The Use of Pediatric Simulation in Nursing Education

by
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A DNP project submitted to the
School of Nursing
State University of New York
In partial fulfillment of the requirement for the degree of Doctor of Nursing Practice

May 2019
DNP Project Approval Form

This is to certify that ________________

(Name of Student)

successfully defended their DNP research project entitled:

The Use of Pediatric Simulation in Nursing Education

on ____________________________, 2019.

(Date)

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(Typed Name)

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Committee Member 1*

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(Signature)

*If applicable
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Acknowledgements

Thank you to the faculty at Pomeroy College of Nursing at Crouse Hospital. Special thank you to David Falci, Bridget Sunkes, Anne Lesselroth, and Eileen Sharp for their expertise and support that without which this project would not be possible.
Abstract

Background and Significance
The use of simulation is a mainstay in nursing education. Pediatric clinical experiences can be a significant stressor for nursing students. Modalities to improve these experiences are integral for students’ success.

Purpose and Objective
The purpose of this project was to determine if the use of simulation throughout the pediatric clinical rotation improved registered nursing (RN) students’ self-efficacy related to assessment and medication administration?

Theoretical Framework
The framework for this project was social learning theory. It was applied to this project by providing practice through simulation to increase students’ knowledge and skills related to pediatric nursing in order to improve their self-efficacy.

Methods and Design
The design for this project was quasi-experimental. Thirty-five 3rd semester students in an associate degree nursing program participated in two different pediatric simulations throughout their pediatric clinical rotation. Twenty-two students completed a pre & post simulation self-efficacy survey and 29 participated in a focus group. Aggregate averages for each survey question were analyzed via a paired t-test. Focus group data were collected and analyzed for themes.
Results

Student averages pre and post simulation for four of the five survey questions were statistically significant at the .05 level for a 2-tailed test. Most common themes derived from the focus groups were improved preparation, enhanced confidence, and requests for more simulations.

Conclusion

The results indicate that the use of simulation can improve nursing students’ self-efficacy related to pediatric nursing. As a result of this study faculty are planning to increase simulation opportunities in other courses.

*Keywords*: Pediatric Nursing, simulation, student self-efficacy
Nursing students experience significant stress and anxiety entering specialty areas of nursing such as pediatrics. Improving students’ self-efficacy related to tasks commonly completed during clinical rotations such as assessment and medication administration will facilitate an enhanced learning environment. One proven method to improve preparation and allow for practice in healthcare is simulation. The goal of the study was, that by adding pediatric simulation before the start of the clinical rotation and part way through the rotation, students would have improved self-efficacy. The data gathered from this study can be used to improve RN students’ pediatric nursing education.

**Background**

The use of simulation in education has been a mainstay in nursing and other areas of healthcare education (Billings & Halstead, 2016). Simulation allows students to practice skills in a safe environment and permits them to make mistakes that will not impact real patient care (Fabiane, Boell, Girondi, & Santos, 2017). Clinical simulation gives students a mock environment to practice skills, perform assessments, and acquire knowledge (Fabiane et al., 2017). Pediatrics is an area of nursing that students do not get a sizable amount of experience during school and has distinctive challenges along with significant differences compared to adult nursing. Specialty areas of nursing, including maternity and pediatrics, pose challenges for students. Maternal-child clinical experiences have been shown to cause anxiety for nursing students (Hollenbach, 2016). These differences and the limited amount of clinical time available for students, in pediatrics, contributes to why simulation should be utilized.

**Significance**

Nursing is one of the most stressful professions in the world (Rathnayake & Ekanayaka, 2016). Nursing students, also, experience a portion of that stress due to the high stakes
environment that nursing students are assigned. There is tremendous pressure related to
evaluation both in the classroom and clinical setting (Rathnayake & Ekanayaka, 2016). The
healthcare environment can lead to nursing students experiencing significant anxiety
(Rathnayake & Ekanayaka, 2016). Numerous studies have shown that there are high rates of
stress, anxiety and depression among nursing students (Rathnayake & Ekanayaka, 2016). A
small amount of stress is helpful in motivating students but high amounts of stress can inhibit
collection, decision making, and problem solving (Rathnayake & Ekanayaka, 2016).

Pediatric clinical experiences can be a significant stressor for nursing students
(Hollenbach, 2016). Simulation can elicit a moderate amount of anxiety for nursing students but,
after the simulation, there is an overall decrease in anxiety related to entry into the real-life
clinical setting (Hollenbach, 2016). Faculty at the University of Alabama also recognized the
substantial stressor associated with pediatric and obstetric clinical rotations and implemented a
simulation “boot camp” to prepare nursing students for these rotations (Hogewood, Smith,
Etheridge, & Britt, 2015). The boot camp assisted students in understanding the patient
population, different procedures and interventions unique to those clinical environments
(Hogewood et al., 2015).

The problem of students’ anxiety related to entering the pediatric clinical settings has an
impact on all of the nursing students at the college and in that specific clinical group. Nursing is
a team sport and how a few students are feeling can impact the entire group. This can also affect
nurse educators along with the objectives and outcomes for a clinical rotation. The anxiety and
lack of knowledge perceived by students can also affect their performance at the bedside
(Hollenbach, 2016). Confidence is vitally important for students to perform psychomotor skills
and provide competent care (Hollenbach, 2016). This lack of confidence in knowledge and skills along with anxiety could have negative impacts on patients at the bedside.

**Literature Review**

The literature review demonstrates overwhelmingly positive support for the use of pediatric simulation. Pediatric simulation was utilized in numerous ways to obtain different results throughout the literature. A study by Edwards, Boothby, Succheralli and Gropelli (2018) utilized simulation throughout the pediatric and maternal health rotations. The simulation unfolded throughout the rotation and was used to ensure that students had similar clinical experiences. Data was collected about faculty perceptions of the use of simulation. The faculty found that the simulations assisted the students to critically think, prioritize, and work collaboratively (Edwards et al., 2018).

A quasi experimental study by Curl, Smith, Ann Chisholm, McGee and Das (2016) used high fidelity simulation to replace fifty percent of traditional clinical experiences in obstetrics, pediatrics, mental health and critical care for a group of students. Pre-graduation exit exam and medical surgical exam scores were compared with a group of students that received all traditional clinical experiences. The results showed higher scores on both exams for students that received the combination simulation and traditional clinical experiences compared with those than received only traditional clinical experiences (Curl et al., 2016).

A study completed by Gamble (2017) integrated pediatric simulation and assessed the effectiveness of pediatric simulation at multiple timeframes (immediately after the simulation, after the pediatric clinical rotation, and 3 months after graduating from the program). Quantitative data gathered did not show any definitive correlations. The qualitative data from
students was overwhelmingly positive that the simulations assisted in their learning (Gamble, 2017).

Park, Ahn, Kang and Sohn (2016) assessed if simulation can be used as an evaluation method for nursing students. Clinical competency was assessed by the faculty by using the global rating scale checklist. This data was then compared with grade point average, self-efficacy, topic specific knowledge, and clinical competence. The researchers concluded that simulation can be used as an evaluation method for nursing students (Park et al., 2016).

A case report completed by Hogewood et al. (2015) utilized pediatric and obstetric simulation in a “boot camp” model prior to the start of clinical to enhance preparation. The faculty members reflected that the simulations assisted the students to better understand the unique patient populations, procedures, and interventions that would be necessary during the clinical rotation (Hogewood et al., 2015).

A correlational study by (Cazzell & Anderson, 2016) examined the impact of critical thinking on clinical judgement during a pediatric objective structured clinical evaluation (simulation). The results indicated that clinical judgement and critical thinking are distinctly different and should be analyzed independently. The study concluded that educators need to continue using innovative strategies to improve clinical judgement and critical thinking (Cazzell & Anderson, 2016).

A mixed methods study by Valler-Jones (2014) implemented peer-led pediatric simulations and subsequently assessed students’ confidence and competence levels along with students completing a clinical competence assessment. There was a 100% pass rate for the clinical competence assessment following the simulation. The students reflected positively on the learning they gained through the simulations and stated they experienced improved personal
development. The study concluded that peer-led simulations promote new learning and is a valuable education approach (Valler-Jones, 2014).

A study completed by Lubbers and Rossman (2016) utilized a quasi-experimental design to assess students’ self-confidence before and after a pediatric community simulation. The data collected demonstrated improved self-confidence, knowledge, skill, communication, and documentation after the simulation. The students reported significantly higher self-confidence after the simulation than before (Lubbers & Rossman, 2016).

Samawi, Miller and Haras (2014) assessed simulation throughout the pediatric clinical rotation. The researchers gathered both quantitative and qualitative data related to students’ self-confidence and satisfaction with the simulations. The data revealed a correlation between the use of simulation and improved student self-confidence. The qualitative data demonstrated three themes: advanced assessment skills, critical thinking skills application, and greater self-confidence in caring for children (Samawi, Miller, & Haras, 2014).

A study completed by Darcy Mahoney, Hancock, Iorianni-Cimbak and Curley (2013) analyzed the use of pediatric simulation by collecting data via Likert scale questionnaires after the simulation experiences. Qualitative data was collected via open ended questions asked after the simulation experiences. The results were positive in terms of meeting the learning objectives, quality of instruction, quality of instructors and overall experience with the simulation (Darcy Mahoney et al., 2013).

The review of the literature demonstrates that simulation has a beneficial role in pediatric nursing education. The future implications for nursing involve continued use of pediatric simulation. As technology improves and enhances colleges’ ability to implement high fidelity simulation, nursing faculty should advocate for the use of pediatric simulation. Specialty clinical
sites such as pediatrics are distinctive settings that require enhanced student experiences to facilitate improved critical thinking, self-efficacy, and knowledge.

Despite the known benefits of pediatric simulation exemplified through the literature review there are still significant gaps. The biggest gap is that there are not any large-scale studies that involve multiple cohorts of students at different colleges. Also, there is a lack of any randomized studies that compare a control versus experimental group. These larger scale studies with randomization are important to determine if the results and conclusions can be used throughout all colleges and nursing programs for RN students. It is possible that the conclusions of these small-scale studies apply only to certain regions or colleges. There are potential extraneous variables that could be shaping the data that a larger randomized study could assist in differentiating.

The review of the literature demonstrates strong support for the use of pediatric simulation among nursing students. The benefits for the use of pediatric simulation include: improved self-confidence, improved self-efficacy, improved test scores, improved critical thinking and improved abilities to meet clinical objectives/outcomes. Simulation allows students unique clinical opportunities that might not occur in the traditional clinical environment and it allows students to have these experiences in a non-threatening environment where mistakes can be made. More research is needed to solidify the best modality for the implementation of pediatric simulation. Larger scale studies involving multiple colleges and more participants are also needed. The use of pediatric simulation should be continued to enhance the students’ pediatric experience and learning.
Theoretical Framework

The theoretical framework chosen to guide this project is social learning theory. Social learning theory is rooted in students developing self-efficacy (Billings & Halstead, 2016). Social learning theory was proposed by the researcher Bandura and involves students’ learning by modeling behavior and it is through this modeling of behavior that confidence and self-efficacy is built (Billings & Halstead, 2016). Nursing educational strategies such as simulation, role playing, and clinical learning experiences are based on social learning theory by improving students’ self-efficacy in clinical practice.

Social learning theory meets the needs of this project because the intervention that will be implemented for nursing students is simulation and the area of measurement is self-efficacy. Based on social learning theory the goal of this project is to ascertain if adding simulation will assist in students’ abilities to model the behaviors of pediatric assessment and medication administration and if through modeling these behaviors will self-efficacy be improved.

Methods

Project Design

This project is a quasi-experimental feasibility study utilizing a mixed methods approach to address the following question: Does the use of use of simulation throughout the pediatric clinical rotation improve registered nursing (RN) students’ self-efficacy related to assessment and medication administration?

Subjects and Sample Size

The subjects are 3rd semester RN students enrolled in the maternal child course at the chosen project site. The pediatric clinical rotation is during the 3rd semester maternal-child course. The didactic information related to pediatric assessment, medication administration, and
child development is taught within the first semester. All other concepts and exemplars related to pediatrics are taught throughout the second, third, and fourth semester courses. Students experience difficulty bringing the information taught in the first semester forward to apply during the pediatric clinical rotation. Integrating simulation throughout the pediatric clinical rotation assisted in bridging the gap between the pediatric didactic content.

All students received the intervention (simulation). Recruitment for the data collection occurred before class at the beginning of February 2019. Students signed a paper consent form to participate in the data collection. Students enrolled in the maternal child course during the spring 2019 semester were offered enrollment in the data collection portion of the study. Participating in the data collection was completely optional for the students. The sample size for the quantitative self-efficacy survey was 22 students and 29 students participated in the focus groups.

Setting and Tools

The project setting was a hospital-based associate degree RN program. The project site utilizes a concept-based curriculum in which pediatric content is taught throughout the entire program. The simulations were completed in a college of nursing classroom. All of the students participated in the simulations and were able to observe the other students completing the simulations. The simulation was conducted with infant and child mannequins. Each student participated in both the infant and child simulations. The child simulation occurred before entry into the clinical setting and involved the student performing pediatric assessment and administration of an oral medication. A self-efficacy tool created by the principal investigator was used. Students participating in the data collection completed the pre self-efficacy survey before the child simulation. After the third clinical day all students participated in the infant
simulation which involved completing an infant assessment and intramuscular injection.

Students participating in the data collection completed the post self-efficacy survey after the infant simulation. All students debriefed as a group after the simulations were complete. There was also a focus group to ask open-ended questions and ascertain qualitative data. The focus groups occurred at the end of the clinical rotation. Focus group questions were written by the principal investigator. The self-efficacy tool and focus group questions are located in appendix C. Focus groups occurred with each clinical group at the completion of the pediatric clinical rotation.

**Recruitment Methods**

Clinical groups occurring during the spring 2019 semester were offered the opportunity to participate in the study. Participation was completely optional. Students were notified that participation is voluntary and will not affect their course grade in any way. All participants were provided informed consent. Another college faculty member obtained consent to participate in the data collection. This was done to decrease the risk for coercion. There were 35 possible participants. Twenty-two students participated in the self-efficacy survey and 29 students participated in the focus groups.

**Project Intervention Process**

All students enrolled in the maternal child course during spring 2019 semester received the simulations. Simulation is universally known to be a beneficial teaching modality. Withholding the simulation from certain students could alter or deter learning from the students not receiving the simulations. The simulations were conducted before entry into the clinical setting with all students. The simulation involved completing a pediatric assessment and administering oral medications. Half-way through the clinical rotation students participated in a
2nd simulation. The simulation involved completing an infant assessment and administering an intramuscular injection.

The scenario for the child simulation was four-year-old Marco was admitted with high fevers and viral illness. Students were expected to complete a head-to-toe assessment while using appropriate developmental strategies to engage the patient. Students were expected to address Marco’s headache and give PRN Tylenol (calculate and measure the appropriate volume of medication). Marco became upset and/or noncompliant if students did not explain/engage in developmentally appropriate dialogue or offer age appropriate choices.

The scenario for the infant simulation was six-month-old Marco was admitted with fevers and viral illness. Mom is present at the bedside. Marco will be discharged but needs to receive his flu vaccine. Students were expected to complete a head-to-toe assessment while engaging mom in conversation. Students were expected to prepare and administer IM flu vaccine in the appropriate site. Marco’s mom had numerous questions related to how vaccines function, the procedure for administration and vaccine safety.

**Data Collection and Analysis Procedures**

Quantitative data was gathered via the pre/post self-efficacy tool. The self-efficacy tool was created by the principle investigator to assess self-efficacy and preparedness related to pediatric nursing, medication administration to children and infants, and assessment of infants and children. Average aggregate pre and post scores for each question were compared with a paired t-test. Qualitative data was gathered via the focus groups. Focus groups were recorded and analyzed for themes. Themes were identified and defined.
Ethical Considerations

Students are considered a vulnerable population for research. Students gave consent to participate in the data collection. The principle investigator was a lecture and clinical faculty for the course in which the simulations and data collection were taking place. There was a risk for coercion related to student participation. This was mitigated by having another college faculty member explain the study and obtain consent from the students. There was a limited risk for harm to come to the students in the study. A plan was in place to assist any students that feel any emotional distress during the simulation focus group discussion. There were no students that expressed emotional distress during the focus groups.

Results

The pre and post simulation survey questions were analyzed with dependent variable paired $t$ test. The survey questions can be found be appendix C. There were five Likert scale questions to the self-efficacy survey. Twenty-two participants completed all five questions pre and post simulation. The aggregate averages for each question pre and post were compared via dependent variable paired $t$ test utilizing IBM SPSS Statistics version twenty-five. The detailed results are outlined in table 1. The differences in the aggregate averages pre and post simulation for questions 1, 2, 4 and 5 were statistically significant at the .05 level for a 2-tailed test. The difference in the aggregate average pre and post simulation for question 3 was not statistically significant at the .05 level for a 2-tailed test. The results for the t-test can be found in table 1. The descriptive statistics for all 5 questions pre and post can be found in table 2.

[Insert Tables 1 & 2 about here]

Focus groups were conducted three times throughout the semester after the completion of the pediatric clinical rotations for all groups. The focus group questions can be found in
appendix C. There was a total of 29 participants in the focus groups. The focus groups were audio recorded and analyzed later for themes. The complete list of comments can be found in table 3. The themes related to question 1 (How did the simulations make you feel?) were: improved preparation, nervous, good review before clinical, and good practice. The themes related to question 2 (How did the simulations enhance your pediatric clinical rotation?) were: more practice, more confidence, and helpful with communication and assessments. The themes related to question 3 (How did the simulations assist your learning of pediatric nursing?) were: more preparation, helpful feedback, and helpful to see how other students completed skills. The themes related to question 4 (How did the simulations assist you in administering medications and completing assessments during the pediatric clinical rotation?) were: improved preparation, help talking to kids and families, help with pediatric medication math, help realizing the differences in giving kids medications versus adults and helpful to have different tools/ approaches for working with kids. The themes related to question 5 (What was helpful about the simulation?) were: improved confidence, improved practice of skills, and helpful to be able to learn from other students. The themes related to question 6 (What could be improved about the simulations?) were: more simulations, simulations are never the same as real life, more practice to improve skills, different situations to improve skills, and more realistic mannequins.

Some of the significant quotations for the focus groups were: “It made me feel more prepared to take on patients (focus group communication, February 27, 2019).”, “Help build and increase confidence before you go in the room and touch a baby (focus group communication, February 27, 2019).”, “It was a really good review before going into clinical (focus group communication, April 3, 2019).”, “An icebreaker before we went and took care of real kids and interact with parents. (focus group communication, April 3, 2019).”, and “I felt more prepared going into peds
especially because it was a different demographic that I hadn’t dealt with before (focus group communication, April 23, 2019).”

Discussion

The results of the study indicate that the use of simulation does improve nursing student’s self-efficacy related to pediatric assessment and medication administration. The quantitative and qualitative data both support that the use of simulation throughout the pediatric clinical rotation and improved student self-efficacy related to the areas of assessment and medication administration. The quantitative data gathered from the pre and post self-efficacy survey demonstrated statistically significant data for questions 1, 2, 4, and 5. The average pre-simulation scores were significantly less than the post-simulation scores. Those questions were related to student’s preparation for pediatric nursing, pediatric assessment, pediatric medication administration and infant medication administration. The results indicate a significant correlation between using pediatric simulation and improved self-efficacy in those areas of pediatric nursing.

Question 3 which asked about “how prepared do you feel to complete an infant assessment” did not have a statistically significant result. There was a delay in receiving institutional review board approval that resulted in the first group being unable to participate in the self-efficacy survey data collection and only participated in the focus group. The 2 subsequent groups that completed the self-efficacy survey pre/post simulation had already completed a maternal-newborn clinical rotation in which a comprehensive newborn assessment is reviewed and completed during the 3-week clinical rotation. Conceivably, the students that completed the self-efficacy survey already felt prepared and confident related to the skill of infant assessment based on their previous clinical experience. The potential exists that the data
related to question 3 could have been different if all participants had not already completed this skill in the clinical setting.

The focus group provided invaluable qualitative data related to the simulations that the self-efficacy survey could not ascertain. Overall, the themes related to the simulations were that they assisted the students in feeling more prepared for entry to the pediatric clinical setting. The simulations improved student’s confidence. Other simulations at the project site are done in a more structured setting in the simulation lab where the simulations are recorded then watched as a group and debriefed. Students preferred the classroom setting without recording in which they could feel less intimidated while practicing skills. The students’ found benefit in watching other students complete the simulations and learning different techniques/strategies. The students discussed numerous benefits related to communicating with a pediatric patient and the parents and how it was helpful to prepare for this during the simulations. Based on the focus group data the students would like more simulations and more practice. The areas for improvement based on the focus groups are more realistic mannequins, more simulations, and different scenarios for practice.

The theoretical framework used for the development and implementation of this project was social learning theory. Social learning theory is ingrained in the notion that practice makes perfect. Social learning theory is a foundation of nursing education. It is the learning theory that supports the fundamental use of simulation and role playing. The other component of social learning theory is the knowledge of self-efficacy. Social learning theory was utilized in the creation of the self-efficacy tool and in the foundational planning of this study. The tenants of social learning theory and improved self-efficacy through practice and preparation were validated by the results of this study.
**Strengths and Limitations**

Strengths of this study include that both quantitative and qualitative data were gathered. The statistical analysis is valuable information but the rich qualitative information from the focus groups gives a deeper understanding of how the simulations can be used to improve nursing education practices. Another strength of this study is the consistency of the simulations due to the fact that the principle investigator led every simulation.

The limitations of this study were that it was a small sample size. There were twenty-two participants for the self-efficacy survey and twenty-nine participants for the focus groups. The demographics for the college of nursing in which the study was conducted has a relatively homogenous student population. Another limitation is that the study was only conducted at one site which makes it difficult to discern whether the results could be applied to other colleges in different regions with different student demographics.

Another limitation for this study is that the tools (self-efficacy survey and focus group questions) were not validated tools. The tools and questions were written by the principle investigator. There were not validated tools that adequately met the needs of this study. Other studies and tools were reviewed to create the self-efficacy survey and focus group questions used for this study.

A final limitation of this study is the lack randomized subjects and true experimental design. Simulation is a research proven modality in nursing and healthcare education. Withholding simulation from any of the student groups would be unfair and potentially unethical. A control versus experimental group would have been beneficial to compare data but was not an option related to the nature of this study.
Future Implications

There are numerous future implications for the results of this study. Specifically, this study demonstrates the benefits that simulation can have towards self-efficacy, confidence, and preparation towards pediatric nursing. This study can be utilized at the project site and at similar colleges to support the integration of simulation during pediatric clinical rotations. This study supports the use of time and faculty resources to plan and implement simulation to improve nursing education. The future implications for this study would be to repeat this study on a larger scale utilizing more than one RN program at different colleges. Another, future implication would be to replicate this study over multiple semesters/cohorts of students at the same project site. A final, future implication would be to adapt this study for other specialty areas of nursing such as maternal/newborn and mental health clinical rotation and observe if similar results were met.

Conclusion

Project Deliverables

The deliverables for this project are abundant. This study supports an already present body of research that supports the continued use of simulation in nursing education. The findings of this study will be presented to the project site faculty during an end of semester meeting. The goal is that the results of this study can stimulate discussion and further curriculum planning in which more and different uses for simulation can be integrated. Another goal, is to present this study and the results to a larger forum at nursing education conferences. This will enhance the dissemination of the findings and potentially assist in improving nursing education practice for more than the project site. A final goal is to have this study and the results published
in a nursing education journal. This will allow other nurse educators to benefit from these results now and into the future.

Potential research based on the results of this study would be to integrate more simulations into other specialty clinical rotations that can cause student’s stress and anxiety such as mental health or obstetric clinical and evaluate for similar results. It would also be beneficial to repeat this study at other academic centers to observe for similar results and to increase the overall diversity and sample size.

**DNP Essentials**

The doctorate of nursing practice (DNP) essentials were met during the completion of this project. The DNP essential 1 (Scientific Underpinnings for Practice) was met through the project development process and literature review. The DNP essential 1 was also met through the completion of the institutional review board (IRB) applications for the University at Buffalo and the project site. The study was required to reflect the scientific underpinnings for practice to gain IRB approval. The DNP essential 2 (Organizational and Systems Leadership for Quality Improvement and Systems Thinking) was met by collaborating and meeting with other course/college faculty to implement this project. The results of this study will be used at the project site to improve nursing education practice. The DNP essential 3 (Clinical Scholarship and Analytical Methods for Evidence-Based Practice) was met through reviewing the body of literature related to the project topic to complete the background and literature review to support the implementation of this project. The DNP essential 3 was also met through the data collection and analysis process for this study. The DNP essential 4 (Information Systems/Technology and Patient Care Technology for the Improvement and Transformation of Health Care) was met by utilizing applicable technology to complete the study such as mannequins to complete the
simulations and SPSS technology to complete the data analysis. The DNP essential 5 (Health Care Policy for Advocacy in Health Care) was met by assisting in the development of improved nursing education modalities that will in turn assist in the education of better prepared nursing students and future bedside nurses. The DNP essential 6 (Interprofessional Collaboration for Improving Patient and Population Outcomes) was met through continuous collaboration with University at Buffalo faculty and project site faculty. There were numerous colleagues that were integral in the success of this project and without effective communication and collaboration this project would not have been possible. The DNP essential 7 (Clinical Prevention and Population Health for Improving the Nation's Health) was met through improving the education for pediatric nursing which could have implications towards improving the population of pediatrics. The DNP essential 8 (Advanced Nursing Practice) was met by improving nursing education modalities. One of the fundamental roles of an advanced practice nurse is being an educator at the bedside and formally for nursing students.
References


### Tables

**Table 1**

*Self-Efficacy Survey Paired t test Results*

<table>
<thead>
<tr>
<th>Question</th>
<th>Mean</th>
<th>SD</th>
<th>Std error mean</th>
<th>t</th>
<th>df</th>
<th>sig</th>
</tr>
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<tr>
<td>How prepared do you feel related to pediatrics nursing?</td>
<td>1.00</td>
<td>0.7559</td>
<td>0.1612</td>
<td>6.205</td>
<td>21</td>
<td>.000</td>
</tr>
<tr>
<td>How prepared do you feel to complete a pediatric assessment?</td>
<td>1.04</td>
<td>0.7854</td>
<td>0.1675</td>
<td>6.243</td>
<td>21</td>
<td>.000</td>
</tr>
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<td>How prepared do you feel to complete an infant assessment?</td>
<td>0.31</td>
<td>0.9946</td>
<td>0.2120</td>
<td>1.501</td>
<td>21</td>
<td>.148</td>
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<td>How prepared do you feel to administer medications to a pediatric patient?</td>
<td>0.72</td>
<td>0.9351</td>
<td>0.1994</td>
<td>3.648</td>
<td>21</td>
<td>.002</td>
</tr>
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<td>How prepared do you feel to administer medications to an infant?</td>
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<td>0.7327</td>
<td>0.1563</td>
<td>5.238</td>
<td>21</td>
<td>.000</td>
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Table 2

*Self-efficacy survey results*

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<th>Question</th>
<th>N</th>
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<th>Min</th>
<th>Max</th>
<th>Mean</th>
<th>SD</th>
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<tbody>
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<td>Pre-simulation question 1 How prepared do you feel related to pediatrics nursing?</td>
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<td>2</td>
<td>2</td>
<td>4</td>
<td>3.091</td>
<td>0.6102</td>
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<td>3</td>
<td>1</td>
<td>4</td>
<td>3.045</td>
<td>0.7222</td>
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<td>Pre-simulation question 3 How prepared do you feel to complete an infant assessment?</td>
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<td>3</td>
<td>2</td>
<td>5</td>
<td>3.773</td>
<td>0.8691</td>
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<td>Pre-simulation question 4 How prepared do you feel to administer medications to a pediatric patient?</td>
<td>22</td>
<td>2</td>
<td>2</td>
<td>4</td>
<td>3.455</td>
<td>0.5958</td>
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<tr>
<td>Pre-simulation question 5 How prepared do you feel to administer medications to an infant?</td>
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<td>1</td>
<td>3</td>
<td>4</td>
<td>3.409</td>
<td>0.5032</td>
</tr>
<tr>
<td>Post-simulation question 1 How prepared do you feel related to pediatrics nursing?</td>
<td>22</td>
<td>2</td>
<td>3</td>
<td>5</td>
<td>4.091</td>
<td>0.6838</td>
</tr>
<tr>
<td>Post-simulation question 2 How prepared do you feel to complete a pediatric assessment?</td>
<td>22</td>
<td>2</td>
<td>3</td>
<td>5</td>
<td>4.091</td>
<td>0.6102</td>
</tr>
<tr>
<td>Post-simulation question 3 How prepared do you feel to complete an infant assessment?</td>
<td>22</td>
<td>3</td>
<td>2</td>
<td>5</td>
<td>4.091</td>
<td>0.6838</td>
</tr>
<tr>
<td>Post-simulation question 4 How prepared do you feel to administer medications to a pediatric patient?</td>
<td>22</td>
<td>2</td>
<td>3</td>
<td>5</td>
<td>4.182</td>
<td>0.5885</td>
</tr>
<tr>
<td>Post-simulation question 5 How prepared do you feel to administer medications to an infant?</td>
<td>22</td>
<td>2</td>
<td>3</td>
<td>5</td>
<td>4.227</td>
<td>0.6119</td>
</tr>
</tbody>
</table>
Table 3

**Focus Group Themes**

<table>
<thead>
<tr>
<th>Question</th>
<th>Themes</th>
</tr>
</thead>
<tbody>
<tr>
<td>How did the simulations make you feel?</td>
<td>Improved preparation</td>
</tr>
<tr>
<td></td>
<td>Practice responding to parents appropriately</td>
</tr>
<tr>
<td></td>
<td>More prepared</td>
</tr>
<tr>
<td></td>
<td>More prepared to walk in the child’s room</td>
</tr>
<tr>
<td></td>
<td>Anxious</td>
</tr>
<tr>
<td></td>
<td>Able to apply information from adults into pediatrics</td>
</tr>
<tr>
<td></td>
<td>Good review to give medications to children</td>
</tr>
<tr>
<td></td>
<td>Practice with talking to a child is helpful</td>
</tr>
<tr>
<td></td>
<td>More prepared related to a different demographic</td>
</tr>
<tr>
<td></td>
<td>Helpful</td>
</tr>
<tr>
<td></td>
<td>Nervous at first but was reassuring of skills afterwards</td>
</tr>
<tr>
<td></td>
<td>Feeling more prepared by having the simulations throughout the clinical rotation</td>
</tr>
<tr>
<td>How did the simulations enhance your pediatric clinical rotation?</td>
<td>Providing practice</td>
</tr>
<tr>
<td></td>
<td>More practice</td>
</tr>
<tr>
<td></td>
<td>Practicing assessments</td>
</tr>
<tr>
<td></td>
<td>Feeling more confident</td>
</tr>
<tr>
<td></td>
<td>Practice handling parents’ concerns</td>
</tr>
<tr>
<td></td>
<td>Icebreaker before going to clinical</td>
</tr>
<tr>
<td></td>
<td>Practice talking to parents</td>
</tr>
<tr>
<td></td>
<td>Helpful with giving medications in real life</td>
</tr>
<tr>
<td></td>
<td>Helpful communicating with parents</td>
</tr>
<tr>
<td>How did the simulations assist your learning of pediatric nursing?</td>
<td>Getting a “feel” for things</td>
</tr>
<tr>
<td></td>
<td>More preparation</td>
</tr>
<tr>
<td></td>
<td>Good extra component and good hands on experience</td>
</tr>
<tr>
<td></td>
<td>Helpful to have immediate feedback before entering clinical</td>
</tr>
<tr>
<td></td>
<td>Helpful to see how other students complete the simulations</td>
</tr>
<tr>
<td></td>
<td>Reinforce application of knowledge</td>
</tr>
<tr>
<td></td>
<td>Helpful to practice on a mannequin before an actual child</td>
</tr>
<tr>
<td></td>
<td>Get feedback for improvement</td>
</tr>
<tr>
<td></td>
<td>Good to deal with difficult situations in simulation before being at a beside</td>
</tr>
<tr>
<td>How did the simulations assist you in administering medications and</td>
<td>Helped with pediatric math</td>
</tr>
<tr>
<td>completing assessments during the pediatric clinical rotation?</td>
<td>Being prepared and able to practice</td>
</tr>
<tr>
<td></td>
<td>Improve patient/family teaching</td>
</tr>
<tr>
<td></td>
<td>Feedback to improve is helpful</td>
</tr>
</tbody>
</table>
| What was helpful about the simulation? | Practice helping to perfect skills  
| | Improve confidence before entering a real child’s room  
| | Validation that you know how to care for a child  
| | Help with putting it all together  
| | Learning from other students and seeing different ways to do things  
| | Confidence builder  
| | Relieving nerves before clinical  
| | Improved confidence  
| | Helpful to practice talking to a parent in simulation before clinical |
| What could be improved about the simulations? | Simulations aren’t real life  
| | More simulations  
| | More practice  
| | Different situations to improve confidence  
| | More realistic mannequins  
| | Practice for a palpable blood pressure on an infant  
| | More simulations with a more casual format  
| | Great to practice answering parent’s questions  
| | More simulations throughout all courses  
| | More hands-on practice |
Appendix A

UB IRB Approval
February 13, 2019

Dear Kathryn Holliday:

On 2/13/2019, the IRB reviewed the following submission:

<table>
<thead>
<tr>
<th>Type of Review:</th>
<th>Initial Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Title of Study:</td>
<td>The Use of Pediatric Simulation in Nursing Education</td>
</tr>
<tr>
<td>Investigator:</td>
<td>Kathryn Holliday</td>
</tr>
<tr>
<td>IRB ID:</td>
<td>STUDY00003064</td>
</tr>
<tr>
<td>Funding:</td>
<td>None</td>
</tr>
<tr>
<td>Grant ID:</td>
<td>None</td>
</tr>
<tr>
<td>IND, IDE, or HDE:</td>
<td>None</td>
</tr>
</tbody>
</table>
| Documents Reviewed: | • Tools.docx, Category: Surveys/Questionnaires;  
                       • HRP-503-Template Protocol Kathryn Holliday.docx, Category: IRB Protocol;  
                       • HRP-502-Template Consent Document Toolkit 4.0 Kathryn Holliday.pdf, Category: Consent Form;  
                       • information sheet.pdf, Category: Recruitment Materials; |
| Personnel Changes: | |

The IRB approved the study on 2/13/2019. The Modification and Continuing Review study materials for the project referenced above were reviewed and approved by the SUNY University at Buffalo IRB (UBIRB) by Expedited/Non-Committee Review. The IRB has determined that the study is no greater than minimal risk.

The UBIRB is requiring a yearly continuing review update submission to Click IRB to monitor the ongoing status of the study. Before 2/12/2020 or within 30 days of study closure, whichever is earlier, you are to submit a continuing review update with required explanations. It is recommended that you submit your continuing review update at least 30 days prior to 2/12/2020.

You can submit a continuing review update by navigating to the active study in Click IRB and selecting ‘Create Modification / CR’. Then, please choose ‘Modification and Continuing Review’ and ‘other parts of the study’ as the Modification Scope. If you are editing study team members, please choose ‘study team members’ as well.

In conducting this study, you are required to follow the requirements listed in the Investigator Manual (HRP-103), which can be found by navigating to the IRB Library within the IRB system.
Appendix B

IRB Approval from Crouse Health
February 6, 2019

Kathryn Holliday, MS, CPNP
5138 Old Barn Rd
Clay, NY 13041

Subject: Approval
RE: IRB Study#: 2018.1210
Protocol Title: The Use of Pediatric Simulation in Nursing Education

Dear Kathryn,

Thank you for your recent study submission for the above referenced study which included the following documents:

- Initial IRB Application
- Protocol
- Self-Efficacy Survey/Focus Group Questions
- Consent Document

The documents were reviewed and have been approved via expedited review under category 7 of the Federal regulations (45 CFR 46.110 and 21 CFR 56.110). The study, as described has been approved for a period of 12 months, expiring on 02/04/2020.

Attached for your files is a copy of your current consent that was approved by the Institutional Review Board with our official stamp. You must only use the current “Crouse IRB Approved” consent form.

You are required to notify the Board of any of the following reportable events including but not limited to: any unanticipated problems involving risks to subjects or others; unanticipated adverse device effects; any serious adverse events; amendments or changes in protocol; protocol violations/deviations; change of investigator; study termination.

As always, you are responsible for submitting annual updates and a final report at the end of the study. In the event this study is published, we respectfully request a copy as a matter of interest.

If you have any questions about this approval, please feel free to contact me. Thank you.

Sincerely,

Barbara N. Favreau, Pharm. D.
Chair, Crouse Hospital IRB

PLEASE REFERENCE IRB Study# 2018.1210 ON ALL CORRESPONDENCE FOR THIS STUDY
Appendix C

Survey Tools
Self-efficacy survey (1-Not at all prepared, 5-Completely prepared)

How prepared do you feel related to pediatrics nursing?
1   2   3   4   5

How prepared do you feel to complete a pediatric assessment?
1   2   3   4   5

How prepared do you feel to complete an infant assessment?
1   2   3   4   5

How prepared do you feel to administer medications to a pediatric patient?
1   2   3   4   5

How prepared do you feel to administer medications to an infant?
1   2   3   4   5
Focus Group Questions

How did the simulations make you feel?

How did the simulations enhance your pediatric clinical rotation?

How did the simulations assist your learning of pediatric nursing?

How did the simulations assist you in administering medications and completing assessments during the pediatric clinical rotation?

What was helpful about the simulation?

What could be improved about the simulations?
Purpose of Capstone Project

Integrate pediatric simulation throughout the pediatric clinical rotation within an associate degree registered nursing program.

Evaluate nursing students’ self-efficacy before and after participation in the simulations.

Evaluate nursing students’ experiences with the simulations.

Simulations focused on pediatric assessment and medication administration.

Specific Aims

To assess improvement in self-efficacy related to pediatric assessment and medication administration by use of a pre and post simulation self-efficacy survey.

To identify student themes related to the use of pediatric simulation and student experience by use of focus groups with set open-ended questions.

Capstone Question

Does the use of simulation throughout the pediatric clinical rotation improve registered nursing (RN) students’ self-efficacy related to assessment and medication administration?
Why use simulation?

The use of simulation in education has been a mainstay in nursing and other areas of healthcare education (Billings & Halverson, 2016).

Simulation allows students to practice skills in a safe environment and permits them to make mistakes that will not impact real patient care (Fabian, Boei, Girondi, & Santos, 2017).

Clinical simulation gives students a mock environment to practice skills, perform assessments, and acquire knowledge (Fabian et al., 2017).

Pediatric Nursing

Pediatrics is an area of nursing that students do not get a sizable amount of experience during school and has distinctive challenges along with significant differences compared to adult nursing.

Specialty areas of nursing, including maternity and pediatrics, pose challenges for students. Maternal-child clinical experiences have been shown to cause anxiety for nursing students (Hollenschbach, 2016).

These differences and the limited amount of clinical time available for students in pediatrics, contributes to why simulation should be utilized.

Background & Significance

Nursing is one of the most stressful professions in the world (Rathnayake & Elanayake, 2016).

Nursing students also experience a portion of that stress due to the high-stakes environment that nursing students are placed. There is tremendous pressure related to evaluation both in the classroom and clinical setting (Rathnayake & Elanayake, 2016).

Numerous studies have shown that there are high rates of stress, anxiety, and depression among nursing students (Rathnayake & Elanayake, 2016).

A small amount of stress is helpful in motivating students but high amounts of stress can inhibit concentration, decision-making, and problem solving (Rathnayake & Elanayake, 2016).

Background & Significance

The anxiety and lack of knowledge perceived by students can also affect their performance at the bedside (Hollenschbach, 2016).

Confidence is vitally important for students to perform psychomotor skills and provide competent care (Hollenschbach, 2016).

This lack of confidence in knowledge and skills along with anxiety could have negative impacts on patients at the bedside.
Theoretical Framework: Social learning theory

Social learning theory is noted in students developing self-efficacy (Billings & Halstead, 2016).

Proposed by researchers Bandura and involves students' learning by modeling behavior and it is through this modeling of behavior that confidence and self-efficacy is built (Billings & Halstead, 2016).

Nursing educational strategies such as simulation, role playing, and clinical learning experiences are based on social learning theory by improving students' self-efficacy in clinical practice.

Theoretical Framework

Social learning theory met the needs of this project because goal of this project was to add simulation (practice or modeling of behaviors) to enhance students' self-efficacy.

Based on social learning theory the goal of this project is to ascertain if adding simulation will assist in students' ability to model the behaviors of pediatric assessment and medication administration and if through modeling these behaviors will self-efficacy be improved.

Contribution to Clinical Practice

Potential to Improve:
- Pediatric nursing education modalities
- Advanced practice nurses' abilities as an educator
- Students' pediatric nursing experiences
- Students' self-efficacy

Project Design

Feasibility study
Quasi-experimental design
Protection of Human Subjects
Students are considered a vulnerable population for research. There was a risk to coercion due to the principle investigator also being a clinical nurse faculty of the course. Another faculty member briefed the students on the project and obtained consent to decrease the risk for coercion. All students received the intervention. Students gave consent to participate in the data collection. There was a limited risk for harm to come to the students in the study. A plan was in place to assist any students that feel any emotional distress during the simulation focus group discussion.

Subjects and Sample Size
3rd semester RN students enrolled in the maternal-child course at an associate degree nursing program.
All students received the intervention (simulation).
Students at the beginning of the spring 2019 semester were offered enrollment in the data collection portion of the study.
Participating in the data collection was completely optional.
The sample size was 22 students for the self-efficacy survey and 20 students for the focus groups.

Setting and Tools
The project setting was hospital-based associate degree RN program.
The simulations were completed in a college of nursing classroom.
The simulations were conducted with infant and child mannequins.

Project Intervention Process
Simulation is universally known to be a beneficial teaching modality.
Withholding the simulation from certain students could alter or deter learning from the students not receiving the simulations.
The child simulation was conducted before entry into the clinical setting with all students. The simulation involved completing a pediatric assessment and administering an oral medication.
Halfway through the clinical rotation students participated in a 2nd simulation. The simulation involved completing an infant assessment and administering an intramuscular injection.
Project Intervention

Clinical Day 1: clinical orientation, administration of pre-self-efficacy survey, participation in child simulation

Clinical Day 3: post-conference participation in infant simulation, administration of post-self-efficacy survey

Clinical Day 6: participation in focus group

Project Intervention

Simulations were done as a group in a classroom.

Students completed the simulations while the other students observed.

Debriefing about the scenarios was done after all students had completed the simulation.

The principle investigator served as the voice for the child and as the parent for the infant.

Project Intervention

Child simulation

4 year old Marco was admitted with high fevers and viral illness. Students were expected to complete a head-to-toe assessment while using appropriate developmental strategies to engage the patient.

Students were expected to address Marco’s headache and give PRN Tylenol (calculate and measure the appropriate volume of medication). Marco became upset and/or noncompliant if students did not explain engagement in developmentally appropriate dialogue or offer age-appropriate choices.

Infant simulation

6 Month old Marco was admitted with fevers and viral illness. Mom is present at the bedside.

Marco will be discharged but needs to receive his flu vaccine. Students were expected to complete a head-to-toe assessment while engaging mom in conversation.

Students were expected to prepare and administer IM flu vaccine in the appropriate site.

Marco’s mom had numerous questions related to how vaccines function, the procedure for administration and vaccine safety.
**Survey Tool**

Ranking analysis tool:

1. How prepared do you feel to use a pediatric assessment tool?
2. How prepared do you feel to conduct a pediatric assessment?
3. How prepared do you feel to administer medications to an infant?

**Focus Groups**

Focus Group Questions:

1. How did the simulations make you feel?
2. How did the simulations enhance your pediatric clinical rotation?
3. How did the simulations assist your learning of pediatric nursing?
4. How did the simulations assist you in administering medications and completing assessments during the pediatric clinical rotation?
5. What was helpful about the simulations?
6. What could be improved about the simulations?

**Data Analysis**

Quantitative data was gathered via the pre/post self-efficacy tool.

Aggregate average pre and post scores for each question were compared with a paired t-test.

Qualitative data was gathered via the focus groups.

Focus group data was recorded and assessed for themes.

**Results**

Twenty-two participants completed all 6 questions pre and post simulation questions.

The aggregate averages for each question pre and post were compared with a paired t-test and statistically significant differences were found for each question.

The differences in the aggregate averages pre and post simulation for questions 1, 2, 4 and 5 were statistically significant at the .05 level for a 2-tailed test.

The difference in the aggregate average pre and post simulation for question 3 was not statistically significant at the .05 level for a 2-tailed test.
Results

The theme related to question 1 (How did the simulations make you feel?) were improved preparation, nervous, good review before clinical, and good practice.

The theme related to question 2 (How did the simulations enhance your pediatric clinical rotation?) were: more practice, more confidence, and helpful with communication and assessments.

The theme related to question 3 (How did the simulations assist your learning of pediatric nursing?) were: more preparation, helpful feedback, and helpful to see how other residents completed skills.

The theme related to question 4 (How did the simulations assist you in establishing rapport and completing assessments during the pediatric clinical rotation?) were: improved preparation, help talking to kids and families, help with pediatric medication math, help realizing the differences in giving kids medications versus adults and helpful to have different facial approaches for working with kids.

The theme related to question 5 (What was helpful about the simulation?) were: improved confidence, improved practice of skills, and helpful to be able to learn from other students.

The theme related to question 6 (What could be improved about the simulation?) were: more simulations, simulations weren’t the same as real-life, more practice to improve skills, different situations to improve skills, and more realistic mannequins.

Quotations from focus groups

“It made me feel more prepared to take on patients (focus group communication, February 27, 2018).”

“Help build and increase confidence before you go in the room and touch a baby (focus group communication, February 27, 2018).”

“It was a really good review before going into clinical (focus group communication, April 3, 2018).”

“I got more prepared going into pediatrics especially because it was a different demographic that I hadn’t dealt with before (focus group communication, April 25, 2018).”
Strengths
Collection of both quantitative and qualitative data
Consistency of simulations

Limitations
Small sample size
Intervention and data collection is only at one college
Generalizability
Use of non-validated tools
Lack of control group

DNP Essentials
The DNP essential 2 (Organizational and Systems Leadership for Quality Improvement and Systems Thinking) was met by collaborating and meeting with otheruczarski, who is the faculty implementing the project.

The DNP essential 3 (Critical Scholarly P3 and Analysis of Methods of Evidence-Based Practice) was met by reviewing the body of literature related to the project topic to complete the background and literature review to support the implementation of this project.

DNP Essentials
The DNP essential 6 (Interprofessional Collaboration for Improving Patient and Populare Outcomes) was met through continuous collaboration with the faculty at Buffalo and project site faculty.

The DNP essential 8 (Advanced Nursing Practice) was met by improving nursing education modalities. One of the fundamental roles of an advanced practice nurse is being an educator at the bedside and formally for nursing students.
Future Implications
The findings of this study will be presented to the project site faculty during an end of the semester meeting. These results will stimulate discussion and further curricula planning in which new and different areas for simulation can be integrated. Another goal is to present this study and the resultant larger forum at a nursing education conference. This will enhance the dissemination of the findings and potentially undid ideas in improving nursing education practice for more than the project site. A final goal is to have the study and its results published in a nursing education journal. This will allow other nurses educators to benefit from the results now and into the future.

Project Deliverables
Specifically, this study demonstrates that benefits of simulation can have towards self-efficacy, confidence, and preparation towards pediatric nursing.

Conclusion
This study supports an already present body of research that supports the continued use of simulation in nursing education.

This study demonstrates the benefits that simulation can have in enhancing confidence, comfort, and preparation in pediatric nursing.

References
References


