because there is still too much rumor and not enough sleep." That isn't correct; it is prone to errors.(WN10)

"Well, the pharmacy only has certain times that you can get prescriptions filled, so if a patient is admitted in the evening, you just need to plan where you're going to get your medications from."(WN14)

The nurses had positive things to say about the pharmacy department, including the fact that they could get guidance from the pharmacist on medicine interactions and dosage, as well as preparation procedures.

The adoption of safe practices by nurses;

The nurses listed a number of safety practice attributes that are critical to their adoption and use. Every nurse has stated that: (a) it is critical that a safety procedure genuinely increases patient safety and is ideally supported by evidence. However, a number of nurses stated that scientific evidence is not always required and that a practice can and may be founded on common sense.

"Individuals need to believe that it offers benefits and enhances patient safety. It, in my opinion, is what drives nurses." (WN14)

"Well, I really believe that an innovation should be evidence-based, have a clear effect, and have an advantage over the current situation." (WN11)

Individuals believe it's critical to offer their opinions, try new ideas, assess the results, and see how things work out. (WN14)

Lastly, a number of nurses mentioned how crucial it is that (c) a practice feels natural and appropriate. The practice of wearing "do not disturb" tabards during a medication round is not universally embraced due to personal obstacles and a lack of compelling proof of benefit, despite the fact that many nurses claimed that interruptions and distractions are an issue.

DISCUSSION:

Main findings

In medication management and safety, nurses are essential. Their involvement goes beyond simply preparing and giving prescription drugs as directed. Because they organize care delivery and have the most direct patient connection, nurses are best suited to evaluate patients' conditions in relation to prescription medications. Safe medicine administration has been linked to nurses' clinical reasoning and their ability to coordinate care with doctors and pharmacists, according to several studies (Eisenhauer et al. 2007, Popescu et al. 2011, Dickson & Flynn 2012). But occasionally, it's unclear when their accountability ends.

This ambiguity suggests that in order to improve patient safety, multidisciplinary teamwork must be increased and a shared responsibility must be assumed. Nurses must be sufficiently knowledgeable about pharmaceutical safety issues in order to achieve this goal. The perceived requirement to implement safety procedures in day-to-day work appears to be influenced by knowledge of the dangers related to medicine delivery. Furthermore, research has shown that adherence to a prescription administration strategy is more likely to prevent errors when the substance being administered is high-risk, unknown, or mandated by law to be double-checked (Davis et al., 2005, Mania et al., 2005, Armitage 2007, Gillet et al. 2012).

To provide nurses with the necessary information to effectively carry out their function, however, agreement is required regarding which medications are high risk and/or

which patients in specific clinical situations require additional safety precautions (Institute for Safe Medication precautions 2012, Maaskant et al. 2013). Given the nature of the prescribed medications, the anti-hypertensive therapy quote from the interviews is an excellent illustration of a clinical setting where active monitoring of the patient's vital signs is necessary (Harvey & Jordan, 2010). Because the perceived benefit is a significant motivator to accept and use a practice, this understanding is especially crucial for the adoption and implementation of safety procedures (van Noord et al. 2010, van der Voort et al. 2012).

These results suggest that additional work needs to be done to enhance basic and ongoing drug safety education in order to prepare and empower nurses to be leaders in medication management (Gabe et al. 2011). In addition to receiving sufficient theoretical training in pharmacology in the classroom, nurses must also learn how to apply this information in clinical reasoning. For instance, case-based learning encourages critical thinking and the acquisition of knowledge via experience (Hughes & Blegen 2008, Adhikari et al. 2013, Vaismoradi et al. 2013). Another potential teaching tactic to help nurses recognize and handle pharmaceutical errors when and if they happen is to simulate drug delivery and errors in a controlled environment (Hughes & Blegen 2008). Additionally, more active clinical pharmacist participation in the ward fosters interprofessional cooperation and offers chances for case-based learning and education. Nonetheless, it is also evident that, despite the apparent benefits of a particular safety precaution (such as double checking), the measure is not always practicable in day-to-day operations (Fogarty & McKeon 2006, Popescu et al. 2011). The practice environment, dependencies on others, and work pressure all affect a nurse's capacity to carry out their duties effectively. These conditions seem to influence whether nurses follow safety procedures, together with the perceived risk. The environmental factors of safe medication administration can be improved by using a standard medication room and raising awareness of the potential for disruptions (Rozenbaum et al. 2013). In order to solve this issue, process-improvement techniques like Lean Six Sigma, which minimize needless variation and decrease waste, may also be of interest (El-ganzour et al. 2009, Aboumatari et al. 2010, Conrad et al. 2010, Newell et al. 2011).

A recent study (Ching et al., 2013, Rozenbaum et al., 2013) that used a Lean Six Sigma strategy to incorporate six safety principles showed a significant decrease in pharmaceutical delivery errors.

Lastly, the nurses frequently complained that they were not receiving enough support from the system, which could result in mistakes and extra time-consuming steps. It has been shown

that computerized medication systems can increase the safety of medication administration by combining patient data from electronic medical records with trigger tools that notify the nurse of high-risk situations and by bar-coding medication administration as a last check prior to actual administration (Hodgkinson et al. 2006, Choet et al. 2010/Poonet et al. 2010/Newell et al. 2011/McDonald et al. 2013). These systems are a promising development.

Nurse management must appreciate and facilitate the critical role that nurses play in enhancing the safety of drug administration. Growing research supports the idea that good patient safety results in hospitals are largely dependent on how nurses are organized and how care is delivered. Patient safety results have been demonstrated to be impacted by nurse-related characteristics, including staffing, education, collegial relationships with physicians, and transformational leadership (Duffield et al., 2011; Clavelle et al., 2012; Duboi et al., 2013; Smed et al., 2013; Wonget et al., 2013).

Nursing is acknowledged as a professional field with a wide range of skills and a high staffing intensity in such an environment of professional practice. With increased investments in innovation and education, the practice environment is more conducive to professional practice. High levels of management trust also appear to motivate nurses to use procedures that catch mistakes before they hurt patients and provide better nursing care (Vogus & Sutcliffe 2011, Flynn et al. 2012). The seven components that drive patient safety—leadership, evidence-based practice, teamwork, communication, and a culture that is patient-centered, just, and learning—also support this trust (Burston et al. 2013).

Strengths and limitations:

This study's qualitative design gave researchers the chance to investigate a challenging subject. The iterative technique and in-depth interviews have helped to clarify many of the experiences and underlying beliefs of nurses. Despite the fact that this was a single-center study conducted at a university hospital, we believe the findings are applicable to different healthcare settings and have consequences because they are consistent with other studies.

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