POST-SIMULATION STRUCTURED DEBRIEFING ON CLINICAL REASONING SKILLS

AMONG ASSOCIATE DEGREE NURSING STUDENTS:

A RANDOMIZED CONTROLLED TRIAL

A DISSERTATION IN
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DOCTOR OF PHILOSOPHY

by
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POST-SIMULATION STRUCTURED DEBRIEFING ON CLINICAL

REASONING SKILLS AMONG ASSOCIATE DEGREE NURSING

STUDENTS: A RANDOMIZED CONTROLLED TRIAL

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ABSTRACT

Background: Debriefing is considered the most important aspect of simulation. As nursing programs utilize simulation as a substitution for traditional clinical experiences, it is necessary to compare different types of debriefing and their impact to student learning. The purpose of this randomized-controlled trial was to compare the effects of a structured debriefing method, Debriefing for Meaningful Learning©, (DML), and an unstructured debriefing method following a simulation activity on clinical reasoning skills among associate degree nursing students.

Methods: Participants from one Midwest associate degree nursing program were randomized to the intervention group or the attention-control group following a simulation activity. The intervention group received the DML method and the attention-control group received an unstructured debriefing. Demographics and the Nurses Clinical Reasoning Scale pretest and post-test were collected and analyzed.

Results: In this study, 67 associate degree nursing students participated with 33 in the intervention group and 34 in the attention-control group. The average age of participants was 28 and 61 participants were female. On average, participants who received the DML intervention scored 0.29076 higher on the clinical reasoning post-test than the participants who received the unstructured debriefing. This was statistically significant (p=.032) between

the intervention group and the attention-control group on the pre-test and post-test clinical reasoning scores.

   Conclusion: The results suggest that using the DML structured debriefing following a simulation activity may increase the clinical reasoning skills of associate degree nursing students. Future studies are needed utilizing multiple research sites. It is recommended to utilize an instrument that is more objective in nature and that the debriefing facilitator be evaluated on the implementation of the intervention after receiving training and prior to data collection.

APPROVAL PAGE

The faculty listed below, appointed by the Dean of the School of Nursing and Health Studies, have examined a dissertation titled "Post-Simulation Structured Debriefing on Clinical Reasoning Skills Among Associate Degree Nursing Students: A Randomized Controlled Trial", presented by Gena Coomes, candidate for the Doctor of Philosophy degree, and certify that in their opinion it is worthy of acceptance.

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ACKNOWLEDGEMENTS

DEDICATION

       I dedicate this dissertation to my family, friends, coworkers, and nursing students. I would first like to thank my husband, Mark. He has fulfilled both parental roles on so many occasions and has never complained about it. He provided emotional support and encouragement with the numerous times that I felt like I was ready to give up. To my boys, Kale, Kyler, and Korbin - your personalities and laughter kept me afloat and focused on why I was doing all of this in the first place. You made it worth it and I am so incredibly grateful to be your mom. To my parents, in-laws, and extended family – all of you have helped Mark and I during this process, whether it was with the kids, with your words of encouragement, or with your unconditional love. It truly takes a village and we have the best parents and family that anyone could ask for! To my coworkers and friends – thank you for motivating me to finish and for being a listening ear when times were hard. I appreciate all of the laughter and fun times that we have! Jill Ulepich – you have always been a bright light in my life and I cannot thank you enough for the constant motivation, laughter, support, and for being my dearest friend. To my nursing students – don't ever stop learning and don't ever give up on your dreams. Thank you for always having that zest for life and learning.

CHAPTER 1

INTRODUCTION

Background

Improper simulation debriefing in academic programs of nursing lead to poor student learning outcomes and the inability to properly analyze patient situations. Neill and Wotton (2011) stated that simulation in academic programs of nursing has become prevalent as technology has advanced and its ability to serve as an alternative to student experiences in an acute care setting when clinical sites are limited. The teaching-learning format of simulation activities in nursing education has three sections. The first section includes preparing the students for the simulated scenario. Students are provided background information of the patient, which is similar to a shift report that registered nurses receive. The second section encompasses all activities associated with the students actively engaging in the simulation activity. The third section surrounds debriefing, where students, facilitated by a faculty member, reflect on the simulated patient scenario. Debriefing has been known to maximize student learning and is considered the most important step in the simulation activity (Chronister & Brown, 2012).

Three important documents have identified debriefing quality as a significant factor of simulation-based learning experiences. These include the National Council of State Boards of Nursing (NCSBN) National Simulation Study (Hayden, Smiley, Alexander, Kardong-Edgren, & Jeffries, 2014), a vision statement on debriefing across the curriculum from the National League for Nursing Board of Governors, 2015), and the simulation standards set by the International Nursing Association for Clinical Simulation and Learning [INACSL]; Decker et al., 2013). The NCSBN National Simulation Study (Hayden et al.,

2014) determined that up to 50% of traditional clinical experiences can be replaced with simulation and still have the same learning outcomes as traditional clinical experiences, such as an increase in critical thinking and clinical reasoning among nursing students. The most significant finding of this study was that when nursing students were provided with structure and adequately prepared faculty with appropriate resources, excellent student outcomes were achieved (Hayden et al., 2014).

The vision statement from the National League for Nursing (2015) on debriefing across the curriculum focused on encouraging nursing programs to integrate debriefing not only in simulation, but across the nursing curriculum as it has the potential to positively impact student learning in nursing education. In addition to, INACSL developed simulation standards of best practice on debriefing to help guide nursing programs maximize in simulation debriefing. The "INACSL Standards of Best Practice: Simulation Debriefing Standard states the following criteria: 1. The debrief is facilitated by a person(s) competent in the debriefing process; 2. The debrief is conducted in an environment that is conducive to learning and supports confidentiality, trust, open communication, self-analysis, feedback, and reflection; 3. The debrief is facilitated by a person(s) who can devote enough concentrated attention during the simulation to effectively debrief the simulation-based experience; 4. The debrief is based on a theoretical framework for debriefing that is structured in a purposeful way; 5. The debrief is congruent with the objectives and outcomes of the simulation-based experience" (INACSL Standards Committee, 2016, p.S21-S22).

These three documents establish connections between debriefing that is well-structured and meeting the necessary student learning outcomes (Rudolph et al., 2016). However, there are minimal intervention studies utilizing a randomized controlled trial that

focuses on nursing student learning as an outcome measure when using a structured debriefing method (Mariani & Doolen, 2016; Reed, Andrews, & Ravert, 2013). This research study fulfills that gap in the simulation debriefing literature. The next section describes the purpose of the research study and the rationale for choosing the intervention that was used in this study.

Purpose of the Study

The purpose of this research study was to compare the effects of a structured debriefing method, Debriefing for Meaningful Learning©, (DML), and an unstructured debriefing method following a simulation activity on clinical reasoning skills among associate degree nursing students. The nursing literature states, "DML is a theory-based debriefing method that has been adopted by more than 300 nursing programs in the United States, and nine other countries" (Bradley, 2018, p.15). The NCSBN chose DML as the debriefing method for the multisite national simulation study (Hayden, et al., 2014). The next section discusses the specific aim/hypothesis of this research study while comparing the two debriefing methods to the clinical reasoning skills of associate degree nursing students.

Specific Aim/Hypothesis

The specific aim of this research study was to test the DML method, on associate degree nursing students, to improve clinical reasoning skills following a simulation activity. The overall hypothesis was that by using DML as the debriefing method, there would be an increase in the clinical reasoning skills of associate degree nursing students when compared to an unstructured debriefing method following a simulation activity. The next section describes the research question of the study in order to identify the effect of the two different debriefing methods following a simulation activity.

Research Question

The research question associated with this study was: What is the effect of the DML method when compared to an unstructured debriefing, on clinical reasoning skills among associate degree nursing students following a simulation activity? This study focused on one primary research question comparing the effects of two debriefing methods. The next two sections will discuss the assumptions and limitations for this type of research study.

Assumptions

The assumptions that were made for the purpose of this research study were:

1. Participants will actively engage in the intervention appropriately.

2. Participants will answer the pre-test and post-test honestly.

3. When participants are exposed to the structured debriefing method, their cognitive ability will be heightened in regards to problem-solving and decision making.

4. The participant's clinical reasoning ability will improve due to the experience of the simulation activity and the structured debriefing.

5. Reflection of an experience is valuable to a learner (Kolb, 1984).

Limitations

Limitations that are inherent in this type of research include:

1. Convenience sampling can introduce bias into a research study and decreases the ability to generalize the research findings (Polit & Beck, 2017).

2. A single site research study makes the generalizability of research findings very difficult.

CHAPTER 2

LITERATURE REVIEW

Historical Context of Simulation and Debriefing

Simulations have been used in medical education since the 1960s. However, it was not until the late 1990s that nursing education programs started using simulations as a teaching modality (Hayden et al., 2014). Nehring and Lashley (2004) identified that nursing education programs started with the use of human patient simulators in the 1990s. Nursing programs have accelerated the use of this teaching-learning modality since 2004 with nursing faculty finding ways to integrate simulation-based experiences into the nursing curriculum. One significant factor in this change was the Institute of Medicine Report *To Err is Human*, which reported that more than 90,000 deaths each year were attributed to preventable medical errors (Kohn, Corrigan, & Donaldson, 1999). Nursing programs identified that simulation was a way for nursing students to practice certain skills without any harm to the patient.

In 2008, boards of nursing began to change regulatory policies to allow simulation to be counted as a substitution for traditional clinical experiences (Nehring, 2008). Reasons for underpinning the use of simulation-based experiences include: (a) larger enrollments for nursing programs; (b) lack of quality clinical placements; (c) improved technology through the use of high-fidelity mannequins; (d) increased acuity of care for patients; and (e) an expectation that nursing graduates will develop the necessary critical thinking skills (Grant, Moss, Epps, & Watts, 2010). Debriefing is known as an essential component of simulation when used as a teaching modality in nursing education (Fanning & Gaba, 2007). It often involves the debriefing facilitator/instructor and the students identifying the correct and

incorrect assessments and/or interventions that were completed with the simulated patient, and what should be done differently if caring for this patient again (Dreifuerst, 2009). Currently, there are a lack of intervention studies using randomization while comparing different types of debriefing and nursing student outcomes. The next section examines the contemporary context of simulations and the objectives of debriefing.

Contemporary Context of Simulation and Debriefing

Simulation in nursing education today includes the use of a variety of modalities that have been incorporated into nursing curricula and includes: (a) role playing; (b) standardized patients; (c) virtual reality; (d) low-fidelity simulated mannequins; and (e) high-fidelity simulated mannequins (Sanko, 2017). Simulation education provides students with the opportunity to practice critical thinking and appropriate decision making with the use of high-fidelity simulators (Childs & Seeples, 2006). High-fidelity simulation experiences are a teaching and learning strategy used to offer students experience with different clinical situations. Exposure to these situations is difficult during any clinical rotation, but are frequently encountered as a registered nurse (Wotton, Davis, Button, & Kelton, 2010). High-fidelity simulation offers a non-threatening environment that is safe for the patient and the students, and is a way to practice cognitive, psychomotor, and affective competencies (Murray, Grant, Howarth, & Leigh, 2008). Simulation literature states, "there are five critical attributes of high-fidelity simulation and includes the following: (a) creating a hypothetical situation; (b) authentic representation; (c) active participation; (d) integration; and (e) repetition, reflection, and evaluation" (Bland, Topping, & Wood, 2011, p.667). Some disadvantages of simulation in nursing education include: (a) costs of high-fidelity mannequins and simulation equipment; (b) increased prep time of simulation facilitators; (c)

possibility of increased anxiety and decreased performance of nursing students in front of their peers; (d) decreased engagement due to increased anxiety; and (e) frustration by the nursing student due to the patient not being real (Gharaibeh, Hweidi, Al-Smadi, & Montreuil, 2017; Sanko, 2017).

The "aim of debriefing is to reconstruct real-time representations of students' interactions and to build on existing knowledge to form mental representations of clinical problems through pattern recognition and cognitive inference" (Wotton et al., 2010, p. 633). An important function of debriefing is to strengthen the learning objectives and critique student performance for the purpose of learning in an objective, nonjudgmental environment (Chronister & Brown, 2012). Debriefing typically occurs immediately after the simulation activity and involves a reflective thinking session with students and nursing faculty to examine what happened in the scenario and what was learned (Jeffries, 2007). It is critical for nursing faculty to know how to properly lead the debriefing session following a simulation activity. According to Dreifuerst (2009), nursing faculty can facilitate reflective learning through the debriefing in order to help students gain insight and clinical reasoning skills to advance their decision making ability into nursing practice.

Warrick, Hunsaker, Cook, and Altman (1979) further defined the objectives of debriefing as the following: (a) identification of the different perceptions and attitudes that have occurred; (b) linking the exercise to specific theory or content and skill-building techniques; (c) development of a common set of experiences for further thought; (d) opportunity to receive feedback on the nature of one's involvement, behavior, and decision making; and (e) reestablishment of the desired classroom climate, such as regaining trust, comfort, and purposefulness (as cited in Dreifuerst, 2009). In order to facilitate active

learning through the debriefing process, there are a set of attributes that must be present in the debriefing. The necessary attributes of "reflection, emotion, reception, integration assimiliation are the defining attributes of simulation debriefing" (Dreifuerst, 2009, p.111). These attributes must be present must be present in order to create a significant learning experience for the student (Dreifuerst, 2009). Clearly, there is a linkage of attributes and objectives between the concepts of simulation and debriefing. The next section discusses the definition of terms related to this research study.

Definition of Terms

Level I nursing student, is defined, for the purpose of this study population, as a student enrolled in the first year of an associate degree nursing program in the Midwest.

Level II nursing student, is defined, for the purpose of this study population, as a student enrolled in the second year of an associate degree nursing program in the Midwest.

Simulation activity, in nursing education, is defined as creating a hypothetical situation for nursing students to practice clinical skills without the risk of inflicting harm to patients. It is a teaching-learning strategy for nurse educators to provide a safe and effective way of preparing nursing students for clinical practice.

Debriefing, in nursing education, is defined as a process of reflecting on an experience that follows the simulation activity. This process is led by a facilitator who witnessed the simulation activity.

Structured debriefing, in nursing education, is defined as a specific process where faculty and students re-examine a simulated activity, using a structured dialogue that helps foster students' reflection of a situation. Structured debriefing uses a learner-centered discussion in order to enhance student learning.

Debriefing for Meaningful Learning© is a type of structured debriefing that involves the following six components: (a) engage; (b) explore; (c) explain; (d) elaborate; (e) evaluate; and (f) extend. This specific type of debriefing is meant to take students beyond the level of critical thinking, to a higher-level of thinking, such as clinical reasoning.

Critical thinking, in the health care setting, is defined as the ability to explore and analyze patient situations, interpret complex ideas, and appropriately evaluate a patient's condition.

Clinical reasoning, in the health care setting, is the application of critical thinking to a clinical situation. It is a decision-making process to apply and guide a nurse's clinical judgment.

Nurses Clinical Reasoning Scale is an instrument using a 15-item Likert five point scale that measures clinical reasoning of clinical nurses and/or nursing pre-graduates. It is based on the Clinical Reasoning Model.

Theoretical/Conceptual Framework

Two theories most prominently informed the research study: Experiential Learning Theory (Kolb, 1984) and Reflective Learning Theory (Dewey, 1910). The theoretical origin of simulation is experiential learning (Cioffi, 2001; Kolb, 1984). Kolb's (1984) Experiential Learning Theory explains learning as a continuous process, where reflection on concrete experiences creates learning, changing how a person thinks and behaves. Experiential Learning Theory is a form of cyclical learning, which includes a concrete experience, followed by reflective observation, abstract conceptualization, and active experimentation (Fanning & Gaba, 2007). "Simulation learning is portrayed by this cycle as starting with an experience, a performance of a simulation scenario, followed by a reflection period, also known as debriefing" (Reed, 2012, p.e212). Participation in the concrete experience of

Kolb's (1984) model is correlated to deductive reasoning and the process of abstract

conceptualization leads to inductive reasoning.

Debriefing, or the process of guided reflection, aligns with the concept of reflective

learning. The phrase "reflective learning" was first discussed by John Dewey in 1910 (as

cited in Dufrene & Young, 2013). Donald Schon (1983) expanded the concept of reflective

learning "to encompass the reflective practitioner and provides learners with the opportunity

to consciously review their actions during or after an activity or situation" (as cited in

Dufrene & Young, 2013, p.372.). According to Schon (1983), debriefing provides students

with opportunities to foster reflective learning, encircling the ability to think-in-action as well

as think-on-action.

Dreifuerst (2010) notes that debriefing enhances students' clinical reasoning and

judgment skills through reflective learning. As indicated by Schon (1983), the process of

reflective learning allows learners to think back on their actions, as in simulation, in order to

develop the appropriate skills, and can guide the debriefing process. Dreifuerst (2009)

identified that reflective learning can be fostered by debriefing with students as they utilize

thinking-in-action, thinking-on-action, and thinking-beyond-action using simulated

experiences. The two theories of Experiential Learning and Reflective Learning are similar

in regards to their philosophical concepts, that if an experience is of a certain quality and

reflected on in a meaningful way, then learning and interactions will be enhanced. The next

section examines the empirical studies that have utilized a structured debriefing model in

nursing education.

Empirical Referents Utilizing Structured Debriefing in Nursing Education

Research studies have noted that learning does not occur in simulation-based experiences without the use of debriefing (Cantrell, 2008; Cato & Murray, 2010; Katz, Peifer, & Armstrong, 2010; Shinnick, Woo, Horwich, & Steadman, 2011). Additionally, Jeffries (2012) noted that "poorly conducted debriefing results in persistently poor clinical judgment" (as cited by National League for Nursing Board of Governors, 2015, p.3). A meta-analysis (Tannenbaum & Cerasoli, 2012) concluded that the quality of debriefing was positively correlated with improved learning outcomes. In addition to, the meta-analysis findings "suggest that debriefs are even more effective when structured and facilitated" (Tannenbaum & Cerasoli, 2012, p.242). The nursing literature identified seven studies that examined structured debriefing in nursing education. However, only four of those studies specifically tested the effect of a structured debriefing method on nursing student learning outcomes (Kuiper, Heinrich, Matthias, Graham, & Bell-Kotwall, 2008; Shinnick et al., 2011; Dreifuerst, 2012; Mariani et al., 2013).

Kuiper et al. (2008) collected data using a mixed-method, descriptive study design to determine if a specific model "Outcome Present-State Model" could be used as a method of debriefing in determining the clinical reasoning activities surrounding patient simulation. The study was comprised of 44 baccalaureate nursing students who completed the Outcome Present-State Model (OPT) after actual clinical experiences in addition to high-fidelity simulation experiences. Kuiper et al. (2008) concluded that the OPT results with authentic clinical experiences was comparable to the OPT results of the simulated experiences. The objective of this study was to focus on a specific tool utilized during debriefing to enhance clinical reasoning. However, there is a possibility that these scores would have been the

same if the OPT model would not have been used and some form of debriefing still occurred after clinical and simulated experiences. Kuiper et al. (2008) recognized that the small sample size and descriptive design were limitations of the study.

Shinnick et al. (2011) conducted a research study to determine where greater knowledge gains occurred in a simulation-based experience when completing a simulated scenario on heart failure. It was a repeated measures, experimental design, and used two groups. Shinnick et al., (2011) concluded that "clear knowledge gains were found to be the greatest not after the hands-on component of the simulation, but after the debriefing component of the simulation" (p.e110). However, it is still not clear what specific gains in a structured debriefing method impact student learning.

Dreifuerst (2012) conducted an exploratory, quasi-experimental design, using a pretest-posttest that examined the relationship between the DML model during debriefing and the ability to improve the clinical reasoning skills of prelicensure nursing students. The study was comprised of 238 baccalaureate nursing students at one Midwestern university. The findings revealed a greater change in clinical reasoning skills when nursing students were facilitated with the structured debriefing model versus the unstructured debriefing. Dreifuerst (2012) identified the following limitations of the research study: (a) the control and intervention groups were not randomized; (b) one-site study examining only baccalaureate nursing students;(c) the control group debriefing was led by multiple clinical instructors and not the same debriefer, which can lead to variation in the unstructured debriefing method; and (d) convenience sample and selection bias with students chosen by clinical groups. Dreifuerst (2012) recommended repeated studies with other debriefers to follow up on the results and suggests a repeated measure, randomized controlled trial study

design. This study met that criteria using the same structured debriefing model and examining clinical reasoning skills.

Mariani, Cantrell, Meakim, Prieto, and Dreifuerst (2013) completed a mixed-method study comparing the clinical judgment of students who participated in structured debriefing sessions versus unstructured debriefings. A convenience sample of 86 students were randomly assigned to a clinical group and then the entire clinical group was assigned to the intervention or attention-control group. The instrument for assessment of clinical judgment was the Lasater Clinical Judgment Rubric (Lasater, 2007). The structured debriefing sessions used the DML method as the intervention in the study. Mariani et al., (2013) concluded that "students perceived DML to foster student-focused learning and assisted in recognizing the affective component of learning" (p.e152). However, there was not a statistical significance difference in the overall clinical judgment scores between the intervention and attention-control groups. One limitation of this study was the homogeneity of the sample. There were 82 women (95.3%) and only four men (4.65%). The mean age was 20.5 years, with an age range from 20 to 21 years, and 100% of the students enrolled in a generic, traditional, 4-year baccalaureate nursing program. Another limitation of this study was the possible variation of the unstructured debriefing involving multiple clinical faculty and the research team, and the amount of time spent on debriefing for each group. The next section discusses the current gaps in the simulation and debriefing literature.

Current Gaps in the Literature

The quality of previous research on the debriefing process following simulations is mainly descriptive and exploratory research (Cantrell, 2008; Grant et al., 2010; Kuiper et al., 2008; Wotton et al., 2010). Mariani and Doolen (2016) conducted a gap analysis descriptive

study examining the perceived gaps in nursing simulation research. The study revealed the following gaps: (a) rigorous, multi-site studies; (b) intervention studies; (c) randomized-controlled trial (RCT) focusing on student and/or patient outcomes; and (d) outcomes such as critical thinking or clinical reasoning. This research study meets a majority of these gaps, which ultimately could move the simulation-research agenda forward to provide nursing faculty with the best practices on simulation debriefing. The ultimate goal is to help nursing students successfully transfer their learning to nursing practice. The next section discusses the innovation of the research study.

Innovation of Study

This study has great potential to impact nursing simulation research and its focus on nursing student learning outcomes. It is a RCT comparing two debriefing methods following a simulation activity on clinical reasoning skills of associate degree nursing students. It builds on Dreifuerst's (2012) study, with the addition of randomization, and provides more control with the same instructors leading all intervention and attention-control groups. It also meets the current gaps in nursing simulation research as an intervention study focusing on student learning outcomes, and has a specific outcome measurement of clinical reasoning. The next chapter examines the methods associated with this research study.

CHAPTER 3

METHODS

Research Design

The design of this research study was a RCT comparing two debriefing methods following a simulation activity on an associate degree nursing students' clinical reasoning skills. The structured debriefing method, DML, was implemented following the simulation activity and clinical reasoning was evaluated as a pretest and post-test format. The study used a single-blind procedure to reduce performance bias and the participants were unaware of whether they were in the intervention or attention-control group. The next section discusses the setting for the research study.

Setting

The setting included an associate degree nursing program located in the Midwest United States. The college is a member of the American Association of Community Colleges, is governed by the Kansas Board of Regents, and is accredited by the Higher Learning Commission of the North Central Association of Colleges and Schools. This community college nursing program is accredited by the Accreditation Commission for Education in Nursing. The total enrollment at this community college is 1500 students and approximately 80 students in the nursing program. This community college has a high-fidelity simulation laboratory where the simulation activities and debriefing sessions occurred for the study. The nursing program also has a full-time nursing faculty member, who serves as the simulation coordinator, and is specifically involved with organizing and facilitating of all simulation activities for the nursing program. Prior to participating in any simulated experiences, the Level I nursing students at this community college complete an

orientation to the simulation equipment and simulation laboratory by the simulation coordinator. The researcher obtained a written letter of support to conduct this research study from the Dean and Nursing Program Director at the participating community college (Appendix A). The researcher is not employed or personally affiliated with the community college or the nursing program at this community college. The next section discusses sampling and recruitment of the participants for the study.

Sampling and Recruitment

Convenience sampling was utilized to recruit participants for this study. Convenience sampling may introduce bias into a study, since those who choose to participate may do so based on a particular set of personal attributes (Polit & Beck, 2017). However, convenience sampling is an effective method of maximizing participation and was considered appropriate for this research study. The target population was Level I and Level II nursing students who were currently enrolled in an associate degree nursing program in the Midwest. Inclusion criteria included the participant had already been accepted into the associate degree nursing program at the participating community college, was able to read and write in English, and was in attendance in the simulation lab on recruitment days. Exclusion criteria for the study was any nursing student who was not a Level I or Level II nursing student in the nursing program at the participating community college.

After receiving institutional review board (IRB) approval from the University of Missouri-Kansas City [UMKC], (Appendix B) and approval from the participating community college, recruitment by the researcher occurred in the simulation lab at the community college prior to the simulation activity. The purpose of the study, the participant role, and the exempt research study information sheet (Appendix C) was addressed. Students

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were assured that participation in the study was voluntary and independent of course requirements. Participants were recruited by the researcher instead of nursing faculty at the community college to ensure participants that there would be no impact on course content or assignment grades. Information sheets were provided to all students and participants had the opportunity to ask questions prior to the simulation activity and at any time during the study. There were not any negative consequences for any student who chose not to participate in the study. Students who chose to participate created a six digit identifier that included their day of birth followed by the last four digits of their telephone number. The student included their six digit identifier on his/her pretest, post-test, and whether they were randomly assigned to the intervention or attention-control group. No identifying information from the participants was collected at any point in the study.

Sample Size

A power analysis indicated that a sample size of 64 participants would be required for a power coefficient of .80 and a medium effect of .50 at an alpha value of .05 (Polit & Beck, 2017). A total of 80 nursing students who were Level I or Level II nursing students at the community college were eligible to participate in the research study. Therefore, it was possible to achieve the required sample size to have adequate power. The next section discusses human subjects consideration for the participants involved in the research study.

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Human Subjects Consideration

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The research study went through the approval process by the IRB at UMKC. Following approval from UMKC, approval from the participating community college was completed. Possible benefits of participating in this study, in either the intervention group or attention-control group included: (a) increased nursing knowledge; (b) increased technical

skill ability; and (c) the potential to increase clinical reasoning skills when working with patients. According to Kolb (1984), reflection of an experience is valuable to a learner.

Indirect benefits, or benefits to nursing faculty include generating new scientific knowledge to help future nursing students and the nursing profession. One potential risk to the study participant was the possibility of not performing adequately during the simulation. As a result, a student may have had increased anxiety and/or the possibility of a decreased confidence level in their nursing skills. The community college has a counseling service available to students on campus and also offers 3 free mental health visits for students to the mental health agency in the community. Precautions to maintain confidentiality of student participants were exercised throughout the study. Participants' identity was protected by not collecting any names or identifying information that could be linked back to the participants. The next section examines the instrument that was chosen for the measurement of clinical reasoning skills in this study.

Instrument

Clinical reasoning was measured using the Nurses Clinical Reasoning Scale [NCRS]; (Liou et al., 2016). It is a validated 15-item instrument designed to measure clinical reasoning in clinical nurses and/or nursing pre-graduates. Liou et al. (2016) report internal consistency reliability with a Cronbach's alpha of 0.93 for the pilot study and 0.94 for the main study, indicating a high level of reliability. Test-retest analysis using interclass correlation coefficients demonstrated substantial agreement of 0.87 for the pilot study and 0.85 for the main study (Liou et al., 2016). Content and construct validity have been established through a panel of experts and completion of a factor analysis (Liou et al., 2016). In addition to, known-groups validity has been established as the instrument can discriminate

between two groups who differ in their present state (Liou et al., 2016). Criterion validity and concurrent validity have not been published for this instrument. An emailed letter of permission to use the NCRS was provided by the authors of the instrument prior to the study (Appendix D). The next section discusses the intervention that was used for the study.

Intervention

The DML method was the intervention variable of this study. The theoretical underpinning of DML is Schon's (1983) Reflective Learning Theory and it utilizes a consistent process to guide student reflection and dialogue throughout the learning experience. It utilizes Socratic questioning in the reflective thinking process. The flow of this intervention "begins with a systematic approach to release emotions from the simulation experience and moves into a critical analysis of events" (Dreifuerst, 2012, p.327). The DML content involves six concepts and includes the following: "(a) engage (the participants); (b) explore options reflecting-in action; (c) explain decisions, actions, and alternatives using deduction, induction, and analysis; (d) elaborate (thinking-like-a-nurse and expanding analysis); (e) evaluate the experience; and (f) extending reflection beyond action" (Dreifuerst, 2012, p.327). The underlying principle of DML is to challenge students to a higher-level of thinking using inductive reasoning, deductive reasoning, and evaluative thinking processes (Dreifuerst, 2015). The DML method does not include the use of video debriefing and video debriefing was not used in this research study. The researcher delivered the intervention one time to the intervention group following the simulation activity. The researcher was formally trained in the DML method by the developer (K.T. Dreifuerst) prior to the study to maintain fidelity/integrity of the intervention. Permission to use DML and the DML student worksheets was obtained from the developer (Appendix E). The DML student

worksheets are copyrighted and are not included in the Appendices. The next section

discusses the procedures involved in the research study.

Procedures

Prior to the simulation activity, all participants completed the NCRS pre-test

(Appendix F) and completed the demographic information sheet (Appendix G). Prior to the

simulation activity, the participants were involved in a prebriefing that included the

simulation scenario (Appendix H). All participants completed the same simulation activity

facilitated by the simulation coordinator at the community college, which involved the

assessment and management of care for a postoperative patient experiencing hypotension and

active bleeding from the surgical site upon being transferred from the postanesthesia care

unit (PACU) to the medical-surgical unit. Participants were randomly assigned to the

intervention group or to the attention-control group following the simulation activity.

Randomization in this study was determined by drawing a debriefing method out of a hat,

which is appropriate for two-group randomization.

Intervention Group: Following the simulation activity, the researcher delivered the

DML intervention to the intervention group. Each participant then completed the NCRS

post-test (Appendix I) following the debriefing. The delivery of the intervention was

completed using the DML worksheets to ensure all steps of the DML process were

completed. The participants had no previous experiences with the DML method in past

simulation and debriefing activities in the nursing program at the participating community

college.

Attention-Control Group: The participants in the attention-control group completed

the same simulation scenario as the participants in the intervention group. Following the

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simulation activity, the research assistant, who is also the simulation coordinator at the community college, delivered an unstructured debriefing method to the attention-control group. Each participant then completed the same NCRS post-test following the debriefing session.

The simulation coordinator at the community college was assigned to facilitate all unstructured debriefings for the attention-control group and has been trained in simulation and a customary debriefing to ensure that all participants in the attention-control group are debriefed the same way. The research assistant has never been trained in the DML method and neither debriefing facilitator had access to the other debriefer's materials to maintain fidelity. The length of time involved for all participants was approximately two hours. The next section will discuss data collection for the research study.

Data Collection

The NCRS pretest and demographic information including Level I or Level II nursing student, age, gender, and race was completed by the participants and collected by the PI prior to the simulation activity. The NCRS post-tests were completed by the participants and collected by the PI following the conclusion of the intervention and attention-control group debriefing sessions. Scores from the NCRS pretests and post-tests were entered into a database on the PI's personal password-protected computer. Pretest and post-test data were linked using the participant's six-digit identifying number, in which they assigned themselves. The next section discusses the data analysis plan for the study.

Data Analysis

Data analysis was managed using the Statistical Package for Social Sciences (SPSS) software (version 24). Data were analyzed at an alpha level of *.05*. Demographic

information of participants was analyzed using descriptive statistics to characterize the sample and a table was used to display the continuous data for age of participants, and categorical data for Level I or Level II nursing student status, gender, and race of the sample.

The research question: What is the effect of the DML method when compared to an unstructured debriefing, on clinical reasoning skills among associate degree nursing students following a simulation activity? The independent variable was the structured simulation debriefing method, which is considered nominal data (yes/no) and the dependent variable was clinical reasoning, which is considered ratio/scale data. Each participant had two data collection points: prior to the simulation activity and immediately following the intervention or attention-control group. Based on two data collection points with the same participant, the level of measurement for the independent and dependent variables, and the experimental design being completely randomized, average pretest and post-test scores for the intervention and attention-control groups were computed. In addition, independent sample *t*-tests for the average pretest and post-test scores for the intervention and attention-control groups were computed. Data analysis was completed by the PI and the statistician. The next chapter discusses the results of the data analysis for the study.

CHAPTER 4

RESULTS

Demographics

Demographic data on the age of 67 study participants is found in Table 1 and age demographics using a histogram is found in Figure 1. The average age of the participants was 28.18 (SD=8.747) with a median age of 25. There was good variability of age with a range of 19 to 53.

Table 1: Age of Study Participants (N=67)

N	Valid	67
	Missing	0
Mean		28.18
Std. Deviation		8.747
Median		25
Range		19-53
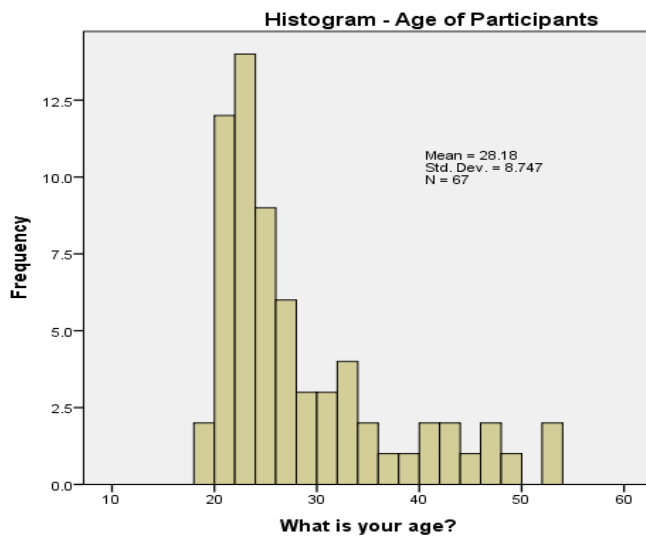
Figure 1. Age Demographics using a Histogram

Of the 67 participants, 61 were female (91%) and 6 were male (9%); 44 were Level I nursing students (65.7%) and 23 were Level II nursing students (34.3%); 62 were Caucasian (92.5%), 3 were Latino (4.5%), and 2 listed Other (3.0%). There was no missing demographic information from any of the study participants. With the 67 participants, homogeneity of variance was established by having participants from different levels in the nursing program. Categorical demographic data of the study participants is found in Table 2.

Table 2: Categorical Demographic Data of Study Participants (N=67)

Variable	Frequency	Percent
Gender - Female	61	91.0
Gender - Male	6	9.0
Level I Nursing Student	44	65.7
Level II Nursing Student	23	34.3
Race – Caucasian	62	92.5
Race - Latino	3	4.5
Race - Other	2	3.0

Pretest Scores for Intervention and Control Groups

Prior to the simulation activity and debriefing, all participants completed the NCRS pretest. The average pretest score for the intervention group was 3.77 (SD=.497) and the average pretest score for the attention-control group was 3.65 (SD=.428). Table 3 provides the mean and standard deviation for the average pretest scores of both groups.

Table 3: Average Pretest Scores on Nurses Clinical Reasoning Scale

	Average Pretest Scores on Nurses Clinical Reasoning Scale				
	Attention-Control or Intervention	N	Mean	Std. Deviation	Std. Error Mean
Average Pretest Score	Intervention Group	33	3.7717	.49750	.08660
	Attention-Control Group	34	3.6569	.42802	.07340

The null hypothesis is that the variance of the attention-control group is equal to the variance of the intervention group on the NCRS pretest. The probability (.304) calculated with the test statistics (F = 1.076) is greater than the alpha value (.05). Therefore, we fail to reject the null hypothesis. Equal variance is assumed between the two groups ($t = 1.014$, p = .314). Since equal variance is assumed, the null hypothesis is that the attention-control group is equal to the intervention group on the NCRS pretest. An independent sample *t*-test was computed and the probability (.314) calculated with the test statistics ($t = 1.014$) is greater than the alpha value (.05). Therefore, we *fail to reject* the null hypothesis. It appears that both groups were similar to one another from the measurement taken on the pretest. Since participants were completely randomized to the two groups (where it is assumed the groups are alike to begin with), this provides further evidence that these groups were alike prior to the intervention. Table 4 provides the independent samples *t*-test for the average pretest scores.

Table 4: Independent Samples Test for Average Pretest Scores

		Levene's Test for Equality of Variances		t-test for Equality of Means					95% Confidence Interval of the Difference	
Independent Samples *t*-Test for Average Pretest Scores										
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Average Pretest Score	Equal variances assumed	1.076	.304	1.014	65	.314	.11485	.11327	-.11136	.34107

Post-Test Scores for Intervention and Control Groups

Following the simulation activity, all participants were randomized to the intervention group or attention-control group by drawing a debriefing method out of a hat. After completion of the debriefing session, all participants completed the NCRS post-test. The average post-test score for the intervention group was 4.33 (SD=.589) and the average post-test score for the attention-control group was 4.04 (SD=.490). Table 5 provides the mean and standard deviation for the average post-test scores of both groups.

Table 5: Average Post-Test Scores on Nurses Clinical Reasoning Scale

	Average Post-Test Scores on Nurses Clinical Reasoning Scale				
	Attention-Control or Intervention Group	N	Mean	Std. Deviation	Std. Error Mean
Average Post-test Scores	Intervention Group	33	4.3333	.58996	.10270
	Attention-Control Group	34	4.0426	.49044	.08411

The null hypothesis is that the variance of the attention-control group is equal to the variance of the intervention group on the NCRS post-test. The probability (.175) calculated with the test statistics (F = 1.885) is greater than the alpha value (.05). Therefore, *we fail to reject the null hypothesis*. Equal variance is assumed (*t* = 2.196, p = .032). Since equal variance is assumed, the null hypothesis is that the attention-control group is equal to the intervention group on the NCRS post-test. The probability (.032) calculated with the test statistics (*t* = 2.196) is greater than the alpha value (.05). Therefore, we reject the null hypothesis. The attention-control group is not equal to the intervention group on the NCRS post-test. Table 6 provides the independent samples *t*-test for the average post-test scores.

Table 6: Independent Samples Test for Average Post-test Scores

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Average Post-test Scores	Equal variances assumed	1.885	.175	2.196	65	.032	.29076	.13238	.02638	.55514

Research Question

What is the effect of the DML method when compared to an unstructured debriefing, on clinical reasoning skills among associate degree nursing students following a simulation activity? On average, the participants who received the DML intervention scored .29076 higher on the NCRS post-test than the participants who received the unstructured debriefing. This demonstrates a statistically significant difference (p=.032) between the attention-control group and the intervention group. This supports the overall hypothesis that DML increases an associate degree nursing students' clinical reasoning skills when compared to an unstructured debriefing method following a simulation activity.

CHAPTER 5

DISCUSSION

The purpose of this RCT was to compare the effects of a structured debriefing method, DML, and an unstructured debriefing method following a simulation activity on clinical reasoning skills among associate degree nursing students. This was the first study to use the DML method and the NCRS with associate degree nursing students (personal communication, K.T. Dreifuerst, October, 2018). This chapter discusses the results of this intervention study and the significance to previous research. Strengths and limitations of the study are explored, leading to the implications for future research.

Strengths

One strength of this research study was a statistically significant difference (p=.032) between the NCRS post-test scores for the intervention and attention-control groups. Nursing students who had the DML debriefing scored significantly higher on the NCRS post-test than the nursing students who received the unstructured debriefing. This provides nursing faculty with the understanding that when the debriefing session is structured, it positively impacts a students' decision-making ability and their learning. This is supported by previous research studies recommending that students are to be systematically guided through a reflective process in line with the defined learning outcomes of the simulation activity during the debriefing session (Fey & Jenkins, 2015; Forneris, 2016; Sittner et al., 2015). Another strength of this study was the randomization of participants to the two groups. Randomization of participants enhances the rigor of a study by eliminating bias in group assignment based on attributes of groups or individuals within groups which could impact outcome variables (Polit & Beck, 2017).

Previous research studies using the DML method have shown significant impact on a nursing students' clinical reasoning skills through the use of a quasi-experimental research design (Dreifuerst, 2012; Forneris et al., 2015). However, the participants were not randomized to the two groups prior to the intervention. The randomization of participants to the two groups reduces the chance of systematic bias in the groups with respect to preintervention attributes that could affect the outcome variable (Polit & Beck, 2017). Based on the statistical analysis of the NCRS pretest scores, it appears that both groups were similar to one another prior to the simulation activity and the debriefing sessions. With a total of 67 participants, 34 were randomized to the attention-control group and 33 to the intervention group. This randomization occurred after the simulation activity and immediately prior to the intervention, which is the recommended timing for RCT's (Polit & Beck, 2017).

This study met the observed power analysis, which reduces the risk of a Type II error. Polit and Sherman (1990) analyzed the effect sizes for all studies published in *Nursing Research* and *Research in Nursing & Health* in 1989, and discovered that the average effect size for *t*-test situations was .35. Polit and Beck (2017) have identified that most nursing studies have an effect size in the range of .20 to .40. This study met a medium effect size of .50, which strengthens the validity of the statistical conclusion.

Another strength of the study was having the same debriefing facilitator lead all of the DML debriefings and the same debriefing facilitator led all of the unstructured debriefings. In Dreifuerst's (2012) study, it is explained that a possible difference in scores between the intervention and control groups may have been due to the debriefer, whereas the researcher served as the debriefer for the intervention groups, but multiple clinical instructors served as the debriefers for the attention-control groups. Dreifuerst (2012) recommended repeated

studies with the same debriefing facilitators for the intervention and attention-control groups, which provides consistency in the debriefing sessions. The next section discusses the limitations of the research study.

Limitations

One limitation of this study was that a single research site was utilized and included convenience sampling, which decreases the generalizability of the statistical results. Another limitation was the subjective nature of the NCRS instrument that was used for the study. It is difficult to match an instrument with the concept of interest and there are limited instruments in nursing research that objectively measure the clinical reasoning ability of nursing students. It is also a limitation that the Level I nursing students who participated in the study have not had the same amount of traditional clinical and/or simulation experiences as the Level II nursing students. Another limitation of the study was that the debriefing facilitator for the DML sessions was not evaluated on the implementation of DML following the training and prior to data collection. It is possible that the DML method was not properly administered as it was designed. The next section will discuss the implications for future research.

Implications for Future Research

Now that the strengths and limitations of this research study have been explored, implications for future research can be discussed. Utilizing multiple research sites would help with the generalizability of the research results, possibly including a combination of associate degree and baccalaureate nursing programs. Of the 67 participants in this research study, 44 were Level I nursing students and 23 were Level II nursing students. For future studies, it might be help to only include Level II nursing students, as they have completed more traditional clinical and simulation activities, than students who are in their first year of

nursing school. This provides the researcher with a better understanding of those nursing students who have not only completed more requirements and clinical time, but are getting ready to transition to practice. The results of this research study showed statistical significance (p=.032); however, qualitative data from the participants were not collected. For future studies, the use of qualitative feedback from the participants would help identify the participants' perceptions of DML. One way to collect qualitative data using DML for future research is to use the Debriefing for Meaningful Learning Supplemental Questions to explore user feedback and compare it with those who received a different type of debriefing (Dreifuerst, 2012).

Another recommendation for future research is to consider another instrument to measure clinical reasoning in nursing students. Being that the NCRS is subjective in nature, it would be appropriate to utilize a more objective instrument that measures the clinical reasoning ability of nursing students. In addition to, the use of performance raters during the simulation, such as nursing faculty, would provide an objective measurement for the nursing skills and tasks being completed by the student participants. Another recommendation for future research is to evaluate the debriefing facilitator prior to the study. In this research study, the same debriefing facilitator, who was trained in the DML method, completed all of the debriefing sessions for the intervention group, and the research assistant completed all of the debriefing sessions for the attention-control group. For future studies, it would be helpful to have the debriefing facilitator for the intervention group be evaluated by the Debriefing for Meaningful Learning Inventory© (DMLI) to ensure that the DML method is properly implemented prior to testing (Bradley, 2018).

The DMLI was created from the Debriefing for Meaning Learning Evaluation Scale© (DMLES), which has demonstrated internal consistency (Cronbach's alpha = 0.88), interrater reliability (0.86, total scale intraclass correlation [p<.01]), content validity (scale-level CVI = 0.92), and face validity (Bradley & Dreifuerst, 2016). A confirmatory factor analysis of the DMLI supported a six-class DFactor model (DFactor1 p = .024, DFactor2 p = .022, DFactor3 p = .012, DFactor4 p = .006, DFactor5 p = .036, DFactor6 p = .009) and the six factors represent the six Es of DML (Bradley, 2018). To determine that the debriefing facilitator who was formally trained in DML is applying it as designed, it is recommended to use the DMLI to assess how the debriefing methods are applied after DML training (Bradley, 2018).

Conclusion

In conclusion, this study compared the effects of a structured debriefing method, DML, and an unstructured debriefing method following a simulation activity on clinical reasoning skills among associate degree nursing students. As the results indicated a statistically significant difference (p=.032) between the intervention and attention-control groups; however, further research is needed using multiple research sites and qualitative data from study participants to help identify factors in the debriefing session that improve their decision-making skills and ultimately enhance the clinical reasoning skills of nursing students. Nursing faculty have an obligation to provide best practice teaching-learning opportunities to students in order to improve their knowledge and influence student learning.

APPENDIX A

LETTER OF SUPPORT – PARTICIPATING COMMUNITY COLLEGE

Gena Coomes, PhD(c), RN   April 17, 2018
PhD Nursing Student
School of Nursing and Health Studies
University of Missouri-Kansas City
Kansas City, Missouri 64080

Dear Ms. Coomes,

I am pleased to offer my support for your research study "**The Impact of Post-Simulation Structured Debriefing on Clinical Reasoning Skills Among Associate Degree Nursing Students: A Randomized Controlled Trial."** As the Director of the nursing program at Labette Community College, I fully support your research study which examines the clinical reasoning skills of our nursing students. I am excited about our nursing students being involved in this study and the potential benefit that it will also have for our nursing faculty.

Labette Community College nursing faculty and staff will work collaboratively with you and your research team on this intervention study. This type of research in nursing education helps nursing faculty utilize best practice strategies with simulation and debriefing. As a result, the improvement in a nursing students' clinical reasoning skills will carry over to nursing practice with patients. Your research study provides further insight into the debriefing process and the literature has shown that debriefing is the most important component of simulation. Again, I offer my full support for this randomized-controlled trial. We wish you success in your research study and we look forward to working with you.

Sincerely,

Dr. DeLyna Bohnenblust
Nursing Program Director

Dr. George Knox
College President

APPENDIX B

INSTITUTIONAL REVIEW BOARD APPROVAL – UMKC

UMKC
Office of Research Services

NOTICE OF EXEMPT DETERMINATION

Principal Investigator: Dr. Carol Schmer
UMKC School of Nursing and Health Studies
Kansas City, Missouri 64108

Protocol Number: 18-076
Protocol Title: The Impact of Post-Simulation Structured Debriefing on Clinical Reasoning Skills Among Associate Degree Nursing Students: A Randomized Controlled Trial
Type of Review: Panel Manager Review
Exempt Category # 1

Date of Determination: 07/10/2018

Dear Dr. Schmer,

The above referenced study was reviewed and determined to be exempt from IRB review and approval in accordance with the Federal Regulations 45 CFR Part 46.101(b).

- This study was determined to qualify under Exempt Category #1 as follows: Research conducted in established or commonly accepted educational settings, involving normal education practices, such as (i) research on regular and special education instructional strategies, or (ii) research on the effectiveness of or the comparison among instructional techniques, curricula, or classroom management methods.

This determination includes the following documents:
Attachments

    Coomes Dissertation Committee Approval Form
    Coomes - LCC Support Letter 2018
    NCRS
    Coomes - CITI Training Completion Report
    Coomes - Simulation Activity for Dissertation Research
    Coomes - Demographic Information Sheet
    Coomes - Exempt Research Study Information Sheet(2)

You are required to submit an amendment request for all changes to the study, to prevent withdrawal of the exempt determination for your study. When the study is complete, you are required to submit a Final Report.

Please contact the Research Compliance Office (email: umkcirb@umkc.edu; phone: (816)235-5927) if you have questions or require further information.

Thank you,

C. Thompson

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APPENDIX C

EXEMPT RESEARCH STUDY INFORMATION SHEET

<u>**Exempt Research Study Information Sheet**</u>

Title of Study: Post-simulation structured debriefing on clinical reasoning skills among associate degree nursing students: A randomized controlled trial

INTRODUCTION

Hello, my name is Gena Coomes and I am a PhD in Nursing student at the University of Missouri-Kansas City. I am conducting a research study to gain knowledge about two different debriefing methods used following a simulation activity and the impact they have on a nursing students' clinical reasoning skills. The results of this study could provide nursing faculty with evidence to effectively guide the debriefing process following a simulation activity to ensure quality patient care. This study is being conducted at a Midwestern college in the United States with current nursing students.

PROCEDURES

- A packet will be distributed to you prior to the simulation activity and will include the exempt research study information sheet, a Nurses Clinical Reasoning Scale, and a demographic information form.
- If you choose to participate, you will complete the Nurses Clinical Reasoning Scale and the demographic form prior to the simulation activity. The Nurses Clinical Reasoning Scale and the demographic form will take approximately 30 minutes to complete.
- If you choose not to participate, it will not affect your standing in the school or your grades. Participation in this study is voluntary at all times. You may choose to not participate or to withdraw at any time. To do so, simply turn in the forms without submitting any answers. If you choose not to participate, you are welcome to complete a crossword puzzle at the same time as participants are filling out the forms.
- You will then complete the simulation activity, followed by a debriefing session that will be led by either the principal investigator or the research assistant. Participants will be randomly assigned to a debriefing group following the simulation activity by drawing a debriefing method out of a hat.
- Following the debriefing session, you will be asked to complete the Nurses Clinical Reasoning Scale again as a post-test. The total length of time involved for you as a participant is two hours. There will not be any audio or video-recording of the simulation activity or debriefing sessions.

VOLUNTARY PARTICIPATION

Participation in this research study is completely voluntary. Refusal to participate will involve no penalty or loss of benefits to which you would otherwise be entitled, and you may

discontinue participation at any time without penalty. Your course grade will not be affected in any manner through participation or non-participation in this research study.

POSSIBLE RISKS

The risk for participating in this study is minimal. That means that the risks of taking part in this research are not expected to be more than the risks in your daily life. The potential risks include breaches of privacy and confidentiality, the possibility of not performing well during the simulation activity, or the possibility of increased anxiety or decreased confidence level in your nursing skills. It is often difficult for students to perform simulations in front of their peers. If this occurs, you will be instructed to notify the researcher immediately, and study participation may be discontinued if desired.

POSSIBLE BENEFITS

Other nursing students may benefit in the future from the results of this study, which can be used for improvement in student outcomes by identifying effective teaching strategies to enhance student learning using simulation and debriefing. Using student participants will provide the best group for determining how to improve student outcomes in nursing education simulation research.

PRECAUTIONS TO MAINTAIN CONFIDENTIALITY

Safeguards will be implemented to maintain confidentiality in this study. Each participant will have a study number linking their pre-test and post-test for the Nurses Clinical Reasoning Scale, and the demographic information sheet. This six digit number will be chosen by the student. No student names or identifying student information will be collected for the study.

Demographic information collected includes gender, age, race, and whether the participant is a Level I or Level II nursing student. Demographic data are only collected to provide a description of the participants within the study. All study data will be stored electronically in a computer database on the principal investigator's password protected computer. Demographic information sheets and the Nurses Clinical Reasoning Scale pretest and post-test documents will be stored in the principal investigator's office in a locked filing cabinet for seven years after the study is completed. After seven years, all paper and computer documentation related to this research study will be erased and shredded by the principal investigator. While aggregate data might be provided in a presentation or publication about this research study, information will not be discussed in a way that would allow you to be individually identified as a participant or named in any reports.

CONTACT FOR QUESTIONS

Do you have any questions about this research study? If you would like to speak with the principal investigator to discuss any questions, concerns, or problems, please call Gena Coomes at (620)-249-8260 or email at gmc89f@mail.umkc.edu or you may speak to Dr. Carol Schmer, faculty advisor for Gena Coomes, at 816-235-1713 or email at schmerc@umkc.edu if you would prefer. If you have questions or concerns about your rights as a research participant, you can call the Research Compliance Office at the University of Missouri-Kansas City at 816-235-5927.

APPENDIX D

NURSES CLINICAL REASONING SCALE – PERMISSION EMAIL

Dear Gena,

It is great to know that you are interested in using the NCRS in your study. Your study sounds very interesting and is important to nursing education. You have our permission to use the scale in your study. Information about the NCRS can be found in the article (DOI: 10.1111/jan.12831). You can also find the scale in the attached documents. Please do remember to cite the article whenever you publish your studies.

Good luck to your study.

 Chingyu

Ching-Yu Cheng, PhD, RN

Professor

Chang Gung University of Science and Technology

email: chingyuus@gmail.com

APPENDIX E

DEBRIEFING FOR MEANINGFUL LEARNING© – PERMISSION LETTER

MARQUETTE
UNIVERSITY
Be The Difference.

April 8, 2019

To Whom It May Concern:

Geena Coombs received training to use Debriefing for Meaningful Learning (DML) from me. She has my permission to use the DML method and the worksheets in her research study.

Sincerely,

Kristina Thomas Dreifuerst PhD, RN, CNE, ANEF, FAAN
Associate Professor
kristina.dreifuerst@mu.edu

APPENDIX F

NURSES CLINICAL REASONING SCALE – PRETEST

Nurses Clinical Reasoning Scale - Pretest

The NCRS measures self-perceived nursing clinical reasoning ability. The scale contains 15 items with higher score indicating self-perceived higher level of clinical reasoning ability. There are no reverse questions. The total score is to sum all item scores. Below is the scale.

Directions: Please read each item and circle the number that best describes your current performance. There is no right or wrong answer.

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
1. I know how to collect an admitted patient's health information quickly.	5	4	3	2	1
2. I can apply proper assessment skills to collect a patient's current health information.	5	4	3	2	1
3. I can identify abnormalities from the collected patient information.	5	4	3	2	1
4. I can identify a patient's health problems from the abnormal information collected.	5	4	3	2	1
5. I can recognize possible early signs or symptoms when a patient's health deteriorates.	5	4	3	2	1
6. I can explain the mechanism and development associated with the early signs or symptoms when a patient's health deteriorates.	5	4	3	2	1
7. I can accurately prioritize and manage any identifiable patient problems.	5	4	3	2	1
8. I can correctly explain the mechanism behind a patient's problems.	5	4	3	2	1
9. I can set nursing goals properly for the identified patient problems.	5	4	3	2	1
10. I can provide appropriate nursing intervention for the identified patient problems.	5	4	3	2	1
11. I am knowledgeable of each nursing intervention provided.	5	4	3	2	1
12. I can identify and communicate vital information clearly to the doctors based on the patient's current condition.	5	4	3	2	1
13. I can anticipate the prescription ordered by the doctor according to the patient information provided.	5	4	3	2	1
14. I can accurately evaluate and identify whether a patient's condition is improved.	5	4	3	2	1
15. I know the follow-up steps to take if the patient's condition does not improve.	5	4	3	2	1

APPENDIX G

DEMOGRAPHIC INFORMATION SHEET

Post-Simulation Structured Debriefing on Clinical Reasoning Skills

Among Associate Degree Nursing Students: A Randomized-Controlled Trial

Demographic Information Form

Instructions: Please provide a response for each of the following questions:

1. **What is your age?** _____

2. **What is your gender?**

Female ⭕   Male ⭕

3. **Are you currently a Level I or Level II nursing student?**

Level I Nursing Student ⭕   Level II Nursing Student ⭕

4. **Which racial or ethnic category do you most closely identify with?**

African American ⭕   Asian/Pacific Islander ⭕   Caucasian ⭕   Latino ⭕

Other: _____

5. Please write down your 6 digit identifier, which is the same one you have written down for the Nurses Clinical Reasoning Scale pretest.

_____

APPENDIX H

PREBRIEFING SIMULATION SCENARIO

Pre-Briefing Simulation Scenario

Agnes Taylor is an 81-year-old Caucasian female who suffered a fractured hip early this morning. She lives alone in an assisted living facility. Agnes states that she had tripped over a rug in her living room, fell to the floor, and was unable to get back up. She was able crawl to her phone and call 911. Agnes has been widowed for 10 years. She has a distant relationship with her son and daughter, though both live nearby. Agnes was transported to the hospital via ambulance and presented to the emergency department at 0600 Monday. She was alert & oriented to person, place, time, and the situation upon arrival. She was admitted to the floor at 0730. She underwent surgery and had an open reduction internal fixation (ORIF) of her left hip. She has just been transferred from the postanesthesia care unit (PACU) to the medical-surgical unit and you have received report from the PACU nurse. The PACU report indicated that at 1545 her vital signs were the following: Temp – 98.1 F, BP 121/75, Pulse – 73, Respirations – 18, O2 saturation 95% on Room Air. Per PACU, the Jackson Pratt (JP) drain had a small amount of serosanguineous fluid. Her surgical dressing to the left hip was clean, dry, and intact, with no drainage per PACU. It is currently a Monday at 1600.

APPENDIX I

NURSES CLINICAL REASONING SCALE – POST-TEST

Nurses Clinical Reasoning Scale – Post-test

The NCRS measures self-perceived nursing clinical reasoning ability. The scale contains 15 items with higher score indicating self-perceived higher level of clinical reasoning ability. There are no reverse questions. The total score is to sum all item scores. Below is the scale.
Directions: Please read each item and circle the number that best describes your current performance. There is no right or wrong answer.

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
1. I know how to collect an admitted patient's health information quickly.	5	4	3	2	1
2. I can apply proper assessment skills to collect a patient's current health information.	5	4	3	2	1
3. I can identify abnormalities from the collected patient information.	5	4	3	2	1
4. I can identify a patient's health problems from the abnormal information collected.	5	4	3	2	1
5. I can recognize possible early signs or symptoms when a patient's health deteriorates.	5	4	3	2	1
6. I can explain the mechanism and development associated with the early signs or symptoms when a patient's health deteriorates.	5	4	3	2	1
7. I can accurately prioritize and manage any identifiable patient problems.	5	4	3	2	1
8. I can correctly explain the mechanism behind a patient's problems.	5	4	3	2	1
9. I can set nursing goals properly for the identified patient problems.	5	4	3	2	1
10. I can provide appropriate nursing intervention for the identified patient problems.	5	4	3	2	1
11. I am knowledgeable of each nursing intervention provided.	5	4	3	2	1
12. I can identify and communicate vital information clearly to the doctors based on the patient's current condition.	5	4	3	2	1
13. I can anticipate the prescription ordered by the doctor according to the patient information provided.	5	4	3	2	1
14. I can accurately evaluate and identify whether a patient's condition is improved.	5	4	3	2	1
15. I know the follow-up steps to take if the patient's condition does not improve.	5	4	3	2	1

REFERENCES

Bland, A., Topping, A., & Wood, B. (2011). A concept analysis of simulation as a learning

strategy in the education of undergraduate nursing students. *Nurse Education Today*,

31(7), 664-670. doi:10.1016/j.nedt.2010.10.013.

Bradley, C.S. (2018). Confirmatory factor analysis of the debriefing for meaningful learning

inventory. *Clinical Simulation in Nursing, 14,* 15-20.

https://doi.org/10.1016/j/ecns.2017.09.004.

Bradley, C.S., & Dreifuerst, K.T. (2016). Pilot testing the debriefing for meaningful learning

evaluation scale. *Clinical Simulation in Nursing, 12*(7), 277-280.

https://doi.org/10.1016.j.ecns.2016.01.008

Cantrell, M.A. (2008). The importance of debriefing in clinical simulations. *Clinical

Simulation in Nursing, 4*(2), e19-e23. https://doi.org/10.1016/j.ecns.2008.06.006

Cato, D.L., & Murray, M. (2010). Use of simulation training in the intensive care unit.

Critical Care Nurse Quarterly, 33(1), 44-51. doi:10.1097/cnq.0b013e3181c8dfd4

Childs, J.C., & Seeples, S. (2006). Clinical teaching by simulation: Lessons learned from a

complex patient care scenario. *Nursing Education Perspectives*, *27*(3), 154-158.

doi:10.1043/1094-2831(2006)027%5B0154:CTBSLL%5D2.0.CO;2

Chronister, C., & Brown, D. (2012). Comparison of simulation debriefing methods. *Clinical

Simulation in Nursing*, *8*(7), e281-e282. doi:10.1016/j.ecns.2010.12.005

Cioffi, J. (2001). Clinical simulations: development and validation. *Nurse Education Today,

21(6)*, 477-486. doi:10.1054/nedt.2001.0584

Decker, S., Fey, M., Sideras, S., Caballero, S., Boese, T., Franklin, A.E., & Meakim, C. (2013). Standards of best practice: Simulation standard VI: The debriefing process. *Clinical Simulation in Nursing, 9*(6), S26-S29.

Dewey, J. (1910). The american association for the advancement of science as subject matter and as method. *Science, 31*(787), 121-127. doi:10.1126/science.31.787.121

Dreifuerst, K.T. (2009). The essentials of debriefing in simulation learning: A concept analysis. *Nursing Education Perspectives*, *30*(2), 109-114. doi:10.1043/1536-5026-030.002.0109

Dreifuerst, K.T. (2010). *Debriefing for meaningful learning: Fostering development of clinical reasoning through simulation.* Doctoral dissertation. Indiana University. Retrieved from https://scholarworks.iupui.edu/bitstream/handle/1805/2459/KTD%20%20Final%20Dissertation.pdf?sequence=1

Dreifuerst, K.T. (2012). Using debriefing for meaningful learning to foster development of clinical reasoning in simulation. *Journal of Nursing Education, 51*(6), 326-333. doi: 10.3928/01484834-20120409-02

Dreifuerst, K.T. (2015). Getting started with debriefing for meaningful learning. *Clinical Simulation in Nursing, 11*, 268-275. doi:10.1016/j.ecns.2015.01.005

Dufrene, C., & Young, A. (2013). Successful debriefing – best methods to achieve positive learning outcomes: A literature review. *Nurse Education Today, 34*(3), 372-376. doi:10.1016/j.nedt2013.06.026

Fanning, R.M., & Gaba, D.M. (2007). The role of debriefing in simulation-based learning. *Simulation in Healthcare, 2*(1), 1-9. doi:10.1097/sih.0b013e3180315539

Fey, M.K., & Jenkins, L.S. (2015). Debriefing practices in nursing education programs: results from a national study. *Nursing Education Perspectives, 36*, 361-366.

Forneris, S.G. (2016). Simulation education solutions for nursing. *Nursing Education Perspectives, 37*, 122.

Forneris, S.G., Neal, D.O., Tiffany, J., Kuehn, M.B., Meyer, H.M., Blazovich, L.M., & Smerillo, M. (2015). Enhancing clinical reasoning through simulation debriefing: A multisite study. *Nursing Education Perspectives, 36*(5), 304-310. https://doi.org/10.5480/15-1672

Gharaibeh, B., Hweidi, I., Al-Smadi, A., & Montreuil, T. (2017). Attitudes and perception of baccalaureate nursing students towards educational simulation. *Cogent Education, 4*(1), 2-14.

Grant, J.S., Moss, J., Epps, C., & Watts, P. (2010). Using video-facilitated feedback to improve student performance following high-fidelity simulation. *Clinical Simulation in Nursing*, *6*(5), e177-e184. doi: 10.1016/j.ecns.2009.09.01

Hayden, J., Smiley, R., Alexander, M., Kardong-Edgren, S., & Jeffries, P. (2014). The NCSBN national simulation study: A longitudinal, randomized, controlled study replacing clinical hours with simulation in prelicensure nursing education. *Journal of Nursing Regulation, 5*(2), S4-S41.

INACSL Standards Committee. (2016). INACSL standards of best practice: Simulation debriefing. *Clinical Simulation in Nursing, 12*(S), S21-S25. http://dx.doi.org/10.1016/j.ecns.2016.09.008.

Jeffries, P.R. (2005). A framework for designing, implementing, and evaluating simulations used as teaching strategies in nursing. *Nursing Education Perspectives*, *26*(2), 96-103. doi:10.1043/1536-5026(2005)026%3C0096:AFWFDI%3E2.0.CO;2

Jeffries, P.R. (2007). *Simulation in Nursing Education*. New York: National League for Nursing.

Jeffries, P.R. (Ed). (2012). *Simulation in nursing education: From conceptualization to evaluation* (2nd ed.). New York, NY: National League for Nursing.

Katz, K.B., Peifer, K.L., & Armstrong, G. (2010). Assessment of patient simulation in selected baccalaureate nursing programs in the United States. *Simulation in Healthcare, 5*(1)*,* 46-51. doi:10.1097/sih.0b013e3181ba1f46

Kohn, L.T., Corrigan, J.M., & Donaldson, M.S. (1999). *To err is human: Building a safer health system.* Committee on Quality of Health Care in America. Washington, DC: Institute of Medicine, National Academy Press.

Kolb, D. (1984). *Experiential learning: Experience as the Source of Learning and Development*, Englewood Cliffs, NJ: Prentice Hall.

Kuiper, R.A., Heinrich, C., Matthias, A., Graham, M., & Bell-Kotwall, L. (2008). Debriefing with the OPT model of clinical reasoning during high fidelity patient simulation. *International Journal of Nursing Education Scholarship, 5*(1), 1-14. doi:10.2202/1548-923X.1466

Lasater, K. (2007). High-fidelity simulation and the development of clinical judgment: Student experiences. *Journal of Nursing Education, 46*(6), 269-276. Retrieved from http://web.a.ebscohost.com/ehost/pdfviewer/pdfviewer?sid=7189e1ae-9ac7-4b64-8c45-0ba59b64a75c%40sessionmgr4005&vid=2&hid=4106

Liou, S.R., Liu, H.C., Tsai, H.M., Tsai, Y.H., Lin, Y.C., Chang, C.H., & Cheng, C.Y. (2016).

    The development and psychometric testing of a theory-based instrument to evaluate

    nurses' perception of clinical reasoning competence. *Journal of Advanced Nursing,*

    72(3), 707-717. doi:10.1111/jan.12831

Mariani, B., Cantrell, M.A., Meakim, C., Prieto, P., & Dreifuerst, K.T. (2013). Structured

    debriefing and students' clinical judgment abilities in simulation. *Clinical Simulation*

    in Nursing, *9*(5), e147-e155. doi:10.1016/j.ecns.2011.11.009

Mariani, B., & Doolen, J. (2016). Nursing simulation research: What are the perceived gaps?

    Clinical Simulation in Nursing, 12(1), 30-36.

Murray, C., Grant, M.J., Howarth, M.L., & Leigh, J. (2008). The use of simulation as a

    teaching and learning approach to support practice learning. *Nurse Education in*

    Practice, *8*(1), 5-8. doi:10.1016/j.nepr.2007.08.001

National League for Nursing Board of Governors. (2015). *Debriefing across the curriculum:*

    A living document from the National League for Nursing. Washington, DC: National

    League for Nursing.

Nehring, W.M. (2008). U.S. boards of nursing and the use of high-fidelity patient simulators

    in nursing education. *Journal of Professional Nursing, 24*(2), 109-117.

Nehring, W.M., & Lashley, F.R. (2004). Current use and opinions regarding human patient

    simulators in nursing education: An international survey. *Nursing Education*

    Perspectives, 25(5), 244-248.

Neill, M.A., & Wotton, K. (2011). High-fidelity simulation debriefing in nursing education:

    A literature review. *Clinical Simulation in Nursing*, *7*(5), e161-e168.

    doi:10.1016/j.ecns.2011.02.001

Polit, D.F., & Beck, C.T. (2017). *Nursing research: Generating and assessing evidence for nursing practice* (9th edition). Philadelphia, PA: Lippincott, Williams, & Wilkins.

Polit, D.F., & Sherman, R. (1990). Statistical power in nursing research. *Nursing Research, 39*, 365-369.

Reed, S. (2012). Debriefing experience scale: Development of a tool to evaluate the student learning experience in debriefing. *Clinical Simulation in Nursing, 8*, e211-e217.

Reed, S.J., Andrews, C.M., & Ravert, P. (2013). Debriefing simulations: Comparison of debriefing with video and debriefing alone. *Clinical Simulation in Nursing*, *9*(12), e1-e7. doi:10.1016/j.ecns.2013.05.007

Rudolph, J.W., Palaganas, J., Fey, M.K., Morse, C.J., Onello, R., Dreifuerst, K.T., & Simon, R. (2016). A DASH to the top: Educator debriefing standards as a path to practice readiness for nursing students. *Clinical Simulation in Nursing, 12*(9), 412-417.

Sanko, J. (2017). Simulation as a teaching technology: A brief history of its use in nursing education. *The Quarterly Review of Distance Education, 18*(2), 77-85.

Schon, D.A. (1983). *The reflective practitioner: How professionals think in action*. New York: Basic Books.

Shinnick, M.A., Woo, M., Horwich, T.B., & Steadman, R. (2011). Debriefing: The most important component in simulation. *Clinical Simulation in Nursing, 7*(3), e105-e111. doi:10.1016/j.ecns.2010.11.005

Sittner, B.J., Aebersold, M.L., Paige, J.B., Graham, L.L., Schram, A.P., Decker, S.I., & Lioce, L. (2015). INACSL standards of best practice for simulation: Past, present, and future. *Nursing Education Perspectives, 36*, 294-298.

Tannenbaum, S.I., & Cerasoli, P. (2012). Do team and individual debriefs enhance

performance? A meta-analysis. Human Factors: *The Journal of the Human Factors*

and Ergonomics Society, 55(1), 231-245.

Warrick, D.D., Hunsaker, P.L., Cook, C.W., & Altman, S. (1979). Debriefing experiential

learning exercises. *Journal of Experiential Learning and Simulation, 1*, 91-100.

Wotton, K., Davis, J., Button, D., & Kelton, M. (2010). Third-year undergraduate nursing

students' perceptions of high-fidelity simulations. *Journal of Nursing Education*,

49(11), 632-639. doi:10.3928/01484834-20100831-01

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