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High Fidelity Simulation Experience and Development of Clinical Judgment: Recent Graduate Nurses' Reflections

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DEDICATION

To DuVal, Madeline, Matt, Lilly Kate, Elodie Piper, and Beth with untold gratitude for your support and patience. You have made the journey worthwhile.

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ABSTRACT

Introduction: Nurse faculty endeavor to educate future nurses who are able to effectively transition to competent practice after graduation. Shrinking clinical resources and shortages of qualified clinical faculty have contributed to the increasing utilization of high fidelity simulation (HFS) as a substitute for and enhancement of clinical practice in nursing education. The growing body of HFS research documents both student and faculty satisfaction and increased student self-confidence and self-efficacy. A significant gap in the literature is the lack of research on the translation of knowledge gained in HFS to practice. The aim of this research was to investigate recently graduated nurses' experiences as baccalaureate students with HFS and their perceptions of the impact of HFS on their development of clinical judgment during their transition to practice.

Methods: Data collection consisted of semi-structured, audio-recorded individual interviews with 20 registered nurses who were recent graduates of ten different baccalaureate nursing programs. The participants included 14 white women, 3 African American women, 1 Hispanic woman, and 2 white men. Thematic analysis was the approach applied to the qualitative interview data.

Results: New nurses regarded HFS as valuable to their education. They reported that HFS had contributed to their consolidation of knowledge from various courses and clinical experience, assisted them in learning to work with a team, and positively affected

their development of clinical judgment. Participants recognized faculty expertise as contributing significantly to positive HFS experiences and considered HFS to have been underutilized in pre-licensure nursing education.

Discussion: These research findings have implications for nurse educators in general and more specifically for those involved in HFS. Implementation of HFS by well-prepared faculty can enhance the education of nursing students and their ability to effectively transition to practice. Further research is needed into the effectiveness of specific aspects of HFS, the impact of faculty preparation and evaluation on student learning, and the optimal balance of HFS content for students at various levels.

TABLE OF CONTENTS

CHAPTER 1

INTRODUCTION

New nurses are expected to enter the profession at the level of competent beginner, able provide safe, effective nursing care to patients in a variety of settings (Benner, 1982). Experience is key to development of clinical judgment (Tanner, 2006), an essential component of nursing care. Appropriate and timely judgements foster appropriate nursing actions, thus optimizing care (Lavoie, 2013). Development of expertise and clinical judgment is dependent on the quality of students' clinical experiences (Dreyfus & Dreyfus, 1980; Klein, 1998). With increased competition for clinical sites and a shortage of qualified nursing faculty, educators face challenges in providing the quality and quantity of onsite clinical experiences for students (MacIntyre, Murray, Teel, & Karshmer, 2009; Robinson & Dearmon, 2013). Lack of access to electronic medical records for students and restrictions on student practice activities at clinical sites are additional constraints to on-site clinical practicum experiences (Hayden, Smiley, Alexander, Kardong-Edgren, & Jeffries, 2014). To meet the challenge of providing consistent, high-quality clinical student experiences within these constraints, educators have adopted new approaches, including high fidelity simulation (HFS). By providing high quality simulated clinical experiences with consistent critical content coverage, HFS may also contribute to the development of clinical judgment in nursing students. In this chapter, I present the history of

simulation in nursing education,

examine current use and application, and identify significant gaps in the simulation research literature.

History of high fidelity simulation in nursing

Nurse educators have used simulation since the earliest days of nursing education (Nehring, 2010). Examples of early simulation techniques include the use of oranges to practice injection technique or a fellow student to practice assessment skills. In the 1960s, educators developed human patient simulators, or manikins, to enable students to practice specific skills, such as cardiopulmonary resuscitation (CPR). These early simulators used in nursing and medical education were Resusci Anne for CPR training and Harvey, developed for teaching cardiology skills (Jeffries, 2007). In the late 1990s, the development of affordable and easy-to-use patient simulators spurred the growth of simulation in nursing education (Jeffries, 2007). The level of technical sophistication in these simulators has increased significantly since the early 2000s. Furthermore, increased concern for patient safety paired with a simultaneous decrease in clinical sites and shortage of clinical faculty further spurred the increasing adoption of human patient simulators in nursing education. Following reports on patient safety by the Institute of Medicine (2000), nurse educators recognized simulation as a means to afford students the opportunity to practice technical and higher order thinking skills in an environment in which there are no risks to actual patients. Findings from a survey of 917 schools of nursing conducted in 2010 reported that 87% of undergraduate nursing programs utilized medium to high fidelity simulation in their undergraduate nursing program (Hayden, 2010).

High fidelity simulation employs state of the art manikins to present patient situations and conditions. Advantages of HFS include the opportunity for students to assume the role of the nurse, make decisions, and perform related psychomotor skills in an environment devoid of risk to actual patients. Other benefits include the opportunity to expose all students to low incidence/high risk patient conditions as well as the ability to demonstrate potential outcomes to interventions by compressing time intervals.

Disadvantages include both initial and ongoing costs, which can range upwards of $100,000 for a very basic new center with additional costs for personnel salaries and training as well as supplies (Frick, Swoboda, Mansukhani, & Jeffries, 2014). HFS may have a crucial role to play in the education of optimally prepared new graduate nurses, but there is a lack of understanding of how students' simulated clinical learning experiences contribute to their development of clinical judgment and expertise as practicing nurses. In the following section, I will discuss the theoretical framework for this research.

Theoretical framework

Clinical judgment ability is critical to safe patient care and is highly dependent on experience as the nurse learns to recognize which aspects of knowledge apply to a given patient situation (Tanner, 2006). There are various definitions of the concept of clinical judgment within the discipline of nursing. Most focus on the mental processes nurses employ in responding to patient situations. The most widely disseminated is Tanner's definition of clinical judgment as, "… an interpretation or conclusion about a patient's needs, concerns, or health problems, and/or the decision to take action (or

not), use or modify standard approaches, or improvise new ones as deemed appropriate by the

patient's response" (p 204). Tanner's conceptual definition and model of clinical judgment guided this research.

Tanner's model of clinical judgment in nursing

Currently the most complete and cohesive model of clinical judgment in nursing is the Clinical Judgment Model developed by Tanner (2006). Tanner developed the model from extensive research and literature review and considered it applicable to experienced nurses in practice as well as useful to nurse educators teaching novice students to develop clinical judgment skills (Tanner, 2006). Tanner based the model of clinical judgment on both her own research and that of other nurse researchers and included over 200 studies in her 2006 review. Tanner's research revealed five major conclusions:

1) What the nurse brings to the situation has a more profound effect on clinical judgment than objective data. Aspects of what the nurse brings to a given clinical situation include knowledge, experience, expertise, and values. Theoretical knowledge is scientific and generalizable, while experience enriches and fills out that knowledge adding individualized nuances (Tanner, 2006). Personal values can effect nurses' perceptions and in turn, their judgments. For example, McCarthy (2003b) found that nurses' philosophical perspective on aging influenced their ability to identify dementia in older adults.

2) Knowing the patient and engagement with the patient influence clinical judgment. Knowing the patient and engagement with them are important aspects of clinical

judgment. The nurse's knowledge of the patient enables either her to know which details of the situation matter, and which do not matter or perhaps matter less. Knowledge of the

patient allows the nurse to tailor interventions for that individual as well. Engagement with the patient and sensitivity to their concerns and priorities enhance clinical judgment (Tanner, 2006).

3) Both context and culture of a nursing unit influence clinical judgment. Context of the situation as well as the culture of the nursing unit have an influence on clinical judgment. The routine and workflow of a given unit influence clinical judgments. Benner, Tanner and Chesla (2009) noted that nursing knowledge was socially embedded and that the narratives about this knowledge influenced clinical judgment. Power divisions and status inequities in the context of the culture of a given nursing unit may have an influence on which patient issues are followed up and when and how a nurse chooses to intervene (Tanner, 2006).

4) Nurses use a variety of reasoning patterns to arrive at clinical judgments. Clinical judgment is complex, and nurses rarely rely on a single method of decision making when making clinical judgments. These methods can range from analytic processes to intuition. Which method is used depends on the expertise of the nurse. Novice nurses tend to be more methodical and use more analytical reasoning, while expert, experienced nurses are more likely to rely on intuition and to arrive at judgments faster (Tanner, 2006). Even experienced nurses fall back on analytic reasoning when faced with a situation that does not fit their experiences.

5) Breakdown in judgment is often what triggers reflection, yet reflection on both successful experiences as well as problematic ones, is essential for improved clinical judgment.

From her extensive research, Tanner (2006) developed a model of clinical judgment in which she detailed four activities: noticing, interpreting, responding, and reflecting. In the model reproduced in Figure 1, the overarching concept is clinical judgment and the relationships among the four activities of clinical judgment is illustrated. Much of the process of clinical judgment is internal, involving thinking and reasoning on the part of the nurse.

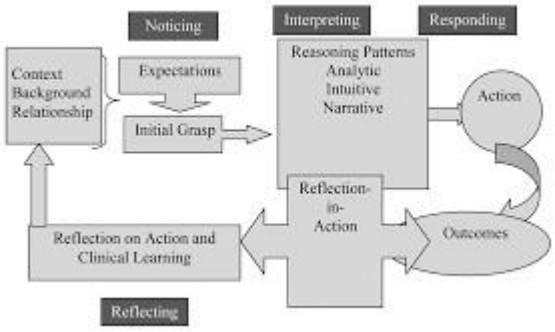

Figure 1.1 Clinical Judgment Model (Tanner, 2006)

Noticing relates to the expectations that the nurse has of a given patient situation. Although it may seem that this aspect of clinical judgment would correlate to the aspect of assessment in the nursing process, the more important dynamic is the association between the situation and the nurse's expectations. For example, if the nurse is assessing a patient who is one day post-op from an abdominal surgery, she might expect moderate pain; decreased breath sounds in the lung bases, and decreased or absent bowel sounds. The patient who demonstrates unexpected symptoms would cause the nurse to pay attention, hone in, and try to figure out why he was having these

unusual symptoms. The nurse's initial understanding of the situation would then trigger interpreting and/or responding, one of two reasoning patterns identified by Tanner (2006).

In interpreting and/or responding, the expert nurse may recognize an expected pattern immediately and intuitively while the novice nurse may engage in more deliberate, linear reasoning. In either case, the nurse would then continue with patient care that takes into account conclusions reached about the patient condition, monitoring the patient for changes. If the patient does not fit the anticipated pattern, the experienced nurse may also engage in a hypothetico-deductive mode of reasoning, in order to add to the possible hypotheses, which might explain what was wrong. The nurse may also recall narratives related to similar conditions to help understand the patient condition. In the example of the post op patient, if the nurse heard wheezes in the lung fields, she might then evaluate whether the patient had chronic asthma or if the wheezing was a new event for him or her. This type of reasoning would likely be more linear and logical than the intuitive reasoning that might otherwise take place.

Reflection, the final phase of Tanner's model of clinical judgement, is comprised of both reflection-in-action and reflection-on action. The former is the continual assessing that nurses engage in as they care for patients in order to evaluate effectiveness of interventions. The latter, reflection-on-action, takes place after the fact of patient care and may be informal as when the nurse reflects on her day driving home or it may be formal as in a formal debriefing or critical incident meeting when something unexpected happens. Reflection is essential to the nurse's development as a professional, enabling the nurse to learn from clinical situations (Tanner, 2006).

Nurses may engage in reflection on their own or with colleagues on a daily basis to enhance their clinical judgment, which is optimal. Most often, however, some failure or perceived failure in clinical judgment triggers reflection (Tanner, 2006). Reflection tends to happen more

often after something goes wrong in patient care in both informal and formal ways. This means that nurses often fail to reflect on what they did well in a patient care situation, missing important opportunities for improvement of their knowledge and clinical judgment. Tanner emphasized that an essential aspect of clinical judgment is moral reasoning on the part of the nurse engaged with the patient with an intent to do what is right (Tanner, 2006).

Review and critique of Tanner's model and application to simulation

Eight years after the publication of Tanner's (2006) Clinical Judgement Model, Cappelletti, Engel, and Prentice (2014) conducted a systematic review of the literature on clinical judgement in nursing. Although they concluded that the exiting body of research contributed support for the validity of Tanner's model, they suggested adding a sixth element, notably, that nursing education may affect what the nurse brings to the patient encounter.

Other critiques include the lack of inclusion of the patient's concerns or point of view, or characteristics of the patient or their family. In my opinion, in-depth consideration of how the patient interacts with the nurse to share information, set goals and work toward a better state of health would add to the model. The term relationship in the activity of noticing infers a relationship with the patient, which in turn implies sharing of information, setting goals and working together towards those goals.

Making this aspect of the model more explicit would add value to the patient perspective and emphasize to nurses the importance of the patient.

Another limitation of the model is the lack of clarity as to its application to nurses with varying levels of expertise. While Tanner implied that the expert nurse would be

better at all four activities of clinical judgment, she does not make this explicit. A discussion of how the new graduate nurse might arrive at clinical judgments would add to the model, for advanced beginner nurses are practicing and are required to make decisions and judgments just as more expert nurses must. In addition, further examination of nurses who have experience, yet are not experts, would be beneficial in explicating the processes and attributes of experience that contribute to the development of expertise. Finally, a discussion of characteristics of the nurse and the practice environment that contribute to both the development and application clinical judgment would further enhance the model.

The implications for nursing education is another area for further exploration, if not directly applicable to the model itself. Each of the four activities of clinical judgment as outlined in Tanner's model is amenable to guidance in its development. Nielsen (2009) noted that nursing expertise is much more complex than learning facts. True expertise involves the ability to connect facts to a particular patient situation, calling on experience, enabling the nurse to decide which observations are important and how context influences nursing care. In her research Nielsen utilized the Tanner clinical judgment model in the context of concept based nursing education to conceptualize how learning takes place in the clinical environment. Students received

instruction in noticing, interpreting, responding and reflecting in terms of concepts such as fluid and electrolyte imbalance. Instructors specifically utilized higher order questioning to help students explore various ways of noticing, interpreting, and responding to patients, then reflecting on their experience. Unusual situations were postulated to be especially useful for deep learning of connections between knowledge and clinical situations. Nielsen's

major conclusion was that the Tanner clinical judgment model provided a useful framework for educating students in the clinical environment in a way that helped them integrate knowledge so that they would be able to use that knowledge in future similar situation.

Tanner's (2006) clinical judgment model offers a useful means to conceptualize how nursing decision-making takes place. It has usefulness for nurse educators as they seek to enhance the development of clinical judgment in nursing students through various pedagogies including HFS. Additional models have been used to frame HFS including Benner's 1982 novice to expert theory, Jeffries nursing education simulation framework (Nehring, 2010), and experiential learning theory (Victor-Chmil, Turk, Adamson, & Larew; 2015). Tanner's clinical judgment model has the advantage of being applicable to a number of aspects of education as well as to practice.

This research, framed by Tanner's clinical judgment model, explored the perceptions of new graduates related to their student simulation experience as well as how that experience transferred to their practice as new nurses. Chapter Two contains a scoping review of the literature related to clinical judgment and simulation, in the format of a manuscript submitted for publication to Clinical Simulation in Nursing. I

describe research methods used in Chapter Three, followed by findings presented in Chapter Four as two manuscripts submitted for publication to Clinical Simulation in Nursing and Journal of Professional Nursing. I present discussion and conclusions in Chapter Five.

CHAPTER 2

THE ROLE OF HIGH FIDELITY SIMULATION IN THE DEVELOPMENT OF CLINICAL JUDGMENT AMONG NURSING STUDENTS: A SCOPING REVIEW[1]

[1] Lawrence, K. and D. Messias. Submitted to Clinical Simulation in Nursing

Abstract: Existing research indicates faculty and student satisfaction with the effectiveness of high fidelity simulation (HFS) as a teaching-learning strategy that is associated with improvement in student self-confidence and self-efficacy. This scoping review examines the current state of the science on HFS and clinical judgment among nursing students. We identified 14 articles that specifically addressed clinical judgment in HFS then read each article closely multiple times and noted common salient themes. The existing body of research highlights both the complexity of HFS and its relationship to student learning. Nurse educators need further research to ascertain how specific aspects of HFS contribute to gains in clinical judgment among nursing students and how they subsequently translate these educational experiences to their clinical nursing practice.

Key Points:

1. Existing research indicates high fidelity simulation may facilitate information synthesis and contribute to enhanced clinical judgment among in undergraduate nursing students.
2. The complexity of high fidelity simulation may enhance clinical judgment development in students, both individually and synergistically.
3. Future research is warranted to examine the possible relationships between simulated learning experiences, subsequent translation of knowledge and skills to the clinical setting, and development of critical thinking skills among nursing students and recent graduates.

Key words: Clinical judgment, high fidelity simulation, nursing students, nursing education, clinical competence

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Upon graduation, employers expect new nurses to have the knowledge, skills, and ability to assess patients' conditions, anticipate changes, and communicate effectively with a diverse health care team. Nurse executives continue to raise concerns related to the readiness of new graduates to safely and effectively practice (Wolff, Regan, Pesut, & Black, 2010). Competency in clinical judgment enhances new nurses' ability to provide patient care safely (De Meester, Van Bogaert, Clarke, & Bossaert, 2012). Tanner (2006) defined clinical judgment as "an interpretation or conclusion about a patient's needs, concerns, or health problems, and/or the decision to take action (or not), use or modify standard approaches, or improvise new ones as deemed appropriate by the patient's response" (p. 204).

In recent years health care technology has become more complex and although hospitalized patients are more seriously ill, their stays are shorter (Hamstrom, Kankkunen, Suominen, & Meretoja, 2012), resulting in a challenging clinical practice environment. Recently graduated nurses must quickly effect the transition to practice and become safe, effective caregivers (Benner, Tanner, & Chesla 2009). Simultaneously, current challenges in nursing education include decreasing opportunities for clinical placements and shortages of nursing faculty (MacIntyre, Murray, Teel, & Karshmer, 2009; NLN, 2015; Robinson & Dearmon, 2013, Richardson, Goldsamt, Simmons, Gilmartin, and Jeffries, 2014, Hayden, Smiley, Alexander, Kardonng-Edgren, & Jeffries,

2014). In response, nurse educators have developed new pedagogies and engaged in re-imagining the processes of educating nurses (Benner, 2011; Hayden, Smiley, Alexander, Kardong-Edgren & Jeffries, 2014).

High fidelity simulation manikins are quite realistic and closely mimic actual patient conditions, allowing the replication of a variety of patient conditions in laboratory settings (Hovancsek, 2007). There is a substantive, growing body of literature on the relationships between HFS and student self-confidence and self-efficacy, as well as both student and faculty satisfaction with HFS. Hayden and colleagues (2014), in a study supported by the National Council of State Boards of Nursing, reported students who spent up to 50% of their clinical time in simulation demonstrated no significant difference in NCLEX ($p=0.737$) and standardized test scores ($p=0.478$) compared to students who had 10% of their clinical time replaced with simulation. Faculty ratings of clinical competence were also similar ($p=0.688$). Despite these potential pedagogical contributions, HFS is expensive in terms of both equipment and resources. To enhance the utilization of HFS in nursing education, it is imperative that nurse educators have a clearer understanding of the ways in which HFS educational experiences influence the development of clinical judgment.

Prior research on HFS has examined student confidence, self-efficacy, and participant and facilitator satisfaction (Nehring, 2010). Findings from a 2016 survey of International Nursing Association for Clinical Simulation and Learning (INACSL) members indicated these areas had been adequately addressed. The authors of the survey report noted several perceived gaps in the literature, including higher order thinking skills and the translation of learning to clinical practice, both as a student in clinical setting or newly licensed nurse in practice (Mariani & Doolen, 2016). The aim of this scoping

review is to assess the current literature on the relationship between HFS and the development of clinical judgment in undergraduate nursing students.

Method

Inclusion criteria were research reports focused on the use of HFS to enhance the development of clinical judgment in undergraduate nursing students published in an English language, peer reviewed professional journal, between 2006 and 2016. To assure inclusion of pertinent research related to clinical judgment, the timeframe was based on the initial publication of Tanner's (2006) model of clinical judgment. The Cumulative Index of Nursing and Allied Health Literature (CINAHL), Medline, and Google scholar were each searched separately, using various combinations of the following search terms: nursing students, clinical judgment, and simulation. The combined initial search yielded 42 articles, of which 13 were duplicates. The remaining 28 abstracts were screened according the inclusion criteria. The 15 excluded manuscripts focused on reports of the development or validation of instruments (N=7), reports of educational interventions without data indicating outcomes of that intervention (N=3); and studies that used simulation strictly as an evaluation tool and not a teaching tool (N=5). The final sample consisted of 14 articles published between 2006 and 2016 (Table 1) which included a wide range of research designs and methods (Table 2).

The analysis consisted of repeated close readings of each article with the goal of identifying and describing the significant findings. Included articles were re-read and common salient themes were noted. Examples of initial themes include the complexity

of simulation, anxiety experienced by students, the opportunity to make connections, the relationship of self-confidence and self-efficacy to clinical judgment, and the effect of fidelity on learning. Further analysis and refinement of these initial themes resulted in the construction of three broad findings, each of which is addressed in more detail in the subsequent sections:

- HFS provides students with opportunities to make connections, and synthesize content from a variety of courses and experiences.
- The complexity of HFS involves a wide range of activities and formats which may have independent or synergistic effects on students' development of clinical judgment.
- There may be relationships between the level of simulation fidelity, students' familiarity with the simulator, and the development of clinical judgment skills.

Results

Opportunities to Make Connections and Synthesize Knowledge, Nursing students gain knowledge from a variety of experiences in diverse contexts. In relation to simulated learning, making connections and synthesis denote processes of bringing together knowledge to develop a holistic conception of nursing knowledge, actions, and clinical judgment. The ability to synthesize content from multiple sources and understand relationships between theoretical understanding and patient conditions contributes to students' development of self-confidence, self-efficacy, and clinical judgment skill. To assess the impact of a post-partum simulation lab on self-confidence and self-efficacy, Bambini, Washburn and Perkins (2009) conducted pre and post

simulation surveys among 112 undergraduate nursing students. The surveys incorporated Bandura's notion of self-efficacy as the perceived ability to perform a given task. The post-test results indicated a significant increase in self-efficacy ($p < .01$) related to skills ranging from vital signs to patient education. Analysis of the responses to three open-ended questions indicated improved ability to apply prior knowledge and acknowledgment of personal change in clinical judgment, and improved ability to set or shift priorities as a situation changed. Examples of students' statements regarding the need to prioritize assessment skills and the ability to "…really…put all the pieces together" (p. 81) were included as evidence of development of clinical judgment through simulated patient care. The researchers further noted, "Anecdotal comments from students later in the semester described experiences in the real-world clinical setting that reflected simulated experiences. These students stated that they felt better prepared to solve problems when a similar situation arose" (p. 82).

Using Gillespie and Paterson's (2009) situational clinical decision-making framework, Shelestak, Meyers, Jarzemback, and Bradley (2015) evaluated the relationships between student knowledge gained from HFS exposure, reported interpretation of patient's symptoms, and subsequent clinical decisions. The study involved undergraduate students (N=51) participating in a HFS scenario based on American Heart Association Advanced Cardiac Life Support guidelines in which the patient experiences a vagal episode with a drop in heart rate and blood pressure and subsequent deterioration resulting in a cardiac arrest. At two points in time, the instructor paused the HFS, prompting students to respond in writing about cues presented in the scenarios. The cross-tabulation of frequencies of correct cue identification and

subsequent correct judgments suggested that cue recognition might be essential to clinical decision making.

Previous studies of nurses' clinical decision making have focused on outcomes such as time management, prioritization, and communication (Fero et al., 2010), Clinical decision making is a complex process involving a multifaceted relationship between the practitioner noticing aspects of a simulated patient's condition, interpreting cues correctly and choosing appropriate responses. Shelestak and colleagues (2015) did not explore the possibility of participants' level of expertise as an explanation for correct judgment in the absence of correct cue identification. According to Benner's (1982) theory of the development from novice to expert nurse, novice nurses often rely on protocols as decision-making tools, suggesting the novice might perform a correct action without fully understanding the nuances of the decision in the way an expert nurse would.

More recently, Bussard (2016) conducted an investigation of the oral debriefing component of HFS involved 20 nursing students who participated in four HFS scenarios and subsequently viewed a video of their simulation experience. Upon completion of these activities, the students completed an open ended, nine-item survey based on Tanner's model of clinical judgment (2006). Bussard's qualitative analysis of students' responses resulted in identification of four themes related to clinical judgment development: confidence, communication, decision-making, and change in clinical practice. Examples of responses representative of the theme of decision making included, "I noticed subtle changes in my patient that helped guide my care" (p. 526) and "I need to be more systematic with my thinking" (p. 526).

In their grounded theory study of nursing students' experiences and responses to HFS, Najjar, Lyman, and Miehl (2015) conducted focus group interviews with students (n=26) who had a simulation component to clinical courses. The goal of the focus groups was to enhance dialogue around the social process of students' experiences in simulation and allow students to explore individual and shared experiences. Their findings described students' efforts to make connections on multiple levels, which included linking prior knowledge to the current simulation, interacting with colleagues in order to process their HFS experiences, and anticipating ways to connect knowledge gained in HFS to future patient care situations. Some students' instructors encouraged the use of the Lasater Clinical Judgment Rubric (LCJR; Lasater, 2007b) as a guide for self-reflection. One response suggested this might contribute to a more compressed reflection period: "[When using the rubric], I would go home and write it all out...[and say], 'I learned from that, move on'. And I think without that tool, I was in my head about [the simulation experience] a lot longer." (p. 6).

Researchers in a variety of settings have used the LCJR to assess student proficiency. In their research in Lebanon, Fawaz and Hamdan-Mansour (2016) compared nursing students exposed to content on congestive heart failure presented through either traditional lecture or HFS, employing a post-test quasi-experimental design. They reported students in the HFS intervention group scored significantly higher on the LCJR ($p<0.001$) and the critical thinking subscale of the Motivated Strategies for Learning Questionnaire (MSLQ; $p<0.001$), a measure of student motivation for learning, concluding that HFS may enhance critical thinking and motivation by encouraging synthesis of knowledge.

Yuan, Williams, and Man (2014) designed a quasi-experimental study in which faculty members rated 113 undergraduate nursing students during five simulated learning experiences, which were videotaped for further evaluation. Comparing ratings of student performance, measured on the LCJR subscales, during both the live and videotaped simulations, they found significant improvement over the five simulations ($p=0.000$). They also reported students perceived HFS experiences as valuable in helping them apply knowledge and skills, particularly in relation to clinical judgment: "…debriefing let us to reflect on our performance…and developed our thinking and reasoning skills when we gave the comments to others." (p. 13). Each of these six studies contributed further evidence on the possible contributions of HFS to students' ability to synthesize knowledge from different sources such as readings, lectures, skills labs, and clinical experiences.

Complexity of HFS. Another subset of the research literature focused on the relationship between complexity of simulated education experiences and clinical judgment. Standard IX of INACSL's standards of best practice (2015) addresses the multiple elements of simulation design. These include needs assessment, measureable objectives, format of simulation, clinical scenario or case, fidelity, facilitative approach, briefing, de-briefing, evaluation, participant preparation, and test of the design (Meakim, Fey, Chmil, Mariani, & Alinier, 2015). Each element in turn may have aspects that add further to the complexity of HFS. In addition, students learn in a broader environment. Another area of research has focused on identifying and understanding the elements of nursing education and HFS that influence the development of clinical judgment. Employing a quasi-experimental design, Blum, Borglund, and Parcells (2010)

investigated the impact of simulation on skill enhancement and clinical judgment acquisition among 53 nursing students in their first clinical course. They also used the LCJR (Lasater, 2007b) with both student and faculty performing ratings at two points in a simulation experience. The control group learned skills using task trainers, for specific skill training for example, pelvic models to practice catheter insertions. The intervention group was exposed to simulation-enhanced skill training using higher fidelity manikins. Both groups progressed equally in clinical judgment abilities over the course of the semester. The authors concluded that regardless of the use of simulation, students progressed in clinical judgment in a step-wise fashion through the early portion of their nursing education. Recommendations included a focus on confidence building in early nursing courses, given that confidence enhances the development of competence, and reserving HFS for later semesters, given both the expense and questionable additional contribution of HFS over low fidelity task trainers.

Other researchers have examined the use of HFS in combination with specific didactic content. Lindsey and Jenkins (2013) compared faculty-rated knowledge gains among an intervention group (n=39) exposed to rapid response systems education consisting of a combination of a lecture and a simulation scenario to a control group (n=40) who received the usual lecture-only exposure. The outcome measure consisted of faculty ratings of student performance in the HFS scenario. The intervention group demonstrated significantly greater improvement ($p<.001$) compared to the control group.

In their investigation of signal detection among students (n=63) and experienced practitioners (n=34), Thompson, Yang, and Crouch (2012) examined responses to both paper and high fidelity scenarios. Interestingly, they found that high fidelity scenarios

resulted in less accurate signal detection among both students and practitioners. Participants were more likely to convey false alarms or miss true findings in response to the information presented in the HF scenario than in the written case study. These findings suggest the need for further examination of students' experiences of and responses to the level of complexity presented in HFS as well as of the impact of the interplay of various aspects of simulation on students' ability to process information.

In a randomized experimental study, Page-Cutrara and Turk (2017) examined the effect of an enhanced pre-briefing on students' clinical judgment. The pre-briefing for intervention participants (N=42) included guided reflection-before-action and concept mapping, in addition to the usual activities of discussion of objectives, orientation to the manikin, and introduction to the patient situation. The control group (N=38) received only the usual pre-briefing of orientation to the manikin and brief scenario information. Faculty scored all participants on the Creighton Competency Evaluation Instrument Clinical Judgment Subscale (CCEI-CJ). Participants in the experimental group scored significantly higher on the CCEI-CJ subscale ($p<0.001$). The investigators posited that structured pre-briefing may contribute to the development of essential nursing skills.

Manikin fidelity and students' familiarity with the simulator. The level of sophistication and degree to which manikins simulate reality varies widely among currently available manikins. However sophisticated, manikins still lack many qualities of actual human patients, such as facial expressions and skin temperature. Najjar and colleagues (2015) reported students' perceptions of HFS as unrealistic, contributed to increased anxiety that affected their learning. Specifically, students reported a perceived inability to accurately gather information about the simulated patient's clinical status and

uncertainty related to the inability to distinguish findings related to the level of fidelity of the manikin from true findings, which interfered with their learning. Students' perceived that fidelity of simulation affected their engagement with the scenario and interaction with colleagues. For example, students noted lack of facial expressions, mismatch of the patient's voice with the scenario presented, and delayed verbal responses by the manikin as factors that distracted them and affected both learning and performance.

There is some evidence that repeated exposure to simulation may be related to improved learning in nursing students due to better understanding of manikin capabilities related to fidelity on the part of students. In research designed to evaluate clinical judgment in a simulation setting, Jensen (2013) examined both faculty and student ratings on the LCJR over a period of two semesters. Participants included 88 students and an unspecified number of nursing faculty members. Faculty rated students in a summative simulation scenario and students with scores of one on a single dimension or two scores of two on any dimensions of the LCJR were required to repeat the graded simulation. Over two semesters, 42 students (48%) were required to repeat the simulation evaluation. Of note, faculty LCJR ratings of students required to repeat the simulation were significantly higher than the original ratings. Repeated exposure to HFS and the increased familiarity with qualities of the manikins may have contributed to enhanced student learning. Although Jensen's (2013) focus was on the use of simulation as an evaluation of other teaching methods, using simulation to evaluate learning, these findings have implications for use of simulation as an educational strategy. Improved scores among students required to repeat the simulation exercise suggests that a higher level of familiarity with the simulator may contribute to improved learning and performance.

Jensen also reported a summary of students' debriefing comments, which revealed students' perception that their anxiety levels had a negative effect on performance. Jensen noted that anxiety was increased by faculty presence, the novelty of the simulation experience, and the use of summative evaluation and suggested student anxiety may have affected clinical reasoning scores resulting in artificially low scores.

In a study of the relationship between simulation design and clinical judgment, Ironside and Jeffries (2016) examined nursing students' perceptions of two HFS scenarios. They used the Professional Judgment Rating Form as the measure of clinical judgment. The sample included 527 undergraduate nursing students who all participated in two HFS scenarios. They found a significant correlation between clinical judgment performance and the simulation design ($p<.006$) in one simulation but not the other. In addition, clinical judgment performance correlated positively with subscales of the Simulation Design Scale such as problem solving features ($p<.01$), fidelity ($p<.002$), and debriefing/feedback ($p<.002$). They hypothesized that in the second experience, students had developed sufficient familiarity with the simulation environment that they could focus more fully on the simulated situation. In addition, they suggest that fidelity is an essential aspect of HFS scenario design along with problem solving and debriefing/feedback. These aspects of simulation aid students in developing clinical judgment.

Student Perspectives on HFS. One additional study highlighted student perspectives related to HFS. As part of a larger research initiative of clinical judgment among nursing students, Lasater (2007a) conducted a focus group with junior nursing students ($n = 8$) who were part of a class who attended a two and half hour simulation lab in groups of 12

as either a participant or observer, followed by de-briefing sessions. The analysis resulted in identification of 13 primary themes, which were consolidated into five major findings. Findings related to strengths of HFS were the bringing together of theoretical knowledge from readings and lectures with skills and clinical experiences. Findings related to limitations of HFS included the anxiety provoked by HFS paired with increased learning, students' desire for more feedback, the importance of connections among students in simulation, and recommendations for successful HFS. Despite the anxiety of participating in HFS, students did recognize that they actually learned more from experiences when they had not performed as well as expected. Although facilitators utilized positive feedback in an attempt to increase confidence, students expressed a desire to have more specific feedback on ways they could improve in their patient care. Another student noted advantage when multiple students participate in HFS was the opportunity to not only learn from their own actions but the additional benefit of learning from peers. Lasater suggested that critical reflection in debriefing and engagement of students observing the simulation would enhance student learning from HFS. Each of the included studies contributes new knowledge to the understanding of HFS and clinical judgment development.

Summary and Conclusions

The body of literature identified for this scoping review of HFS and clinical judgment among nursing students consisted of 14 published articles from 2007 to 2017. Despite the relatively small number of studies, the body of research included a variety of research methods. Key findings of the analysis of this body of research were 1) HFS provides students with opportunities to make connections, and synthesize content from a

variety of courses and experiences; 2) The complexity of HFS involves a wide range of activities and formats which may have independent or synergistic effects on students' development of clinical judgment; and 3) The level of simulation fidelity may influence students' development of clinical judgment. Nurse educators need information regarding the transference of knowledge and skills gained in HFS into practice. These studies each highlight the complexity of HFS, which, in turn, takes place within the complex structure of nursing education. Given that the level of fidelity of simulation may have an impact on student learning and performance, nurse educators need more information about this relationship, as well as further assessment of the cost effectiveness of level of fidelity and clinical content. Overall, this body of evidence suggests that HFS may be beneficial in helping students to develop clinical judgment skills. Given the rapid proliferation of HFS, there is an urgent need for further evidence on the relationships between exposure to HFS and the development of clinical judgment among student nurses. Of note, the identified body of research pertains only to the implementation of simulation with undergraduate nursing students. There is clearly a need for research on the utilization of simulation in the education of advanced practice nurses.

Future Directions

There are many opportunities for further nursing education research on identifying best practices in utilization of HFS across various levels and contexts of nursing education. Nurse educators need to better understand how students develop clinical judgment and the potential role of HFS as a pedagogical tool. Future directions for research include investigation of the effects of particular aspects of simulation including student preparation, level of clinical content, de-briefing, and other aspects of simulation

design as elucidated in the International Nursing Association for Clinical Simulation and Learning's Standard IX (Meakim et al, 2015). Findings related to levels of anxiety experienced by students and the correlation to learning in simulation warrant further investigation as well. Future investigations must also address the translation of knowledge and skills learned in simulation to the clinical setting.

Conclusion

HFS offers unparalleled opportunities for nursing students to learn and enhance their patient care skills and develop clinical judgment in a safe environment. Other advantages include the ability for faculty to control for the students' level of expertise, and review student performance in both formative and summative fashion. The evidence from this review of the current nursing research suggests nursing faculty have in HFS a potential tool for assist students in the development of clinical judgment skills. The complexity of this HFS as well as the synergism between simulation and other forms of instruction demand further investigation that elucidates best practices.

Table 2.1 Summary of Studies

Author(s)	Title	Design	Methods	Sample	Findings
Bambini, Washburn and Perkins (2009)	Outcomes of clinical simulation for novice nursing students: Communication, confidence, clinical judgment	Quasi-experimental repeated measures	Self-report survey with open-ended comments.	Convenience sample (N=112) nursing students	Increased self-efficacy as measured by student report, themes of improved communication ability, confidence, and clinical judgment in comments
Blum, Borglund, and Parcells (2010)	High-fidelity nursing simulation: impact on student self-confidence and clinical competence	Quasi-experimental	Student self-confidence and faculty rating of clinical competence on selected items the Lasater Clinical Judgment Rubric.	Convenience sample (N=53) nursing students	Improvement in both confidence and competence that was not attributed to simulation.

Author(s)	Title	Design	Methods	Sample	Findings
Bussard (2016)	Self-reflection of video-recorded high-fidelity simulations and development of clinical judgment	Qualitative, interpretive, descriptive	Retrospective survey.	Convenience sample of diploma nursing students who had completed four simulations in the first medical-surgical nursing course (N=20).	Review of video enhanced clinical judgment development. Four themes emerged confidence, communication, decision-making, and change in clinical practice.
Fawaz and Hamdan-Mansour (2016)	Impact of high-fidelity simulation on the development of clinical judgment and motivation among Lebanese nursing students	Post-test only quasi-experimental	One HFS scenario or traditional classroom instruction followed by a clinical experience graded on LCJR and completion of the Motivated Strategies for Learning Questionnaire (MLSQ).	Nursing students at two universities in their first year, in adult nursing (N=56).	Significant improvement in LCJR scores ($p<0.001$) and MLSQ scores ($p<0.001$) for intervention group

Author(s)	Title	Design	Methods	Sample	Findings
Ironside and Jeffries (2016)	Using multiple-patient simulation experiences to foster clinical judgment	Quasi-experimental	Students participated in two simulation scenarios and were rated on the Professional Judgment Rating Form (PJRF) after both experiences. Simulation designs were rated using the Simulation Design Scale (SDS).	Purposive sample of final semester BSN and ADN nursing students (N=527).	Significant correlations between simulation design and clinical judgment performance ($p<.006$) in the first simulation only. Significant correlation between SDS subscales of problem solving ($p<.01$), fidelity ($p<.002$), feedback ($p<.002$) and clinical judgment performance.

Author(s)	Title	Design	Methods	Sample	Findings
Jensen (2013)	Clinical reasoning during simulation: Comparison of student and faculty ratings	Quasi-experimental descriptive	Faculty and student ratings on LCJR were compared after a simulated post-partum experience	Convenience sample of 31 associate degree (N=31) and baccalaureate degree (N=7) nursing students	Students who were required to repeat the simulation had higher scores.
Johnson, Lasater, Hodson-Carlton, Siktberg, Sideras, and Dillard (2012)	Geriatrics in simulation: Role modeling and clinical judgment effect	Quasi-experimental	Experimental group students viewed a video of an expert nurse modeling clinical judgment. Control group students participated in simulation with usual preparation.	ADN and BSN Nursing students from the US and UK in their first clinical course (N=275).	Differences in student satisfaction was significant in UK students (p=.000). A majority of students in the experimental group credited the video role model as most helpful.

Author(s)	Title	Design	Methods	Sample	Findings
Lasater (2007a)	High-fidelity simulation and the development of clinical judgment: Students' experiences	Qualitative exploratory	Students participated in a single focus group following simulation experiences as part of their first medical-surgical nursing course	Convenience sample of non-traditional nursing students (N=15).	HFS offered challenging patient scenarios encouraging students to synthesize knowledge from multiple means of learning.
Lindsey and Jenkins (2013)	Nursing students' clinical judgment regarding rapid response: The influence of a clinical simulation education intervention	Experimental pre and post test	Following pretest, intervention group participated in lecture and simulation intervention related to rapid response systems (RRS).	Convenience sample of nursing students (N=79)	Student who experienced simulation related to RRS showed improved knowledge and clinical judgment as measured by and 11-item survey

Author(s)	Title	Design	Methods	Sample	Findings
Najjar, Lyman, and Miehl (2015)	Nursing students' experiences with high-fidelity simulation	Grounded theory	Focus groups with students in multiple classes who had experienced simulation.	Purposive sample of nursing students (N-26)	Improved confidence and transfer of learning to clinical setting reported in student focus groups
Page-Cutrara and Turk (2017)	Impact of pre-briefing on competency performance, clinical judgment, and experience in simulation: An experimental study	Experimental randomized	Experimental group received structured pre-briefing while control group received usual pre-briefing.	Convenience sample of nursing students in medical-surgical course.	Differences noted between groups for competency performance ($p<0.001$), clinical judgment ($p<0.001$), and perception of pre-briefing experience ($p<0.001$).

Author(s)	Title	Design	Methods	Sample	Findings
Shelestak Meyers, Jarzemba k, and Bradley	A process to assess clinical decision-making during human patient simulation: A pilot study	Non-experimental descriptive	Students participated in six HFS scenarios. They wrote responses to questions regarding cues in the HFS at two points in the simulations.	Senior nursing students (N=51).	Participants who correctly identified cues also chose correct actions. Some participants mis-identified cues but still engaged in correct care actions.
Thompso n, Yang, and Crouch (2012)	Clinical simulation fidelity and nurses' identification of critical event risk: a signal detection analysis	Quasi experimental signal detection	Clinical judgment measured using signal detection with paper and simulator cases.	Convenience sample of nursing students (N=63) and experienced nurses (N=34)	With increased fidelity both novices and experts had difficulty distinguishing true risk from noise.
Yuan, Williams, and Man (2014)	Nursing students' clinical judgment in high-fidelity simulation based learning: A quasi-experimental study	Quasi experimental repeated measures	Clinical judgment measured with the LCJR after repeated HFS experiences	Convenience sample of 113 undergraduate nursing students in Macao	Students' LCJR scores increased after multiple HFS experiences.

Table 2.2 Summary of Research Designs

Method	Author(s)
Descriptive	• Shelestak, Meyers, Jarzembak, & Bradley (2015) • Lasater (2007a) • Bussard (2016)
Grounded Theory	• Najjar, Lyman, & Miehl (2015)
Signal detection (is this a design?)	• Thompson, Yang, & Crouch (2012)
Pre and posttest experimental design	• Lindsey & Jenkins (2013) • Ironside & Jeffries (2016) • Page-Cutrara & Turk (2017)
Pre and posttest	• Bambini, Washburn, & Perkins (2009)
Quasi-experimental design	• Blum, Borglund, & Parcells (2010) • Johnson, Lasater, Hodson-Carlton, Siktberg, Sideras, & Dillard (2012) • Jensen (2013) • Fawaz & Hamden-Mansour (2016) • Yuan, Williams, & Man (2014).

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CHAPTER 3

METHOD

Introduction

Employers and consumers expect new nurses to enter the workforce practicing at the level of an advanced beginner, able to provide competent, safe care to patients in a variety of settings. Nurse faculty face demands for more and better-prepared graduates. In the current educational environment, there are fewer clinical sites and scarce clinical faculty (MacIntyre, Murray, Teel, & Karshmer, 2009). Nurse educators have embraced high fidelity simulation (HFS) as a substitute for and enhancement of on-site clinical experiences with 87% of programs responding to a national survey indicating they use HFS as a substitute for or enhancement of clinical education (Hicks, Coke & Li, 2009; Gore & Thompson, 2016). Research indicates that HFS increases student self-confidence and self-efficacy but there is little research on the relationship between HFS and clinical judgment and none related to how skills and knowledge gained in simulation translates to clinical practice. In particular, there is a major knowledge gap related to how nurses who experienced HFS as students view this teaching methodology and its influence on their development of clinical judgment.

The aim of this qualitative descriptive study was to explore and accurately relate the described experience of new nurses related to the phenomenon of high fidelity simulation (HFS). The essential guiding questions were:

- How do recent graduates perceive the influence of prior high fidelity simulation experiences on their personal development of clinical judgment?
- What are recent nursing graduates' perceptions of HFS as contributing to their ability to notice patient conditions, interpret those conditions, respond appropriately, and reflect on their practice?
- What specific aspects of simulation do recent graduates perceive as contributing to the development of clinical judgment?

This qualitative descriptive study consisted of interviews and select demographic data collection with nurses who had one to three years' experience in practice and had experience with HFS as undergraduate nursing students.

In this chapter, I describe the research design in detail with underlying theory, and participant recruitment strategies with inclusion and exclusion criteria. I also present the details of the data collection and analysis procedures, identify ethical issues and detail solutions, as well as describe the significance and limitations of this study.

Research Design

This qualitative descriptive study (Sandelowski, 2000; Cooper, 2010) investigated the experiences of recent nurse graduates with the intent to describe these experiences and identify common themes across the experiences of multiple participants. There is a rich history of nursing research that explores the lived experiences of patients as they encounter illness and health care (Roberts, 2013). In nursing education, the voices of students and former students also have valid things to tell us about how we educate nurses. This is an area of nursing research where participants' voices have not previously been encouraged. As I asked nurses about their experiences of HFS, I encouraged them

to share their stories of the impact that simulation experiences had on their development of clinical judgment.

The goal of the study was to explore the perceptions of nurses with one to three years' experience in practice related to both their overall perception of HFS and specific aspects of their HFS experiences. The aim of each individual interview was to elicit recently graduated nurses' perspectives on prior experiences with HFS when they were students and how these experiences informed their development of clinical judgment in practice. I employed a qualitative descriptive approach in analyzing the interview data with the aim of identifying salient themes related to the perception of the development of clinical judgment and the contribution of HFS.

Research Methods

In the following sections, I outline in detail, the specific research methods, including participant recruitment strategies, sample size, human subject protection, and data collection and analysis.

Inclusion and exclusion criteria

Inclusion criteria included registered nurses with at least one but less than three years' clinical experience who had graduated from a BSN program that included HFS, currently were employed in an acute care hospital within approximately 150 miles of Aiken, South Carolina. During the recruitment process I indicated the intent to include a variety of participants in terms of ethnicity, culture, gender, and age. I excluded potential participants who graduated from the University of South Carolina Aiken, because this is the program where I coordinate simulation.

Sample

The purposive sample consisted of recently graduated RNs with one to three years' experience recruited from recent graduates of Baccalaureate of Science in Nursing (BSN) programs who currently resided within about a 150-mile radius of Aiken, SC. The final sample included 14 white women, three African American women, two white males, and one Hispanic woman. Participants represented ten nursing programs across four states.

I made initial contacts through nurse colleagues whom I knew; they, in turn, encouraged new nurses they knew to participate. Recruitment efforts included social media, emails to nurse managers and educators, and emails sent through the South Carolina Deans and directors' organization. Although I excluded graduates of USC-Aiken as participants, I asked recent graduates to invite co-workers who fit the inclusion criteria for this study to participate. Appendix A is an example of a Facebook post directed at recent graduates. I also contacted local unit based hospital nurse educators who knew nurses who met the inclusion criteria, requesting their assistance in identifying potential participants (Appendix B). Finally, I sent an email announcement to faculty contacts at baccalaureate schools of nursing located in the state of South Carolina with an invitation I asked them to share with recent graduates (Appendix C). I obtained these contacts through the South Carolina Deans and Directors organization. I made an effort to incorporate snowball sampling, by asking participants who have completed the research interview to identify colleagues or acquaintances who fit the inclusion criteria. Of note, I recruited all participants through personal contacts with nurse managers and nurse educators across the region. I recruited no participants through social media, email announcements to schools of nursing, or snowball sampling.

I chose the lower limit of 1-year experience because I believed participants needed some experience to acquire sufficient judgment to develop informed opinions about what specific aspects of undergraduate education had a significant impact on clinical judgment development. I chose the limit of three years' experience because in a previous project in which I interviewed new nurses with more than 3 years' experience, I noted they had difficulty recalling student simulations. Nurses with one to two years' experience had better recall of student simulations and felt more sure of which experiences contributed to their development of expertise. I anticipated that potential participants might be reluctant to take part in a face-to-face interview due to time constraints. I offered a $25 gift card to participants to encourage participation.

By its nature, qualitative research is open-ended and follows emerging knowledge as it is created (Adler & Adler, 2012). Bryman (2012) suggested that homogeneity of the sample, tight focus of the study, and detail of the analysis would allow for a smaller sample. Even with explicit efforts to make the sample diverse, participants had much in common including their education and work experiences. I had previously conduced a pilot study in Spring 2016 in which I interviewed seven nurses with one to six years' of experience. These interviews focused on their student experience with HFS and their perceptions of the contribution of HFS to their subsequent development of clinical judgment. Among the participants in this prior study, four meet the criteria for the current research. I reanalyzed the previously collected data concurrently with the analysis of the more recent interview data. I conducted 16 interviews between April and August 2017, for a total of 20 interviews with 20 participants. I transcribed and analyzed new

interviews as they are conducted permitting me to determine when no new theoretical findings were coming from the data.

Data collection

Data collection consisted of semi-structured interviews with individual participants. Each participant interview lasted 45 minutes to one hour. An important goal in the interview was to allow enough time for trust to develop in order to collect the richest data possible (Morse, 2015). After explaining the purpose and goals of the research, I asked questions from the interview guide (appendix E). I used probe questions (e.g., tell me more about that) and format tying (i.e., repeating the last few words of a participant's statement) to encourage participants to offer more detail or description. At the end of the interview, I asked if I could call them for clarification or if I might schedule a second interview if needed, but I conducted no call backs or second interviews. As data analysis proceeded, emerging findings raised other questions. Later interviews differed slightly in focus from initial interviews with some additional questions. Data collection continued until there was saturation of themes and adequate description. I collected demographic information including age, education, nursing experience, type of nursing unit employed on, and prior work experience (Appendix D). I asked the demographic questions and filled this form in after the interview was completed.

Data analysis

I transcribed all interviews for analysis and checked transcripts against original recordings for accuracy. Davidson (2009) noted that transcription is itself theoretical and representational. In light of this, I thoroughly reviewed each transcript against the audio recordings not just for accuracy but also for authenticity of the participant's voice.

Analysis began with immersion in the data. I accomplished this by multiple readings and open coding of transcripts (Saldana, 2016). Another expert qualitative researcher conducted open coding of the first three interviews and we met to discuss, and compare our analysis. Priest, Roberts, & Woods (2002) characterize open coding as the initial phase of analysis involving a taking apart of data in order to analyze parts. Saldana (2016) suggests that once first cycle coding is complete, second cycle coding is undertaken to reorganize data leading to metasynthesis of the data. This metasynthesis, along with data comparisons between and within transcripts ensured trustworthiness in representation of the data. I engaged in self-reflection and bracketing by keeping a journal throughout the research process. I also engaged in memo writing throughout data analysis. I reviewed and revised or rewrote memos as I engaged with the data.

Human subjects' protection

Approval for the use of human subjects was sought through the Internal Review Board (IRB) at the University of South Carolina (USC). My collaborative institutional training initiative (CITI) program certification in human subjects' protection is current. The determination of the IRB was that this study does not require IRB supervision. I explained all risks and benefits to participants and advised them that participation is voluntary. All participants were over 21 years of age at the time of the study. I provided all participants a copy of an invitation to participate, outlining risks and benefits and containing my contact information. The invitation to participate is included as appendix F.

The primary risk to participants consisted of potential loss of confidentiality. To safeguard against this, I removed identifying information from recordings before I

transcribed them, and I assigned participants a pseudonym. All reports use these pseudonyms. After the conclusion of the project, I will destroy all recordings and retain only de-identified transcripts. During the project, I kept all interview audio recordings and all transcripts on a device that I maintained in a locked file cabinet in my office. I received funding from the Pi Lambda chapter of Sigma Theta Tau International, which partially covered the cost of offering a $25 gift card, for participating. Participants also enjoyed the benefit of the satisfaction of adding to the knowledge base of nursing education.

Summary

This study aimed to explore the perceptions of new nurses related to their experiences with HFS and their development of clinical judgment. In this chapter, I detailed the research design and data collection procedures used to explore and communicate the contributions of HFS to the education of BSN nurses as perceived by recent graduates of one to three years' experience. I conducted semi-structured interviews and analyzed data through open coding. From the open codes themes were developed. In Chapter 4 I detail findings in the form of two manuscripts submitted for publication to Clinical Simulation in Nursing and Journal of Professional Nursing.

CHAPTER 4

FINDINGS

In this chapter, I present the research findings, presented as two manuscripts. "New Nurses' Reflections on Student Simulation: Contributions to Clinical Judgment" reports on themes noted in the data related to the perceived influence of HFS on the development of clinical judgment by participating new nurses. I also report on themes related to the translation of knowledge gained from HFS to early practice. This manuscript was submitted for review to Clinical Simulation in Nursing. The second manuscript, "New Nurses' Perceptions of High Fidelity Simulation Use in Baccalaureate Nursing Programs" was submitted to Journal of Professional Nursing. This manuscript summarizes reflections of participants related to specific aspects of HFS including sense of realism and faculty expertise and resources.

New Nurses' Reflections on Student Simulation: Contributions to Clinical Judgment[2]

[2] Lawrence, K. and D. Messias. Submitted to Clinical Simulation in Nursing

Abstract

Background: The increasing incorporation of high fidelity simulation (HFS) in nursing education warrants further exploration of nurses' perceptions of HFS in relation to their subsequent development of clinical judgment.

Methods: Thematic analysis was performed of in-depth audio-taped interview data from 20 RNs with one to three year's work experience.

Results: HFS provided students opportunities to think and act in the nursing role and thus supported their ongoing development of clinical judgment. HFS contributed to enhanced learning in clinical settings.

Conclusion: The intersection of didactic instruction, clinical, and HFS experience is complex. HFS may provide valuable experiences for nursing students.

Introduction

Clinical judgment, an essential component of effective nursing practice, is grounded in knowledge and experience (Tanner, 2006). High fidelity simulation (HFS) is an accepted means for nursing students to practice psychomotor and clinical judgment skills, and gain experience in synthesizing knowledge. Findings from a national nursing education survey of 1060 programs indicated 87% of respondents reported using HFS as a substitute for, or in addition to clinical experiences (Gore & Thompson, 2016). In their meta-analysis of HFS in nursing education, Lee and Oh (2015) analyzed 26 studies, 19 of which addressed cognitive learning. They postulated a positive treatment effect between exposure to HFS and the cognitive domain of learning, including clinical judgment, among pre-licensure students. There is a growing body of evidence describing the contributions of HFS on students' development of clinical judgment (Bussard, 2016; Fawaz & Hamdan-Mansour, 2016; Ironside & Jeffries, 2016; Lavoie, Pepin, & Cossette,

2017; Page-Cutrara & Turk, 2017; Victor, Ruppert, & Ballasy; 2017). However, a significant gap in the literature is the lack of evidence on how students' simulated learning experiences translate to subsequent clinical practice.

Theoretical Framework

Tanner's Clinical Judgment Model (2006) framed this research and guided data collection and analysis. The model includes four inter-related processes: noticing, interpreting, responding, and reflecting. Although Tanner did not specifically address varying levels of expertise among nurses, there is an underlying assumption that although expert nurses are more skilled in clinical judgment, new graduate nurses are expected to make sound clinical judgments regarding patient care. Furthermore, instruction and practice can enhance the student nurse's ability to notice, interpret, respond, and reflect (Cappelletti, Engel, & Prentice, 2014) and specifically, simulated patient care experiences can contribute to students' development of clinical judgment skills (Lee & Oh, 2015).

Method

To begin to address the knowledge gaps regarding the relationships between students' simulated learning and subsequent nursing practice, the aim of this qualitative descriptive study (Sandelowski, 2000) was to examine recently graduated nurses' recall of their HFS experiences, and perceptions regarding the contribution of HFS to their development of clinical judgment skills. There were three specific research questions: 1) What are the perceptions of recent graduates (i.e., within three years) regarding the influence of prior high fidelity simulated educational experiences on their personal development of clinical judgment? 2) How do recent nursing graduates perceive HFS as contributing to their ability to notice patient conditions, interpret those conditions, respond appropriately, and reflect on their practice? 3) What specific aspects of simulation do recent graduates

perceive as contributing to the development of clinical judgment?

The University of South Carolina Institutional Review Board assessed the research protocol, which was approved and exempted from full review. Inclusion criteria for the purposive sample were BSN graduates with between one and three years' RN work experience. Recruitment involved personal email communications with nurse managers and hospital-based nurse educators to identify potential participants. The sample (N=20) consisted of 18 females and 2 males, ranging in age from 23 to 33 years. Participants' self-reported race/ethnicity included White (n=16), African American (n=3), and Hispanic (n=1). These numbers are consistent with nurse demographic statistics for the region (University of Georgia Board of Regents Center for Health Workforce Planning and Analysis, 2010; Office for Healthcare Workforce Analysis and Planning in the South Carolina Area Health Education Consortium [AHEC], 2014) Participants had graduated from ten BSN programs in four states and at the time of the interviews were employed in a variety of settings in the southeast, including medical-surgical floors, oncology units, psychiatric units, and adult, pediatric, and neonatal intensive care units.

The primary researcher conducted the individual, face-to-face interviews, which ranged from 45 to 60 minutes, and subsequently transcribed the digital audio recordings and compared each transcription with the original recording. A team of two analysts conducted the initial, independent open coding of two transcripts, then met to compare and review these initial codes. Following subsequent independent coding, the analysts met and came to a consensual identification of three major themes (Saldana, 2016; Sandelowski, 2000): 1) the influence of HFS on practicing nurses' development of clinical judgment; 2) the contribution of HFS in developing nurses' ability to notice, interpret, respond to, and reflect on patient conditions; 3) the recognition of how specific

aspects of HFS learning supported the development of clinical judgment. In the following section, we present data related to each theme; all participant names are pseudonyms.

Findings

The Influence of HFS on Nurses' Development of Clinical Judgment

These practicing nurses identified ways that HFS experiences in their nursing education influenced their subsequent development of clinical judgment. For example, noting that as students they rarely had practiced clinical decision making in the clinical setting, they highlighted how the opportunity to take on the role of the nurse in HFS had provided opportunities to exercise clinical judgment. The following exemplars illustrate participants' experiences in the simulated learning environment in which they had actually acted as the nurse and learned to see the whole patient, rather than focusing on completing tasks:

> … I wasn't thinking clinically at that point, it [HFS] helped get me in that direction, because I had a scenario in pretend life [simulation] that I would have to act on and have to figure out, whereas in clinical you still had the primary nurse who was doing everything and you were following around. (Amanda)

> I liked simulation, because in clinicals in the hospital, it's not like we ever got to make a clinical decision on our own…Until my preceptorship I never felt like I was being a nurse in my clinicals. (Brittany)

> ..…but those [simulated patients] were nicer because you got to clinically think about things rather than being told to go get vital signs, or chart an assessment, which is

important, but it turns out not to be the most important part. (Jennifer)

Nicole specifically addressed how taking on the role of the nurse in simulation had translated to the clinical setting:

> …there's this thing I've been learning about - nurse's intuition - and you can only get it from experience. So I can't pinpoint for you specific simulation experiences that for sure reflect back, I think as a whole it does…I felt like we had more responsibility during simulation compared to clinical, we had primary responsibility in simulation.

Recalling the "think aloud" process in simulation, several participants noted they found it stressful at the time, but in retrospect acknowledged how it had contributed to their development of clinical judgment.

> … the instructors would definitely make sure that you were learning. And that to me was uncomfortable because you had to think out loud and be transparent in your thinking … It was just like it was an intimidating experience, but I'm grateful for it because it taught me a lot about myself and how I think... it taught me to be more confident in my thinking. (Kayla)

Learning from mistakes was another common theme. Sarah noted how some faculty "definitely set up the scenario [for students] to mess up." Recalling a simulated experience in which she and her lab partner missed important assessment cues about their patient's condition, Amber recalled both the emotional distress and the benefits of having made a mistake:

… we just totally missed it and messed it up and we wound up at the end praying with the patient and they called it and said 'OK, that's enough' [laughter]. And then when I had a patient… in neurogenic shock in my job … I think 'That's what's going on, his Foley is clogged.' …and that was it. So it was terrifying, but having that content in simulation helped me pull it together.

Britany related that HFS afforded her the opportunity to develop a routine around initiating patient care which helped her with organizational skills:

I think it made me realize that I had to have a set routine. … I liked it because I was able to think of it on my own and it wasn't wrong because that's how you did it. Everyone had their own system. And that's kind of real life.

Similarly, Emily highlighted how HFS afforded students an opportunity to prioritize multiple issues from the physical condition of the patient to safety issues:

… we would have a situation where we really wouldn't know, it would be like John Doe came in the hospital complaining of chest pain or shortness of breath. … it would just be a lot of things. And they would be like, 'How are you prioritizing? Are you managing your safety? What are you paying attention to? Who are you going to call first?' … Like that kind of thing.

Finally, participants related ways in which HFS helped them to practice considering information from multiple sources simultaneously, helping them to see the simulated

patient holistically:

> It definitely did [help with synthesis]. I mean you can be book smart but there were [simulated] situations where it was like do or die. It's not just a patho test or it's not just a pharm test it's like, 'I have to think about all of it at the same time.' (Jennifer)

Contributions of HFS Experiences to New Nurses' Ability to Notice, Interpret, Respond to, Synthesize, and Reflect on Patient Conditions

A primary goal of HFS is to present high quality clinical content that offers students the opportunity to practice clinical judgment with reflection both in and on action (Gore & Thompson, 2016). We specifically asked participants to identify HFS experiences that they had subsequently recalled at some point in their practice as new nurses. Respondents' answers reflected both specific and general HFS experiences. As Lauren aptly noted, "Most of the interventions I do now every day, I did at some point in simulation." Despite having studied at programs in two different states, both Elizabeth and Amber recalled a simulated neurogenic shock patient then subsequently caring for a very similar patient in practice. Both credited their HFS experience with having taught them to notice the patient's condition, interpret symptoms correctly, and respond appropriately. Others related HFS situations in which they had recognized a symptom or problem and noted how the experience increased their confidence in speaking up in the clinical setting, both as a student and as a new nurse. An example was Jennifer's simulated situation involving blood transfusion:

> I think one that stands out - you know how we have to double check blood … we noticed that the patient had two armbands, and they had different

> numbers ….And I was like, 'We shouldn't give this blood.' And the other student was like, 'Let's just give it.' And I was like, 'I think this is something we are supposed to catch.' So we didn't give it, and it turned out to be a good thing. It kind of made me stick to my guns and feel more confident about standing my ground and being a patient advocate.

This situation certainly might occur in a hospital setting, but it is less likely that a student would be acting independently, thus, the experience might not have had the same impact.

Recognition of Specific Aspects of HFS as Contributing to Developing Clinical Judgment

Nurses identified the distinct and different roles of students and instructors in simulated learning as having contributed to developing clinical judgement skills. For example, Emily noted the importance of the instructor's ability in simulation "to hit the pause button and say 'okay, now this is what you're dealing with and in real life you may see this.'" Jessica related other specific examples of how the instructor's role in simulation enhanced learning in ways that may not be possible in the clinical setting:

> I think that was very helpful, because in clinical it was so easy to get caught up in, what's going on in the room, and family dynamics.…And the teachers don't exactly get to go into 'Well, that's why their toes look that way' and stuff like that, that would be helpful to know, but you don't want to do that in front of a patient. Whereas in sim lab they can be, 'They're gonna be like that.' And just kinda throw it out there and tell us what you can look for and what you can see in those types of situations. I think that was helpful. It was

just very honest – "this is what you can expect."

Christopher noted how both peer interactions and debriefing in simulation contributed to his ability to synthesize information more effectively:

> I would talk to the other students and say, 'Okay, this is what I'm thinking. What are you thinking?' … So we would do debriefings after the sim…and even if it wasn't me, I would learn something from my peers. And that was sort of a basis for clinical judgment, for sure, as far as recognition of abnormalities in the patient. Then it started coming together for me.

There was a general concurrence that HFS had contributed to enhancing their confidence as they entered clinical settings:

> For me, it makes you less intimidated to go into clinical… it helped me be more confident in introducing myself, about going to the patient and talking to them. Being more confident in what I was saying. Being more confident in what I knew. (Kayla)

Participants recognized that they had not necessarily understood the value of simulated learning at the time they were in school. However, as Megan recognized in looking back, these experiences enhanced her knowledge base, contributed to building her confidence as a clinician, and helped her gain more from clinical experiences:

> At the time I really didn't see the comparison. But now I really am grateful for the time that I had in simulation lab. Looking back, I kind of see my confidence gradually building when I was in clinical, and it was some of the things I learned in the lab. But I recalled a lot of that knowledge and

> experience, especially in my senior year when we were working in critical care and those types of environments. And it was like, 'Oh yeah, that's right, we did go over this.' So it was really helpful, it really was.

Similarly, Nicole noted that simulated debriefing had contributed to her feeling more open to critique in the clinical setting:

> I would say I was much more receptive to criticism from my preceptor during clinical because I had already heard similar things from my classmates. So you had got criticism before and you were able to move on…you were able to apply it and that was helpful during clinical.

Although several nurses reported recognizing the value of HFS in contributing to their developing clinical judgment skills at the time, others noted that they had not made the connection until later, when they reflected back on their student experiences. One clearly identified advantage of simulated learning over on-site clinical experiences was the fact that faculty were able to pause and explain aspects of nursing care, without concern for how patients might interpret these instructions to students. Several reported that having experienced patient care in simulation increased their confidence level, which led them to engage more readily in the clinical setting as students. They also posited that simulated educational experiences may have indirectly enhanced their learning in the clinical setting. All participants reported having internalized learning from simulation in general; two specifically related subsequent clinical encounters that were nearly identical to scenarios they had encountered in the simulation laboratory. These findings provide

evidence that suggests ways in which HFS experiences may contribute to the development of clinical judgment and expertise among nursing students and practicing nurses.

Discussion

Grounded in Tanner's Clinical Judgment Model, we examined BSN nurses' reflections of their educational experiences with HFS and explored how these experiences may have contributed to their development of clinical judgment. The qualitative descriptive analysis of semi-structured interview data resulted in the construction of three major themes: HFS as contributing to development of clinical judgment as newly practicing nurses; HFS as contributing to nurses' ability to notice, interpret, respond to, and reflect on patient conditions; and identification of specific aspects of HFS learning as supporting the development of clinical judgment. Prior research has focused primarily on nursing students' experiences of simulated learning. This study addresses a gap in the literature, recently graduated nurses' perceptions of how their HFS experiences as students may have contributed to their subsequent development of clinical judgment.

These recent BSN graduates reported having felt more responsible for care without supervision in the HFS laboratory than in clinical practice settings, findings that are similar to those reported by Thomas and Mraz (2017). This research provides evidence that HFS provides students opportunities not only to take on the role of the nurse in providing for the simulated patient, but to learn from mistakes in a safe environment. Reflecting on their prior student experiences in simulated learning, these nurses attributed taking on the simulated role of the nurse as enhancing their ability to synthesize

information from coursework and clinical experiences and develop clinical judgment skills. Interestingly, two nurses recalled specific instances in which they cared for a patient with the same disease process as a simulated patient they encountered as a student. Both attributed their prior HFS experience with enhancing their ability to notice and respond to the patient's condition in the practice setting. Others credited HFS experiences to their subsequent ability to organize care. Nash and Harvey (2017) reported senior level undergraduate students found transferring HFS learning to clinical experiences to be complex. Participants in this study were practicing nurses, whose student experiences were one to three years in the past, which may have influenced the ways in which they described transfer of knowledge from HFS to practice as relatively fluid, not only in specific knowledge of patient conditions, but also in their confidence, ability to organize care, and make clinical judgments.

These findings suggest that unique aspects of HFS (i.e., ability of faculty to pause, safe environment to make mistakes, post-simulation debriefing) may contribute to the development of clinical judgment skills in ways that differ from student nurse clinical experiences. One clearly identified benefit of simulation was the instructor's ability to pause the simulated scenario to provide in-time explanations about assessment findings, without the concern for speaking in front of an actual patient, or having to wait until the student nurses are out of the room. Participants described HFS as having been a safe space to make mistakes, noting vivid memories of those mistakes made in HFS, with the benefit of not having resulted in any untoward effects on an actual patient. Similarly, they noted how debriefing associated with simulated patient scenarios was useful in correcting

misconceptions, synthesizing knowledge gained from classes and clinical settings, and enhancing their ability to respond constructively to critique.

In a qualitative exploratory study, Meyer and colleagues (2014) reported that recent graduates conceptualized HFS as performance and faculty as directors whose main function was to support students and provide cues. These nurses recollected a strong faculty role, which may reflect both the increasing use of HFS and enhanced faculty comfort level with HFS. Although clinical settings may afford students experiences with complex situations that are difficult, if not impossible, to re-create in HFS (Brien, Charette, & Goudreau, 2017), Victor, Ruppert, and Ballasy (2017) posited that essential aspects of the patient situation could be replicated enabling students to translate this knowledge into the clinical setting. Findings from this research suggest the opportunities to receive more detailed explanations from faculty in the HFS setting, both through pausing the simulation and in debriefing, were deemed beneficial. These nurses perceived that synthesis took place and indicated satisfaction with the level of complexity of HFS scenarios. Similarly, Brien, Charette, and Goudreau (2017) noted students who were asked to compare HFS and clinical placement attributed promotion of clinical judgment to experience in both settings and postulated the distinct environments might enhance different types of learning. These findings suggest complementary relationships between clinical and HFS experiences and provide evidence that HFS experiences may increase new nurses' confidence and help them develop routines to organize patient care.

Limitations

There are several limitations to this descriptive research, including the limited sample, both in terms of geography and nursing programs. Furthermore, the elapsed time

since the respondents' HFS experiences and the impact of either very positive or very negative experiences may have affected recall. There is clearly a need for further investigation of the interrelationships of HFS experiences, clinical placement experiences, and the development of clinical judgment.

Conclusion

The development of clinical judgment, an essential nursing skill, depends on cumulative knowledge and experience. As nurse educators face continued challenges in providing high quality clinical experiences, HFS provides nursing students opportunities to begin to develop both essential technical skills and clinical judgment. The relationships between didactic instruction, HFS, and clinical experience are complex; further research is needed to explicate approaches which may enhance the ongoing development of clinical judgment among students and practicing nurses.

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New Nurses' Perceptions of High Fidelity Simulation Use in Baccalaureate Nursing Programs[3]

[3] Lawrence, K. and D. Messias. Submitted to Journal of Professional Nursing

Abstract

Background: Nurse educators employ high fidelity simulation (HFS) as a substitute for and enhancement of student clinical experiences. Despite the increasing utilization of HFS, little is known about practicing nurses' perceptions of their educational HFS experiences. The aim of this qualitative research was to explore recent graduates' perceptions of their HFS educational experiences.

Methods: Data were generated through individual interviews with a purposeful sample of 20 RNs with one to three years' professional experience. The researchers individually conducted open-coding of two semi-structured interview data, then collaborated in focused coding, iterative analysis, and identification of themes across the entire data set.

Results: These nurses assessed HFS as an effective but underutilized educational practice. They valued HFS for the sense of realism, recognized the importance of faculty expertise and resources, and identified opportunities for improving debriefing practices.

Conclusion: These new RNs' retrospective assessments provide unique perspectives on current and potential uses of HFS in undergraduate nursing education. They recognized and valued the range of faculty skills and resources required for effective HFS learning. They acknowledged benefits of their HFS learning experiences, but considered HFS had been underutilized. Further research is needed to explicate best practices in HFS nursing education.

Introduction

The increasing adoption of high fidelity simulation (HFS) is a key strategy employed by nurse educators to meet the ongoing challenges of scarce clinical placements, shortages of qualified clinical faculty, and external constraints on students' practice in

clinical settings (MacIntyre, Murray, Teel, & Karshmer, 2009; Robinson & Dearmon, 2013; Schram & Aschenbrenner, 2014). Findings from a recent national survey of nursing programs (N=1060) indicated 87% of the respondents reported using HFS to replace or enhance clinical learning experiences (Gore & Thompson, 2016). According to the National League for Nursing (NLN, 2015), the increasing incorporation of simulation aids educators' efforts to facilitate learning experiences that enhance student skills acquisition and clinical judgment development. However, despite the widespread implementation of HFS, there is very little research on new nurses' perceptions of their prior HFS learning experiences. In the only study of practicing nurses found, Meyer and colleagues (2014) in a qualitative exploratory study reported nurses who had attained licensure within the previous 12 months perceived simulation as advantageous in development of knowledge and self-efficacy. To address this gap, the aim of this study was to explore recently graduated RNs' prior HFS experiences as students.

Background

According to the International Nursing Association for Clinical Simulation and Learning (INACSL), critical aspects of HFS include, "…best practices from adult learning, education, instructional design, clinical standards of care, evaluation, and simulation pedagogy" (INACSL Standards Committee, 2016, p. S5). The effective use of critical elements of simulation, which include pre-briefing, clinical case, de-briefing, evaluation, and a sense of realism, contributes to and enhances student learning. A necessary component of effective simulation is the provision of faculty guidance for students in synthesizing knowledge and practicing psychomotor and critical thinking skills (INACSL Standards Committee, 2016). However, nursing instructors may have minimal preparation in both technical and pedagogical aspects of teaching with HFS and

may lack essential skills in both relevant theories and specific skills (Pittman, Schubert, Rohrig, and Melnyk, 2018). Of note, nursing programs with strong faculty development components tended to have earlier and more effective adoption of HFS (Taplay, Jack, Baxter, Eva, and Martin, 2015). Institutional financial and personnel constraints limit the ability of nursing faculty to stay abreast of advances in simulation education.

There is evidence that HFS learning experiences may enhance student self-efficacy, learning, and development of clinical judgment (Brien, Charette, & Goudreau, 2017; Lee, & Oh, 2015; Nash & Harvey, 2017; Victor, Ruppert, & Ballasy, 2017; Yuan, Williams, Fang, & Ye, 2012; Zapko, Ferranto, & Balsiman, & Shelestak, 2018). Such outcomes are dependent on the quality of HFS that students experience (Alexander et.al., 2015). However, there is little evidence regarding actual practice of HFS from the perspective of recent former students who have experienced this type of learning.

Method

The aim of this qualitative exploratory investigation (Sandelowski, 2000) was to examine recently-graduated RNs' experiences of HFS and their perceptions of how HFS contributed to their learning and subsequent practice. The research proposal was submitted to the University Institutional Review Board (IRB), which deemed this educational study as not subject to IRB oversight. All participants received printed information detailing the purpose of the research and describing the processes involved in participation. To protect participants from potential loss of confidentiality, all electronic data were stored on a password protected computer and all printed data were de-identified and kept in a locked file in the first author's office.

Participants

Inclusion criteria were BSN-prepared RNs with one to three years' professional

experience who were willing to participate in an individual, face-to-face audiotaped interview. The professional experience interval was limited to three years to better capture recall of prior educational experiences. Alumni of the program where the principle investigator teaches were excluded. To recruit participants, the principal investigator sent personal emails with a description of the study and contact information to nurse managers and hospital-based nurse educators within a 150-mile radius. Individuals who met the inclusion criteria and were willing to participate either contacted the principle investigator directly or provided contact information through their nurse managers or hospital based educators.

The purposive sample (N=20) consisted of 18 females and 2 males, ranging in age from 23 to 33 years with a mean of 1.95 years' experience. Participants' self-reported race/ethnicity was White (n=16), African American (n=3), and Hispanic (n=1); ratios that reflect the nursing workforce demographics of the region (University of Georgia Board of Regents Center for Health Workforce Planning and Analysis, 2010; Office for Healthcare Workforce Analysis and Planning in the South Carolina Area Health Education Consortium [AHEC], 2014). Participants had graduated from ten BSN programs in four states. At the time of the interviews they were employed at eight hospitals in four cities in a variety of settings, including medical-surgical floors, oncology units, psychiatric units, and adult, pediatric, and neonatal intensive care units.

Data Collection and Analysis

The primary researcher conducted all individual, face-to-face, semi-structured interviews, which were digitally audio-recorded. The interview guide included open-ended questions, probes (e.g., tell me more about) and format tying (i.e., repeating portions of the participant's response) to encourage more detailed reflection (Marshall &

Rossman, 2011). Each interview began with open-ended questions about prior HFS experiences as a student, with follow-up questions that focused on experiences deemed most helpful and those that had been more problematic. Follow-up questions encouraged reflection on how HFS had contributed to professional development as an RN. The primary investigator transcribed each interview and subsequently compared the transcription with the audio recording to ensure fidelity. After completing the transcription, the primary researcher assigned participant pseudonyms used in reporting the data in order to protect participants' confidentiality.

The two researchers independently conducted the initial open coding of two transcripts using a thematic analysis approach (Saldana, 2016; Sandelowski, 2000). After meeting to review and compare initial codes, the primary researcher independently conducted the subsequent coding. As the data collection and analysis proceeded, the researchers met to discuss and refine the codes and developed three major themes from the data: HFS is effective, but underutilized, and variations exist in implementation; the value of realism in simulation; and student assessment of faculty expertise and resources. In the following sections we present data related to each theme.

Results

HFS is effective, but underutilized, and variations exist in practice.

In reflecting back on their student HFS experiences, most participants indicated they had enjoyed the HFS learning environment and considered it a productive, but often underutilized teaching strategy. As Jessica noted,

> I remember it being helpful, but I also feel like we didn't do it a whole lot…we didn't have a whole lot of them [HFS experiences]. But I guess I can see situations where it would have been helpful to have more

> simulation lab because you only see so much in clinical. So to have more sim labs of "Okay, this is something that you could see."… Maybe being able to experience the situation in the sim lab would have been a lot more helpful… so I guess I see where it would have been nice to have more sim labs.

Across the sample, these nurses recalled having participated in structured simulated learning about twice a semester:

> I remember wanting to have more experience in the lab as a student. I don't know if that was just me wanting to build my comfort level…. I wouldn't say we had a lot of experience in the lab. I had a pretty good amount but we thought there were opportunities for more experiences. I think on average we did about one to three per semester. (Megan)

The reported range of students participating in a specific simulated learning scenario varied from as few as 2 to as many as 12. Christopher noted a benefit of learning in small groups: "…we did mostly group simulations, we never went into a room alone, it was myself and one other person, so I felt like it was nice to have someone to bounce ideas off of." In contrast, they noted larger groups were not as conducive to learning. However, the nurses recalled a variety of ways that faculty had managed larger groups to enhance the simulated learning experience. These included having some group members serve as observers, then having students switch roles for a subsequent scenario. Another strategy was that students reported to the simulation lab in groups of eight, but only two students at a time participated in each clinical case, while the other six students waited. Of note, several participants reported having been assigned roles or tasks that had the effect of

fragmenting the learning process rather than fostering integrated learning. Sara reflected how student roles and faculty teaching styles and engagement also impacted learning experiences:

> … you were assigned roles like, "You will be the primary nurse, you will give meds." It could help with learning to be a team player, but a lot of times, like if you were giving meds, you just focused on your meds, and pleasing the teacher…you didn't have to really use your skills in other ways… and if you weren't the primary nurse, you really didn't have to worry about it. You just did your little task. It was very task oriented…There were some [faculty] who really focused on what was going on in the scenario and us talking about it afterwards and there were some, I don't know what they were thinking. There was one, I guess I just didn't care for her teaching style so much…she was more task oriented than trying to talk through what the scenario was about. It was more about getting things done.

Beyond differences in the number of students in simulation, participants recalled variations in the amount of time they spent on each clinical case, some of which may be accounted for as differences in clinical courses and the goal of the simulation. However, several participants believed longer scenarios would have been more beneficial:

> It was kind of like, "here's a 15-minute chunk of what's happening in your shift." Like, "your patient is hypoglycemic or has CHF exacerbation," or something like that. I think that it would be nicer to come in to do an assessment…stuff you would do as a nurse …take report, look at your orders, …draw blood, something somebody forgot to draw last night, you know,

whatever. Then you have a change or you have a lab that comes back crazy and you have to address it. (Rachel)

Presenting a slightly different perspective, Stephanie noted that in comparison to her current nursing practice, there was little that really went "wrong" in simulation:

I walked out of there [HFS lab] and nothing really goes wrong, and I was shocked at how much goes wrong [in practice] and what can happen and there are lives at stake. We could have gone through more situations than just med-surg.

Participants did report that the level of difficulty of the clinical content in HFS had a strong impact on their learning. An example was Amber, who clearly recalled the complex pathophysiology involved in specific scenarios:

The ones that I can remember doing, did have some pretty in-depth patho. That neurogenic shock one was in med-surg, I think. I was like, 'I don't really even know what neurogenic shock is. I don't know what that means.' I only knew because I did home health care for a guy who had a suprapubic catheter and so I kinda knew that that was something that we worried about with suprapubic catheters but I didn't really remember the pathology so I think that this patient that they set him up to be that and I just wasn't seeing their vision. Just wasn't seeing where they were going with that. (Amber)

These nurses also noted the relationships between their level of knowledge and how they perceived the simulated experiences. Ashley noted, "…as a first semester nursing student I felt like they were pretty complex. We didn't have any experience prior to that

in the real world, so it was a little complex for us just to be learning." Similarly, Elizabeth recalled a scenario later in her student experience that she characterized as not particularly helpful:

> We did one code situation. But, I remember we weren't ACLS [advanced cardiac life support certified], we didn't know which drugs to push, so why should you run a code if you are not ACLS? Why even do that sim?

Christopher noted that aspects of care which he now considered to be routine had been very challenging in simulation:

> We had pediatric resuscitation and just the sheer fact of going in and putting the mask on appropriately because we had not done that in the clinical setting. And at first I put the mask on upside down and one of my classmates caught it. That prepared me for those high intensity moments as far as dealing with a real baby and I felt that helped hone (sic) in my anxiety level in that situation.

The amount of detail in HFS scenarios contributed to students' feeling overwhelmed and frustrated by not having sufficient time to process information:

> I also remember in that situation where we had to do a drug calculation so it was kind of a lot, a lot thrown into that one 30-minute situation. Assessing, prioritizing, calculating, which we had just learned at the time, so it was newer to us. I mean there were books that we were able to use but who has time to look through a book like that when you are stressed like that. (Ashley)

> I want to process on my own. I don't need an hour, but I need to have my time and we never got that, so I think it would be nice just to even know what their diagnosis was going to be. …so when you're in there you can feel like you're recognizing the things…. If you had time to look over it, you would see those very evident things that afterward you are like, 'Oh yeah. It does make sense, if I would have thought about it I would have seen that.' (Brittany)

Emily noted that scenarios in which students were required to recall knowledge from multiple courses and integrate psychomotor with higher order thinking skills were most helpful:

> [The best experience was] one where we walked in and it's kind of like, 'OK, this is your patient.' And it took you step by step. I think those were helpful because you put things together like patho and pharm…. That was helpful because it kind of creatively introduced, 'OK this is like some drugs and it's not a bajillion but this is like your list of like six. Like, 'What would you choose, or these are the ones they've gotten and which should you be concerned about?' And you really kind of widen or narrow that so that you can get more like clinical.

Other aspects of simulation that these nurses identified as being helpful as they entered practice were giving report to other nurses and making phone class to other members of the health care team (often role-played by faculty members).

The value of experiencing a sense of realism in simulation

A sense of realism is required in order to instill a sense of urgency and enhance

student engagement in simulation, in which they are expected to treat the simulation as reality - a process termed *suspension of disbelief* or *the fiction contract* (Damazo & Damaz, 2018, Rudolph, Raemer, & Simon, 2014). Despite acknowledging that HFS had enhanced their learning, these nurses reported how difficult it had been to treat the simulation situation as reality. As Ashley noted, "Simulation was a very awkward experience." Others reported struggling with the lack of realism and having difficulty in understanding their role vis-à-vis the manikin functions:

> I definitely would say that was the biggest struggle with the simulation - realism… It was almost confusing, because everyone would just stand in a circle and be like, 'Okay, do we actually have to, like, needle decompress this person, or are we going to just pretend?' And a lot of time, you wouldn't get much direction from the person behind the glass. When you almost kinda wanted to be like, 'What am I supposed to do?' (Rachel)

Matthew noted his frustration with the artificial nature of the manikins and recalled how he initially found the HFS situations confusing. However, on further reflection he recognized how HFS had enhanced his learning experience and helped prepare him for practice as an emergency room nurse:

> I mean if you knew what they were like …some of the manikins, you could feel pulses in some areas, where in real humans it was different. I mean it would expedite things and things would go better. I mean we knew that they were doing things and how they operated. Sometimes the instructor was vague, but that was part of the learning, even though we got a little frustrated. But there is always something to learn. And I learned to keep poking and

> prodding and keep asking patients who are vague, which has translated to the ED.

Beyond reflecting on the awkwardness and anxiety that accompanied their student experiences of HFS, several participants noted how certain aspects of simulated learning had actually translated to practice better than they anticipated:

> I was pretty anxious because I felt like this pressure to act. I don't know, I just felt like I was being watched and normally I don't mind talking to you, but when someone's watching me and like observing me …because I don't want to do something wrong and I felt pressured. But when I look back, it's funny, because that is exactly what real life is like because in a situation where if you call a MET [Medical Emergency Team] or a code or something, that's exactly what is going on. There's a bunch of people in a room trying to figure out what to do. (Brittany)

> It was always silly to me, it always felt a little silly, but it was good experience, because like before you went in the real world, it helped you like, 'OK that's what I really need to do when I see an actual patient' instead of, 'Oh, I did that wrong to an actual person.' (Ashley).

Although Amber recalled not doing well in simulation as a student, which she attributed to lack of familiarity with the manikin, she was currently responsible for staff education, which included simulation. As a result, she recognized the importance of being comfortable in dealing with the manikins in simulated education:

> I never did well in simulation in college. We use it at [name of] Hospital, because I teach Advanced Cardiac Life Support and Pediatric Advanced Life Support. …it's been a real positive experience, now that I have the background, knowing what the simulator is trying to get across. In nursing school, the simulator would be doing something, like breathing really quickly, and I would think, 'I don't know…maybe that's how the machine breathes, I don't know.' Mostly I remember it being terrifying, and I would walk out, and wouldn't know what's going on, and it's such a big part of your grade…. But I do, I think that it's helpful if you can get more comfortable with the manikins.

Similarly, several other nurses reflected that having had a better understanding of the manikin capabilities could have enhanced their ability to engage more fully in the HFS experience:

> If you just had an orientation day of 'This is what to expect; it [the manikin] can do all these things.' …I'm thinking of just a store mannequin, when you're told, 'We're going to work with this manikin.' So you don't even know what to expect, like, 'Okay, I should be checking the breath sounds like a real patient or I should be doing this like a real situation.' (Jessica)

Assessment of institutional resources and faculty expertise

These nurses were particularly cognizant of the level of resources and institutional support required for simulated education. Emily recalled an observation she had made while visiting college campuses and nursing schools and the multiple components of effective utilization of simulation in nursing education:

> …when I looked at schools, they were all across the board as far as what they even had available for simulation. So some didn't even have [basic equipment], some had these whooped out manikins, but they didn't have the program to run it and do whatever that manikin was capable of, so that constrained what they could do. So, sometimes if simulation isn't effective it may be that the school doesn't have the resources to make that effective.

Participants clearly recognized the importance of faculty expertise, enthusiasm, and resources. Stephanie stated, "I think in Sim some people [instructors] were just very comfortable with being the voice of the patient and others were not as comfortable running Sim." Jennifer noted the variation in faculty expertise and engagement, "We pretty much did simulation with our clinical instructors, so… some of them were better. I guess what I feel is helpful is if they are more enthusiastic." Similarly, Jennifer noted that both individual faculty members' expertise and teaching styles and student learning styles and preferences could impact students' receptivity to and experiences with simulated learning:

> It really depended on the teacher. Like our OB teacher, she was really into it, like really thought it was neat and had seen great results with her students, so she really utilized it. Our psych teacher, she preferred like the [real] world… and our health assessment teacher, she preferred things she could draw lines on. So I think some of that depends on the teaching style and for students some learn better under one style of teaching than another. And I will say that I'm terrible with technology, like I wasn't meant to be born in the 21st century. I don't do well with it, so I'm a little wary of it.

People who are super-proficient in it, they may navigate it better.

Clearly defined learning goals and practicing skills in context were elements that Nicole identified has having helped her learn more effectively. However, she identified the caveat that overly complex simulation scenarios may be less effective and also recognized the challenge of assessing student learning within the context of simulation:

> I think for me, like simulation was most used like for skills, or for check-off… when we used the [high fidelity] manikin. I think creativity and thinking on my feet made it most helpful. But like when I got checked off for health assessment, they would say, 'This patient came in for this.' and you would have to say, 'In light of that, I'm going to choose these two focused assessments. I'm going to do neuro and cardiovascular.' So through that I was able to take an experience and apply that skill. And you know, that was really helpful for me, because that wasn't an isolated thing. That thing had context and so yeah, I think I would like to see more creativity, but I think students can sometimes get lost. And it's hard as a teacher and how are you going to measure what they are learning?

Nurses identified faculty preparation and expertise as contributing to successful simulated learning. Three participants reported having attended a school where a dedicated faculty member was responsible for all simulated learning activities. Kayla, who had worked in the simulation lab as a work-study student, shared her positive experience in this environment:

> I feel like it was an amazing student experience, because when I was in the program, one of the instructors …was the bomb with those manikins and

> getting stuff set up and getting stuff done.…after my first year in the nursing program, I had a work study [position] and I was in simulation with her, helping to set up simulation. …that definitely taught me more of the background of how much work goes into …getting it done. [Students] were like, 'Oh we love simulation it really helped.' …They [the faculty] did a really good job with it and students were really receptive to it.

In contrast, several participants related resource issues with technology that went beyond the technical abilities of faculty. In addition to technological expertise, they recognized the need for faculty to be well versed in the pedagogy of simulation. Lauren noted how some faculty told students what was happening with the simulated patient, rather than allowing them to experience the process of figuring things out:

> Sometimes they just told us what was going on and what to do and I'm like, "Seriously, you just told us the answer!" Like I understand giving hints, but don't just say, "Okay, it's crackles." I mean give us clues, rather than give us like the straight thing, then move onto the next scenario. It was like checking the boxes.

Debriefing practices within simulation varied widely, in terms of format and content. Brittany recalled debriefing as being "…student led, the teacher didn't say too much, just us talking about it." Of note, there were several reports of negative or emotionally disturbing experiences in simulated debriefing:

> [My best experience in HFS] was probably the code, because I'm pretty level headed, so I didn't freak out and the group either before or after us completely freaked out. So the only reason it felt good was because the

instructor was like, "You did a good job." Because usually we would walk back and there was a white board on each side and one was like team A, and one was team B and the teacher was like, "Missed this. Missed this. Didn't check this." So when you walked in and checked your board you were like, "Oh God. We have a lot to talk about." (Elizabeth)

So it wasn't necessarily my experience, but I remember it was such a big deal and people were leaving crying. …this particular group was working with an IV and didn't prime the line and so they air-bolused the patient and…it killed the patient. So it was so traumatizing and people left crying, and of course it just makes everybody scared to even go in there. And I knew I wouldn't make that mistake, that they had done, but it was horrible. People were so jacked up the rest of the time, 'I killed a pediatric patient.' And even some of the other instructors were kind of like, 'I can't believe she just did that." The students were terrified. (Kayla)

Discussion

The aim of this research was to explore new nurses' perceptions of their HFS experiences as students. Three themes emerged from the qualitative descriptive analysis of the interview data: 1) HFS is valuable but underutilized with variations in practice, 2) experiencing a sense of realism in simulation, and 3) institutional resources and faculty expertise. Despite research findings that support the implementation of high quality HFS education as a substitute for, or enhancement of, on-site clinical education experiences, a valid concern among educators is the risk of implementation of HFS without suitable support or adequate faculty preparation (Alexander et.al, 2015). These findings

contribute to filling the knowledge gap regarding practices in simulation that contribute to knowledge gains that carry over into practice. The nurses who voluntarily participated in this research valued their HFS experiences in nursing school and believed that they had contributed to skills and knowledge development. They viewed some aspects of HFS as having key influence on their learning. These aspects included practicing skills in context, practicing communication and teamwork skills, and connecting concepts from pathophysiology and other didactic courses to complex cases. However, these findings suggest HFS education may be underutilized and has the potential to contribute significantly to their nursing education. Nursing faculty should take into consideration the number of students participating in simulated learning as well as preparation activities for HFS, aspects these nurses identified as having had an impact on their learning experiences. Another challenging aspect of HFS was the clinical information and content embedded within the scenarios. Participants recalled this clinical content as often challenging, complex, or confusing. Even among this small sample, nurses related considerable variation in the level of clinical content and length of time they had spent on specific simulated learning scenarios. These findings suggest that more focused student preparation and pre-study, particularly for patient scenarios that involve complex pathophysiological issues, may enhance student HFS experiences.

Similar to the findings of Mariani and colleagues (2013), this research suggests the reflective process of de-briefing enhanced student learning. Kelly, Hager, & Hallagher (2014) noted that undergraduate nursing students rated de-briefing, reflections, and faculty guidance as the top three elements of HFS which enhance clinical judgment while ranking orientation to the simulation lab as one of the lowest three elements, with viewing video playback of the simulation and having information on the patient ranking

lower. These new nurses reported that having a better understanding of manikin functions might have increased their comfort level and enhanced their engagement in HFS learning. This finding suggests that students may suspend disbelief or engage in the fiction contract more effectively if there is better understanding of what actions are a function of how the manikin works and what is meant to be a patient finding. The aspect of HFS known as the fiction contract has been identified as crucial to learner engagement which in turn is essential to learning (Rudolph, Raemer, & Simon, 2014).

Of note, these new nurses' responses indicate their appreciation of the extent of the resources, both human and technological, necessary to provide high quality HFS. Participants clearly recognized and valued faculty expertise in technical aspects of running the equipment as well as skill in teaching with this very specialized modality. Similarly, Nash and Harvey (2017) reported that students valued effective guidance from faculty in de-briefing as an important ingredient in learning. HFS has become increasingly popular as a means to supplement clinical education and many nursing programs have invested substantial monetary resources in simulation equipment. As Kneebone (2003) pointed out, innovations in educational technology must be integrated into the context of the program where they will be used or there is a risk of using technology at the expense of sound educational principles. The perspective of practicing nurses is a crucial one for nurse educators. Prior research has included students as participants and although the student point of view is important and of interest, it is necessarily limited. Practicing nurses who have some experience represent a voice that is not often acknowledged in nursing education, yet may offer valuable insights.

Limitations

Findings from this exploratory study are limited to the perspectives of the

participants, who had attended ten distinct nursing programs in the southeastern United States, and the findings are not generalizable to other geographic areas or contexts. The inclusion of recent graduates with one to three years' nursing experience aimed to capture the important perspective of practicing nurses' as they reflected on their simulated learning experiences. It is possible that elapsed time since their student experiences may have affected recall and or limited recall to only more salient simulated learning experiences.

Conclusions

This research focused on new nurses' reflections of their prior HFS experiences as students. Participants offered valuable insights into advantages and pitfalls of HFS as a pedagogy. The findings are of interest to nurse educators who incorporate simulation into their courses, program directors who allocate resources, and nurse researchers interested in furthering knowledge and understanding of this unique pedagogy. Further investigations are warranted to better understand the contribution of specific aspects of HFS to student learning and professional development and to examine the ways in which nurse educators' knowledge, preparation, and practices of HFS learning contribute to the processes of translating the knowledge and experience students gain through HFS into subsequent nursing practice.

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CHAPTER 5

DISCUSSION

The clinical judgment required for nurses to provide safe and effective care for patients in all settings depends primarily on clinical experience (Tanner, 2006). New nurses must quickly consolidate didactic knowledge, clinical experience, and HFS experiences in order to provide optimal patient care. The goal of nursing education is to prepare new graduate nurses who are able achieve this level of competency through the development of effective clinical judgment skills (Tanner, 2006). Therefore, nurse educators aim to optimize student experiences in order to enhance the development of clinical judgment. HFS offers the benefit of allowing students to practice in an environment devoid of risk to actual patients, affording opportunities for students to practice psychomotor skills, decision-making, communication, and teamwork. Additionally, new nurses who participated in HFS as students may experience less anxiety as they transition to independent practice (Hayden, Smiley, Alexander, Kardong-Edgren, & Jeffries, 2014). Over the past decade, nurse educators have reported intensifying difficulties in finding adequate numbers and quality of clinical practice sites, the traditional settings in which student nurses acquire experience (MacIntyre, Murray, Teel, & Karshmer, 2009; Robinson & Dearmon, 2013).

The increasing use of HFS is one response to the scarcity of clinical placements (Hayden, Smiley, Alexander, Kardong-Edgren, & Jeffries, 2014; Jeffries, 2007).

Potential added benefits of HFS include allowing students to practice in a setting where real patients will not be harmed (Jeffries, 2007, Richardson, Goldsamt, Simmons, Gilmartin, and Jeffries, 2014), and providing students with opportunities to integrate knowledge from the multiple didactic courses and clinical experiences (Lawrence, 2017, Zulkosky, K., White, K., Price, A., & Pretz, J., 2016).

The aim of this research was to explore new nurses' reflections on their prior student experiences with High Fidelity Simulation (HFS) and perceptions of the influence of HFS on their subsequent development of clinical judgment. The research was framed on Tanner's model of clinical judgment, comprised of four interconnected aspects of nursing actions (i.e., noticing, interpreting, intervening, and reflection). Noticing consists of being able to recognize critical aspects of patient conditions and is dependent on nurses' expectations as well as objective findings. Interpreting entails recognition of a pattern and may take place very quickly for expert nurses or may require deliberation on the part of less experienced nurses. When clinical findings do not fit a usual or expected pattern, an experienced nurse may also engage in more deliberate hypothetico-deductive thinking. Responding encompasses the actions of the nurse taken to enhance the patient's well-being. Experienced nurses may respond intuitively without a great deal of conscious thought. Reflection is critical to nurses' development and may take place during patient care as the nurse refines interventions based on new findings, reflection in action, or may take place after care either formally or informally, reflection on action.

This research presents the perspectives of nurses with one to three years' employment experience on the utilization of HFS in nursing education and suggests possible associations between HFS and the development of clinical judgment. The

findings indicated that the new nurses recognized HFS as having significant influence on their development of clinical judgment. A number of major themes emerged from the data. These included the way that new nurses perceived the influence of HFS on their development of clinical judgment with specific influence on their ability to notice, interpret, intervene, and reflect both in action and on action. Specific aspects of HFS may have more or less influence on the development of clinical judgment. Participants recalled HFS as effective but underutilized in their pre-licensure education, noting that faculty expertise and experience with this pedagogy was critical to productive experiences. New nurses valued their recalled HFS experiences, remembering them as realistic.

Although nurses remembered HFS as having been stressful, they recognized simulated learning as contributing to the development of clinical judgment. The expectation of acting in the role of the nurse compelled them to notice simulated patients' condition, consider interpretations for this condition, and attempt nursing interventions. They recalled both reflection in action during the course of the simulation and reflection on action in debriefing.

Practicing nurses credited their prior HFS experiences with contributing to knowledge, self-confidence, self-efficacy, and clinical judgment abilities. They reported that when they entered professional practice they felt more comfortable asking questions to fill gaps in their own knowledge and speaking up to advocate for patients. These new nurses recollected the transfer of learning from the HFS setting to practice as relatively fluid, perhaps because they were reflecting back on student experiences from the perspective of at least one years' experience. They related details of specific aspects of

HFS as contributing to their development of clinical judgment. Other important findings included the recognition of the importance of clinical scenario content within the HFS experience, evidenced by participants' sharing of specific cases that they had found to be realistic and complex. There was a clear recognition that HFS was more productive if the level of complexity was appropriate to the knowledge level of the student, evidenced by recall of overly complex HFS scenarios as not helpful because of lack of knowledge required to address a specific patient situation. Of note, debriefing was identified as being especially helpful in reinforcement of knowledge but participants specifically noted that the ability of faculty to pause the simulation and to speak openly about aspects of patient conditions were also helpful aspects of HFS.

Findings with specific implications for nurse educators are that these practicing nurses considered HFS to be an underutilized resource and that faculty had varying degrees of comfort and skill with this teaching pedagogy. Of interest, participants considered the education and training of HFS personnel to be of equal importance with the equipment and technology involved. They also noted that when students are assigned roles, faculty must assure that all students are cognizant of all aspects of patient care not just their assigned task. Finally, new nurses related their perception that HFS had contributed to their ability to work as effective members of a team because they had taken on specific roles in HFS scenarios.

Implications for practice

These results hold significant implications for the practice of nursing education and more specifically HFS. This research indicated that new nurses perceived the relatively new technology of HFS as an effective educational approach. They also considered

overall program development to be as important as the acquisition of equipment, findings that have implications for nursing curriculum development and program planning.

Study strengths

This research had several notable strengths. Given the prior lack of research on the translation of HFS to practice, this study addresses a significant gap in the nursing education literature. Whereas previous researchers have focused on nursing students' development of self-confidence and self-efficacy in the context of simulated learning experiences, this study explored the perspectives of practicing nurses, and thus provides a unique and valuable perspective to research on nursing education. Although no effort was made to recruit participants who were graduates of diverse programs, these participants were graduates of ten different baccalaureate nursing programs from four different states. This diversity of nursing programs lends strength to the common themes noted across the interviews. The similarities of experiences reported about diverse programs likely reflect current education practices across the region accurately.

Limitations

There were several limitations to this study, including the lack of racial and gender diversity within this small sample. Efforts to recruit male and minority participants included specifically asking professional contacts for referrals. The minority proportion of the sample (i.e., three African American women and two white males) does, however, reflect RN employment demographics of South Carolina and Georgia (Office for Healthcare Workforce Analysis and Planning in the South Carolina Area Health Education Consortium [AHEC], 2014; University of Georgia Board of Regents Center for Health Workforce Planning & Analysis, 2010). All participants currently worked in

the southeast and only one had graduated from a baccalaureate nursing program outside of the region. It is important to note that the time elapsed since graduation, which ranged from one to three years, may have affected participants' recall of educational practices.

Implications for future research

Implications for future research include the need for further studies of student receptivity and engagement with specific aspects of HFS. For the most part, these nurses recalled an ability to suspend disbelief in order to engage in the fiction contract of HFS. However, some described having difficulty in distinguishing which findings were "true" patient findings from those that were functions of the manikins. The suggestion that increased familiarity with the manikin might contribute to enhanced learning in simulation indicates the need for nurse educators to elucidate best practices for the introduction of HFS experiences to students. Further research is needed to establish means of establishing objective measures of learning in HFS. Another area for further research is the relationship between educator education and training and student learning. Other knowledge gaps include examination of the content, approaches, and effectiveness of HFS training and education of nursing simulation educators and support personnel. Finally there is a need to better understand how clinical content of HFS and student preparation for HFS might affect student learning.

Conclusions

This research contributes to knowledge of new nurses' translation of HFS experiences in nursing education to practice and their perceptions of the contributions of HFS experiences to the development of clinical judgment. Participants' positive recollections of their HFS experiences indicate the need for nurse educators to identify and

implementing strategies known to effectively enhance HFS education. Despite the high costs of equipment and personnel, HFS offers nursing students unique educational opportunities. Future research should focus on identifying and enhancing specific aspects of HFS practices in order to maximize the impact of this useful nursing pedagogy.

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APPENDIX A: COMMUNICATION FOR FACEBOOK

Dear colleagues,

I am a PhD student at the University of South Carolina College of Nursing. My research focuses on nurses' experiences with high fidelity simulation in nursing school. By asking nurses to look back on their experiences with simulation, I hope to better understand the impact of simulation in preparing nurses for practice.

If you are a nurse who graduated from a BSN program within the past 3 years and had simulation experiences as part of your education, you are eligible to participate in this research.

Participation in the study involves a 30-40 minute individual interview, scheduled at a time and place of your choice.

Upon conclusion of the interview, participants will receive a $25 gift card.

If you are interested in sharing your experiences as part of this research, please contact:

Kay Lawrence at 803-640-8671 or email at mklawrence23@gmail.com

APPENDIX B: E-MAIL COMMUNICATION TO NURSE EDUCATORS IN THE CENTRAL SAVANNAH RIVER AREA

Dear_____,

I am currently enrolled in the PhD in nursing science program at USC. I am conducting a study to explore the experiences of nurses who had high fidelity simulation (HFS) in BSN nursing programs. I am seeking nurses with 1 to 3 years' of experience who are graduates of a BSN program to participate in an individual interview that would last about thirty minutes to one hour. Graduates of USC Aiken will not be eligible to participate, because I coordinate the simulation laboratory for this program. I will schedule interviews at the participants' convenience. I will also collect demographic information (i.e., age, graduation date, length of nursing experience, what type of unit they are working on and prior work experience). I am seeking a variety of nurses in order to learn about a variety of viewpoints. Interviews as well as any other contact would take place on their own time. A $25 gift card to one of 3 retail stores or restaurants will be given as a token of thanks. Results will be disseminated through peer reviewed journals and professional conferences. If you know of nurses who fit the criteria and might be interested in participating in this study, please give them my contact information. I am more than happy to answer questions that anyone might have. Thank you in advance for your assistance.

Kay Lawrence MSN, RN

803-640-8671 (cell) Mklawrence23 @gmail.com (private email account)

APPENDIX C: E-MAIL COMMUNICATION TO DEANS AND DIRECTORS OF SCHOOLS OF NURSING.

Dear Dr._____,

I am currently enrolled in the PhD in nursing science program at USC. I am conducting a study to explore the experiences of nurses who had high fidelity simulation (HFS) in BSN nursing programs. I am seeking nurses with 1 to 3 years' experience who are graduates of a BSN program to participate in an individual interview that would last about thirty to forty-five minutes. I will schedule interviews at the participants' convenience. I will also collect some demographic information i.e. age, graduation date, length of nursing experience, what type of unit they are working on and prior work experience. I am seeking a variety of nurses in order to learn about a variety of viewpoints. Interviews as well as any other contact would take place on their own time.

A $25 gift card to one of 3 retail stores or restaurants will be given as a token of appreciation for participants' time and contributions. Results will be disseminated through peer reviewed journals and professional conferences.

Please forward this to any alumni who might meet the criteria. I am more than happy to answer questions that anyone might have. Thank you in advance for your assistance.

Kay Lawrence MSN, RN

803-640-8671 (cell)

Mklawrence23 @gmail.com (private email account)

APPENDIX D: DEMOGRAPHIC INFORMATION

New Nurses' Perceptions of High Fidelity Simulation (HFS) and its Contribution to the Development of Clinical Judgment Skills

Participant number_____

Age:_____Ethnicity:_____Gender: _____

Year graduated from BSN: _____

Nursing Program:_____Date of beginning employment as an RN: _____

Type of unit currently working on: _____

Other RN positions held: _____

Other work experience: _____

Date/time of interview: _____

Location on recorder 1:_____Recorder 2: _____

Pseudonym: _____

APPENDIX E: INTERVIEW GUIDE

Introduction: Thank-you for agreeing to talk with me about your experiences with high fidelity simulation as a nursing student. I will ask some questions about your simulation experiences and about how these experiences may have contributed to your clinical expertise and judgment. Please feel free to share other experiences or thoughts related to your simulation experiences and development of clinical judgment. With your permission, I will record interviews and take some notes.

After obtaining consent and turning on recorder:

- Thinking back to nursing school, tell me what you remember about your experiences in the high fidelity simulation lab? (Possible probes include asking about specific courses which typically include simulation like med-surg or asking about how groups were assigned to simulation).
- Tell me a story about what you consider your best student experience with simulation.
- Please describe a simulation experience that you think contributed to the development of your clinical judgment skills. May ask specifically about noticing, interpreting, responding, reflecting.
- Thinking about your nursing practice since graduation, describe a situation you encountered in which you consciously drew on your experience in the simulation lab.

- Thinking more specifically about patient care decisions you have made, give me some examples of how your student simulation experiences may have influenced how you made those decisions.
- Thinking back, identify what you would consider good or helpful learning experiences in the simulation lab.
- Reflecting on your student experiences in both the simulation lab and clinical practice, how did these experiences contribute to your developing clinical judgment skills?
    - Tell me about one of those situations…..
    - More specifically, what was it about that situation that enhanced your learning?
    - Can you tell me of other simulation situations that were particularly helpful?
    - What aspects of these experiences were particularly helpful?
    - Looking back, what changes might have enhanced these learning experiences?

- Did you have any unpleasant or untoward experiences in the simulation lab as a student?
    - If yes, - Can you tell me about that situation and how the experience affected you?
    - Depending on response, probes may be used to explore what made those experiences uncomfortable (ie level of clinical content, preparation,

method of debriefing). Examples include: What might have made that experience more helpful?

- Tell me about any other simulation experiences that you particularly remember or that you have "drawn on" in your current practice.
- Please share anything else about your student simulation experiences that you think would be helpful in understanding what students' experiences are like and how those experiences translate into nursing practice.

APPENDIX F: INVITATION TO PARTICIPATE

New Nurses' Perceptions of High Fidelity Simulation (HFS) and its Contribution to the Development of Clinical Judgment Skills

Purpose and Background: You are being invited to participate in a study by Kay Lawrence, PhDc, RN. I am a doctoral candidate in the College of Nursing at the University of South Carolina. This research is sponsored by the University of South Carolina. The purpose of this study is to explore the perceptions of nurses who have 1 to 3 years' experience related to their experience with high fidelity simulation as nursing students. I hope to gain knowledge of how HFS experiences contribute to the development of clinical judgement and expertise in new nurses. You are being asked to participate in this study because you are a nurse with 1 to 3 years' experience who experienced HFS as a student. This study is being done at several sites and will involve about 15 volunteers. This form explains what you will be asked to do if you decide to participate in this study. Please read it carefully and feel free to ask questions before you make a decision about participating.

Procedures: If you agree to be in this study the following will happen:

1. You will be asked to complete an interview about your experiences with HFS as a nursing student and how those experiences influenced your development as a nurse.

2. I will audio record our interview to be sure that I accurately capture the details that you provide.

3. After reviewing your interview and the interviews of other participants you may be contacted for brief follow up questions, if you agree.

4. You will also be asked to complete some demographic information such as age, type of unit you work on, ethnicity, and prior work experience.

Duration: Participation in the study involves one in person visit lasting about thirty minutes to one hour. The time and place will be set to make it most convenient for you.

Risks/Discomforts:

The main risk of participating in this study is loss of confidentiality. Recordings will not have identifying information. Transcripts of interviews will be de-identified and a pseudonym assigned. All recordings and transcripts will be maintained on a USB storage device which will be kept in a locked file cabinet in my office. Paper copies of demographic data and consent forms will also be maintained in a locked file cabinet

Benefits: Taking part in this study is not likely to benefit you personally. However, this research may help us understand ways to use HFS more effectively to enhance nursing education.

Costs: There will be no costs to participate in this study other than transportation to the interview site and parking.

Payment to Participants: Each participant will receive a $25 gift card to a retail store or restaurant.

If you have questions about this research study you may contact Kay Lawrence at 803-641-3557 or by email at marthal@usca.edu.