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Comparison of Simulation Exposure in Accelerated Undergraduate Nursing Education and its Effect on Clinical Judgement and Critical Thinking Development

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Main Conclusion

The findings from this study may provide researchers, educators, and healthcare partners with an understanding of the relationship between simulation-based learning (SBL) and the development of clinical judgement and critical thinking skills.

Abstract

Background

Simulations can provide the environment for learners to enhance their critical thinking skills through repeated practice, reflection, and retention of experiences, which may impact the care and safety of their patients in the future (Jeffries, 2007). Evidence is lacking on the relationship of critical thinking development with the use of simulation, even though the use of higher order thinking is essential to deliver safe nursing care.

Method

The quasi-experimental, two-group, pre-post design compared, Health Education Systems Inc. (HESI) clinical judgement and critical thinking scores, of accelerated nursing students (who were exposed to simulation for 10% of their traditional clinical time) compared to accelerated nursing students (who were exposed to simulation for 25% of their traditional clinical time) in an undergraduate baccalaureate nursing program.

Results

There were significant differences in the means in the nursing judgement competency scores between students that had 10% and 25% simulation ($p=0.013$) and the critical thinking scores between students that had 10% and 25% simulation ($p=0.022$). Specifically, there were higher mean scores for cohorts of students who experienced 10% simulation.

Conclusion/Implications

This study provides novel findings for the relationship between simulation percentage and the development of clinical judgement and critical thinking skills in undergraduate nursing students.

Keywords: Simulation, accelerated undergraduate nursing students, critical thinking, HESI

Introduction

The use of simulation education for nursing students has become commonplace by many schools in the United States and around the world to prepare our future nurses to care for patients in our complex healthcare arena (Beroz & Hallmark, 2017). Our traditional practice of educating nursing students in both the classroom and the clinical setting, has encountered some barriers recently. These include competition with other schools of nursing for limited clinical placements, limits on clinical group size, and restrictions on what skills our clinical partners will allow nursing students to safely practice in the clinical setting. Additionally, the lack of qualified clinical instructors as compared number of nursing students in undergraduate nursing programs has limited the number of nurses entering the workforce. Therefore, simulation education has become a necessary adjunct and substitution to clinical instruction. Simulation as a teaching strategy enables student nurses to think critically and gives students the opportunity to practice in a safe environment (Knoesel, 2017). This provides experiences that would be impossible to capture in actual practice situations with patients (Benner,

Hughes, & Sutphen, 2008). The use of simulation can be an effective solution to the previously mentioned problems, but the effectiveness of this modality must first be evaluated (Knoesel, 2017). The National League for Nursing research priorities call for the identification and evaluation of the effectiveness of technologies in the teaching of nursing decision-making skills (NLN, 2012).

Nursing research on simulation use has increased exponentially during the last two decades with many studies focused on students' confidence, satisfaction, perceptions, self-efficacy, and competence, with minimal focus on critical thinking, clinical judgement, or clinical reasoning, for which the findings provide equivocal evidence (Bruce et al., 2019; Theobald, 2021). The terms critical thinking, clinical judgement, and clinical reasoning are interrelated and used interchangeably, but can be uniquely defined. Critical thinking is the cognitive processes used for analyzing knowledge based on evidence and science (INACSL, 2016). Critical thinking is a key skill integral for clinical reasoning. Clinical reasoning is a necessary cognitive component of clinical judgement in nursing. Clinical judgement in nursing is the cognitive, psychomotor, and affective processes demonstrated through action and behaviors within the four phases of clinical judgement: noticing, interpreting, responding, and reflecting (Tanner, 2006).

A recent interest, in prelicensure nursing students' clinical judgment development, has emerged in response to the National Council of State Boards of Nursing (NCSBN) project: the Next Generation National Council Licensing Exam (NCLEX). According to the NCSBN, while passing the NCLEX ensures entry level competency as a registered nurse, clinical judgement underlies almost all a nurse's activities. Clinical judgment is a fundamental component of and an elemental construct of nursing. Clinical judgement is at the very core of what nurses do and who they are (Dickison 2022). As part of the Next Generation project, the NCSBN looked at ten years of NCLEX research to develop a model to measure judgement and decision making, which will be deployed in 2022-2023 and may be applicable to other professions.

A lack of valid and reliable tools can affect the measurement of clinical judgement and critical thinking in undergraduate nursing students. In a recent systematic review (Adib-Hajbaghery & Sharifi, 2017), the researchers looked at the relationship of simulation training on the development of nurses' and nursing students' critical thinking. Sixteen studies were reviewed and had equivocal findings. The researchers identified the use of critical thinking instruments

that were not specific to healthcare professions in many of the studies, which may have affected the outcomes. Several studies in the review used the Watson-Glaser Critical Thinking Appraisal instrument (WGCTA), which was developed for business professionals. Other studies used the California Critical Thinking Skills Test (CCTST), which is not specific to nursing.

One measure of clinical judgement and critical thinking development is used by the Health Education Systems Inc. (HESI) exit exams. Under the umbrella term "clinical knowledge variables," student sub-scores in clinical judgement and critical thinking competencies are based on test items written at the application and analysis level to evaluate these abilities in nursing students. These test items measure the student's ability to use clinical judgement and apply knowledge to clinical practice situations (Knoesel, 2017). The HESI exit exam is grounded in classical test and critical thinking theory and is designed to define the constructs indicative of behaviors required for entry-level practice (Morrison, Adamson, Nibert, & Hsia 2004).

HESI examinations were incorporated into the curriculum at the school of nursing prior to the implementation of simulation, and the scores on the HESI examination are used as a measurement of learning outcomes in most courses in the curriculum. Passing the HESI examination indicates that the students have "the minimum competencies needed to perform safely and effectively as a newly licensed, entry-level nurse" (NCSBN, 2014). This study used the clinical judgement and critical thinking sub-scores from the HESI exit exam of students who have graduated from a private university to measure these competencies after exposure to simulation.

Background

Approaches to using simulations may vary in design and fidelity (realism), but most include pre-simulation briefing, simulated clinical scenarios, and post-simulation debriefing. There are many types of simulations, including the use of task trainers (low fidelity), human patient simulators (high fidelity), and standardized patients (actors), or a combination of types. Simulation was introduced and integrated into the curriculum in the undergraduate nursing programs at a private university in the northeast in 2012, which incorporated human patient simulators (HPS), standardized patients (SP's), and hybrid simulations (using a mannequin

and a standardized patient). Currently nursing students are required to participate in simulations for every clinical course in the curriculum, which are linked to the didactic course objectives (Knoesel, 2017). This university uses simulation scenarios from the National League of Nursing (NLN) and Laerdal. Based on the NCLEX test plans, these simulations have been developed and evaluated to demonstrate the relationship between the process and its intended purpose. They are specific, sensitive, reliable, and reproducible (Jeffries, 2007). Additionally, *Standards for Best Practice* from the International Nursing Association for Clinical Simulation and Learning (INACSL), were incorporated in the development and execution of each simulation scenario, starting with the pre-simulation assignment, and ending with a debriefing. Consistent nurse faculty, skilled in simulation practices, facilitated all simulations on both campuses. Additionally, nursing faculty teaching didactic theory courses were consistent during the study's timeframe. A need for further assessment of the relationship between the development of students' clinical judgement and critical thinking skills with simulation implementation became evident with the expansion of simulation use in the nursing program at this university, as well as the increase in simulation throughout the United States (Knoesel, 2017). Therefore, a quasi-experimental study was conducted comparing HESI exit exam clinical judgement and critical thinking sub-scores, with a range from10% to 25% of clinical time substituted with simulation, in an undergraduate nursing program.

Literature Review

A review of simulation outcomes conducted by Lapkin et al. (2010), included over 1,600 studies between 1999 and 2009 in the initial search, but only eight studies met the inclusion criteria for their review, which included evidence of teaching clinical reasoning skills. The researchers found that simulation improved critical thinking, skills performance, and knowledge of subject matter. An increase in clinical reasoning was inconclusive, although the components of clinical reasoning; critical thinking, prioritization, and clinical decision making, did improve with simulation. A recent systematic review (Theobald et al., 2021) sought to evaluate the relationship of simulation effectiveness for acquisition of clinical reasoning and identified ten quasi-experimental studies in their review. Their findings conclude that there is insufficient evidence to draw conclusions about the effectiveness of simulation to acquire clinical reasoning based on the available studies (Theobald et al., 2021). The researchers noted a lack of valid and reliable instruments used, inconsistent terms for

clinical reasoning, and homogeneity of the evidence and study design, which prevented them from completing a meta-analysis. It is interesting that in the eleven years between Theobald's et al. (2021) systematic review and the Lapkin et al., (2010) initial review, evidence is still lacking on the relationship of clinical reasoning with the use of simulation, even though the use of higher order thinking is essential to deliver safe nursing care.

Purpose/Aim

The specific aim of this study was to determine what effect the substitution of simulation for traditional clinical time as a percentage, has on accelerated Bachelor of Science in nursing (ABS) students' clinical judgement and critical thinking skills, as measured by the HESI exit exam sub-scores from undergraduate nursing cohorts.

The research question follows:

"What is the difference between HESI exit exam clinical judgement and critical thinking sub-scores of accelerated nursing students who have 10% of their traditional clinical time substituted with simulation as compared to the HESI exit exam clinical judgement and critical thinking sub-scores of accelerated nursing students who have 25% of their traditional clinical time substituted with simulation"?

Theoretical Framework

Benner's (1984), model *From Novice to Expert*, provides a theoretical framework for identifying nursing knowledge acquisition and level of expertise, and underpins the study. Benner (1984) introduced the concept that expert nurses develop skills and understanding of patient care over time through a sound educational base as well as a multitude of clinical experiences. Benner (1984) describes the five levels of nursing skill development as: novice, advanced beginner, competent, proficient, and expert. Benner (1984) further proposed that the different levels of skill reflect changes in three aspects of skilled performance: that movement from abstract principles to using past experiences guide actions, that a change in the learner's perception allows for the ability to put separate pieces together as a whole, and that the learner is no longer an observer outside the situation but is actively engaged in the situation.

This researcher believes that experiential learning can be achieved using simulation (Knoesel, 2017).

Materials and Methods

Study Design

The quasi-experimental, two-group, pre-post design compared clinical knowledge measured by the HESI exit exam clinical judgement and critical thinking sub-scores of cohorts of ABS nursing graduates from one nursing program. The comparison included scores during one academic year (2016-2017) in which 10% of traditional clinical time was used for simulation, as compared to cohorts of nursing graduates during another academic year (2018-2019) in which 25% of traditional clinical time was used for simulation. The HESI exit exam reports results in the form of a conversion score. This score is based on the average weight of all test items answered correctly and is used as a component of a student's final course grade in many nursing programs including the university in this study. Evidence and theory support the interpretation, and use, of HESI clinical judgement and critical thinking sub-scores in this study to measure student learning outcomes (Knoesel, 2017).

Setting, Sample, and Ethical Considerations

The population for this study was drawn from an intact sample in a private university in the northeast. The university has two campuses, one is in New York City and the other is in Westchester County. The nursing program is accredited by the Commission on Collegiate Nursing Education (CCNE).

The population was based on graduating cohorts of ABS nursing students and consists of HESI exit exam clinical judgement and critical thinking sub-scores, demographic data (age, gender, and ethnicity), and end program GPA. Accelerated baccalaureate nursing degree programs vary in length from one to two years. The sample for this study had students who are full time and complete the program in one year. The cohort's range in size from 32 to 69 students. ABS students or non-traditional students have a previous undergraduate degree and are pursuing a second undergraduate degree in nursing. These students are more mature (age greater than 22 years), include more male students, and bring previous life experience to their education (Knoesel, 2017).

Permission to conduct this study was received from the Institutional Review Board (IRB) of the College of Health Professions at Pace University. All data was coded to ensure privacy and confidentiality of the participants and has been password protected during the time of data analysis and for one year after. There was no potential harm to participants of this study. Permission from Elsevier to use the university's scores from graduated cohorts was obtained.

Students consent to participation and video recording for their ABS nursing program simulation sessions, during their first simulation activity in the Center for Excellence in Healthcare Simulation lab.

Instrumentation

The HESI exams provide an external independent assessment of a student's competency (using Bloom's taxonomy) at the higher cognition level of application, analysis, and synthesis (Morrison, Nibert, & Flick, 2006). Content validity for the HESI exit exam is achieved through use of the National Council Licensing Exam for Registered Nurses (NCLEX-RN) exam blueprint to determine content, types of questions, and reading level. Nine studies that investigated the validity of the HESI exit exam indicate that it is 96.36%-99.16% accurate in predicting NCLEX-RN success (Lauer & Yoho, 2013). HESI exit exams range in the highest categories for estimated reliability coefficients using the Kuder Richardson Formula 20 (KR-20) and range from 0.90 to 0.94. Reliability is determined for each edition and version by conducting item analyses on each exam and statistically calculating reliability (Elsevier, 2016).

Procedure/Data Collection

Using an intact sample of graduate cohorts, student clinical judgement and critical thinking sub-scores from the HESI exit examination were obtained from the Registered Nurse Specialty Examination Reports found on the Elsevier Web site, faculty section (Elsevier, 2016). Students' demographic data, including age, gender, ethnicity, and GPA, were obtained from the university's registrar's office. All students participated in simulation-based learning (SBL) for either 10% of their traditional clinical time or 25% of their traditional clinical time prior to taking the HESI exit exam.

Data Analysis

Bivariate stratified analyses were conducted to ascertain whether there were differences in demographic characteristics for HESI pre- and post-test scores. For categorical demographic variables (i.e., gender, race/ethnicity), either t-tests (for two category demographic variables) or one-way ANOVAs (for three or more category demographic variables) were used. For continuous demographic variables, correlation analysis was used. In addition, to examine whether there were differences in the average HESI pre- and post-test scores within cohorts, regardless of demographic characteristics, paired t-tests were conducted to examine whether there were significant differences in scores pre and post-test. Lastly, stepwise multivariate

regression was conducted, adding variables individually that were significantly associated with either the HESI pre- or post-test score, to ascertain what demographic variables predict differences between the HESI pre- and post-test scores. The latest version of SPSS available (SPSS version 24) was the exclusive software package used for analysis.

Results

Sample Demographics

Table 1 outlines the clinical knowledge and student demographic characteristics of the study sample. Regarding clinical knowledge, the average score related to the nursing judgement competency was 784.7, with a standard deviation of 145.9. Additionally, the average score related to the critical thinking competency was 781.8, with a standard deviation of 151.9. Nearly two-thirds (65.8%) of the sample experienced 25% simulation during their clinical encounters. The mean age of students in the sample was 27.49 years, with a standard deviation of 4.65 years. Additionally, the average grade point average was 3.45, with a standard deviation of 0.244. Most of the sample (84.0%) was female. About half of the sample was white (50.8%); the second most common race/ethnicity was Asian at 19.3%. About 3.9% of the sample did not report a race/ethnicity.

Table 1 - Demographics

Variable	Mean (SD)	N (Percentage)
Clinical Knowledge Variables		
Nursing Judgement, NLN Educational Competency	784.7 (145.9)	-
Critical Thinking, NLN Educational Competency	781.8 (151.9)	-
Simulation Percentage 10% Simulation 25% Simulation	 - -	 68 (34.2) 131 (65.8)
Student Demographic Variables		
Age	27.49 (4.65)	-
Grade Point Average	3.45 (0.244)	-
Gender Female Male	 - -	 152 (84.0) 29 (16.0)

Race/Ethnicity		
White	-	92 (50.8)
Black/African American	-	20 (11.0)
Hispanic	-	20 (11.0)
Asian	-	35 (19.3)
Alaskan Native/Pacific Islander	-	1 (0.6)
Multi-Racial	-	6 (3.3)
Unknown	-	7 (3.9)

Bivariate Statistical Analysis

Table 2 details the statistical differences in nursing competencies and academic performance of nursing students by the percentage of simulation that they experienced during their clinical encounters. There was a statistically significant difference in the means in the nursing judgement competency score between students that had 10% and 25% simulation (p=0.013); specifically, there was a higher score for the group of students who experienced 10% simulation. Additionally, there was a statistically significant difference in the means in the critical thinking score between students that had 10% and 25% simulation (p=0.022); the 10% simulation group also had a higher rating in the critical thinking competency. Lastly, there was no significant difference in the mean GPA between students that had 10% and 25% simulation for their clinical encounters (p=0.434).

Table 2 – Analysis Related to Differences in Nursing Competencies and Academic Performance by Simulation Percentage During Clinical Encounters

Variable	N	Mean	df	t	P-value
Nursing Judgement, NLN Educational Competency					
10% Simulation for Clinical	68	816.8	177	2.512	0.013
25% Simulation for Clinical	131	768.0			
Critical Thinking, NLN Educational Competency					
10% Simulation for Clinical	68	812.7	176	2.304	0.022
25% Simulation for Clinical	131	765.7			
Grade Point Average					
10% Simulation for Clinical	68	3.47	179	0.783	0.434
25% Simulation for Clinical	131	3.44			

Differences by Student Age

Table 3 depicts the statistical differences in nursing competencies and academic performance of nursing students by student age. Older students had a statistically significant higher score in the nursing judgement competency (p=0.039) and critical thinking competency (p=0.029), compared to younger students. There was not a significant difference in grade point average by student age, however (p=0.324).

Table 3 – Analysis Related to Differences in Nursing Competencies and Academic Performance by Student age					
Variable	N	Mean	df	t	P-value
Nursing Judgement, NLN Educational Competency 26 and Younger 27 and Older	 95 86	 771.5 816.0	179	-2.082	0.039
Critical Thinking, NLN Educational Competency 26 and Younger 27 and Older	 95 86	 766.6 815.6	179	-2.205	0.029
Grade Point Average 26 and Younger 27 and Older	 95 86	 3.43 3.47	179	-0.989	0.324

Differences by Student Race/Ethnicity

Table 4 outlines the statistical differences in nursing competencies and academic performance of nursing students by student race/ethnicity. White students had a statistically significantly higher score in their nursing judgement competency (p=0.012) and their critical thinking competency (p=0.010) than their non-white student counterparts. Additionally, white students had a statistically significant higher-grade point average than their non-white counterparts (p=0.030).

Table 4 – Analysis Related to Differences in Nursing Competencies and Academic Performance by Student Race/Ethnicity					
Variable	N	Mean	df	t	P-value
Nursing Judgement, NLN Educational Competency White Non-White	 92 82	 814.6 760.0	172	2.535	0.012
Critical Thinking, NLN Educational Competency White Non-White	 92 82	 813.6 754.9	172	2.614	0.010
Grade Point Average White Non-White	 92 82	 3.49 3.41	158	2.186	0.030

Discussion

The aim of this study was to evaluate the relationship between the development of clinical judgement and critical thinking development after varying degrees of exposure to simulation in an undergraduate nursing program. The findings of the HESI exit examination clinical judgement and critical thinking competency sub-scores for students who participated in simulation for 10% of clinical time were statistically significantly higher (p=0.013) than students who participated in simulation for 25% of clinical time (p=0.022). Using these HESI

exit examination scores as a comparison, the data demonstrate that simulation is not a replacement for traditional clinical experience as student performance drops a statistically significant amount as simulation time increases.

This study is one of the first to try to understand the effect of the amount that simulation-based learning (SBL) has on the development of both clinical judgment and critical thinking in students. There is a lack of literature that focuses on knowledge acquisition after the implementation of simulation in undergraduate nursing programs, even though 96% of nursing education programs use simulation education in five or more courses in their curriculum (Jeffries et al., 2015). The use of SBL has provided some relief from the barriers to effective clinical education mentioned previously as a replacement for clinical hours, but the student learning outcomes of this pedagogy is still unknown. Recent systematic reviews (Adib-Hajbaghery & Sharifi, 2017; Theobald et al., 2021) are equivocal in their findings of SBL and its relationship to develop clinical reasoning skills. The is further complicated by overlapping and varying definitions of clinical reasoning, clinical judgement, and critical thinking when measuring outcomes of SBL, and the varied instruments used to measure these concepts make it difficult to compare similar studies.

Current research on the amount of time that can be substituted with simulation is ongoing and inconclusive (Knoesel, 2017). A landmark study (Hayden et al., 2014), conducted by the National Council of State Boards of Nursing (NCSBN) used a large scale, randomized control design, to evaluate if some traditional clinical experience hours can be replaced with simulation. Findings from this longitudinal study revealed that there was no difference in clinical competency, nursing knowledge, and National Council Licensure Examination (NCLEX) pass rates between the groups that used simulation substitution. Of note is that the NCSBN does not mandate a minimal amount of time for traditional clinical or simulation experiences, but instead requires that each school of nursing determine the right amount for their program and provide a rationale for their decision (Hayden et al., 2014). Perhaps future research from the NCSBN's Next Generation NCLEX (with its' focus on clinical reasoning) will help to clarify the impact of SBL on the development of the skills that are integral to the development of nursing clinical reasoning competency.

Benner’s (1984) model of skill acquisition provided an accurate and useful theoretical framework for this study. This model looks at the advancement of skill performance based on experience, education, knowledge development, and career progression (Benner, 1984). Benner (2008) stated that a multitude of clinical experiences are necessary to develop skills in

the expert nurse and simulation as a teaching strategy enable student nurses to think critically and give students the opportunity to practice in a safe environment, providing experiences that would be impossible to capture in actual practice situations with patients.

A surprising finding in this study, was the wide range of HESI clinical judgement and critical thinking sub-scores. All students were exposed to the same course work and simulation scenarios, but the scores ranged from very low (scores in the 600's) to very high (scores in the 1100's). This variability in scores produced a large standard deviation which may have affected the study's findings and prompted the following questions. Why do some students perform well on standardized exams and others do not? Is a HESI exit examination a good measure for student and program evaluation? Did the cohorts that had 10% simulation have more robust traditional clinical experiences than the 25% simulation cohorts? What percentage of SBL may influence clinical reasoning development? These questions may be answered with future studies focused on simulation outcomes with instruments to measure clinical judgement and critical thinking competency in nursing students.

While this study's sample reflects gender demographics consistent with comparable baccalaureate nursing programs, it also includes a more diverse sample (44%) as compared to national statistics (30%). The reported diversity percentage for the state in which this study was conducted is 34% for baccalaureate enrollment for the years 2015-2019 (AACN, 2020). This interesting finding is in line with the NLN's call to increase diversity in the nursing workforce, by increasing the diversity of nurses to reflect the diversity of the patients they care for (Knoesel, 2017). Additional findings include that white students had statistically significant higher scores in nursing judgement, critical thinking, and GPA than non-white students. Student age also influenced nursing judgement and critical thinking subscores, with older students having increased scores in both competencies. Future studies should include demographic factors that need to be taken into consideration in the design study to investigate this association.

Findings from this study are the first to provide evidence that the use of the HESI exit examination, can be used for objective measurement of student learning. Furthermore, this study's statistically significant findings of increased clinical judgement and critical thinking sub-scores for students who participated in 10% SBL as compared to 25% SBL substituted from traditional clinical experiences. Overall this study highlights the effects on HESI exit exam scores as a function of percentage of SBL substituted for traditional clinical time, and

adds to the body of literature and evidence of the effect of simulation use in undergraduate nursing education.

Limitations

The study used historical data to evaluate HESI exit exam clinical judgement and critical thinking sub-scores from students who have graduated from an accelerated nursing program in a private university in the northeast United States during the academic years 2016-2017, and 2018-2019, which may limit generalizability. Additionally, ABS students' level of clinical experience or previous learning was not considered, and some students' scores may have been affected by test taking anxiety/fatigue or other personal events.

Recommendations for Nursing Education

Current research is equivocal in providing evidence as to the right mix of substitution of simulation for traditional clinical experiences. Soon after the conclusion of this study, the Covid-19 pandemic began, and nursing programs had to pivot to remote teaching and learning. The nursing program in this study instituted the use of virtual simulation during the first year of the pandemic for most clinical courses, as our use of traditional clinical facilities and in person SBL was not available. Numerous studies have begun to evaluate the outcomes of using this technology in the education of nurses. It is unclear how the use of virtual simulation will impact clinical judgement and critical thinking skill development for our future nurses. This researcher plans to continue the investigation of the relationship of clinical judgement and critical thinking skill development and simulation learning (including virtual), with future cohorts of nursing students.

Recommendations for Future Research

Researchers have called for a moratorium on the development of new instruments to measure critical thinking and clinical decision making, instead suggesting longitudinal experimental studies, with large sample sizes and valid and reliable instruments, to evaluate if we are providing the education necessary to impact patient care and safety (Hayden et al., 2014). Further studies with larger sample sizes and multi-site studies, that correlate the use of the HESI exit examination, simulation evaluation, clinical judgement, and critical thinking scores, are needed to examine the impact of simulation implementation and development of these competencies in nursing students (Knoesel, 2017).

Conclusion

Previous studies have focused on student satisfaction, self-confidence, and self-efficacy, but few studies have evaluated the relationship of simulation and the development of clinical judgement and critical thinking competency as measured by the HESI exit examination clinical knowledge sub-scores. This study did provide statistically significant findings to support the relationship in cohorts of students who had 10% simulation as compared to 25% simulation, in clinical judgement and critical thinking sub-scores for all cohorts after simulation exposure. The findings of this study are consistent with previous research, which are equivocal in assessing the measurement of knowledge gained using this teaching strategy. Educating nurses to be knowledgeable, competent, practitioners is challenging. Gaps in the literature remain with the evaluation of simulation, and its relationship to clinical judgement and critical thinking, and the instruments used to measure them.

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