University of Central Florida

STARS

2013

Factors contributing to the commission of errors and omission of standard nursing practice among new nurses

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FACTORS CONTRIBUTING TO THE
COMMISSION OF ERRORS AND OMISSION
OF STANDARD NURSING PRACTICE
AMONG NEW NURSES

by

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A thesis submitted in partial fulfillment of the requirements
for the Honors in the Major Program in Nursing
in the College of Nursing
and in The Burnett Honors College
at the University of Central Florida
Orlando, Florida

Spring Term 2013

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Abstract

Every year, millions of medical errors are committed, costing not only patient health and satisfaction, but thousands of lives and billions of dollars. Errors occur in many areas of the healthcare environment, including the profession of nursing. Nurses provide and delegate patient care and consequently, standard nursing responsibilities such as medication administration, charting, patient education, and basic life support protocol may be incorrect, inadequate, or omitted. Although there is much literature about errors among the general nurse population and there is indication that new nurses commit more errors than experienced nurses, not much literature asks the following question: What are the factors contributing to the commission of errors, including the omission of standard nursing care, among new nurses? Ten studies (quantitative, qualitative, and mixed-mode) were examined to identify these factors. From the 10 studies, the researcher identified the three themes of lack of experience, stressful working conditions, and interpersonal and intrapersonal factors. New nurses may not have had enough clinical time, may develop poor habits, may not turn to more experienced nurses and other professionals, may be fatigued from working too many hours with not enough staffing, may not be able to concentrate at work, and may not give or receive adequate communication. Based on these findings and discussion, suggested implications for nursing practice include extended clinical experience, skills practice, adherence to the nursing process, adherence to medications standards such as the five rights and independent double verification, shorter working hours, adequate staffing, no-interruption and no-phone zones, creating a culture of support, electronically entered orders, translation phones, read-backs, and standardized handoff reports.

Acknowledgements

Special thanks to my thesis chair,
Dr. Linda Gibson-Young,
for her guidance, encouragement, and enthusiasm
and to my thesis committee,
Dr. Diane Andrews and Dr. Donna Malvey,
for their time and expertise.

I would also like to thank
Dr. Victoria Loerzel,
the faculty at the College of Nursing,
The Burnett Honors College,
and the University of Central Florida
for their support of undergraduate research.

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Significance and Background

A patient with an open tracheostomy aspirated liquid pain reliever. The electronic medical record contradicted a written physician order against acetaminophen for a post-operative patient with recent gastric ulcers. A "Nothing by mouth" (NPO) sign remained on a patient's doorframe hours after the oral intake status had been changed to clear liquids. Until provided with an alcohol swab, a nurse almost injected an intravenous (IV) medication without scrubbing the IV port. Another nurse demonstrated incomplete and infrequent hand washing between patient contacts, while another nurse failed to listen to a patient's lungs during regular assessments. One could imagine the potential negative patient consequences for each respective occurrence: pulmonary infection, exacerbation of gastric ulcers, symptoms of dry mouth (at best), a blood infection, transmission of microorganisms resulting in infection, and missed adventitious or diminished lung sounds. These above occurrences and more, witnessed by the researcher in a relatively short time span in the in-patient hospital setting, provide some indication of the seriousness of medical error in the current healthcare system.

Every year, an estimated 1.62 million hospitalized Medicare patients alone experienced some event that caused temporary harm (Office of Inspector General, 2010). An estimated 180,000 Medicare patients per year died due to medical error. Close to 50% of adverse or temporary harm events were preventable and were most commonly linked to medical errors, substandard care, and lack of monitoring and assessment. Besides the resulting human harm, these events cost Medicare $324 million in one month, or approximately $3.9 billion per year. Of the errors reported to The Joint Commission (TJC) between 2004–2012, approximately 60% of those errors resulted in patient death; approximately 30% resulted in unexpected additional care,

extended care, or psychological impact; and approximately 9% resulted in some loss of function (TJC, 2012b).

In the most recent national survey of the public's opinion of error, 34% of respondents confirmed that he, she or a family member had experienced a medical error at some point, causing death (8%), long-term disability (11%) or severe pain (16%) (The Kaiser Family Foundation et al., 2004). The incidence of error occurring in those with a chronic illness was 20% higher than in those without a chronic illness. High workload, too few nurses, stress and fatigue of the healthcare professionals, inadequate time for physician interaction with patients, and inadequate teamwork and communication were frequently cited by respondents as factors that contributed to error. Fourteen percent of patients who experienced error resulting in serious consequences filed a malpractice lawsuit. Curiously, of the 1,128 hospitals surveyed for a yearly report on patient safety, 55% of respondents reported no events in their hospital over the past 12 months, which, compared to the other reports from safety and quality agencies, signals that safety problems may not be recognized or reported (Sorra, Famolaro, Dyer, Nelson, & Smith, 2012, p. 29).

Error can also negatively affect those committing the error – the employees in the healthcare environment. Errors occur in multiple fields including general medicine, surgery and anesthesiology, obstetrics and gynecology, pediatrics, psychiatry, emergency medicine, family practice, and nursing, as evidenced by analyzed morbidity and mortality cases (Agency for Healthcare Research and Quality [AHRQ], 2003). Error involvement takes a physical and psychological toll on those involved. After their medication error experiences, nurses have described feeling "terrible," "scared," "stupid" (p. 1332), "absolutely sick" (p. 1333), "panicky,"

"devastated" (p. 1334), "ill," "afraid," "nauseous," "upset" (p. 1335), "incompetent," "guilty,"

"horrible," and "inadequate" (p. 1336) (Treiber & Jones, 2010). Because of the detrimental

effects of medical error, it is important to closely examine factors that contribute to error.

<div align="center">Definitions of Error</div>

There are many terms related to patient safety events, including adverse events,

temporary harm events, sentinel events, and serious reportable events. Some patient safety events

are reportable to state and national quality and safety agencies, accreditation agencies, or funding

agencies. For example, "sentinel events" are adverse events resulting in serious injury or death

and reportable to The Joint Commission (TJC), while "Serious Reportable Events," include 29

specific events that the National Quality Forum (NQF) recommends be publicly reported (TJC,

2012b; NQF, 2011). Specific terms include "adverse event," defined as "significant harm

experienced by patients as a result of medical care," and "temporary harm event," defined as

"harm that required medical intervention but did not cause lasting harm" (Office of Inspector

General, 2010, p.1). Healthcare error has also been previously defined as "mistake, inadvertent

occurrence, or unintended event in health-care delivery which may, or may not, result in patient

injury" (Liang, 2001, p. 346). Near-miss situations are those that could result in some form of

injury but did not, whether by intervention or chance (Ebright, Urden, Patterson, & Chalko,

2004). These definitions do not account for the omission of standard nursing practice, which can

cause harm due to inaction. An encompassing definition of error is "deviations from current

standards of practice" (Rogers, Hwang, Scott, Aiken, & Dinges, 2004).

Error definitions become clearer in light of the types of errors. Errors can be categorized

as diagnostic (e.g. inadequate testing or failure to act on testing or monitoring results), treatment

(e.g. inappropriate care), preventive (e.g. falls or failure to provide preventive treatment), charting (e.g. documenting that a medication was administered when it was not), transcription (e.g. placing orders on the wrong chart), and other errors (e.g. failure to communicate, equipment failure) (Balas, Scott, & Rogers, 2004; Leape, Lawthers, Brennan, & Johnson, 1993). For the purpose of consistency and based on the aforementioned definitions, medical error will be defined as action or inaction that has caused or has the potential to cause patient harm.

New Nurses, Error, and Omission of Standard Nursing Practice

The researcher's personal experience as a student nurse on in-patient acute care hospital units, as described at the beginning of this paper, encouraged investigation into the factors that influence commission of errors and omission of standard nursing practice among nurses. A preliminary search of the literature revealed that much research has been conducted related to the errors among nurses in general, but not as much pertaining to transitioning new nurses. However, there is evidence that there is a difference between errors committed by new nurses and those committed by more experienced nurses. A recent Australian study (Westbrook, Rob, Woods, & Parry, 2011) evaluating the use of correct procedure for IV medication administration indicated that with each year of clinical experience (up to six years), the number and severity of medication errors declined. A Swiss study investigating the connection between workplace stressors and patient safety-related events in the hospital setting found that medication near-misses decreased significantly ($p < .05$) in number as nurse experience increased (Elfering, Semmer, & Grebner, 2006). In a qualitative study of novice nurses and near-miss and adverse-event experiences (Ebright et al., 2004), factors common to most cases include first-time experiences, having difficulty with workflow and time constraints, and the need for assistance

from more experienced nurses. Identification of the factors that contribute to error can result in the development of interventions intended to avoid such factors and improve patient safety and outcomes.

<u>Benner's Novice to Expert Continuum</u>

Benner (1982) described a proficiency continuum in nursing, based on the Dreyfus Model of Skill Acquisition, which listed five levels of proficiency as follows: novice, advanced beginner, competent, proficient, and expert. Benner's descriptions indicate that most new nurses could be considered novice or advanced beginner. Novices operate in a phase of context-free rules. They complete tasks expected of nursing students (checking blood pressure, tracking fluid intake and output, and other objective information) under guidelines that are to be followed without regard to circumstance. Advanced beginners begin to think more globally and depend on prior experience to recognize aspects, which are components of situations that have recurred often enough to recognize an overarching theme. In beginning to recognize these aspects, advanced beginners learn to set corresponding priorities. Most nurses, starting at about two or three years of work experience, practice at the competent level. The competent nurse does not only see isolated tasks or only think concretely, but sets goals and plans by thinking abstractly. In this level, the nurse exhibits an increased ability to efficiently manage nursing care. The proficient nurse sees the whole picture, with experience to recognize expected events, but the decision-making ability to change plans when needed. The nurse is now guided by maxims, but attuned to the nuances of situations and aware of the exceptions to the rules. An expert nurse, who many nurses never become, relies on experience, problem solving, and intuition, serving as a model for less experienced nurses (Benner, 1982).

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Research Question

The purpose of this review of the literature is to determine the factors contributing to the commission of errors and omission of standard nursing practice by new nurses. For the purpose of consistency, the researcher will define registered nurses with less than one to two years of work experience as new nurses. The researcher's definition of new nurses would likely fit into Benner's descriptive framework of novice and advanced beginner nurses, and all other nurses would fit into the three highest proficiency levels. Comparisons and explanations may be able to be made between the nursing actions described in the literature and the proficiency levels. Findings of this thesis may promote further studies and exploration into this topic.

Method

A search for relevant literature was conducted in Cumulative Index to Nursing and Allied Health Literature (CINAHL) to determine what research has been conducted and what conclusions were reached. Searches for relevant reports and data were be conducted in websites associated with The Joint Commission (TJC), National Quality Forum (NQF), and Agency for Healthcare Research and Quality (AHRQ). Searches include key words such as "healthcare error" "medication error," "error," "adverse event," "sentinel event," "medication error," "falls," "patient safety," "omission," "factor," "cause," "clinical competence," "nursing knowledge," "clinical decision making," and "nurse practice." Search terms such as "new nurse," "novice nurse," "graduate nurse," "new graduate nurse," and "newly licensed nurse" are used for the aforementioned criteria of nurses with approximately one year or less of experience. Additional criteria include "English language" (or available in English), peer-reviewed, research report. A secondary search was also conducted in the reference lists of articles produced from the initial search. Studies outside the United States are included, provided they are available in English. Exclusion criteria includes editorials. Due to the range of key words, literature was selected from multiple primary and secondary searches. Following the above inclusion and exclusion criteria, 10 studies were selected for inclusion on the basis of publication within the last 10 years and description of errors and care omitted by new nurses. Quality and validity were scored by using the "Determining Quality and Validity of Findings" tool by Quelly, located in Appendix A (2007). Eight of the 10 studies scored at Level 3 (High quality) and two of the 10 studies scored at Level 2 (Moderate Quality).

Findings

The Table of Evidence is located in Appendix B. The 10 studies meeting criteria for this literature review included three qualitative studies, six quantitative studies, and one mixed-mode study (Ebright et al., 2004; Elfering et al., 2006; Kenward & Zhong, 2006; Li, 2007; Manias, Aitken, & Dunning, 2004; Smith & Crawford, 2003; Treiber & Jones, 2010; Unver, Tastan, & Akbayrak, 2012; Westbrook et al., 2011; Whyte et al., 2012). The studies and reports were conducted in the USA, Turkey, Australia, and Switzerland. The total sample size of new registered nurses from eight of the studies was 1,994. The number of new nurses in two studies could not be determined, although total sample sizes of nurses in general were 158 and 107, respectively (Treiber & Jones, 2010; Westbrook et al., 2011). Three main themes identified in this review included lack of experience, stressful working conditions, and interpersonal and intrapersonal factors. These themes were determined qualitatively by reviewing qualitative, mixed-mode, and quantitative literature for recurrent themes.

Lack of Experience

Lack of clinical experience

A mixed-mode study investigated the connection between workplace stressors and patient safety-related events in the hospital setting (Elfering et al., 2006). The study was completed in two phases, with phase one starting at 0–1 months of work experience and ending at 5–6 months of work experience and phase two starting at 12–13 months and ending at 17–18 months of work experience. Of the participating new registered nurses ($n = 40$), 23 completed patient safety event pocket diaries. The diaries were versions of computer-assisted self-observation (rated with a Likert scale). Interviews were also conducted. Sixty-two (19.7%) of the 314 work-related events

were coded as relating to patient safety. The study found that medication near-misses decreased significantly ($p < .05$) in number as nurse experience increased. There were also more safety-related events documented during the first phase of the study than during the second phase of the study, but this was not found to be statistically significant.

A recent quantitative Australian study of new and experienced nurses ($n = 107$; experience, median = 6 years; experience, range <1–43 years) prospectively observed the use of correct procedure for IV medication administration (Westbrook et al., 2011). With each year of clinical experience (up to six years), the risk of error decreased by 10.9% and the risk of serious error decreased by 18.5%. The researchers also attributed a large proportion of the IV medication administration errors in new nurses to knowledge and skills deficiencies. Likewise, a quantitative study of newly graduated ($n = 87$) and experienced ($n = 82$) nurses used questionnaires to solicit their perspectives of medication errors, rating common causation of error on a 1–10 scale (Unver et al., 2012). The fifth, seventh, and eighth most commonly perceived causes of medication errors were when the nurse, experienced or new, miscalculated the dose (mean = 6.18; SD = 2.69), set up or adjusted an infusion device incorrectly (mean = 5.53; SD = 2.56), or was confused by different types and functions of infusion devices (mean = 5.50; SD =2.65).

A qualitative study employed semi-structured retrospective interviews with new nurses ($n = 12$) to identify factors that influenced near-miss and adverse event situations in the acute care hospital setting (Ebright et al., 2004). Seven out of eight reported near-miss or error cases were due to first-time experiences, including using an infusion pump, hanging albumin, using insulin or heparin protocol, the continuous use of Versed, and caring for a patient recovering from open-

heart surgery. An unpublished quantitative study surveying new nurses ($n = 560$; experience, average = 11.4 months) and their preceptors ($n = 231$; experience, average = 13.7 years) investigated the factors that contribute to the experience of transitioning to work and the effect of that transition on safe practice and clinical competency (Li, 2007). Of the new nurses, 28.2% made an error in performance of skills, and 23.8% misinterpreted a physician or provider order. A qualitative study employing semi-structured interviews explored new nurses' ($n = 12$; experience = < 1 year) perceptions of their management of medication in acute care (Manias et al., 2004). New nurses who performed electrocardiograms (ECGs) could not interpret the results; likewise, some nurses did not check laboratory results and did not know how to interpret laboratory values (potassium, sodium, urea, creatinine) and their influence on the medications they were to administer.

A quantitative study employed random stratified surveys to solicit information from new registered nurses ($n = 628$; experience $\leq$ 1 year since licensure) and new licensed practical and vocational nurses (LPNs/VNs; $n = 519$; experience $\leq$ 1 year since licensure) in the United States (Kenward & Zhong, 2006). Solicited information includes demographics, adequacy of education, and the issues including transition to practice, practice issues, difficulty of assignments, involvement of errors, and change in nursing positions. Of the 610 new RNs involved in errors (by commission, supervision, or discovery), 16.2% ($n = 99$) believed that inadequate orientation (too short or not thorough) was a contributing factor, while 4.6% ($n = 28$) believed that lack of continuing education (CE) contributed to their involvement with error. A secondary analysis of a similar survey concerning medication errors and new patient assignments for new RNs ($n = 655$ new nurses; experience, mean = 6.8 months; SD = 2.2 months) and licensed practical nurses ($n =$

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623 new LPN/VN; mean = 6.4 months; SD = 2.8 months) found that 49% ($n = 321$) were

involved in errors (Smith & Crawford, 2003). Statistics were similar to the Kenward and Zhong

(2006) study in that 18% of new RNs involved in error cited inadequate orientation, and 5%

cited lack of CE courses as a cause of error.

New nurses seeking assistance from, or being confronted by, more experienced nurses

was identified in eight out of eight reported cases of errors or near-misses. The presence of an

additional new nurse was involved in four of the eight reported cases, with new nurses concerned

about an inexperienced skill mix and receiving an inadequate handoff report that lacked a holistic

approach and important patient details to look for (Ebright et al., 2004). New nurses also omitted

important nursing tasks due to role confusion. The researchers of the qualitative medication

management study found that several nurses ($n = 4$) did not participate in discharge medication

education because they felt it was the role of the pharmacist or more experienced nurse (Manias

et al., 2004). Half ($n = 6$) of the nurses did not monitor pathology results because they thought it

was the role of doctors. Of the nurses who felt inadequately prepared to teach clients, 81.5% ($n =$

22) were involved in errors ($x^2 = 8.30$; df = 1; p 0.01) (Kenward & Zhong, 2006). All eight near-

miss or error cases were influenced by lack of knowledge of the unit and workflow patterns

(Ebright et al., 2004). These nurses described being behind on administering medications and

being unable to review patient information with a tech.

Losing the big picture and lack of critical thinking

The use of a 35-item clinical competence measure correlated to error found that new

nurses who were competent in areas of clinical reasoning ability made fewer practice errors (Li,

2007). Of the nurses who believed they did not have the educational preparation to synthesize

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data from multiple sources in making decisions, 72.5% ($n = 29$) were involved in errors ($x^2 = 6.22$; df $= 1$; $p < .01$) (Kenward & Zhong, 2006). "Losing the big picture" is described as being so focused on certain parts of the patient's situation that the nurse fails to synthesize all information into the appropriate indications for patient care (Ebright et al., 2004, p. 536). This occurred in six out of eight reported cases of error or near-misses. Examples include hanging albumin at a rate too high for a patient with history of congestive heart failure, administering fluids with sodium to a patient with high urine output, and administering the wrong medication while focusing on the patient's hemodynamics. "Clinically focused critical thinking" (p. 534) was a theme identified in eight out of eight cases in the same study. Examples include a new nurse's failure to report progressively decreasing hemoglobin values due to misinterpretation of acceptable levels, administering morphine at the wrong rate due to misinterpretation of the effectiveness of the medication, and notifying the physician that an infant was about to code based on clearly faulty assessment data (Ebright et al., 2004). An observational quantitative experimental fall simulation study compared new ($n = 10$; experience, mean $= .58$ years) and experienced ($n = 12$; experience, mean $= 18.34$ years) nurses' reactions to a patient who had fallen and sustained a head injury. Six out of the 10 new nurses focused on the head wound sustained by the patient, missing likely closed head trauma (Whyte et al., 2012).

Lack of standard nursing care and institution policy or protocol

Among new and experienced nurses, the third most commonly rated (1–10 scale; mean $= 6.73$; SD $= 3.09$) cause of medication error was failure to check the patient's name band with the medication administration record (Unver et al., 2012). A qualitative study investigated nurses' ($n = 202$ new and experienced nurses; experience, range $= 1 — >40$ years at time of surveys)

perceptions of the cause of their medication errors and how they cope with them (Treiber & Jones, 2010). In a situation described as a busy, short-staffed day, a new nurse with six months of experience was instructed by the manager to administer eight units of insulin to a patient with a blood glucose reading of 250; unfortunately, the manager told her the wrong room number. In addition to the new nurse's failure to see if the nurse manager wrote down the blood glucose level next to the room number or checking the chart to confirm the order, the nurse's inclusion of short staffing in her recollection of the event indicates stressful working conditions contributed to the error. The qualitative study investigating new nurses and medication management found that, although new nurses assessed the safety of administering analgesics, antiemetics, and laxatives, a recurrent problem was the new nurses' belief that it was not essential to assess and record post-administration patient outcomes (Manias et al., 2004). Also, despite the pain management gold standard of pain prevention, new nurses did not administer *prn* (*pro re nata,* "as needed") medications until the patient showed signs of needing them, asked if the patient wanted only the medications that had been administered recently, and administered the medications conservatively (Manias et al., 2004).

The secondary analysis of a survey of new nurses revealed that 20% of nurses involved in errors cited poorly understood policies and procedures (Smith & Crawford, 2003). In the falls simulation study, there was obvious lack of protocol-based responses on the part of the new nurses, despite the fact that all were critical care nurses and had basic life support (BLS) training (Whyte et al., 2012). The observed actions were coded with Observer Coding System[®], which showed a statistically significant difference ($p < .001$) between the performance of experienced nurses' (score, mean = 4.83, SD = 1.9) compared to the new nurses' score (score, mean = 2.6;

SD = 0.97). Of the 10 new nurses, 40% failed to call for help, 20% delayed the call for help, and 20% immediately called for help. The average time to check the "patient's" level of consciousness and to call for help was approximately three times longer than that of an experienced nurse. Of those new nurses who did call for help, only 40% checked for responsiveness before calling for help and 10% assessed airway, breathing, and circulation after calling for help.

<div align="center">Stressful Working Conditions</div>

Long hours, inadequate staffing, time constraints, and inadequate support

The medication perspectives study found that the primary factor (1–10 scale; mean = 8.89; SD = 1.84) behind medication errors is nurses who are exhausted (Unver et al., 2012). Another study (Smith & Crawford, 2003) found that 23% of new RNs who were involved in errors cited long work hours as the factor behind error involvement. Although these nurses were scheduled the same number of hours as those who did not cite work hours as a factor, they worked an average of 1.7 hours more overtime ($^t(556) = 3.53$; $p < .0001$). Two surveys (Kenward & Zhong, 2006; Smith & Crawford, 2003) found that 55.4% ($n = 338$) and 70% ($n = 427$), respectively, of new RNs involved in errors cited inadequate staffing as a contributing factor. The 70% of new RNs who cited inadequate staffing cared for an average of 5.6 patients, compared to the 4-patient average of the RNs who did not cite inadequate staffing as a factor ($^t(468) = 4.0$; $p < .0001$) (Smith & Crawford, 2003). In seven out of eight cases of near-misses or errors (Ebright et al., 2004), the new RNs felt time constraints. One new nurse reported feeling "very messy" (p. 535) due to all the activity on the unit, and another was feeling behind and had not seen some patients for one to two hours. Another nurse described increased stress and a

disrupted work routine as factors preceding her mistake. Delays in care or treatment were reported as factors among 37% of new RNs who committed errors (Smith & Crawford, 2003). The nature of nursing includes the possibility of emergency at any given moment, seen in one emergent case when a nurse had no time to look up information (Ebright et al., 2004).

In addition to inadequate staffing, other types of inadequate or improper resources contribute to error. Twenty-two percent of new RNs involved in error cited lack of support from other departments, 16% cited lack of supplies or equipment, and 6% cited lack of adequate reference materials as contributing factors (Smith & Crawford, 2003). A similar study (Kenward & Zhong, 2006) showed that 20.2% of new RNs involved in error cited lack of support from departments such as pharmacy, food service, or equipment. This study also found that 14.3% of nurses involved in error thought lack of supplies or equipment contributed to error. Nurses also committed errors due to confusion between two drugs with similar names (1–10 scale; mean = 6.18, SD = 2.74) and medication labels or packaging that are of poor quality or damaged (1–10 scale; mean = 3.54; SD = 2.70) (Unver et al., 2012). Inadequate support from physicians contributed to error when a physician prescribed the wrong dose (1–10 scale; mean = 5.93; SD = 2.80) (Unver et al., 2012). New nurses also did not administer a cardiac medication to a patient with chest pain because it was not signed, had difficulty requesting from the physician a change from *prn* to scheduled medications, received medications late from the pharmacy, and administered a double dose of medication because the order was not signed (Manias et al., 2004).

Inability to concentrate

Inability to concentrate influences the occurrence of errors. The second most common reported factor contributing to medication errors (following exhaustion) was distraction by other

patients, co-workers, or events on the unit (1–10 scale; mean = 8.31; SD=2.14) (Unver et al.,

2012). Studying the link between new nurses' work stress and safety-related events found that

concentration demand was the most statistically significant factor contributing to error (Elfering

et al., 2006). The frequency ($p < .001$, two-tailed) and familiarity ($p < .001$, two-tailed) of patient

safety events were positively associated with concentration demands and negatively associated

with job control (or the degree of independence and planning the nurses demonstrated). One

nurse described trying to concentrate on preparing a medication, making a mistake, and having to

discard some of the original medications and start over.

<div align="center">Interpersonal and Intrapersonal Factors</div>

Inadequate communication

Inadequate communication was found to be a contributing factor to error in eight of the

10 reviewed studies. The use of a 35-item clinical competence measure correlated to error found

that more competent new nurses, especially in areas of communication and interpersonal

relationships, made fewer practice errors (Li, 2007). Of the nurses who were involved in error,

38.5% missed a physician or provider order. Two surveys of new RNs found that 43% and 44%,

respectively, of those involved in error believed that inadequate communication among

healthcare staff was a factor (Kenward & Zhong, 2006; Smith & Crawford, 2003). A study of

nurses' medication perspectives found that a common factor behind medication error was when

the physician's handwriting on the order form was difficult to read or illegible (1-10 scale; mean

= 5.46; SD = 2.94) (Unver et al., 2012). An experienced nurse in a retrospective qualitative study

recalled that, as a new graduate working under the supervision of an experienced nurse, she

administered an antihypertensive medication not knowing the other nurse had already

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administered but forgotten to chart the medication or tell the new graduate (Treiber & Jones, 2010). The patient could have died due to a significant drop in blood pressure that had to be treated with emergency drugs.

Seven out of eight cases of error or near-miss in one study involved improper handoff reports (Ebright et al., 2004). One nurse said she did not receive much information from the shift change report, while another described her report as "skimpy" (p. 535). Another event involved the arrival of a neonatal intensive care unit (NICU) baby returning from surgery. With eight people in the room, including other RNs who were transferring IVs, documenting vitals, and managing chest tubes, the new nurse focused on blood pressure and monitors while simultaneously writing verbal orders from residents. Improper handoff of information was also identified in the medication management study, when a new nurse reported that she was not told when a patient was ordered an immediate dose of a cardiac drug (Manias et al., 2004). A study of new nurses and safety-related events found that a patient should have had his own room due to infection, yet no one told the nurses or left a memo for the physicians. Fragmentary, incomplete, or incorrect documentation was involved in 25 of 62 reported events in the same study, including an improperly recorded prescription and an unlabelled blood specimen (Elfering et al., 2006).

Unspoken expectations

The attitudes of the work unit also contribute to error. Seven out of eight cases of near-miss or error in one study were influenced by peer pressure and social norms (Ebright et al., 2004). One new nurse described the pressure of having everything ready for the oncoming day shift because they were worried about what the other nurses would think and they wanted to look competent. Another new nurse stated that there were unwritten standards about how the day

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should be organized. Being afraid to ask for help also contributed to error because, as a nurse described, "I was thinking that they [other RNs] would think I should know that by now" (p. 536). Likewise, more than 60.9% of RNs didn't report medication errors due to fear of colleagues' reactions, and 69% did not report errors due to fear of a supervisor's reactions (Kenward & Zhong, 2006).

Discussion

The first year of work as a nurse has been described as very stressful (Rhéaume, 2011). Despite acknowledging their own relatively limited knowledge and experience, new nurses may still feel confident in their abilities, especially in that, while they might not always have an answer, they have the ability to find one (Etheridge, 2007). When they do feel inadequately prepared for frequently difficult situations, some seek the support of more experienced nurses (Rhéaume, 2011). However, other studies showed that new nurses were reluctant to solicit help from more experienced nurses and have described the conflicting desire to be seen by their peers as capable, fearing that soliciting help would tarnish that image (Boychuk Duchscher & Cowin, 2004, p. 292; Manias et al., 2004). One study showed that 65.5% of new nurses are not usually sure how medication errors occur, a statistically significant difference between the new nurses and more experienced nurses ($x^2 = 5.66$; $p = .017$) (Unver et al., 2012, p. 321). This indicates a lack of awareness of error-prone situations. New nurses also do not pick up as many clinical cues as more experienced nurses (Hoffman, Aitken, & Duffield, 2009). This is evident in the falls study, in which new nurses did not respond as appropriately as experienced nurses in critically thinking about the pathology presented and in their protocol actions, although both new and experienced nurses received the same Basic Life Support (BLS) training and worked in critical care (Whyte et al., 2012).

While many new nurses are confident in their academic abilities, applying their newfound knowledge is difficult (Pinchera, 2012). One study found that only 50% of new nurses "almost always" synthesize data from multiple sources (Li, 2007, p. 25). Lack of clinical experience results in the lack of opportunity to think critically. The nurse must learn continual

analysis and reprioritization, evaluating physician orders, and patient uniqueness, of which

clinical experience is the best teacher (Etheridge, 2007). New nurses have noted they did not

develop critical thinking or practice calling physicians about orders during nursing courses or

clinicals (Etheridge, 2007; Del Bueno, 2005; Olson, 2009). This description is consistent with

Benner's novice and advanced beginner stages, in which the nurses complete tasks and must

learn to set priorities (Benner, 1982). Critical thinking skills develop best when tested with real

patients and real scenarios; then a novice can progress to advanced beginner by identifying

patterns from previous experiences (Del Bueno, 2005; Benner, 1982).

Once in the clinical setting, student nurses begin to mentally separate nursing into two

compartments: ideal nursing and realistic nursing, which may be inferior to nursing standards

(Boychuk Duchscher & Cowin, 2004). Likewise, new nurses have described feeling unable to

provide ideal patient care, believing it impossible to not compromise good hospital care in some

way. The demands of delegation, prioritization, and decision-making create a strain between

completing tasks and providing quality care (Pinchera, 2012). According to Benner (1982),

completing tasks is a key role in a novice nurse's practice, but sometimes even simple tasks are

not completed correctly. While the researchers of the IV medication administration errors study

attributed many cases to deficient knowledge or skills, they also realized that some of the IV

errors were committed due to learned behaviors, a nod to the reality of transitioning to realistic

nursing (Westbrook et al., 2011). Likewise, omission of patient name band checks and

verification of the correct patient for insulin administration, while complicated by other factors,

are relatively simple tasks that unfortunately were not established as solid habits (Treiber &

Jones, 2010; Unver et al., 2012). Nurses may not stay up-to-date on evidence-based practice or

there may be lack of opportunity to be tested in knowledge or practice skills (Ebright et al., 2004; Kenward & Zhong, 2006; Unver et al., 2012; Westbrook et al., 2011). Other habits that may not be well established, possibly due to lack of clarity in nurses' education, are patient education, monitoring lab results, and use of the nursing process (such as not evaluating client outcomes after medication administration) (American Nurses Association [ANA], 2013; Kenward & Zhong, 2006; Manias et al., 2004).

New nurses may find particular difficulty in managing patient care due to stressful working conditions. New nurses have described feeling powerless with support issues such as patient assignments, collegial relationships, and other issues related to the work environment (Pinchera, 2012). Consequently, the following four components of a scale measuring the nursing environment were positively associated with error interception practice: nurse participation in hospital affairs, nursing foundations for quality of care, good nurse and physician relationships, and a supportive and competent nurse manager (Flynn, Liang, Dickson, Xie, & Suh, 2012).

One of the included studies found that 47.4% of new nurses "almost always" recognize when demands exceed capability, 49.1% "almost always" manage time and workload effectively, 24% "often" or "always" felt overwhelmed with patient care responsibilities, and 15.6% "often" or "always" felt that expectations of nurses were unrealistic (Li, 2007, pp. 25, 36). These numbers were not presented in relationship to errors, but they indicate a work environment surrounding new nurses that may result from inadequate staffing and inadequate time to complete their tasks. Shifts longer than 8.5 hours increase the risk of errors, which becomes significant after 12.5 hours (errors $p < .005$; near errors $p = 0.03$) (Rogers et al., 2004). Errors also increase significantly when nurses work over 40 hours per week (errors $p < .0001$; near

errors p =.03) and over 50 hours per week (errors $p < .0001$; near errors $p = .03$). Nurses working

long shifts have also been found to have dissatisfied patients, to be less satisfied with their jobs,

to experience higher rates of burnout, and to leave their jobs in higher numbers (Witkoski

Stimpfel, Sloane, & Aiken, 2012). Interruptions and distractions add to these demands, resulting

in an inability to concentrate. Unfortunately, interruptions are not entirely avoidable (Popescu,

Currey, & Botti, 2011). While some interruptions, such as attending to patients, are considered

beneficial, most are not (McGillis Hall et al., 2010). Interruptions increase the rate of both

clinical errors and procedural failures, independent of hospital or nurse characteristics

(Westbrook, Woods, Rob, Dunsmuir, & Day, 2010). The most frequent sources of interruptions

are environmental (such as monitor alarms) and other nurses, patients, family members, and

physicians (McGillis Hall et al., 2010). These stressful conditions contribute to new nurses'

descriptions of feeling exhausted, always busy, and often hoping at the end of the day that they

had not made any mistakes (Olson, 2009).

　　Inadequate communication, especially during handoff reports, adds complexity and risk

to any nursing situation (Ebright et al., 2004). From 2010 to 2012, inadequate communication

was cited by The Joint Commission (2012a) as the third most common reason for sentinel events.

Inadequate communication is also evident when 54% of new RNs reported having trouble

understanding non-English speaking clients or staff and 51% experienced difficulty reading or

understanding physicians' orders (Smith & Crawford, 2003). Understandably, new nurses, as

well as their preceptors, have identified communication as an area for improvement (Myers et

al., 2010). This includes communicating with other healthcare professionals, questioning medical

students, addressing ethical concerns and code status, talking to the patient's family, and

preparing for rounds with the doctors to visit the patients.

Limitations

Limitations include a lack of research regarding the topic of new nurses and the commission of errors and omission of standard nursing care, as evidenced by the sample size of 10 studies. Some studies employed small sample sizes, reducing the generalizability of their conclusions. One of the studies was presented at an international conference but was not published in a peer-reviewed journal (Li, 2007). One study, although published in 2006, included data collected from years 1997–1999 (Elfering et al., 2006). Some studies employed thematic analysis in their interpretation of interviews with study participants, allowing for error in interpretation of content and meaning. In addition, four research studies reviewed for results were conducted in countries outside of the United States, including Switzerland, Turkey, and Australia (Elfering et al., 2006; Manias et al., 2004; Unver et al., 2012; Westbrook et al., 2011). Conclusions from these studies may differ culturally and logistically.

Conclusions and Implications

Nursing education should focus on critical thinking and making application of acquired knowledge. Because experience is the best teacher, multiple nursing residencies, which are extended periods of clinical experience before working independently, have been and are being tested across the United States (Etheridge, 2007; National Council of State Boards of Nursing [NCSBN], 2009). They show promising outcomes in new nurses' critical thinking and actions, as well as improved patient outcomes (National Council of State Boards of Nursing [NCSBN], 2009). Continuing education and learning from more experienced nurses have been suggested as a method for decreasing medication errors (Unver et al., 2012). Lack of standard nursing practice or institutional protocol or policy may be improved by conducting frequent simulation scenarios on the unit (Whyte et al., 2012). Independent medication verification and multiple checks of the medication rights must be strictly adhered to. Nursing situations could also be improved by application of the nursing process of assessment, diagnosis, planning, intervention, and evaluation, which remains a pertinent support and guide for nurses' thinking and actions (ANA, 2013). For example, if a nurse administers a medication (an intervention), the next thought should be to evaluate the patient's outcome.

To combat fatigue in the workplace, The Joint Commission (2011) offers several suggestions for administration and staff nurses, including education about sleep hygiene and staying active and engaging in conversations at work to stay alert. Derived from the finding that error risk increases with hours worked, the most important suggestion that could be made regarding fatigue is to avoid 12-hour shifts and eliminate overtime (Rogers et al., 2004). Adequate nurse staffing is also a key component in preventing adverse outcomes (Unruh &

Zhang, 2012). Inability to concentrate should continually be addressed by the creation or enforcement of no-interruption zones for medication administration and banning personal cell phone use while working. Creating a culture of support through managerial and administrative efforts is important. Nurse participation in hospital affairs, nursing foundations for quality of care, good nurse and physician relationships, and a supportive and competent nurse manager are all positive strategies toward error interception practices. Specific examples include encouraging teamwork between physicians and nurses, assigning nurses to patients they have previously cared for to ensure continuity of care, offering opportunities for and encouraging nurses to participate in hospital and unit decision-making, offering continuing education, and retaining nurse administrators who are available to listen to their nurses' concerns and who hold their nurses to high patient care standards (Flynn et al., 2012).

Faculty should also be purposeful in encouraging nursing students to practice and improve their communication skills (Ebright, Carter Kooken, Moody, & Latif Hassan AL-Ishaq, 2006). There are also strategies that inpatient units could implement to facilitate communication. Units should increasingly encourage physician use of electronically entered orders and discharge medications. Repeating back verbal orders from physicians and critical information from other healthcare staff ensures clarity. Stocking and encouraging the staff to use a dual-handset telephone connecting to translation services facilitates communication with non-English speaking patients and their families (Tuot, Lopez, Miller, & Karliner, 2012). Considering that handoff report to the next shift is a complex and risky communication point, standardized handoff reports could curtail the incidence of missed information. A standardized handoff report sheet can be easily implemented (Triplett, 2011). Triplett's (2011) intervention study showed

that using this handoff sheet in conjunction with shift change reports at the bedside resulted in approximately half of the participating nurses feeling it provided a clear and consistent patient picture and made them feel more confident in giving and receiving report. Fifty-five percent also discovered errors during the reports at the bedside. There is evidence that bedside reports improve patient safety. Patients felt more informed of their plan of care, and nurses' perceptions improved significantly regarding nurse-to-nurse accountability, medication reconciliation, and communicating the patients' plans of care to the physicians after nurse handoff (Caruso, 2007; Maxson, Derby, Wrobleski, & Foss, 2012). Nurses received more pertinent information about their patients and the interpersonal relationships improved among the nurses due to bedside reports (Anderson & Mangino, 2006).

Appendix A: Determining Quality and Validity of Findings

Appendix A: Determining Quality and Validity of Findings

1. Research question, hypothesis, or problem is clearly stated.

2. Purpose is clearly stated and relevant to research question or problem.

3. Review of literature and background evidence supports study purpose.

4. Research design is appropriate for research question or purpose.

5. Variables are appropriate for study purpose.

6. Methodology is strong and clearly stated.

7. Sampling method is appropriate and adequate in size and demographics to support external validity.

8. Instrument validity and reliability are appropriate and clearly described.

9. Data is collected and managed systematically.

10. Analysis of results is complete and sound.

11. Study limitations are acknowledged and described.

12. Conclusions are supported by analysis of findings.

Each criterion receives 1 point and evaluated from total points as:

Level 3 (High quality): 9 – 12

Level 2 (Moderate quality): 5 – 8

Level 1 (Low quality): 0 – 4

(Quelly, 2007).

Appendix B: Table of Evidence

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Study	Study Design & Method	Sample	Purpose	Results	Themes
1. Ebright, P.R., Urden, L., Patterson, E., & Chalko, B. (2004). Themes surrounding novice nurse near-miss and adverse-event situations. *Journal of Nursing Administration, 34*(11), 531-538.	Qualitative. Semi-structured retrospective interviews.	New RN *n* = 12. New RN experience, range = 3 months -1 year.	Identify factors that influenced near-miss and adverse event situations among new nurses in the acute care hospital setting.	The researchers found the following nine themes from eight identified near-miss or adverse-event cases: Clinically focused critical thinking (8/8), Seeking assistance from experienced nurses (8/8), Knowledge of unit and workflow patterns (8/8), First-time experience (7/8), Time constraints (7/8), Handoffs (7/8), Influence of peer pressure and social norms (7/8), Losing the big picture (6/8), Novice assisting novice (4/8).	Lack of experience, stressful working conditions, interpersonal and intrapersonal factors.
2. Elfering, A., Semmer, N.K., & Grebner, S. (2006). Work stress and patient safety: Observer-rated work stressors as predictors of characteristics of safety-related	Mixed-mode. Event sampling using pocket diary version of computer-assisted self-observation (Likert scale). Interviews.	New RN *n* = 40. New RN experience, range = < 18 months. Complete event diaries and observer data *n* = 23.	Investigate the connection between workplace stressors and patient safety-related events in the hospital setting.	There were more safety-related events documented during the first phase of the study (starting at 0-1 months of experience and ending at 5-6 months of experience) than during the second phase of the study (starting at 12-13 months of experience and ending at 17-18 months of experience), but this finding was not found to be significant. Medication near-misses significantly	Lack of experience, stressful working conditions, interpersonal and intrapersonal factors.

Study	Study Design & Method	Sample	Purpose	Results	Themes
events reported by young nurses. *Ergonomics, 49*(5-6), 457-469. doi: 10.1080/00140130 600568451				decreased as experience increased ($p < 0.05$). Workplace stressors, particularly concentration demands and (lack of) job control, were linked to safety-related events both in familiarity and chance of recurrence ($p < 0.001$).	
3. Kenward, K., & Zhong, E.H. (2006). Report of findings from the Practice and Professional Issues Survey, Fall 2004. *NCSBN Research Brief, 22*. Retrieved from https://www.ncsbn.org/Vol_22_web.pdf	Quantitative. Random stratified surveys.	New RN $n = 628$. New RN experience ≤ 1 year since licensure. LPN/VN (licensed practical / vocational nurses) $n = 519$. New LPN/VN experience ≤ 1 year since licensure.	Solicit information from entry-level nurses regarding demographics, adequacy of education, and the following issues: Transition to Practice, Practice Issues, Difficulty of Assignments, Involvement of Errors, Change in Nursing Positions.	81.5% ($n = 22$) of RNs who thought they were not prepared to teach clients were involved in errors ($x^2 = 8.30$, df $= 1$, $p < 0.01$) 72.5% ($n = 29$) of the nurses who believed they did not have the educational preparation to synthesize data from multiple sources in making decisions ($n = 40$) were involved in errors ($x^2 = 6.22$, df $= 1$, $p < 0.01$). Of RNs involved in error ($n = 610$), 55.4% ($n = 338$) cited inadequate staffing as a contributing factor; 20.2% ($n = 123$)of new RNs cited lack of support from departments such as pharmacy, food service, or equipment; 16.2% ($n = 99$) cited inadequate orientation (too short or not thorough); 14.3% ($n = 87$) of cited lack of supplies or equipment; 43% ($n = 262$) cited lack of adequate communication;	Lack of experience, stressful working conditions, interpersonal and intrapersonal factors.

Study	Study Design & Method	Sample	Purpose	Results	Themes
				4.6% ($n = 28$) cited lack of continuing education (CE) courses. More than 60.9% of RNs didn't report medication errors due to fear of colleagues' reactions and 69% did not report errors due to fear of supervisor's reactions.	
4. Li, S. (2007). The impact of transition experience on practice of newly licensed registered nurses. [PowerPoint slides]. Retrieved from https://www.ncsbn.org/Suling.ppt	Quantitative. Survey of new nurses and preceptors, including clinical competence and practice errors and breakdowns.	New RN $n = 560$. New RN experience, average = 11.4 months. Preceptor $n = 231$. Preceptor experience, average = 13.7 years.	Describe the transition experiences of new nurses, determining the factors that contribute to the experience and investigating the effect of transition on safe practice and clinical competency.	More competent new nurses, especially in areas of clinical reasoning ability, communication, and interpersonal relationships made fewer practice errors. 28.2% made an error in performance of skills. 23.8% misinterpreted a physician or provider order.	Lack of experience, interpersonal and intrapersonal factors
5. Manias, E., Aitken, R., & Dunning, T. (2004). Medication management by	Qualitative. Semi-structured interviews.	New RN $n = 12$. New RN experience, range = < 1 year.	Explore new nurses' perceptions of their management of medication in	New nurses were conservative in medication administration and did not evaluate the outcomes of administration. New nurses did not administer medications due to lack of a physician's signature, lack of	Lack of experience, stressful working conditions, interpersonal

Study	Study Design & Method	Sample	Purpose	Results	Themes
graduate nurses: Before, during and following medication administration. *Nursing & Health Sciences, 6*(2), 83–91.			acute care.	communication concerning a new order, difficulty requesting change of order, and receiving a medication late from pharmacy. One nurse administered a double dose of medication because the order was not signed. New nurses did not educate patients about medications due to role confusion ($n = 4$); did not monitor pathology results because they thought it was the role of doctors ($n = 6$) Some new nurses who performed ECGs could not interpret the results. Some nurses did not check laboratory results and did not know how to interpret laboratory values (potassium, sodium, urea, creatinine) and their influence on the medications they were to administer.	and intrapersonal factors.
6. Smith, J., & Crawford, L. (2003). Medication errors and difficulty in first patient assignments of newly licensed nurses. *JONA's*	Quantitative. Secondary analysis of surveys.	New RN $n = 655$. New RN experience, range $= \leq 1$ year since licensure. New LPN/VN $n = 623$. New LPN/VN experience $= \leq 1$	Collect information regarding new nurses' error involvement and first patient assignment difficulty.	Of the new RNs ($n = 655$), 49% ($n = 321$) were involved in errors. The percentage of nurses involved in each type of error is as follows: Medications, 75%; Falls, 40%; Delays in care or treatment, 37%; Client elopement, 11%; Care provided by impaired professional, 1.3%; Avoidable death, 0.3%. Of the nurses involved in errors, the	Lack of experience, stressful working conditions, interpersonal and intrapersonal factors.

Study	Study Design & Method	Sample	Purpose	Results	Themes
Healthcare Law, Ethics, and Regulation, 5(3), 65-67.		year since licensure.		percentage of nurses citing causes of errors is as follows: Inadequate staffing, 70%; Lack of adequate communication, 44%; Long work hours, 23%; Lack of support from other departments, 22%; Poorly understood policies and procedures, 20%; Inadequate orientation, 18%; Lack of supplies or equipment, 16%; Other, 16%; Inappropriate use of UAP (unlicensed assistive personnel), 13%; Lack of adequate reference material – 6%; Lack of CE (continuing education) classes, 5%. Of the nurses involved in errors, 23%, ($n = 74$) who cited long work hours as a factor contributing to error worked an average of 1.7 hours more overtime ($t(556) = 3.53$, $p < 0.0001$). Of the nurses involved in errors, 70% ($n = 225$) cited inadequate staffing (cared for an average of 5.6 patients, compared to the 4-patient average of the RNs who did not cite inadequate staffing as a factor ($t(468) = 4.0$, $p < 0.0001$)	

Study	Study Design & Method	Sample	Purpose	Results	Themes
7. Treiber, L.A., & Jones, J.H. (2010). Devastatingly human: An analysis of registered nurses' medication error accounts. *Qualitative Health Research, 20*(10), 1327-1342. doi: 10.1177/10497323 10372228	Qualitative. Open-ended retrospective survey.	New and experienced RN *n* = 202. New and experienced RN experience range = 1 — >40 years at time of surveys.	Investigate nurses' perceptions of the cause of their medication errors and how they cope with them.	The researchers found the following themes from the nurses' accounts: "I'm to Blame, But…," "Being New," "Devastating Reactions," "Dealing with Fear," "Frustrations with Technology and Regulations," "Lessons Learned," and "Advice About Errors." Three examples of new nurses committing medication errors are as follows: One new nurse mixed up medication cups and gave all of the wrong medications to one patient. Another new nurse administered an antihypertensive medication not knowing her more experienced supervising nurse had already administered it but had forgotten to chart the medication or tell the new graduate. On a busy day, another new nurse was instructed by her manager to administer 8 units of insulin to a patient with a blood glucose reading of 250 but was told her the wrong room number.	Lack of experience, stressful working conditions, interpersonal and intrapersonal factors.

Study	Study Design & Method	Sample	Purpose	Results	Themes
8. Unver, V., Tastan, S., & Akbayrak, N. (2012). Medication errors: Perspectives of newly graduated and experienced nurses. *International Journal of Nursing Practice, 18*(4), 317–324. doi:10.1111/j.1440-172X.2012.02052.x	Quantitative. Survey with questionnaire containing two parts: demographics and the perspectives of nurses on medication errors.	Total RN n = 169. New RN n = 87. New RN experience, range = >1 year. Experienced nurse n = 82. Experienced nurse experience, range = > 3 years Total RN experience, average = 11.08 years.	Investigate newly graduated and experienced nurses' perspectives concerning medication errors.	Drug error causation frequency, on a 1-10 scale by new and experienced nurses, are as follows: Nurses are tired and exhausted (mean = 8.89; SD = 1.84); Nurses are distracted by other patients, co-workers or events on the unit (mean = 8.31; SD=2.14); The nurse fails to check the patient's name band with the Medication Administration Record (mean = 6.73, SD = 3.09); There is confusion between two drugs with similar names (mean = 6.18, SD = 2.74); The nurse miscalculates the dose (mean = 6.18, SD = 2.69); The physician prescribes the wrong dose (mean = 5.93; SD = 2.80); The nurse sets up or adjusts an infusion device incorrectly (mean = 5.53, SD = 2.56); Nurses are confused by the different types and functions of infusion devices (mean = 5.50, SD =2.65); The physician's writing on the doctor's order form is difficult to read or illegible (mean = 5.46; SD = 2.94); The medication labels/packaging are of poor quality or damaged (mean = 3.54; SD = 2.70).	Lack of experience, stressful working conditions, interpersonal and intrapersonal factors.

Study	Study Design & Method	Sample	Purpose	Results	Themes
9. Westbrook, J.I., Rob, M.I., Woods, A., & Parry, D. (2011). Errors in the administration of intravenous medications in hospital and the role of correct procedures and nurse experience. *BMJ Quality & Safety, 20*(12), 1027-1034. doi:10.1136/bmjqs-2011-000089	Quantitative. Prospective observations.	New and experienced RN *n* = 107. New and experienced RN experience, median = 6 years (range <1 − 43 years).	To measure the frequency, type and severity of intravenous medication administration errors in hospitals and to examine the associations between errors, procedural failures and nurse experience.	Intravenous medication administrations have a higher risk and severity of error than other medication administrations. Deficiencies in skill and knowledge are evident in a significant proportion of errors committed by nurses. A proportion of committed errors are also due to violations of routine and may be learned behaviors. The number and severity of errors reduce with increasing clinical experience.	Lack of experience
10. Whyte, J., Ward, P., Eccles, D.W., Harris, K.R., Nandagopal, K., & Torof, J.M. (2012). Nurses' immediate response to the fall of a hospitalized patient: A comparison of	Quantitative. Experimental observed scenario, questionnaire, and verbal report components.	New RN *n* = 10. New RN experience, mean = .58 years. Experienced RN *n* = 12. Experienced nurse experience, mean = 18.34 years.	Examine new and experienced nurses' reactions to an experimental scenario of a fallen patient who has a closed head injury.	New nurses were less likely to establish responsiveness; call for help; assess airway, breathing, and circulation; establish responsiveness then call for help; establish responsiveness, then call for help, and then establish airway, breathing, and circulation; reposition patient to neutral alignment; align cervical spine; note fully dilated pupil; hyperventilate patient.	Lack of experience

Study	Study Design & Method	Sample	Purpose	Results	Themes
actions and cognitions of experienced and novice nurses. *International Journal of Nursing Studies, 49*(9), 1054–1063. doi: http://dx.doi.org/10.1016/j.ijnurstu.2012.03.005				New nurses also took longer to check the fall "patient's" level of consciousness, call for help (most statistically significant, $p < 0.05$), and check the pulse.	

References

Agency for Healthcare Research and Quality [AHRQ]. (2003). AHRQ Web M&M: Online

    journal and forum on patient safety and health care quality. Retrieved from

    http://www.ahrq.gov/qual/webmandm.htm

American Nurses Association [ANA]. (2013). The nursing process. Retrieved from

    http://nursingworld.org/EspeciallyForYou/What-is-Nursing/Tools-You-

    Need/Thenursingprocess.html

Anderson, C.D., & Mangino, R.R. (2006). Nurse shift report: Who says you can't talk in front of

    the patient? *Nursing Administration Quarterly, 30*(2), 112-122.

Balas, M.C., Scott, L.D., & Rogers, A.E. (2004). The prevalence and nature of errors and near

    errors reported by hospital staff nurses. *Applied Nursing Research, 17*(4), 224-230.

Benner, P. (1982). Novice to expert. *The American Journal of Nursing*, *82*(3), 402-407.

Boychuk Duchscher, J.E., & Cowin, L.S. (2004). The experience of marginalization in new

    nursing graduates. *Nursing Outlook, 52*, 289-296. doi:10.1016/j.outlook.2004.06.007

Caruso, E.M. (2007). The evolution of nurse-to-nurse bedside report on a medical-surgical

    cardiology unit. *MEDSURG Nursing, 16*(1), 17-22.

Del Bueno, D. (2005). A crisis in critical thinking. *Nursing Education Perspectives, 26*(5), 278-

    282.

Ebright, P.R., Carter Kooken, W.S., Moody, R.C., Latif Hassan AL-Ishaq, M.A. (2006). Mindful

    attention to complexity: Implications for teaching and learning patient safety in nursing.

    Annual Review of Nursing Education, *4*, 339-59.

Ebright, P.R., Urden, L., Patterson, E., & Chalko, B. (2004). Themes surrounding novice nurse
near-miss and adverse-event situations. *Journal of Nursing Administration, 34*(11), 531-538.

Elfering, A., Semmer, N.K., & Grebner, S. (2006). Work stress and patient safety: Observer-rated work stressors as predictors of characteristics of safety-related events reported by young nurses. *Ergonomics*, *49*(5-6), 457-469. doi:10.1080/00140130600568451

Etheridge, S.A. (2007). Learning to think like a nurse: Stories from new nurse graduates. *The Journal of Continuing Education in Nursing, 38*(1), 24-30.

Flynn, L., Liang, Y., Dickson, G.L., Xie, M., & Suh, D.C. (2012). Nurses' practice environments, error interception practices, and inpatient medication errors. *Journal of Nursing Scholarship, 44*(2), 180–186. doi:10.1111/j.1547-5069.2012.01443.x

Hoffman, K.A., Aitken, L.M., & Duffield, C. (2009). A comparison of novice and expert nurses' cue collection during clinical decision-making: Verbal protocol analysis. *International Journal of Nursing Studies, 46*, 1335-1344. doi:10.1016/j.ijnurstu.2009.04.001

The Joint Commission (TJC). (2011, December 14). Sentinel event alert, (48), 1-4. Retrieved from http://www.jointcommission.org/assets/1/18/sea_48.pdf

The Joint Commission (TJC). (2012a). Sentinel event data: Root causes by event type, 2004-2Q 2012. Retrieved from http://www.jointcommission.org/assets/1/18/Root_Causes_Event_Type_2004_2Q2012.pdf

The Joint Commission (TJC). (2012b). Summary data of sentinel events reviewed by The Joint

> Commission. Retrieved from

> http://www.jointcommission.org/assets/1/18/2004_4Q_2012_SE_Stats_Summary.pdf

The Kaiser Family Foundation, Agency for Healthcare Research and Quality, Harvard School of

> Public Health. (2004, November 17). Five years after IOM report on medical errors,

> nearly half of all consumers worry about the safety of their health care. Retrieved from

> http://www.kff.org/kaiserpolls/pomr111704nr.cfm

Kenward, K., & Zhong, E.H. (2006). Report of findings from the Practice and Professional

> Issues Survey, Fall 2004. *NCSBN Research Brief, 22*. Retrieved from

> https://www.ncsbn.org/Vol_22_web.pdf

Leape, L., Lawthers, A.G., Brennan, T.A., & Johnson, W.G. (1993). Preventing medical injury.

> *Quality Review Bulletin, 19*(5), 144–149.

Li, S. (2007). The impact of transition experience on practice of newly licensed registered

> nurses. [PowerPoint slides]. Retrieved from https://www.ncsbn.org/Suling.ppt

Liang, B.A. (2001). The adverse event of unaddressed medical error: Identifying and filling the

> holes in the health-care and legal systems. *Journal of Law, Medicine and Ethics, 29*(3-4),

> 346-368.

Manias, E., Aitken, R., & Dunning, T. (2004). Medication management by graduate nurses:

> Before, during and following medication administration. *Nursing & Health Sciences*,

> *6(2)*, 83–91.

Maxson, P.M, Derby, K.M., Wrobleski, D.M., & Foss, D.M. (2012). Bedside nurse-to-nurse

> handoff promotes patient safety. *MEDSURG Nursing, 21*(3), 140-145.

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McGillis Hall, L., Pedersen, C., Hubley, P., Ptack, E., Hemingway, A., Watson, C., & Keatings, M. (2010). Interruptions and pediatric patient safety. *Journal of Pediatric Nursing, 25*(3), 167-175. doi:10.1016/j.pedn.2008.09.005

Myers, S., Reidy, P., French, B., McHale, J., Chisholm, M., & Griffin, M. (2010). Safety concerns of hospital-based new-to- practice registered nurses and their preceptors. *Journal of Continuing Education in Nursing, 41*(4),163-171.

National Council of State Boards of Nursing [NCSBN]. (2009). Transition evidence grid – March 2009. Retrieved from https://www.ncsbn.org/Evidence_Grid_2009.pdf

National Quality Forum. (2011). Serious reportable events in healthcare - 2011 update: A consensus report. Retrieved from http://www.qualityforum.org/Publications/2011/12/Serious_Reportable_Events_in_Healthcare_2011.aspx

Office of Inspector General. (2010). Adverse events in hospitals: National incidence among Medicare beneficiaries. Retrieved from http://oig.hhs.gov/oei/reports/oei-06-09-00090.pdf

Olson, M.E. (2009). The "Millennials": First year in practice. *Nursing Outlook, 57*, 10-17.

Pinchera, B.J. (2012). Newly licensed nurses: A look at their first 18 months. *Nursing, 42*(5), 18-25. doi:10.1097/01.NURSE.0000413625.74733.f8

Popescu, A., Currey, J., & Botti, M. (2011). Multifactorial influences on and deviations from medication administration safety and quality in the acute medical/surgical context. *Worldviews on Evidence-Based Nursing, 18*(1), 15-24. doi:10.1111/j.1741-6787.2010.00212.x

Quelly, S. (2007). Determining Quality and Validity of Findings. Unpublished manuscript,

    College of Nursing, University of Central Florida, Orlando, Florida.

Rhéaume, A. (2011). Workplace experiences of new graduate nurses. *Canadian Journal of*

    Nursing Leadership, 24(2), 80-98.

Rogers, A.E., Hwang, W.T., Scott, L.D., Aiken, L.H., & Dinges, D.F. (2004). The working hours

    of hospital staff nurses and patient safety. *Health Affairs, 23*(4), 202-212.

    doi:10.1377/hlthaff.23.4.202

Sorra, J., Famolaro, T., Dyer, N., Nelson, D., & Smith, S.A., (2012). Hospital survey on patient

    safety culture: 2012 User comparative database report (Part 1). Agency for Healthcare

    Research and Quality. Retrieved from

    http://www.ahrq.gov/qual/hospsurvey12/hospsurv121.pdf

Smith, J., & Crawford, L. (2003). Medication errors and difficulty in first patient assignments of

    newly licensed nurses. *JONA's Healthcare Law, Ethics, and Regulation, 5*(3), 65-67.

Treiber, L.A., & Jones, J.H. (2010). Devastatingly human: An analysis of registered nurses'

    medication error accounts. *Qualitative Health Research, 20*(10), 1327-1342.

    doi:10.1177/1049732310372228

Triplett, P. (2011). Nurses' end-of-shift report process and implementation of a standardized

    report format tool and bedside handoff [Abstract]. *Critical Care Nurses, 31(2), e43.*

Tuot, D.S., Lopez, M., Miller, C., & Karliner, L.S. (2012). Impact of an easy-access telephonic

    interpreter program in the acute care setting: An evaluation of a quality improvement

    intervention. *Joint Commission Journal on Quality & Patient Safety, 38*(2), 81-88.

Unruh, L.Y., & Zhang, N.J. (2012). Nurse staffing and patient safety in hospitals: New variable

    and longitudinal approaches. *Nursing Research , 61*(1), 1-12.

    doi:10.1097/NNR.0b013e3182358968

Unver, V., Tastan, S., & Akbayrak, N. (2012). Medication errors: Perspectives of newly

    graduated and experienced nurses. *International Journal of Nursing Practice*, *18*(4),/

    317-324.

Westbrook, J.I., Rob, M.I., Woods, A., & Parry, D. (2011). Errors in the administration of

    intravenous medications in hospital and the role of correct procedures and nurse

    experience. *BMJ Quality & Safety, 20*(12), 1027-1034. doi:10.1136/bmjqs-2011-000089

Westbrook, J.I., Woods, A., Rob, M.I., Dunsmuir, W.T.M., & Day, R.O. (2010). Association of

    interruptions with an increased risk and severity of medication administration errors.

    Archive of Internal Medicine, 170(8), 683-690.

Witkoski Stimpfel, A., Sloane, D.M., & Aiken, L.H. (2012). The longer the shifts for hospital

    nurses, the higher the levels of burnout and patient dissatisfaction. *Health Affairs, 31*(11),

    2501-2509. doi:10.1377/hlthaff.2011.1377

Whyte, J., Ward, P., Eccles, D.W., Harris, K.R., Nandagopal, K., & Torof, J.M. (2012). Nurses'

    immediate response to the fall of a hospitalized patient: A comparison of actions and

    cognitions of experienced and novice nurses. *International Journal of Nursing Studies*,

    49(9), 1054–1063. doi: http://dx.doi.org/10.1016/j.ijnurstu.2012.03.005