THE IMPACT OF AN EDUCATIONAL INTERVENTION ON KNOWLEDGE AND COMPETENCY LEVELS FOR STUDENTS ENROLLED IN A FORENSIC NURSING SCIENCE COURSE

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ABSTRACT

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THE IMPACT OF AN EDUCATIONAL INTERVENTION ON KNOWLEDGE AND COMPETENCY LEVELS FOR STUDENTS ENROLLED IN A FORENSIC NURSING SCIENCE COURSE

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Forensic nursing is an emerging nursing specialty recognized by the American Nursing Association. However, nurses often do not have the basic knowledge or practical competence to provide the appropriate level of forensic care. The purpose of this study was to determine if differences in knowledge or practical competence existed between students using two different learning modalities, medium fidelity simulation versus face to face lecture. Students enrolled in an elective online forensic nursing science course were randomly assigned to either an intervention or attention control group. The students in the intervention group (n=18) had three 2-hour sessions working through clinical forensic scenarios in the laboratory. The students in the attention control group (n=17) attended three lectures in a classroom setting. No significant differences were found between the two groups on knowledge or practical competency. The lack of significant results may have been influenced by the small sample size, which resulted in insufficient power to detect possible differences.

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CHAPTER I

INTRODUCTION

Forensic nursing science is a recognized nursing specialty (American Nurses Association [ANA], 2009) that supports various practice roles (e.g. sexual assault nurse, nurse death investigator, correctional/psychiatric nurse), each of which requires advanced study. Practicing nurses often encounter situations that require knowledge of and competency in medicolegal aspects of patient care. However, basic nursing education usually does not include the knowledge and competencies nurses need to care for forensic patients (e.g. patients admitted due to non-natural situations of abuse, assault, accident, or death).

Studies have shown healthcare providers acknowledge they are often ill prepared to identify and accurately describe injuries or recognize tangible forensic evidence (Caliskan & Ozden, 2012; Kent-Wilkinson, 2011). Freedberg (2008) suggested including introductory forensic nursing science concepts and skills into undergraduate nursing education would better prepare nurses to identify and respond to situations dealing with forensic patients and their families. To this end, a school of nursing offered a forensic nursing course for senior baccalaureate and master level students in fall of 2013. To enhance students' learning experience, simulation experiences were incorporated in the course methodology and tested as a learning modality.

Studies have shown simulation to be an effective tool for imparting knowledge and skill competency, chiefly because clinical simulations offer a safe environment for students to actively synthesize and integrate new knowledge (Arafeh, 2011; Cook et al., 2011; Decker, Sportsman, Puetz, & Billings, 2008; Decker, Utterback, Thomas, Mitchell, & Sportsman, 2011). Simulation can serve as either a teaching or learning means (Kaakinen & Arwood, 2009) and as an environment for evaluating student competency (Jefferies, 2007; Kaakinen & Arwood, 2009; Randolph et al., 2012). Educators frequently use simulation as a means of teaching content because simulated activities create an active learning environment for replicating real life situations that permit interaction among students, the teacher, and the clinical environment (Jefferies, 2007).

The use of simulation as a teaching strategy within nursing and other healthcare professions is well supported within the literature (Cook et al., 2011). However, few researchers have studied the impact of simulation as a teaching modality, and fewer have used simulation in teaching of forensic nursing science. The most frequent use of simulated scenarios within forensic nursing science has been in sexual assault training (Ferguson & Faugno, 2009; Lawson & Rowe, 2009).

Problem of Study

The study was designed to determine whether educating nursing students enrolled in a blended forensic nursing science course employing simulation were more knowledgeable and competent in their forensic skills than students enrolled in a blended forensic nursing science course employing face-to-face meetings to clarify content.

Rationale for the Study

The use of simulation as a teaching method is not new. Healthcare educators have used simulation to impart time-sensitive, skilled tasks requiring critical thinking (Jefferies, 2007) and to promote the execution of such tasks in a professional, time-efficient, and competent manner (Epstein & Hundert, 2002). Nurses working within an environment of a facility (e.g. hospital, hospice) may find that caring for patients intersects with the legal system. These nurses need to be professional and ethical when performing forensic aspects of care, such as conducting patient assessments, preserving evidence, and interpreting findings.

Practicing bedside nurses often are unaware of forensic aspects of care and may have difficulty incorporating forensic aspects responsibilities into patient care. Simulation allows the learner to be immersed in patient situations in an environment that permits self-reflection and critique of decisions (Jefferies, 2007). Hoyt (2006) indicated that nurse involvement with forensic issues of care is not an option, but is rather a distinct part of professional practice. Nurses in varying settings need to identify patient issues of interpersonal violence and death. Without basic knowledge of how to assess for abuse or neglect; recognize sudden, unexpected, or non-natural death; or safely and legally collect and document evidence, the facility and nurse are at risk for legal repercussions and financial and professional sanctions. The interprofessional aspect of forensic care has a high potential to create tension among professionals (e.g. law enforcement officer, nurse, physician, and attorney) that can lead to poor medicolegal outcomes and patient/family

distress. Having nurses trained in forensic aspects of care enables a facility to implement patient-centered care in a responsive manner.

Conceptual Framework

The Nursing Education Simulation Framework (NESF) developed by Jeffries (2007) permitted a structured approach to project design. Grounded in theories of constructivism that promote learning-centered practices, the framework was used to augment the nursing education modalities and provide measurable outcomes of the educational interventions. As shown in Figure 1, the model has overarching components, each of which contain variables that affect the simulation experience, student performance, and overall learning outcome (Jefferies, 2007, p. 25).

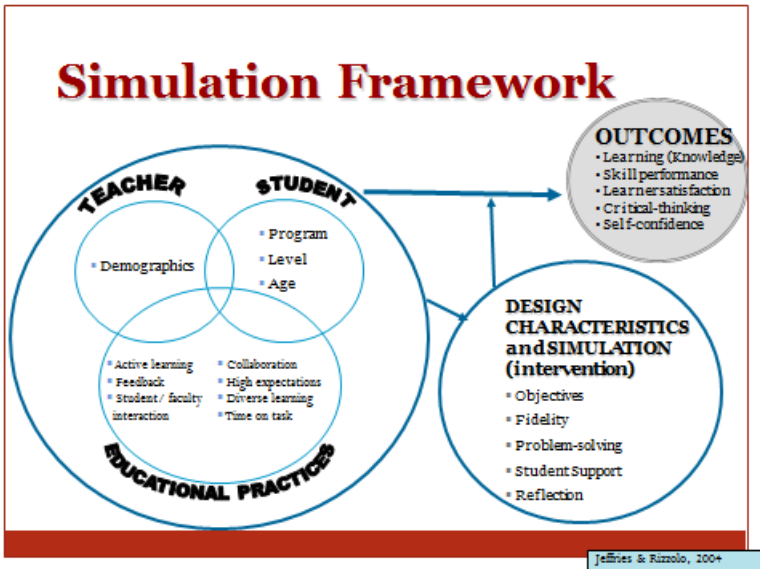

Figure 1. The Nursing Education Simulation Framework (NESF).

Reprinted with permission from P.R. Jefferies (Ed.). (2007). *Simulation in nursing education: From conceptualization to evaluation*. New York, NY: National League for Nursing (See Appendix A).

The framework was used to take into account the multiple components in the learning situation. The framework components consist of course instructors, students, educational delivery and content, design and fidelity of the intervention, and expected educational outcomes. The teachers' nursing experience, level of comfort using simulation, and facilitator role as well as the students' prior exposure to simulated exercises and experience with scenario content influence both teaching and learning.

The framework as designed by Jefferies guided the project to ascertain evidence-based learning modalities for introducing forensic science into nursing curriculum. Participants were asked to supply demographic information, and faculty roles varied from learning facilitator to competency evaluator. Objectives were clearly expressed to aid students in problem-solving and decision-making roles and to enhance the learning environment. The simulation exercises were developed based upon objectives and included a range of fidelity levels, with a debriefing session held at completion of each clinical scenario. Because students were engaged in active learning, expectations were that a real life simulated learning modality would best enhance student learning.

In reference to the study implemented, interplay among components and the roles assigned were as follows:

- The Teacher: Because simulations are student centered, not teacher centered, the teacher served as a facilitator to guide and support students during the clinical exercises and provide feedback in debriefing sessions. The Principle Investigator (PI) of the study executed the teaching role.

- The Students: In active learning, students need to be self-directed, motivated, and responsible for their own learning. Although the teacher set up the scenario and provided specific instructions for the various student roles, students used their own judgment and made decisions as the scenario unfolded. Students were encouraged to reflect upon and critique their performance in the debriefing sessions.
- Educational Practices: Realistic scenarios were devised in which students were self-directed in their assigned roles, with the teacher providing positive corrective actions to consolidate knowledge application in the actual learning experience. As mentor and facilitator, the teacher used diverse learning styles (visual, auditory, tactile, and kinesthetic) to aid student comprehension. Completing the simulated experiences within specific timeframes motivated students to stay on task and manage their time appropriately. Because students worked in groups, teamwork was required to complete the assignment successfully.
- Simulation Design Characteristics: Environmental fidelity (degree of mimicking reality) was attained through low, medium, and high fidelity modeling. Problem solving skills (level of complexity to be attained) were encouraged through open-ended scenarios, student support (frequency of aid) was corrective, and reflective thinking (examination of what happened) was used to comprehend medicolegal responsibilities inherent in the learning

experience. Students were allowed to freely explore the forensic aspects of care during the exercises. Debriefing occurred after each session and open-ended questions were used to enhance critical thinking.

- Educational Outcomes: Outcomes included measurable aspects (e.g. knowledge of forensic concepts gained, learner's level of skill proficiency, and learner's satisfaction). To ascertain intervention validity, forensic experts had reviewed the learning objectives and examined the scenarios for realism and relevancy. To assess educational outcomes, instruments had been developed based on the learning objectives, assessed for validity, and administered at the end of the course. A multiple-choice format test was used to assess knowledge, and faculty members rated student skill performance and task proficiency.

Assumptions

The assumptions relevant to the research investigation were drawn from the six assumptions in Kolb's (1984) experiential learning theory and are implicit in Jefferies NESF model. For this study, learning was viewed as a continuous process that derived from experience and considered as an integrative holistic process that required a resolution of conflicts through interplay between the teacher, students, and the environment (Kolb, 1984).

Research Questions

The following research questions were posed to guide study design, development, and outcomes:

1. Will nursing students who complete a blended forensic nursing science course incorporating a simulation intervention demonstrate greater knowledge of nursing forensic science than students who complete a blended forensic nursing science course incorporating an attention control intervention using face to face content clarification sessions?
2. Will nursing students who complete a blended forensic nursing science course incorporating a simulation intervention demonstrate greater competence in application of forensic skills than students who complete a blended forensic nursing science course incorporating an attention control intervention using face to face content clarification sessions?

Definition of Terms

For the purpose of the study, the term "forensic" or "medicolegal" was defined as healthcare situations or conditions that may have legal implications (Lynch & Duval, 2011). Forensic patients are either victims or perpetrators of non-natural occurring situations (e.g. injury, poisoning, violence, or neglect). Depending on the nature of the medical situation, healthcare providers may intersect with the law (Freedberg, 2008). The forensic aspects of care include the assessment, recognition, intervention, and evaluation of patients, families, or communities in regards to abuse, neglect, or other forms of violence (Eldredge, 2008; Freedberg, 2008).

Conceptual and operational definitions for the study's dependent and independent variables were as follows:

1. *Forensic nursing science knowledge.* Conceptually defined as "the application of the forensic aspects of healthcare combined with the bio/psycho/social/spiritual education of the registered nurse in the scientific investigation and treatment of the trauma or death of victims and perpetrators of violence, criminal activity, and traumatic accidents" (Lynch & Duval, 2011, p. 5). Knowledge was operationally defined as a student's score on a 50-item faculty developed test covering the knowledge aspect of the forensic nursing science education course content.
2. *Forensic nursing science competency*. The competency or skill performance aspect was conceptually defined as "the habitual and judicious use of communication, knowledge, technical skills, clinical reasoning, emotions, values, and reflection in daily practice for the benefit of the individual and community being served" (Epstein & Hundert, 2002, p. 226). Competency, operationally defined as the overall practical competency of a student, as observed and scored by instructor, of the student's performance and responses (Davis & Kimble, 2011), was used as a measure of skill proficiency in relation to injury type identification; evidence recognition, collection, and preservation; and head to toe patient examination.
3. *Nursing students.* Participating nursing students included BSN senior level students, currently practicing registered nurses enrolled for academic or

continuing education credit, and nursing students enrolled in a master's of science nursing program.

Limitations

Limitations of the study included the following:

1. The sample was a voluntary convenience sample drawn from a population of students enrolled in a Baccalaureate (BSN), RN to BSN, or graduate program at a school of nursing located in the Southwestern United States, as well as local practicing nurses enrolled in a CE offering. Thus, findings cannot be generalized beyond the participants in this sample.
2. Because the course was an elective offering, course enrollment was a reflection of students interested in forensic nursing science and thus, offered a small population for recruiting a sample size estimated to be sufficient to ascertain significant findings, if such differences did exist.
3. Participants in the intervention and attention control groups may have interacted with one another that caused a crossover (i.e. contamination) of experience that artificially inflated scores of the attention control group, resulting in less of a statistical difference than anticipated.

Summary

An experimental study was conducted to evaluate whether the use of simulation as a teaching modality impacted knowledge and competency of participants enrolled in a blended forensic nursing science course significantly more than knowledge and competencies of students in an attention control group. The variables of interest were knowledge and competency, and the methods in which the content was implemented, namely simulation versus face-to-face lecture. The theoretical foundation of the study was grounded in the NESF model. Assumptions flowed from the theoretical framework. Conceptual and operational definitions were provided for major variables, and limitations of the study recognized.

CHAPTER II

REVIEW OF THE LITERATURE

This chapter presents a review of literature on the use of simulation as a teaching modality in nursing education. Literature searches were conducted on the following: CINAHL, Cochrane, ERIC, Google Scholar, ProQuest, Pubmed, and Scopus. Key search terms included simulation, competence, knowledge, education, simulation nursing education, forensic science, and forensic nursing education. A large number of results were returned, and these were further refined and narrowed to relevant systematic reviews, meta-analyses, and current research studies. Ancestry examination and manual crosschecks were conducted when studies appeared relevant.

The literature review presented in this chapter summarizes patterns of findings from systematic reviews and portrays results of quantitative studies of the effects of simulation as a teaching modality on nursing student educational outcomes. Aspects of specific reviews that pertain directly to the study are noted when relevant.

Overview

The use of simulation for training dates back to the 18th century. Simulation training was chiefly used to instruct personnel working in aviation, military, and nuclear power (Rutherford-Hemming, 2012). Entry into healthcare began in the 1960's with "Resusci® Anne", a low technology mannequin with only a head and torso for teaching

resuscitation, and “Harvey”, a full sized mannequin with low fidelity simulation capability used primarily as an aid in teaching cardiac assessment (Jefferies, 2007).

A major push for simulation in nursing education occurred in the 20th century. At the end of World War II, advances in technology permitted better patient care as well as more realistic training aids (Jeffries, 2007). Teaching transitioned from using paper-based products to applying a continuum of low-fidelity (case studies), medium fidelity (task trainers to practice psychomotor skills), and high fidelity (realistic models, including programmable mannequins) training devices. Because an increased awareness of patient safety was accompanied by greater demands for healthcare delivery, simulation provided a safe and effective alternative teaching method (Kaakinen & Arwood, 2009). Simulation as a teaching methodology typically permits students to practice skills or apply new care concepts before actual patient contact (Schlairet, 2011). Additionally, instructors can observe and assess student competency and provide timely feedback without risking harm to the patient (Arafeh, 2012).

Systematic Reviews and Meta-Analyses

The number of published studies identifying simulation as a teaching modality increased dramatically in the last decade. Systematic reviews of nursing education literature revealed trends and gaps in use of simulation as a teaching intervention. The trend was toward student-centered learning, where a realistic yet safe environment facilitates the learning experience. Gaps include the lack of rigorous research design

(Cant & Cooper, 2009) and underlying theoretical or conceptual learning frameworks (Kaakinen & Arwood, 2009).

Simulation in Healthcare Education

A meta-analysis by Cook and colleagues presented an overview of use of simulation in healthcare education. Cook et al. (2011) reported on the use of technology-enhanced simulated devices for educating healthcare workers. From a pool of 10,903 articles (published in any language), the authors identified 609 that were research-based (versus informative or descriptive) studies. Of the 609 articles, 67 reported use of simple two-group, non-randomized group assignment designs, and 137, two-group randomized designs. The remaining 405 used a one-group design and reported pre-post test analysis.

Cook et al. (2011) summarized studies using knowledge as the student outcome variable, recognizing knowledge as an indicator of the learning experience in the study. Knowledge gained (pre to post) was measured in 118 of 609 of the studies, giving a pooled effect size of 1.20 (defined as Cohen effect size classification of >0.8). In 16 of the 118 that employed randomized group assignment, the pooled effect size was 0.63. Pooled effect sizes for knowledge were larger for studies that employed an intervention for more than one day.

In their analysis, Cook et al. (2011) commented a majority of the studies examined failed to clearly describe instructional methods or outcomes of interest. However, the authors concluded because the use of simulation in healthcare education is associated with large effects for student outcomes, simulation as a teaching modality is

appropriate for healthcare settings. They recommended future studies should compare the effect of interventions of various time lengths, a recommendation taken into consideration in this study design.

Harder (2010) reviewed articles published between 2003 and 2007 that used quantitative research measures to assess outcomes of simulation intervention. Initially, 61 articles were identified; however, after full review, 23 articles remained. In 10 studies, subjects were practicing healthcare providers and in 13 studies, subjects were medical, nursing, or other healthcare students. The most common method of evaluation was one-group pre/post analysis using objective structured clinical examinations to measure skill development. Although no differences were found between intervention and control groups in three of the studies, overall, participants in simulated activities (from task trainers to virtual programs) demonstrated an increase in skill performance. Study outcome measures also included confidence or competence self-reporting; however, no significant differences were reported. Harder (2010) noted a meta-analysis was not feasible because of inadequate data provided in the articles and cautioned because the instruments used to evaluate skills were clinically based, they may not necessarily relate to experiences in the simulation setting.

Ross (2011) conducted a systematic review of quantitative studies reported in the literature between 2008 and 2011 that examined effect of simulation for psychomotor skill acquisition. The initial search yielded 581 articles; study participants crossed multiple health disciplines, and simulation usage included computer-based and virtual

reality modes. Four of the 581 articles reported nursing student participants. Ross concluded simulated activities, particularly for specific timed tasks, improved student scores. More success in psychomotor skill acquisition was noted in healthcare disciplines other than nursing, where pre to post intervention was primarily by means of computer-based virtual programs.

Simulation in Nursing Education

A study published by Kaakinen and Arwood (2009) affords a background perspective for viewing current applications of simulated interventions. The authors conducted a systematic review of nursing research articles published between 2000 and 2007. An initial search using simulation as a key search term resulted in 640 articles, of which 520 were eliminated as not specific to nursing education. Because use of a theoretical or conceptual model in designing the educational intervention was a main variable of interest, further elimination occurred. For instance, 104 of the remaining 120 articles did not cite a theoretical basis. The remaining 16 articles employed some variant or combination of learning theories or models to structure simulated learning experiences, and 2 of the 16 cited Kolb's experiential learning theory, a theory formulating the underlying assumptions of this study.

The learning theories or models cited were wide ranging and included experiential learning, social learning, adult learning, constructivism, reflective practice, information processing, and performance-based designs. Of the 16 studies that cited a foundational learning theory, more than half of the authors conducting the research reported design

applications that were primarily teacher-centered. Therefore, Kaakinen and Arwood (2009) concluded most nurse educators viewed simulated interventions as a teaching rather than a learning modality. That is, simulation was used more for the instructor to demonstrate a concept and less for a student to interpret and respond to simulated cues in a realistic environment. The authors advocated shifting the use of simulation from a teaching to a learning paradigm, a concept supported by other researchers (Rutherford-Hemming, 2012) and built into this study.

Cant and Cooper (2009) conducted a systematic review of research studies employing quantitative analysis to compare the use of simulation to other teaching modalities in nursing education. Of the 2,019 articles published between 1999 and January 2009, 1870 remained after eliminating articles that were non-experimental; however, the majority of these articles were qualitative or quasi-experimental with one-group pre-post analysis. The use of medium or high fidelity simulation was identified as a variable of interest and studies using non technology-based devices were eliminated. The authors ultimately identified 12 articles that reported use of a two-group randomized design employing medium to high simulation fidelity as the educational intervention.

The mean sample size for these 12 studies was 67, and ranged from 23 to 140. Participants were either undergraduate nursing students or newly graduated nurses. For students in the comparison (control) groups, teaching modalities included lectures, case studies, and structured clinical debriefing. Across the 12 studies, student outcome measures included gains in knowledge or skills, critical thinking, and confidence. Cant

and Cooper (2009) noted that in six of the studies, students showed a significant increase in knowledge over students taught using traditional methods. However, the 12 studies included a wide range in topics taught and large variability of time on task, (one 15 to 20 minute session to 90 minute sessions weekly over 5 weeks). A design flaw noted in 11 of the 12 studies was the control groups were exposed to interactive teaching modalities, such as case study reviews, question and answer discussions, and test reviews.

Lapkin, Levett-Jones, Bellchambers, and Fernandez (2010) conducted a systematic review of the effectiveness of high-fidelity simulation in undergraduate nursing education. Initially, 1,600 articles were retrieved. However, only 8 reported use of a high fidelity simulation intervention as a teaching modality. These studies included both experimental and quasi-experimental designs, with sample sizes ranging from 13 to 40. Students in control groups experienced classroom lecture and low fidelity case study reviews, and students in intervention groups were exposed to high fidelity simulation.

The researchers of each of the 8 studies reported increases in knowledge between pre and post test scores. In one study that employed a two-group with random assignment design, the researchers reported significant differences between groups in knowledge acquisition and self-reported confidence (Brannan, White, & Bezanson, 2008). Study results on effects of simulation on student confidence across the 8 studies tended to be equivalent between groups or showed no significant increase between pre and post testing sessions.

Yuan, William, and Fang (2011) examined the effects of high-fidelity simulation on confidence and competence of nursing students. The authors identified 18 articles in English and 6 in Chinese that reported use of simulation as an alternative or adjunct to traditional clinical training, regardless of the mode or fidelity level of simulation. Sample sizes of the 24 studies ranged from 19 to 300. Three of the studies with undergraduate student participants had two-group designs, where students in randomly assigned control groups received traditional lecture and clinical practice. Participant confidence was typically measured by self-report instruments; however, some researchers rated students in individual interviews. Findings indicated graduate level Chinese students using MicroSim (Virtual programs) experienced increased competence/confidence. However, in studies where the simulated intervention involved mannequins in various levels of fidelity, less than half of the students (predominately junior level nursing students) perceived increased confidence/competence. Yuan et al. noted a reason for this finding was the self-reporting tools and instructor ratings were not consistent across the studies. Also, the extent of hands-on training was limited as students worked in small groups.

Meta-Analysis and Systematic Review Summary

A majority of the simulation studies included in the reviews had small sample sizes, used limited data analysis, and were pre experimental or quasi-experimental in design. Student outcomes, especially in relation to knowledge acquisition, were based on instructor-constructed tests that did not report validity and reliability. Other outcome measures depended upon self-reporting perceptions. Although these design aspects

restrict the development of clear patterns, pooled results generally support the assumptions (theory-based) and methodology (two-group randomized group assignment, valid and reliable test for knowledge, and adequate sample size) of the study.

Specific Current Research Studies

The literature search revealed a limited number of experimental research studies published in or after 2010 that were designed to test the effect of simulation as a modality to increase knowledge and skill performance in nursing education. For the most part, studies reported outcome measures of knowledge acquisition and self-reported confidence, competency, and satisfaction. This section addresses five studies which used a 2-group design to test differences between groups, when simulated activities were part of a teaching intervention.

Schlairet and Pollock (2010) conducted a 2x2 crossover study that examined equivalence testing for knowledge acquisition between traditional and simulated clinical experiences. Study participants were undergraduate nursing students (n=71). Students in Group 1 attended traditional hospital-based clinical sessions for two weeks followed by a single simulation experience, while students in group 2 attended a simulation-based clinical in a laboratory setting. A 25-item test covering fundamental nursing knowledge was administered to both student groups before and after the clinical or simulated sessions. The student groups then switched sequence and the post-test was re-administered. The authors found an increase in knowledge acquisition for both groups; however, the increase was equivalent both within and between groups. A reason for this

equivalence could be the repetition of material as well as possible cross-contamination. The authors recommended further research to determine the use of simulation as an adjunct or replacement tool for actual clinical experience.

Liaw, Scherpbier, Rethans, and Klainin-Yobas (2011) conducted a randomized control study of final year BSN students (n=31) and measured knowledge acquisition, clinical performance, and clinical confidence. A 53-item multiple-choice questionnaire with established content validity was devised to assess knowledge. The tool to measure clinical performance was a 31-item instructor-constructed checklist with a 1-item global rating. The global rating had a 0.94 interclass correlation coefficient across raters. A 5-item confidence scale, with previously reported Cronbach's alpha of .84 to .94, was used to measure clinical confidence. The authors found significant differences between intervention and control groups. However, the control group (n=16) scored higher in self-confidence than the intervention group (n-=15). Student anxiety of performance in a simulated situation may have contributed to this finding. Also, both groups had a brief exposure to simulation in the pre-test phase, which may have introduced contamination. The authors cautioned that self-reported self-confidence does not necessarily mean clinical performance will improve.

Blum, Borglund, and Parcells (2010) conducted a 2-group study to evaluate differences in reported self-confidence and clinical competence within the context of health assessment skills of BSN senior nursing students. The investigators used the Lasater rubric to measure self-confidence and clinical competence. The rubric's inter-

rater reliability (alpha .87) and internal consistency (.886 and .931) were deemed sufficient. The authors found both intervention and control groups had increased self-confidence and clinical competence on pre-post test measures; however, differences between groups were not significant.

Alfes (2011) found similar results when the subjects were beginning nursing students. The author compared differences in self-reporting of confidence and satisfaction with mode of learning between students in traditional learning (n=34) versus simulated teaching (n=29). The instrument used was the National League for Nursing's Student Satisfaction and Self-confidence in Learning Scale. Although no difference was noted for satisfaction of learning modality, students in the intervention group reported higher self-confidence ratings than students in traditional learning modality. The author described the simulation sessions as instructor led demonstrations. The theoretical basis of the study permitted student discovery and active learning, which may increase student confidence in skill performance.

Schlairet (2011) used a mixed methods approach to evaluate usage and user satisfaction of the introduction of simulated activities in clinical practice. Data were collected from both students and faculty, and methods of data collection included instrument completion, faculty surveys, and program evaluation data. The participants were junior and senior level BSN nursing students (n=161) and 26 full-time faculty members. The author used Jeffries (2007) Nursing Education Simulation Framework (NESF) to organize outcome variables, which consisted of student self-confidence and

satisfaction ratings of simulation-related practices. Student data were obtained from students' reflective journaling and instrument completion (Education Practices in Simulation Scale, Simulation Design Scale, and Impact: Student Satisfaction and Self-Confidence in Learning). Faculty members were surveyed on the extent of their usage of simulated activities in clinical practice.

Schlairet (2011) found students valued the opportunity to work with their peers in simulated activities and to evaluate their own behavior. However, the author reported lower satisfaction scores for two demographic student categories: senior level students and students reporting themselves as non-white scored significantly lower than junior level students and students reporting themselves as white. Further research, with larger sample sizes within each demographic group, is required to investigate these findings. On their surveys, a majority of faculty responded that they had attended training in simulation design and reported on their usage of simulated activities in classroom activities. Schlairet estimated 25% of the clinical practice requirements were being taught via simulation. The author concluded the NESF is a valuable framework for identifying variables of interest within simulation research and for guiding simulation designs that employ student-directed active learning.

Current Literature Summary

Methodological issues of the studies that could be challenged include use of convenience samples with small sample sizes, which contributed to a lack of power and potentially to a lack of significant findings. Study results also suggest using valid and

reliable instrumentation to test knowledge acquisition increases the possibility of finding significant differences, if such difference exists. These studies also suggested a framework, such as Jeffries model, should be used in designing simulated activities. Furthermore, the efficacy of collecting student user satisfaction data may be questionable and suggests researchers should examine conditions under which the data is obtained.

Simulation in Forensic Nursing Science Education

Few researchers have reported on the use of simulation within the practice aspects of forensic sciences. A Boolean search with the terms simulation AND forensic sciences yielded 47 articles. However, the majority of these studies, ranging in course content from courtroom testimony to forensic interviews with adolescents, used computer-based programs instead of simulations as a teaching modality. As such, these articles were not included within this review. In the search for medium to high fidelity simulation as a modality for teaching basic forensic nursing science education, no studies were found.

For the most part, simulation in forensic nursing science is used to teach nurses and emergency care personnel on dealing with sexual assault. A typical study is seen in a non-experimental study by Fitzpatrick and colleagues (2012). The authors conducted a 1-group (n=17), pre-post test study to evaluate use of simulation as part of sexual assault cross training for emergency personnel of advanced nurse practitioners and physician assistants. Participants completed 4 simulation scenarios within 2 sessions, where time on task was 45 to 90 minutes. The authors developed a 20-item instrument to assess knowledge and a skills checklist to evaluate competency. Content validity was

established for the test items; however, inter-rater reliability and Cronbach's alpha were not reported. The authors found knowledge and competency increased between pre and post testing. However, lack of a control group contributed to not knowing to what extent the simulated exercises contributed to competency. One finding was participants performed lower on procedures that were new to them (consent process, wound identification, evidence collection) versus procedures they routinely use (wash hands, assess patient, interact with family).

Conclusion

Research results support the use of simulation as a teaching modality to increase knowledge acquisition. One caveat is simulation needs to be designed in accordance with concepts of a theoretical framework so that experience is standardized across subjects and outcomes are measurable. A second caveat is the tool for testing knowledge acquisition should contain a sufficient number of items to test the learning objectives and should be pilot tested and revised for validity and reliability.

Findings in relation to self-reported scores suggest testing conditions should be examined. How, when, and explanations of why the tool is administered may aid in obtaining reliable results in relation to user satisfaction. Using instructor rated rubrics for clinical competency, as opposed to student self reports, would likely result in more accurate assessment. In addition, researchers should take care to not introduce cross-contamination between comparison groups.

The current lack of experimental studies in forensic nursing science using medium to high fidelity simulation as a teaching modality provides an opportunity to develop evidence-based guidelines. The present study augmented the existing body of literature and provided a model for replication. The development of a validated instrument to test knowledge acquisition of basic forensic nursing science concepts and a practical rubric for observing student competency could be of benefit to educators incorporating forensic concepts into nursing curricula. The present two-group experimental design study is expected to fill a gap in literature. The study, guided by Jefferies NESF conceptual framework, addressed student-faculty and simulation design characteristics that promote student learning.

CHAPTER III

METHODOLOGY

A Paper Submitted For Publication in the

Journal of Forensic Nursing

Stacy A. Drake

This chapter contains a manuscript of an article that has been submitted for publication in *Journal of Forensic Nursing.* This article provides a complete description of the development, testing, and implementation of instruments constructed to evaluate the knowledge and practical competency of forensic nursing science.

Quantitative Evaluation Tools for Forensic Nursing Science Assessment

Introduction

Few instruments have been designed to measure knowledge and competency in forensic nursing science, and even fewer research articles provide documentation of the reliability and validity of such instruments. One article was discovered in which Fitzpatrick and colleagues (2012) developed a 20-item multiple choice instrument and a skills checklist to evaluate knowledge and competencies specific for forensic aspects of sexual assault. Although the authors examined content validity for the knowledge-based test, they did not report on the internal consistency of the test nor did they address any inter-rater reliability for the skills checklist.

To address this paucity in the literature, two instructor-developed tools were designed and tested. This researcher developed an objective cognitive examination and a practical competency rubric specific to forensic nursing science and tested the reliability and validity of both tools. The primary aims of the project were as follows:

1. Construct an instructional blueprint that identifies relevant objectives for a basic course in nursing forensic science and subsequently, for the development of a knowledge-based, objective test.
2. Develop a grading rubric for use in assessing student application of the practice aspects of forensic nursing science.
3. Pilot test the instruments, examine content validity and reliability of the two instruments, and revise instruments accordingly.
4. Disseminate the instruments for use in academic or professional settings.

The intent was to develop instruments that would realistically reflect student knowledge and application of basic forensic nursing science concepts. The concepts identified were concepts that nursing students or emergency healthcare providers could expect to use when caring for patients in situations where their care might have medicolegal consequences. As such, once the objectives were validated as relevant and reflective of key concepts of forensic nursing science, the instruments could serve as standalone or paired instruments to be used for assessing knowledge and skills within an academic setting, clinical teaching scenario, or for continued competency evaluation.

Instrumentation

As a starting point, literature was perused to identify basic concepts of forensic nursing science. The key topics condensed from this review included description of forensic nursing science (an introduction); public health and epidemiology; multidisciplinary collaboration; evidence recognition, collection, preservation, and chain of custody; mechanisms of injury; interpersonal violence and human trafficking; forensic nursing evaluation process and clinical forensic practice; medicolegal death investigation, legal standards and procedures; and specialized roles (Brooks, 2010; Freedberg, 2008; Kent-Wilkinson, 2009, 2010).

The nine key concepts served as content guides for developing an instructional blueprint. The blueprint elements consisted of module or course topics with corresponding objectives and identified the number of items to be covered on the test as well as the level of complexity (i.e. comprehensive, application, or analysis).

Instrument Development

A 50-item knowledge-based test was developed from the instructional blueprint. The test items included typical response item formats (e.g. multiple choice, matching, and short answer items). Faculty members with test construction and forensic expertise reviewed the items for content validation, appropriate level of complexity, and correctness of answers and distractors; the test was alpha tested with volunteer students, and the test items were revised according to feedback.

The practical competency rubric (See Appendix A) was developed from the foundational elements of nursing forensic science (examination process; evidence recognition, collection, and preservation; documentation; and interpretation). Because a rubric provides a wider range of feedback than yes or no (Erickson, 2011), a grading rubric was chosen over a checklist format to permit the learner to become an active participant in the learning process.

An instructor would use the rubric to evaluate a student's application of the forensic process. In this case, the forensic process was demonstrated in a medium fidelity simulation scenario, where the student could apply the foundational elements learned in an interactive format. Based on the extent to which the student met instructor expectations, student proficiency would be graded as below proficiency, proficient, or exceeds proficiency. Content expert faculty reviewed the rubric for content validation and to ensure variation was clear between the levels of student proficiency.

Validity and Reliability Methodology

Current practices for test development recommend using various sources of evidence to examine validity and reliability (McDonald, 2007; Oermann & Gaberson, 2009). Three such practices for assessing validity include: 1) content validity (degree to which items reflect relevancy), 2) criterion related validity (extent to which items are related to external set of criteria) and, 3) construct validity (extent to which items reflect the concepts being measured). An initial step in examining instrument validity is to have a panel of experts assess the content of the blueprint and the relevant instruments.

Reliability refers to an instruments ability to accurately and consistently measure targeted concepts and their stability, internal consistency, and equivalence. Three common approaches to testing for reliability include test-retest measures for stability, Cronbach alpha for internal consistency, and inter-rater reliability for equivalence. Knowledge examinations are typically assessed for internal consistency using the Cronbach alpha or Kuder Richardson 20. A competency rubric would need to be tested for inter-rater reliability.

Validity Process

Polit and Beck (2012) note that an external panel of experts knowledgeable on key forensic topics as well as the intended audience can be used in an initial phase of test development (p. 357). To accomplish this phase, persons whose credentials identified them as experts were contacted, and an evaluation packet was emailed to those agreeing to participate.

Because forensic nursing science involves or overlaps significantly with nursing, criminal justice, and forensic science, the panel was made up of persons with these varying backgrounds. The six experts participating in the validity evaluation process were clinical forensic nurses, nursing educators, forensic pathologists, and death investigators. The participants worked independently at their locale of choice. Their instructions were to review the blueprint content topics for relevance and assess whether or not the corresponding course objectives were relevant and comprehensive. They were

then to consider the two test instruments for readability and correctness of response and to assess the extent to which the items met the objectives.

Panel response analyses. To analyze the information received, data were first organized by response. Panel participant responses were sorted on relevancy of the blueprint key topics, objectives, and test items. Responses related to the objectives/topics were also categorized as "clear/measurable" or "not clear/measurable". Comments on the 50-item knowledge test were sorted by syntax modification, distracter clarification, and clarity of items. Comments on the knowledge-based test items were sorted by test layout, direction clarity, or specific to a test item. Comments on the practical competency rubric were sorted in terms of instructor expectations of student performance within each level of proficiency.

Analyses results. The experts were in consensus (100%) on relevancy of the instructional blueprint topics and objectives for an introductory forensic nursing science course. Two objectives were added specific to wound interpretation. Several test items were reassigned to a topic, objective, or taxonomy level. Of the 50 test items, 34 items (68%) required minor revisions related to question clarity, spelling, consistency of distracter options, and syntax. Two (4%) items required significant revision and were rewritten to better address the assigned objective.

Five of the six panel members were in agreement regarding use of the practical application rubric to differentiate competency levels of students in a practical application of the forensic nursing process. That is, instructors could use the rubric to gauge the

extent (expectations) of students' level of proficiency in regard to the forensic examination process; evidence recognition, collection, and preservation; and interpretation. One person commented that the difference between "proficient" and "exceeds proficiency" needed to be clearly delineated, and another person suggested adding "documentation" to the forensic application process. The respondent commented that adding documentation would make the expectations clearer (i.e. exam, collect, interpret, and document the process).

Pilot Test Results

The two instruments were pilot tested in a basic forensic nursing science course given at both a baccalaureate and graduate level for academic and continuing education credit. The course was built from the instructional blueprint and accompanying learner objectives. Internal consistency of the knowledge-based test was evaluated using the Kuder-Richardson Formula 20 (KR20), and the resulting coefficient was .27, a score lower than anticipated. A low reliability coefficient may suggest that the test items assess a diversity of knowledge and as such, are not variations of the same knowledge base. In addition, the sample size was relatively small (N=35) and the age, level of nursing experience, and extent of prior exposure to nursing forensic considerations varied greatly. Also, some students experienced difficulty in taking a test online and others struggled with questions asking for "check all that apply".

In examining test results, item discrimination and difficulty indices were evaluated using standard parameters set forth in Morrison, Nibert, and Flick (2006).

Fourteen items were designated as solid items using the set parameters. Items with a difficulty index of .30 or below and .95 or above and items with a point biserial index of less than 0.15 were selected for review. Seven items had a difficulty index ≤ to .3. These were examined to determine whether the item was problematic or the coverage of the content was inadequate. The seven items were determined to be appropriate questions; however, the content could have been better covered within the course materials. Eleven items had a difficulty index ≥.95. These items were examined to determine if content was essential or if the cognitive level of the item needed to be increased.

Discrimination was examined for the remaining items with a point biserial below .15. There were 13 such items. Item options were examined for each of these 13 items to determine whether the distractors could be improved. Distractors will be reworked based on the item analysis feedback. In summary, the 13 items needing revised distractor options and the 11 items that were correctly answered by 95 to 100% of the students produced poor discrimination indices for half of the total exam items and impacted the overall reliability of the test. These items will need reworking before a retest of the exam for reliability.

For the practical rubric, an Intraclass Correlation Coefficient (ICC) was calculated using six faculty members. In a 2-hour training session, the six faculty members first learned how to use the instrument, and then they viewed a training video of a forensic practitioner conducting an examination and collecting, preserving, interpreting, and documenting the process. Faculty used the rubric to rate performance. The resulting ICC

was .743, suggesting a moderately strong agreement of faculty using the instrument. A cautionary aspect is that the instructors were rating the performance of a practicing forensic pathologist and not the less experience of nursing students. Additionally, a debriefing with faculty was conducted after the final evaluation. Based on their comments, it became apparent that the faculty member raters were evaluating students differently. For example, some faculty were unaware that when opening a paper bag, cross-contamination can occur if a hand is placed inside the bag. Many of the differences seemed to relate to the raters level of experience in a forensic setting. This suggests additional scenarios should be used in rater training sessions with a greater detailing of the finer points when conducting a forensic exam. The differences discussed might also be an indicator that raters need to have some personal experience in conducting forensic examinations to increase their comfort and abilities in rating such exams.

Conclusion

Two instruments were developed to measure forensic nursing science knowledge and practical competency and thus, fill a gap noted in literature. An expert panel evaluating the 50 item objective test and the practical rubric for skill assessment found that the instruments met the learning objectives. Furthermore, the panel considered the objectives to have content validity and to be relevant and comprehensive for a course in introductory forensic nursing science.

The KR 20 reliability level for the knowledge-based exam was low, indicating a need for further discrimination analysis of test items and revision of items followed by

retesting. Inter-rater reliability for the competency rubric was deemed sufficient, making it a useful tool for assessing skill proficiency but use of the instrument requires adequate faculty training on how to appropriately use it to evaluate students. After revising the instruments and retesting to examine reliability, the intention is to make the instruments available for use in the forensic nursing science arena, whether for forensic nursing continuing education, evaluation of continued practical competency of the forensic practitioner, or academic credit.

CHAPTER IV

RESULTS

A Paper Submitted For Publication in the

Journal of Forensic Nursing

Stacy A. Drake

This chapter contains a manuscript of an article that has been submitted for publication in *Journal of Forensic Nursing.* This article provides a complete description of the research study design, describes the methodology and analysis employed and presents the findings with a discussion of results and implications and recommendations for future research.

The Impact of an Educational Intervention on Knowledge and Competency Levels of Students Enrolled in a Forensic Nursing Science Course

Introduction

Forensic nursing science is a recognized nursing specialty (American Nurses Association [ANA], 2009) that supports practice roles such as sexual assault nurse and clinical forensic nurse examiner. Although practicing nurses often encounter situations that require knowledge of and competency in medicolegal aspects of patient care (Henderson, Harada, & Amar, 2012), basic nursing education usually does not include the knowledge and competencies nurses need to care for forensic patients (e.g. patients

admitted due to abuse, assault, or accident, or patients who have died). To augment findings in literature, a project was designed to determine if a commonly used teaching technique, simulation, is an effective way to enhance student skills and enable them to respond appropriately in a clinical situation requiring forensic applications.

Background

The use of simulation as a teaching strategy within nursing and other healthcare professions is well supported within literature (Cook et al., 2011). However, few researchers have published concerning the effectiveness of simulation as a modality in teaching forensic nursing science. The most frequent use of simulated scenarios has been for sexual assault training (Ferguson & Faugno, 2009; Fitzpatrick, Lenchus, Arheart, Rosen & Birnbach, 2012; Lawson & Rowe, 2009).

Practicing bedside nurses are often not familiar with roles and responsibilities inherent in caring for a forensic patient and can have difficulty incorporating forensic aspects into patient care (Eisert et al. 2010; Henderson, Harada, & Amar, 2012). Simulation allows the learner to be immersed in patient situations in an environment that permits self-reflection and critique of decisions (Jefferies, 2007). Hoyt (2006) maintained that nurse involvement with forensic issues of care is not an option, but rather it should be a distinct part of professional practice.

Significance

Without the basic knowledge of how to assess, interpret, and document abuse or neglect, recognize sudden, unexpected, or non-natural death, or how to safely and legally

intervene, healthcare facilities and nurses are at risk for legal repercussions and financial and professional sanctions. Having nurses trained in forensic aspects of care enables a facility to implement patient-centered care in a responsive manner. In addition, nurses educated to interact with other professionals (e.g. law enforcement officers, lawyers, pathologists) can provide better medicolegal outcomes and lessen patient/family distress.

Question Addressed

The research question posed was whether two groups of nursing students enrolled in an online forensic nursing science course would demonstrate differences in knowledge and skill proficiency when the experimental group received a simulation-based intervention and the control group received face to face lecture materials. The expectation was that students participating in clinical forensic scenarios in a laboratory setting would be more knowledgeable of their responsibilities in caring for forensic patients and more proficient in the application of their forensic skills than students in the control group.

Methods

A randomized two group post-test only design was used to evaluate the effectiveness of a simulation intervention on education outcomes. In this design, the intervention was three lab sessions using simulation scenarios. The second group served as an attention control group and received an equivalent amount of time in listening to lectures in a classroom setting.

Setting and Course Description

The setting was a school of nursing in a large metropolitan area in the southwestern United States. The course was conducted as an online elective in introductory forensic nursing science for academic or continuing education credit, where the online portion was blended with an intervention teaching modality (simulation) versus face-to face clarification meetings (attention control).

The content was presented as modules, and the module topics included forensic nursing process, interpersonal violence, evidence principles and techniques, mechanism of injury, public health and epidemiology, medicolegal death investigation, and forensic nursing standards. The format was a Microsoft Power Point presentation with learning objectives, key-terms, and required readings; module content with questions to guide the student's study; individual and team assignments; and additional resources.

Intervention. Clinical simulation exercises were scheduled as 2-hour laboratory sessions. The scenarios portrayed realistic clinical situations, and students responded using the forensic knowledge they gained from the course material. In the first session, student objectives were to recognize, collect, and preserve forensic evidence. In the second session, students were to identify and document traumatic wounds. In the first two sessions, the instructor, a certified forensic nurse and the principal investigator, served as a resource and mentor for the students. In the third session, students, acting on their own in a high fidelity simulated clinical situation, were expected to conduct a head

to toe assessment, identify traumatic wounds, and recognize, collect, and preserve forensic evidence. The students were debriefed after each exercise.

Attention control. The students attended three face-to-face lectures of two hours duration. The lectures provided information on forensic toxicology, forensic chemistry, and the crime scene investigation (CSI) effect. Additionally, student questions on course content were clarified.

Population and Sample

The population consisted of undergraduate Bachelor of Science in Nursing (BSN) students, practicing registered nurses (RN), and masters level nursing students. All enrollees in the forensic nursing science course were considered potential participants, and enrollees who volunteered and consented to be in the study were randomly assigned to either a research intervention or attention control group. As an incentive, participants who remained in the study were eligible to receive an iPod nano.

Initially, 41 students registered in the course, and 20 were randomly assigned to the intervention and 21 to the attention control groups. After enrollment stabilization, 35 students remained in the sample, with 18 students in the intervention group and 17 in the attention control group.

Data Collection and Analyses

Institutional Review Board approval was obtained, students electing to participate were briefed on the research study, and informed consents signed and filed. Participating students completed a student demographic data form. Students in the intervention group

were further randomly assigned to teams of no more than five students per group. At the end of the semester, knowledge was assessed for all students using a 50 item knowledge-based post-test. Content validity was examined via a panel of experts. A KR20 was run on exam results to measure internal consistency and the resulting coefficient was .27. Competency was assessed using a task based practice rubric to score the clinical proficiency, e.g. assessment; forensic evidence recognition, collection, and preservation; interpretation; and documentation of all students using a selected laboratory-based simulated scenario. Validity was examined by a panel of experts and interrater reliability among six faculty raters was .743 using an Intraclass Correlation Coefficient (ICC).

Data analysis. Descriptive and test score data were analyzed using the Statistical Package for Social Sciences (SPSS) computer program. The sample was described and research questions were addressed using two independent t-tests with Bonferroni correction factor to adjust for alpha level.

Findings

Sample

A demographic profile was constructed for the control and experimental groups (Table 1). Participants from the two groups were similar on the variables of gender and highest level of education. Some slight differences emerged when examining age and practice experience for the two groups. The age in the control group was slightly higher (M = 36, SD=9.9) than the intervention group (M=34, SD=9.1). The years of experience were also higher in the control group (M=7.6, SD=7.4) versus the intervention group

Table 1
Frequencies of Selected Demographic Characteristics Broken Down by Group

Variable	Experimental (n = 18)		Control (n = 17)		Total Sample (N= 35)	
	f	%	*f*	%	*F*	%
Gender:						
Male	3	16.7	1	5.9	4	11.4
Female	15	83.3	16	94.1	31	88.6
Race/Ethnicity:						
White	10	55.5	10	62.5	20	57.1
African-Amer	1	5.5	1	5.9	2	5.7
Latino/Hispanic	1	5.5	4	23.5	5	14.3
Asian	3	16.7	2	11.8	5	14.3
Other	3	16.7	0	0.0	3	8.6
Highest Degree:						
LVN	0	0.0	1	5.9	1	2.9
ADN	2	11.1	1	5.9	3	8.6
BSN	16	88.9	14	82.4	30	85.7
DNP	0	0.0	1	5.9	1	2.9
Type of Credit:						
CE	2	11.1	2	11.8	4	11.4
Academic	16	88.9	15	88.2	31	88.6
Area of Practice:						
Critical Care	14	77.7	8	47	22	62.8
Non-critical	4	22.2	8	47	12	34.2
Reporting to ME/C:						
None	7	38.9	10	58.8	17	48.6
1-12/year	7	38.9	6	35.3	13	37.1
>12/year	2	11.1	1	5.9	3	8.6
No response	2	11.1	0	0.0	2	5.7
Prior Forensic Ed.						
Yes	3	16.7	0	0.0	3	8.6
No	15	83.3	17	100.0	32	91.4

(M=5.9, SD=5.7). These differences were not significant. Participants in both groups were from varied practice backgrounds, and the majority had no prior education in nursing forensic science and little or no experience in reporting deaths to a medical examiner/coroner. The intervention group did practice in critical care areas to a greater degree than the control group.

Student Outcomes

Two independent t-tests were conducted to discover if any significant differences existed between the intervention and attention control groups on knowledge and competency scores. All underlying assumptions were met for both t-tests. There was no significant difference in knowledge exam scores between the intervention (M = 62.89, SD =4.86) and attention control groups (M =64.71, SD =6.78); (t(33) =.915, *p* =.367). The magnitude of the mean difference was small (eta squared=.025). There was also no significance in competency scores between the intervention (M=2.94, SD=.94) and attention control group (M=2.59, SD=.71); t(33)=1.26, *p*=.217). The magnitude of the mean difference was small to moderate (eta squared=.05).

Discussion

In this study, scored results from both the knowledge-based exam and practical competency results were not significantly influenced by type of intervention. The students performed in a similar manner, in both the simulation and attention control groups. Several reasons may account for the non significant results. The primary factor is the small sample size. The total sample size of 35 students resulted in power levels of

less than 20% with an alpha = .025, and effect sizes = .31 (knowledge) and .42 (competency). The knowledge-based exam also proved to have a very low reliability rating (KR20 of .27) which may have influenced results.

Knowledge-Based Post-Test Results

The mean posttest scores for each group were lower than expected. Student feedback was that participation in any elective, and in particular, an elective that required face-to-face contribution (a course not wholly online) detracted from time spent on core studies. Therefore, less time was spent on reviewing the course content. The students that dropped the course were primarily undergraduates, and previous studies have reported that undergraduate nursing students have little flexibility in their schedules for electives due to core courses (Crane & Muscari, 2006; Henderson, Harda, & Amar, 2012). Although the majority of the students were MSN graduate students who were balancing employment and core course academic requirements, feedback from the students mirrored that of the undergraduates; core courses were the priority. Additionally, the MSN students thought that the course evaluation requirements for an elective were too rigorous.

Although the test items had been reviewed by an external panel of forensic experts for content validity and for agreement with the learning objectives, there could have been problems with the level of difficulty or other item construction issues with some of the items. Additionally, because the role of the forensic nurse is specialized and requires education and clinical experience that is beyond that of the practicing RN,

(Eisert et al, 2010) the students may not have had a frame of reference for applying forensic concepts. This may signify that additional time is required for application of content (i.e. enhancing clinical component).

Practical Grading Rubric Results

Although not statistically significant, the means between the intervention and attention control groups on skill proficiency suggest that the simulation activities reinforced objectives and improved outcomes. However, these findings could be the result of the intervention group being more familiar with the laboratory setup prior to the final student proficiency examination.

In a faculty debriefing session, the researcher noted that the faculty members without previous forensic science education or experience differed in how they evaluated student performance. Less experienced instructors tended to underestimate student performance (had higher expectations of performance). This suggests faculty involved in a forensic science course should at a minimum have detailed training in evaluating student skill proficiency in a clinical forensic setting. It may indicate a need for using only experienced faculty to rate student skills in the proficiency exam. The need for faculty with education and experience in forensic nursing science or forensic science supports findings in previous articles. For instance, Kent-Wilkinson (2011) suggested that forensic nursing programs do not exist at all levels of nursing education due to lack of adequately prepared faculty.

Limitations of the Study

The limitations of this study include the following:

1. Small sample size.
2. Low reliability of knowledge exam.
3. Inadequate training of faculty scoring simulated proficiencies.

Recommendations for Research

Recommendations for future research are as follows:

1. Revise knowledge exam items that proved to be problematic on item analysis and retest for reliability.
2. Use instructors with experience in forensic nursing to evaluate student performance and provide detailed training in rating student proficiency in concept application.
3. Replicate study using an adequate sample size to ascertain significance difference between experimental and control groups.

Conclusion

Regardless of the setting, nurses will encounter patients whose needs intersect with the legal system, e.g. forensic patient population. Ignoring this patient population is no longer an option – violence and trauma are of increasing concern of healthcare systems. In order to provide competent care to this patient population, nurses can benefit from receiving forensic science education, regardless of teaching modality chosen. Nursing faculty can respond to this need by providing education specific to the proper

recognition of this population of patients, along with teaching the basic concepts of evidence recognition, collection, preservation and documentation. Ensuring education specific to the forensic population as foundational to nursing practice ensures forensic patients are afforded an adequate long-term outcome. Failure to do so can potentially impact outcomes beyond that of the physical needs of the forensic patient.

CHAPTER V

SUMMARY

This research study contributed to the literature on simulation in forensic nursing science education through submission of two manuscripts for publication. The first manuscript provided a review of the process for developing and validating instruments to evaluate student knowledge and competency of forensic nursing science. The second manuscript provided a comprehensive overview of the completed research study. Together these manuscripts provide a basis for further work on using simulation as an intervention to enhance student learning.

The purpose of this two-group experimental post test only study was to determine if nursing students enrolled in a blended forensic nursing science course employing simulation were more knowledgeable and competent than students enrolled in a blended forensic nursing science course employing face-to-face meetings to clarify content. Although the use of simulation in forensic science nursing is scant, a review of literature on the use of simulation in nursing education provided evidence that simulation is an effective modality for improving student learning. To fulfill a gap in literature, evidence was needed that simulation would be an effective modality for teaching application of concepts essentially foreign to BSN seniors or practicing nursing students.

The Nursing Education Simulation Framework served as a guide for developing the simulations, which were produced as self-directed clinical exercises within a

laboratory setting, and as such, constituted the intervention aspect of the blended forensic nursing science elective course. The simulations were designed to promote active learning with the expectation student participation in realistic role-playing situations eliciting application of forensic nursing concepts would result in enhanced knowledge and skill proficiency. Nursing students enrolled in the course who volunteered to participate in the research project served as experimental or control subjects. The course material focused on the assessment of forensic patients as well as recognition, collection, preservation, documentation, and interpretation of forensic evidence. In addition to the online material, students participated in three simulated learning exercises or three classroom lecture sessions, with questions and answers for concept clarification. Students were tested for knowledge by means of a posttest that was administered online and rated for skill proficiency by instructors observing their performance in a simulation clinically based environment.

Summary of the Findings

The results of this study demonstrated that the intervention (simulation) had no impact on learning outcomes. Specifically, there was no significant difference in knowledge-based scores between the intervention and attention control groups Additionally, there was no significance difference in competency skill ratings between the intervention and attention control group

Several factors were identified that could have influenced the study results. The sample size was small, which resulted in a power that was insufficient to detect differences. A low KR20 indicated that the knowledge-based exam needed further review, editing and retesting. Although, inter-rater coefficient for the practical competency rubric was acceptable, faculty feedback highlighted scoring inconsistencies, which were influenced by the Faculty's level of experience in forensic nursing. These findings provide insight helpful for further studies to include the need to revise instruments, enhance the training of faculty, and evaluating how the course content is implemented online.

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APPENDIX A

NLN Permission Request

From: Stacy Drake <drakestacy718@gmail.com>
Subject: **Permission Request**
Date: February 27, 2014 4:04:03 PM CST
To: publications@nln.org
Cc: Stacy Drake <drakestacy718@gmail.com>

To Whom It May concern:

I am seeking permission from the following NLN text: Jeffries, P.R. (2007). Simulation in Nursing Education: From conceptualization to evaluation the exact item, I am wishing to re-produce is Figure 3-1. The Nursing Education Simulation Framework, Page 23. I would like to place this figure in my dissertation, chapter 1. I am a doctoral nursing student at Texas Woman's University and my chair is Rae Langford and other committee members are Anne Young, and Constance Ayers, all faculty at Texas Woman's. The dissertation will be published in the dissertation database.

My graduation date is May 2014.

Please advise on any further information needed.

Thank you in advance,
Stacy Drake

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Thank you for your interest in the NLN Publications! We are in receipt of and processing your request. Please be advised that processing may take anywhere from 4 to 6 weeks. We are pleased that material published by the NLN is seen as valuable and will reply to your request as soon as possible.

APPENDIX B

Demographic Collection Form

Demographic Collection Form

Please read and complete the following questions regarding your background and work experience.

1. You are **Male** **Female**

2. Your age in years _____

3. Your ethnicity
   Hispanic **Asian** **American Indian** **Caucasian,-non Hispanic**
   African American **Other_____**

4. Your highest degree earned
   LVN/LPN **ADN** **BSN** **MSN** **PhD/DNP** **Other_____**

5. Your total number of years of nursing experience _____

6. Your CURRENT work involves managing trauma patient care
   Yes **No**

7. Type of unit that best describes your current employment

   Medical ICU **Surgical ICU** **CVICU/CCU** **Trauma ICU**
   Emergency Room **Neuro ICU** **Pediatric ICU** **Neonatal ICU**
   Other_____

8. Have you received ANY forensic nursing education?
   Yes **No**

9. How often do you inform the medical examiner or justice of peace of a death?
   More than 12/yr **Between 1 and 12/yr** **not at all**

10. If your CURRENT area of practice is critical care, indicate number of year's experience_____.

APPENDIX C

Nursing Forensic Science Knowledge Exam

Nursing Forensic Science Knowledge Exam

Directions: Questions 1 - 22 are multiple choice. Only one answer is correct.

1. What is the diagnostic characteristic of a laceration, as may be sustained in a motor vehicle crash?
    a. Bridging tissue*
    b. Depth greater than width
    c. Soot deposits
    d. Denaturation of skin proteins around the wound

    Rationale: a. is correct because lacerations, which are blunt force trauma, will have bridging vessels present. b. Describes wound characteristic differences between stab vs. cut. c. Is describing a characteristic of contact GSW. d. Describes thermal injury.

2. Which patient finding requires the nurse to report suspicion of abuse or neglect?
    a. Bilateral contusions of the patella
    b. Unexplained injuries*
    c. Anterior rib fractures status post CPR
    d. Hip fracture from a reported trip and fall

    Rationale: b. is the correct answer. If injuries are not explained after conducting a health history, physical examination, and ROS, there is cause to be concerned for the patients safety and well-being, and cause to suspect possible maltreatment. a. Bilateral contusions of the patella could be common injuries after falling or kneeling on the knees as they are bony prominences. c. Anterior rib fractures are common with chest compressions. d. Injuries that are explained and consistent with an accidental fall are not suspicious of abuse or neglect.

3. What should a nurse do with the bloody clothing of a trauma patient?
    a. Place clothing in a bag and save it for the family
    b. Secure clothing in a plastic evidence bag
    c. Dispose of clothing in a biohazard bag
    d. Secure clothing in a paper evidence bag*

    Rationale: d. is correct, because paper will permit airflow to circulate, decreasing the likelihood of DNA degradation or other forms of moisture buildup. a. Clothing from trauma victims should not be returned to family members

without first ensuring the evidence is not needed by law enforcement or medical examiner. b. Plastic bags promote the buildup of moisture and DNA degradation. c. Clothing from trauma victims should not be disposed of.

4. For what patient is collection of touch DNA likely to be important?
    a. Motor vehicle crash
    b. Gunshot wound
    c. Drowning
    d. Manual asphyxiation*

    Rationale: d. is correct because the collection of DNA may prove to be important after a victim has been touched, as in manual asphyxiation. a., b., and c. Patients in these categories do not typically encounter the suspect and the presence of touch DNA is less likely.

5. When caring for a patient who is dying from a prescription drug overdose what nursing action is **most** important to take to preserve toxicology evidence?
    a. Collect additional blood and urine specimens
    b. Collect hair samples with roots intact
    c. Notify law enforcement of overdose and request assistance
    d. Ensure first obtained biological specimens are maintained in the lab*

    Rationale: d. is correct. First drawn specimens are important. When attempting to identify substances, the lab will maintain samples up to a specific number of days; however, if requested, they can hold them longer. a. No additional specimens are warranted for healthcare purposes (e.g. treatment and diagnosis). b. Hair samples are not warranted for toxicology testing of prescription drugs of abuse. c. Notifying law enforcement could be warranted; however, not for the preservation of toxicology evidence which would be needed for death investigations.

6. _____is recognized as the global practice of nursing where healthcare and the legal system intersect.
    a. Forensic science
    b. Forensic pathology
    c. Forensic death investigation
    d. Forensic nursing*

    Rationale: d. is correct. IAFN (2010) recognized this terminology to explaining FN. a., b., and c., are incorrect and reflect different disciplines within the forensic field.

7. Patients who have suffered a violent trauma are at risk for:
    a. Vicarious trauma
    b. Post-traumatic stress disorder*
    c. Continuous victimization
    d. Schizophrenia

    Rationale: b. is correct. People that have undergone a violent traumatic experience are at high risk for developing PTSD. a. Vicarious trauma could occur to providers taking care of patients of trauma. c. and d. are not specific to violent trauma complications.

8. When assessing the gunshot wound of an apparent suicide, which finding should raise suspicions about the circumstances of the death?
    a. Abraded circular wound with soot deposits of the occipital scalp*
    b. Soot on palmar aspects of dominant hand
    c. Hand gun found 8 feet away from body
    d. No suicide note on the scene

    Rationale: a. is correct. Contact GSW of the occipital area is call for concern that injury occurred at the hands of another because its an unusual, but not unheard of, location for self-inflicted entrance GSW. b. If person was holding gun, soot would be present. c. It is not uncommon for gun to be found a distance from the body due to kick back. d. It is not uncommon for no suicide notes to be present at scene of suicide.

9. With which statement should the nurse start when informing the next-of-kin of a family members' death?
    a. "Your daughter was killed today."
    b. "I have some difficult news to bring you."*
    c. "Is there anyone else in the house to be with you?"
    d. "I am sorry to tell you that….."

    Rationale: b. is the correct answer. This response is direct but not harsh and permits open conversation. a. is too direct. c. is not direct and should be said at some point but not in the beginning. d. Starting with "I'm sorry" implies the nurse in some way had control over the death.

10. Which statement indicates that the nurse understands the social complexity and dangers associated with interpersonal violence?
    a. "Why did you go back? Next time you could be dead."
    b. "Leave the situation or it will happen again and only get worse."
    c. "Only you can make the decision whether and when to leave."
    d. "Here is a guideline for a safety plan, when you are ready to leave."*

    Rationale: d. is correct. Victims of violence are more willing to leave a situation when they are ready. The nurse's role is to identify and provide information. a. is a blaming statement. b. is a blaming and threatening statement. c. is a plausible alternative but provides no proactive assistance.

11. A wound on the lower left quadrant of the abdomen is circular with abraded edges surrounded by black substance. As the consulting forensic nurse what action should you do **first**?
    a. Obtain vital signs
    b. Take photograph of wound*
    c. Collect clothing for evidence
    d. Obtain swabs of black substance

    Rationale: b. is the correct answer. Before collecting other forms of evidence, it is important to take before/after photos, especially since soot can be wiped from the periphery of a GSW. a. is the role of bedside RN, not forensic nurse. c. and d. should be taken but are not the first priority.

12. A forensic nurse is a member of the interprofessional mortality committee for violence. Which data is the most beneficial for the forensic nurse to prevent violence?
    a. Victim demographics
    b. Types of injuries victims received
    c. Perpetrators characteristics
    d. Services sought prior to death*

    Rationale: d. is correct because if data suggest that a trend in services are sought, program planners can target these areas to develop prevention strategies. a., b., and c. are important factors but are not the most beneficial for prevention.

13. What information is the forensic nurse permitted to state as an expert witness in court?
    a. Condition of patient, evidence collected, and opinion of what findings reveal*
    b. Condition of patient, rationale for medical procedures, theory of perpetrator actions
    c. Assessment findings, condition of patient, procedures taken to test evidence
    d. Opinion of findings, interpretation of evidence analysis, assessment findings

    Rationale: a. is correct. The expert witness is permitted to testify about condition of patient and evidence collected. Expert opinion can be given about assessment and findings. b., c., and d. are not correct as they are out of the scope of practice for the forensic nurse.

14. Which statement indicates that a nurse understands the various components of forensic nursing theory as it relates to practice? Forensic nursing_____
    a. "practice inter-relates nursing science with forensic science, and criminal justice."*
    b. "combines the art and science of forensic science to court proceedings."
    c. "takes the best practices of forensic science and criminal justice system and incorporates these roles into nursing."
    d. "is the art of the criminal justice system which includes forensic science practices."

    Rationale: a. is the correct answer. Forensic nursing is the interrelationship of nursing, forensic science, and criminal justice. b., c., and d. are incorrect.

15. A patient with metastatic melanoma presents via EMS unresponsive to the emergency department. A CT scan of the head demonstrates an acute subdural hematoma. The patient dies within 36 hours of admission to the hospital. Family reports no history of acute or chronic trauma. No abuse or neglect are reported. What key data requires the nurse to report this death to the medical examiners office?
    a. Unexplained etiology of metastatic melanoma
    b. Unexplained subdural hematoma*
    c. Death occurred within 36 hours after admission
    d. Patient unable to provide details about medical history

Rationale: b. is correct. Subdural hematomas are traumatic in nature unless proven otherwise. a. Investigation into clinical reasons would require clinical autopsy, not medicolegal. c. The death is reportable because of being less than 24 hours; however, that is not the key data. d. this is irrelevant.

16. Body diagrams are useful adjuncts to documentation. The forensic nurse is aware that which of the following notations are included on body diagrams:
    a. Size, shape, color, interpretation, weapon type
    b. Size, shape, location, statements, interpretation
    c. Size, shape, color, location, wound characteristics*
    d. Size, shape, weapon type, location, presence of evidence

    Rationale: c. provides an accurate statement of the essential notation needed for each mark identified on the body. Statements, presence of evidence, and evidence collected may also be included. a., b., and d. are incorrect.

17. Two 20 – 30 year old females die on the scene of a motor vehicle crash and one is taken to the hospital. As the forensic nurse which form of identification will you utilize?
    a. Photo identification comparison
    b. Fingerprint comparison*
    c. DNA comparison
    d. Visual identification with close family or friend

    Rationale: b. is the correct answer. Fingerprinting would serve as a means of scientific identification and is warranted given the description of similar characteristics of decedents. a. Scientific identification is warranted and photo ID comparison is not acceptable. c. DNA would be a last resort for scientific identification due to expense and time. d. Visual ID for identification is not warranted after traumatic incident.

18. Which statement indicates the forensic nurse understands correct procedures for collecting and preserving evidence.
    a. Use rubber tipped forceps to collect a projectile and place the projectile into an envelope*
    b. Cut blood soaked clothing to preserve tire impressions and place into a plastic bag for transportation
    c. Collect saliva swabs and place into plastic bag for transportation
    d. Place several non-labeled blood filled vials into one labeled bag for transport

Rationale: a. is correct. Projectiles should not be removed with objects that could create markings not from the actual firearm (e.g. use rubber tipped forceps and preserve projectile by sealing in envelop). b. Clothing should be cut; however, it should not packaged in a plastic bag. c. Saliva swabs are packaged in a cardboard box. d. Each vial of blood needs to be labeled, not just the entire transport bag.

19. At what angle does the forensic nurse take overall photographs of the body?
    a. 90 degrees*
    b. 60 degrees
    c. 45 degrees
    d. 110 degrees

    Rationale: a. is correct. 90 degrees permits the least distortion of injuries. b., c., and d. are incorrect as they may permit distortion of injuries, leading to misinterpretation,

20. The family requests an autopsy to determine cause of death but the patient's death is not reportable to the medicolegal death investigation agency. What statement implies the nurse understands what options are available to the family:
    a. "We can call the medical examiner and let them know you are requesting an autopsy."
    b. "A clinical autopsy can be arranged through the hospital; however, we will need to have your consent to proceed."*
    c. "We do not have autopsy services available but you can arrange to pay for a private autopsy."
    d. "I understand your wishes; however, there really is no reason for an autopsy. The medical diagnosis will serve as the cause of death."

    Rationale: b. is correct. Hospitals can provide for and/or arrange for a hospital clinical autopsy, given the death does not fall within the jurisdiction of the medicolegal death investigation agency. Consent for a clinical autopsy is required, whereas a medicolegal autopsy consent is within the provision of the law. a. If a death falls out of jurisdiction of the medicolegal death investigation agency, no statutory obligations are required. c. Hospitals are required to provide autopsy services for patients that die within any given hospital admission. d. If a family requests an autopsy, they have a right to have this performed. Asking is an obligation.

21. A forensic nurse is aware that without obtaining patient consent for forensic evidence collection or photo documentation, the type of lawsuit would be:
    a. Criminal action
    b. Civil – negligence or non-intentional tort action
    c. Civil – liability action
    d. Civil – intentional tort action*

    Rationale: d. is correct. A person can file for violation of 5th amendment rights and assault. a., b., and c. are incorrect.

22. Which information is **most** important for the nurse to provide to a patient involved in intimate partner violence?
    a. Resources of how to develop a safety plan*
    b. Contact information for shelters
    c. Police incident number after reporting the crime
    d. Discharge instructions about when to return to hospital

    Rationale: a. is correct. When a person is ready to leave a violent relationship, a safety plan is important. b. could be useful; however, this is included within the safety plan. c. This response implies that a contact to police was made and is not as important as a safety plan. d. This is not relevant to the situation.

Items 23 – 25.

Directions: Read the scenario and state brief rationale for your answer.

23. A patient admitted with a traumatic hip fracture develops pneumonia and acute renal failure and dies 45 days later. Should this death be reported to the medicolegal death investigation agency?
    a. Yes*
    b. No

    State the rationale in the blank.

    _____

    Rationale: yes. The initiating factors leading to the death are unnatural.

24. While establishing an airway of an unresponsive patient, a large bolus of food is removed from the trachea. One week later the patient dies from anoxic encephalopathy. Medical history includes CHF, HTN, and diabetes. Is the patient's death reportable to the medicolegal death investigation agency?
    a. Yes*
    b. No

    State the rationale in the blank.

    _____

    Rationale: yes. The initiating factors leading to the death are unnatural.

25. A 56-year old patient with history of HTN is admitted to the ICU with diagnosis of myocardial infarction. Urinary drug screen tested positive for cocaine. The patient dies 5 days later after three cardiac codes. Is this death reportable to the medicolegal death investigation agency?
    a. Yes*
    b. No

    State the rationale in the blank.

    _____

    Rationale: yes. The initiating factors leading to the death are unnatural.

Items 26 - 28
Directions: Match the wound classifications with the corresponding wound descriptions:

a. Blunt force trauma
b. Sharp force trauma
c. Thermal trauma
d. Gunshot wound
e. Incision

26. __a__5cm by 2cm red/blue horizontal oval contusion located at the right upper chest 2cm above the nipple and 6 cm right of the midline.

27. __b__5cm by 2cm linear vertical wound at the right upper chest 2cm above the nipple, and 6 cm right of the midline. The wound has clean edges with a sharp upper end and a rectangular lower end.

28. __d__Circular defect with a concentric circumferential marginal abrasion with searing of the edges, and a 0.3 cm rim of soot deposition of the right temporal area, 1cm above and 1 cm posterior to the helix. Soot is present in the wound path.

Items 29-33
Directions: Match the injury classifications with the corresponding wound pictures:

a. Sharp force 29.
b. Blunt force 30.
c. Pattern injury 32.
d. Gunshot wound 33.
e. Burn wound 31.

29. a

http://willsavive.blogspot.com/2012/07/knife-wounds-and-there-effect-on-body.html

30. b

http://fuckyeahmedicalstuff.tumblr.com/post/11712543403/blunt-force-laceration-mimicking-sharp-force

31. e

burnremedies.com

32. c

http://medicinembbs.blogspot.com/2011/08/mechanical- injury.html

33. d

http://en.wikipedia.org/wiki/File:Gunshot_wonud_to_leg.JPG

Items 34 - 45
Directions: The following items require **more than one correct answer** for each item. Credit is awarded only if all correct answers are chosen for a given item. Select all that apply.

34. What types of patients qualify for the services of a forensic nurse?
    a. Motor vehicle crashes*
    b. Overdoses*
    c. Healthcare provider giving wrong medication
    d. Families upset about patient care
    e. Interpersonal violence*
    f. Prisoners

    Rationale: a., b., and e. are correct. All three include either trauma and/or unnatural/unexpected events. c., d., and f. may or may not require forensic services - it would depend upon reasons for seeking care.

35. The forensic nurse knows that the following instruments can create sharp force injuries:
    a. Broken glass*
    b. Baseball bat
    c. Edge of paper*
    d. Electrical cord
    e. Dog bite*

    Rationale: a., c., and e. are correct because with pressure, they can create clean edges when coming into contact with the body. b. and d. are not correct as these instrument would create blunt force trauma.

36. A pedestrian was hit by a car that fled the scene. The nurse collects the patient's clothing to preserve which possible evidence?
    a. Pattern impressions*
    b. Hair and fiber*
    c. Glass and paint chip fragments*
    d. DNA
    e. Soot deposits

    Rationale: a., b., and c. are correct. A hit and run victim could have pattern injuries from the vehicle, and glass and paint chip fragments could be analyzed to aid in determining a make and model of the vehicle driven. Hair and fibers could be retained and matched back to any transfer evidence left on the vehicle. d. and e. are not significant forms of evidence to consider in this situation.

37. Why is the chain of custody form important?
    a. Ensures evidence is accounted for*
    b. Provides information about who had contact with the evidence*
    c. Serves as a legal document*
    d. Serves as significant documentation to use if evidence is left unsecured
    e. Serves as a process for managing law enforcement workloads

    Rationale: a., b., and c. are correct. All of these reasons are why COC should be utilized. d. is not correct. Evidence should never be left unattended, if not secured, where access can be made. e. is not correct. No workload decisions are made based upon chain of custody forms.

38. When conducting a forensic examination, which component(s) is /are performed in addition to the nursing assessment?
    a. Focused assessment
    b. Focused review of systems interview
    c. Photography and body diagrams*
    d. Detailed injury assessment*
    e. Collection of forensic evidence*

    Rationale: c., d., and e. are correct. In addition to the process of conducting physical examination and gathering health history, the forensic nurse is required to conduct a detailed injury assessment and evidence collection with appropriate forensic documentation procedures. a. and b. are components of nursing assessment and/or in combination of forensic evaluation.

39. A patient is admitted to the emergency department with lacerations, bruising and swelling of her face, arms and thighs, and contusions consistent with finger marks of the neck. The patient recounts that she attempted to fight back but the attacker was too big. It is a priority to collect forensic evidence from which anatomical area?
    a. Head
    b. Face
    c. Hands*
    d. Genitals*
    e. Neck*

    Rationale: c., d., and e. are correct. Although we do not know if the person was sexually assaulted, collection of forensic specimens for potential DNA evidence is warranted. Touch DNA from the neck and hands (including fingernail scrapings/clippings) is warranted given the situation. a. and b. are areas

specimens could be obtained; however, the priorities are areas in which the assailant was known to have direct contact with the victim.

40. The forensic nurse consults which members of the forensic team for scientific identification of remains?
    a. Forensic odontology*
    b. Forensic entomology
    c. Forensic pathology*
    d. Forensic anthropology*
    e. Forensic epidemiologist

    Rationale: a., c., and d. are correct. If remains are found, the pathologist would aid in deciding forms of evidence needed to scientifically ID them, and forensic anthropologists have knowledge and experience in examining and interpreting skeletal remains. A forensic odontologist may be needed for dental identification. b. Forensic entomology deals with the legal aspect of insects. e. Forensic epidemiology deals with research method used in forensic sciences.

41. When caring for a patient who has suffered from a violent attack, which information must the nurse document in the chart?
    a. Patient response to asking about history of violence*
    b. Legal authorities notified*
    c. Family members contacted
    d. Referral services offered*
    e. Specific location and name of services offered

    Rationale: a., b., and d. are correct. Assessment of, contacting authorities and referrals are required. c. is not correct as the person causing violence could be family member, and HIPPA may apply. d. is not correct because the response to services being offered is irrelevant to assessing for and offering resources to violence.

42. An obese 45-year-old male is found dead at home with an ambient temperature of 76 degrees F. He was last seen alive one week prior to discovery. When assessing the body, what findings should the nurse would expect?
    a. No rigor*
    b. Fixed lividity
    c. Skin discoloration of abdomen
    d. Fly activity with maggots*
    e. No lividity with skin slippage*
    f. No insect activity

Rationale: a., d., and e. are correct. Given the time frame, rigor would have passed, lividity would be non-distinguishable, and skin slippage would be apparent, along with ova, maggots, pupa, and adult flies. b., c., and f. are findings that reflect a time-frame between 8-36 hours, depending upon the environment.

43. Which instruments can create blunt force injuries?
    a. Baseball bat*
    b. Broken glass
    c. Car*
    d. Paper
    e. Sledge hammer*

    Rationale: a., c., and e. are correct. The force exerted upon tissue will create tearing/shearing type injuries. b. Broken glass would cause sharp force injuries. d. Edge of paper would create "paper cut", which is sharp force

44. The forensic nurse obtains consent for clinical forensic photography. Which procedures are important to follow?
    a. Take full length of front at 90 degree angle*
    b. Provide a copy of photos for law enforcement
    c. Take close up photos of wounds with a ruler*
    d. Include photo of case number/identification number and date*
    e. Provide a copy of photos for medical records and family

    Rationale: a., c., and d. are correct procedures when taking forensic photographs. b. and e. are incorrect. Law enforcement and family should not have access to forensic photographs as they need to be secured in separate file for medicolegal purposes; photos should not be in the medical record.

45. An elderly patient with history of non-treated heart failure was admitted for pneumonia. The patient has multiple contusions in various stages of healing across the abdomen and back, rib fractures, and several linear scars on bilateral lower extremities. Which findings indicate that the nurse should consider further investigation of physical abuse?
    a. Rib fractures*
    b. Pneumonia
    c. Multiple contusions in areas difficult to explain*
    d. Lack of medical attention

Rationale: a. and b. are correct. Rib fractures and contusions on the abdomen and back are suspicious for abuse. b. and d. are incorrect. These items could indicate neglect of medical services, not of physical abuse.

46. Which statement indicates that the nurse understands application of the forensic nursing process when caring for a trauma patient? "My plan is to….
    a. "obtain patient consent for detailed injury assessment and make sure tangible evidence is collected."*
    b. "develop a plan of care with the patient and contact the police for further direction."
    c. "assess the patient and provide a list of referrals for follow-up care and community outreach programs."
    d. "contact the police and contact the physician for treatment orders."

    Rationale: a. is correct as consent is required for the forensic nurse to implement the nursing process of assessment, planning, intervention, and evaluation. b., c., and d. do not reflect the forensic nursing process.

47. A student nurse provides community education on the topic of interpersonal violence (IPV). The understanding of risk factors for IPV is mastered when which of the following are included in the presentation? (Select all that apply)
    a. Low self-esteem*
    b. Poly-substance abuse*
    c. Sharing of household chores
    d. Anger mismanagement*
    e. Assertive communication

    Rationale: a., b., and d. are correct. These three factors could increase risk for IPV, whereas c. and e. are factors of a strong healthy relationship that decreases risk of IPV.

48. The nurse assesses a 37-year-old disabled client brought to the emergency department with a rash. Which of the following findings indicate that adult protective services (APS) should be contacted?
    a. Forehead abraded contusion, and long nails
    b. Dirty, foul smelling, and flea bites*
    c. Loose fitting clothes, and forehead contusion
    d. Forehead contusion, and long nails

    Rationale: b. is correct. These findings indicate possible physical neglect. a., c., and d. do not indicate concerns of abuse or neglect.

49. When asked to collect forensic evidence of an unconscious patient, what is **most** important for the forensic nurse to ensure regarding the process
    a. Availability of a clean room with adequate supplies
    b. An organizational policy detailing forensic evidence collection of the unconscious is available*
    c. Chain of custody is maintained during the collection of evidence
    d. The nurse collecting the evidence has appropriate education in the collection of forensic evidence

    Rationale: b. is correct because the collection of evidence requires informed consent throughout the entire process. Hospitals, regardless of having a forensic program, should have a policy in place of how they will handle the collection of evidence of an unconscious patient. a., c., and d. are incorrect as they are not the most important. Without consent, the evidence could be thrown out and/or nurse pressed with assault and battery charges.

50. When preparing for an injury assessment and evidence collection, the nurse should inform the patient that:
    a. The victim should place all clothing in a bag
    b. Documentation of findings will be given to law enforcement
    c. Patient may refuse any part of the forensic examination*
    d. Testimony expectations for victims of violence

    Rationale: c. is the correct answer because the nurse needs to inform the patient along the way of procedures being conducted. Patients have a right to refuse any aspect of the examination or evidence collection. a., b, and d. are incorrect. a. requires the nurse to photograph and collect the clothing. b. None of the documentation is handed over to law enforcement. d. Testimony procedures have little to do with injury assessment and evidence collection.

APPENDIX D

Practical Grading Rubric for Forensic Physical Evaluation and Evidence Collection

Expectations/Components	Exceeds Proficiency	Proficient	Below Proficiency
Examination Process	• Examination is focused, thorough and systematic • Consistently recognizes trauma and distinguishes from natural disease • Consistently, systematically identifies trauma in focused approach	• Examination is systematic • Recognizes trauma and distinguishes from natural disease • Identifies trauma	• Examination is not focused or systematic • Fails to recognize trauma or distinguish from natural disease • Fails to identify trauma
Evidence Recognition, Collection, and Preservation	• Consistently differentiates evidence from non-evidence • Consistently recognizes evidence • Consistently, systematically, and, correctly collects evidence • Consistently, systematically, and correctly preserves evidence • Maintains chain of custody at all times	• Usually differentiates evidence from non-evidence • Recognizes most major evidence • Collects evidence correctly • Preserves evidence correctly • Maintains chain of custody	• Fails to differentiate evidence from non-evidence • Fails to recognize major evidence • Fails to collect major evidence correctly • Fails to preserve major evidence correctly • Chain of custody is broken
Interpretation	• Synthesizes exam findings, and evidence to anticipate court proceedings • Develops diverse theories regarding injury patterns and recognizes limits of interpretation • Consistently interprets injuries	• Analyzes exam findings and evidence • Provides theories of injury patterns • Usually interprets injuries	• Fails to appraise findings • Fails to theorize about injury patterns • Fails to interpret or recognize limits of interpretations
Documentation	• Consistently documents evidence collection process • Consistently describes injuries using correct terminology • Consistently, systematically identifies and documents trauma in focused approach • Documentation is by multiple methods, accurate, and concise	• Usually documents evidence collection process • Usually describes injuries using correct terminology • Usually documents in systematic, and focused approach • Documentation by multiple methods	• Fails to document evidence collection process • Fails to describe injuries using correct terminology • Documentation is not systematic, accurate or concise • Fails to document using multiple methods

APPENDIX E

TWU IRB Letter of Approval

TWU
TEXAS WOMAN'S UNIVERSITY
DENTON DALLAS HOUSTON

Office of Research
6700 Fannin Street
Houston, TX 77030-2343
713-794-2480 Fax 713-794-2488

July 17, 2013

Ms. Stacy A. Drake
College of Nursing
6700 Fannin Street
Houston, TX 77030

Dear Ms. Drake:

Re: The Impact of an Educational Intervention on Knowledge and Competency Levels for Students Enrolled in a Forensic Nursing Science Course (Protocol #: 17406)

The above referenced study has been reviewed by the TWU Institutional Review Board (IRB) and was determined to be exempt from further review.

Any modifications to this study must be submitted for review to the IRB using the Modification Request Form. Additionally, the IRB must be notified immediately of any unanticipated incidents. If you have any questions, please contact the TWU IRB.

Sincerely,

Carolyn Kelley, PT

Carolyn Kelley, PT, DSc, NCS
Institutional Review Board - Houston

cc. Dr. Karen Lyon, College of Nursing - Houston
Rae Langford, College of Nursing - Houston
Graduate School

APPENDIX F

The University of Texas Health Science Center IRB Letter of Approval

Stacy Drake, MSN, MPH, RN
UT-H - MS - Neurosurgery

June 26, 2013

HSC-SN-13-0375 - *THE IMPACT OF AN EDUCATIONAL INTERVENTION ON KNOWLEDGE AND COMPETENCY LEVELS FOR STUDENTS ENROLLED IN A FORENSIC NURSING SCIENCE COURSE*

The above named project is determined to qualify for exempt status according to 45 CFR 46.101(b)

***CATEGORY #1** : Research conducted in established or commonly accepted educational settings, involving normal educational practices, such as:*
a. research on regular and special education instructional strategies,
b. research on the effectiveness of or the comparison among instructional techniques, curricula, or classroom management methods.

Health Insurance Portability and Accountability Act:

Exempt from HIPAA

CHANGES: Should you choose to make any changes to the protocol that would involve the inclusion of human subjects or identified data from humans, please submit the change via iRIS to the Committee for the Protection of Human Subjects for review.

STUDY CLOSURES: Upon completion of your project, submission of a study closure report is required. The study closure report should be submitted once all data has been collected and analyzed.

Should you have any questions, please contact the Office of Research Support Committees at 713-500-7943.

APPENDIX G

Methods Manuscript Review Letter

From: "The Journal of Forensic Nursing" <kathleenmaguire@iafn.org>
Date: March 5, 2014 2:56:20 AM CST
To: "Stacy Drake" <drakestacy718@gmail.com>
Subject: A manuscript number has been assigned to your JFN submission

Mar 05, 2014

Dear Ms. Drake,

Your submission entitled "Quantitative Evaluation Tools for Forensic Nursing Science Assessment" has been assigned the following manuscript number: JFN-D-14-00009.

You may check on the progress of your paper at any time by logging on to Editorial Manager as an author.

http://jfn.edmgr.com/

Thank you for submitting your work to Journal of Forensic Nursing.

Kind Regards,

Kathleen Maguire, JD, RN
Managing Editor
Journal of Forensic Nursing

APPENDIX H

Results Manuscript Review Letter

From: "The Journal of Forensic Nursing" <kathleenmaguire@iafn.org>
Date: March 6, 2014 6:06:09 PM CST
To: "Stacy Drake" <drakestacy718@gmail.com>
Subject: A manuscript number has been assigned to your JFN submission

Mar 06, 2014

Dear Ms. Drake,

Your submission entitled "The Impact of an Educational Intervention on Knowledge and Competency Levels for Students Enrolled in a Forensic Nursing Science Course" has been assigned the following manuscript number: JFN-D-14-00011.

You may check on the progress of your paper at any time by logging on to Editorial Manager as an author.

http://jfn.edmgr.com/

Thank you for submitting your work to Journal of Forensic Nursing.

Kind Regards,

Kathleen Maguire, JD, RN
Managing Editor
Journal of Forensic Nursing