LEVERAGING SIMULATION FOR EXCELLENCE

A Scholarly Project

Submitted to the

Faculty of Liberty UniversityIn

partial fulfillment of

The requirements for the degreeOf

Doctor of Nursing Practice By

Alecia Liburd

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Scholarly Project Chair Approval:

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Kenneth Thompson, Pharm D July 18, 2024

ABSTRACT

This project aims to identify and address the factors hindering the effective utilization of the simulation lab at Grady Memorial Hospital. Despite the simulation lab's potential to enhance clinical skills and decision-making abilities through realistic medical scenarios, it remains underutilized. This evaluation project was a pretest and posttest design to assess the impact of educational interventions. Educational workshops, email communications, and awareness campaigns were the primary methods used to increase the understanding and utilization of the simulation lab.

Data analysis involved descriptive and thematic analyses of lab usage metrics and pre- and posttest responses. The findings indicate that simulation-based learning can improve healthcare professionals' confidence and skills, thereby enhancing patient outcomes. The educational interventions led to an increase in the participants' comfort and confidence levels when using the simulation lab.

Despite the promising results, the study's small sample size and response rate discrepancies between pretests and posttests limit the generalizability of the findings. Future research with larger, more diverse samples is needed to validate these findings and further explore the benefits of simulation-based learning in healthcare. Simulation-based learning provides a risk-free environment for practice and improvement, making it a valuable tool in nursing education and professional development. The project underscores the importance of effectively utilizing simulation labs to improve training outcomes for healthcare professionals and ultimately enhance patient care standards,

Keywords:

Simulation-based learning, quantitative, descriptive analysis, and improved patient outcomes.

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SECTION ONE: INTRODUCTION

Grady Memorial Hospital, located in the heart of Atlanta, Georgia, is a pillar of medical excellence, renowned for its comprehensive trauma care. Recognized as one of the premier trauma centers in the United States (Grady Memorial Hospital, 2023), the hospital extends its reach beyond emergency services to offer substantial community healthcare in collaboration with academic affiliates at Emory University and Morehouse School of Medicine.

In November 2023, Grady Memorial expanded its educational and training capabilities by establishing a state-of-the-art simulation laboratory. This facility is designed to enhance healthcare professionals' clinical skills and decision-making abilities using realistic medical scenarios. The simulation laboratory is a crucial platform for ongoing professional development, improving communication, and elevating patient care standards. Despite its significant contributions to healthcare training, the untapped potential exists within this innovative environment. This capstone project explored how Grady Memorial Hospital can fully leverage the capabilities of the simulation laboratory to maximize its impact on staff performance and patient outcomes.

Background

Bienstock and Heuer (2022) suggested that simulation-based learning is underutilized due to insufficient understanding of available uses, benefits, and types of simulations. Simulation-based learning may improve patient outcomes because simulations are constructed from specific scenarios the learners perform using their knowledge, and they are debriefed following the scenario and may repeat the scenario based on the information from the debrief. Types of simulations include in-person, web-based, game-based, augmented, virtual reality, and mixed reality.

Over the past century, simulation-based learning has developed to enhance quality and safety in healthcare (Bienstock & Heuer, 2022; Ross, 2020). This learning style enriches critical thinking and psychomotor skills (Bienstock & Heuer, 2022; Ross, 2020). Simulation strengthens interprofessional teamwork, communication, and adaptability in clinical situations (Bienstock & Heuer, 2022). Even though these benefits have been acknowledged, simulation-based learning remains underutilized by several health disciplines (Bienstock & Heuer, 2022).

Problem Statement

This student observed that the simulation laboratory has been underutilized at Grady Memorial Hospital. The nursing educators use the laboratory to perform annual skills checkoffs, new graduate onboarding, and team meetings. Several hospital nursing unit incidents should have been reviewed within the simulation lab. For example, an incident in the burn unit led to the demise of a patient. Grady has a root cause analysis process currently in place to evaluate the pediatric patient population based on the severity of illness. The hospital serves 90-98% of adult patient populations, and areas of opportunity include providing robust sim-based learning activities for children who experience complications of trauma.

Purpose of the Project

This project aimed to understand the factors that hinder the effective utilization of the simulation lab at Grady Memorial Hospital compared to institutions where simulation labs are successfully used. After the barriers were identified, strategies were developed within two months to optimize the use of the laboratory and improve training outcomes for healthcare professionals.

Clinical Question

Among healthcare professionals at Grady Memorial Hospital, what factors contribute to the underutilization of the simulation lab compared to institutions where simulation labs are effectively utilized, and how can these barriers be addressed to optimize utilization and improve training outcomes in two months?

SECTION TWO: LITERATURE REVIEW

Search Strategy

The search strategy applied in CINAHL Ultimate involved combining relevant keywords and Boolean operators to identify articles related to the efficacy of simulation lab training in a hospital setting. The keywords used included simulation lab training, simulation education, simulation learning, hospital setting, and terms related to effectiveness, efficacy, success, and outcome. The search yielded 42 results initially, with 21 results remaining after ensuring the articles were published within 5 years.

The keywords used in ProQuest included hospital or health care system in combination with simulation training, simulation education, simulation learning, and debriefing or related terms such as debrief critical incident stress debriefing, and critical patient event. The search yielded over 48,000 results. The search engine was changed to PubMed with the same search terms. Thirty-seven results were obtained. Available articles were reviewed, and two relevant articles were saved.

A search was conducted in ProQuest using the terms simulation-based learning, trial, and meta-analysis. The applied filters included full text, peer-reviewed, published within the last five years, document type evidence-based healthcare, and subject simulation. Twenty-nine articles were obtained from the search.

Another search was conducted in CINAHL Ultimate. The search yielded 12 articles meeting the criteria in CINAHL Ultimate, covering topics such as simulation training in trauma care and critical patient events and the effectiveness of simulation lab training when combined with debriefing techniques. The search also identified seven articles specifically focused on simulation training in trauma care. Furthermore, 17 articles were found when combining simulation lab training with debriefing techniques, spanning 2019 to 2024, with nine remaining after this period.

Overall, the search strategy utilized a combination of relevant keywords and Boolean operators to identify articles related to simulation lab training and education in a hospital setting and their effectiveness and potential inclusion of problem-based learning concepts. CINAHL Ultimate, PubMed, and ProQuest were the primary search engines for research articles. CINAHL Ultimate narrowed the search information best.

Critical Appraisal

Simulation-based training is emerging as essential in modern healthcare education (Bienstock & Heuer, 2022; Fernandez et al., 2019; Holliday et al., 2020; Hwang & Lee, 2021; Jewer et al., 2019; Kim & Yoo, 2020; La Cerra et al., 2019; Musisca et al., 2023; Pezel et al., 2023; Young et al., 2022). The opportunity for healthcare professionals to improve their skills in a risk-free environment is invaluable (Bienstock & Heuer, 2022; Holliday et al., 2020; Hwang & Lee, 2021; La Cerra et al., 2019; Young et al., 2022). Several studies have suggested that simulation-based learning can enhance skills and, ultimately, patient outcomes (Bienstock & Heuer, 2022; Fernandez et al., 2019; Holliday et al., 2020; Hwang & Lee, 2021; Jewer et al., 2019; La Cerra et al., 2019; Musisca et al., 2023; Pezel et al., 2023; Young et al., 2022).

Bienstock and Heuer (2022) reviewed the literature regarding the progression and application of simulation-based training in healthcare. They assessed the impact of clinical proficiency and patient care. Limitations of the article include a lack of methodological details, as the search strategies and criteria were not clearly defined, and a lack of critical analysis, as differing viewpoints were not discussed. The article is relevant as it examines the positive impact of simulation-based training but could benefit from a more critical examination of the literature.

Using a randomized controlled design, Fernandez et al. (2019) provided valuable insight into the impact of simulation-based training on leadership behaviors. It consists of a robust study design with clear objectives, a detailed description of the intervention, and a discussion of comprehensive outcomes. Limitations include a lack of generalizability as the study was conducted in a single institution and potential bias in behavior measurement as the study relies on observations and recall and does not report on long-term follow-ups. The results are relevant as they contribute to the role of simulation-based training in improving clinical leadership, but the study did not note improvement in direct patient care.

Holliday et al. (2020) used qualitative methods to explore a unique approach to improving attitudes, confidence, and self-efficacy in potential nursing students' skills in managing young people with self-harm injuries. The study's strengths include an innovative approach using a simulation scenario with actors from a local theatre group and using established instruments to allow more credibility to the results. Limitations include lack of generalizability, short-term evaluation without a long-term follow-up, and potential bias as the measures are self-reported. The results are relevant and reliable as they suggest that simulated learning may aid in preparing potential nursing students for mental health issues they may encounter.

Karlsen et al. (2024) investigated nursing students' experiences in the learning and development process within a simulation laboratory. This study discussed educational needs in healthcare, provided qualitative insights into the experiences and perceptions of students, and focused on development, outcomes, and confidence. The study lacked demographic detail and may be biased as all information is qualitative and ungeneralizable. The study is reliable as it contains reviews of the potential benefits of simulation education and reviews students' experiences and confidence in their skills.

Musisca et al. (2023) studied mass casualty incident training for emergency medicine residents, using relevant training methods and high-fidelity manikins and actors to simulate real-world conditions. The approach is valuable because participants tested their decision-making skills under pressure. The study used only qualitative data and lacked quantitative metrics, restricting its generalizability. The study is reliable and relevant to the topic.

Pezel et al. (2023) endorsed simulation-based training for cardiology fellows. The study's strengths include a randomized control trial design, extensive sampling, and objective performance metrics. The results are ungeneralizable; the study has a narrow focus, does not address the translation of skill into better clinical practice, and does not include a cost-benefit analysis. The study is relevant as the simulation group performed better than the traditional group and showed higher confidence in their skills.

Hwang and Lee's (2021) quasi-experimental study evaluated the impact of simulation training on nursing students. A pretest and posttest design was used to assess the effectiveness of the teaching and the participants' knowledge and confidence. The study lacked a control group and did not evaluate long-term skill retention or critical thinking. The study is relevant as the

short-term assessment suggested the potential for improved confidence and knowledge regarding disaster preparedness.

Zhang et al. (2022) examined the effectiveness of a 3-phase peer feedback system compared to traditional faculty feedback (FF) in nursing education, focusing on enhancing students' reflective abilities, clinical competencies, feedback practices, and sense of empowerment. The innovative approach to peer feedback represents a significant shift from conventional teaching methods, potentially offering a more interactive and engaging learning environment that promotes deeper reflection and skill acquisition among nursing students. The study's limitations include a lack of randomization, generalizability, and long-term follow-up. This broad evaluation of multiple educational outcomes yielded a comprehensive understanding of how different feedback mechanisms affect various aspects of student development, backed by a methodologically sound quasi-experimental design that strengthens the study's ability to attribute observed changes to the intervention, making this article relevant and reliable.

Young et al. (2022) provided essential insights into the potential benefits of high-fidelity immersive simulation training for mental health clinical staff. They addressed the significant challenge of managing aggression and violence during patient care, employing a methodologically rigorous quasi-experimental design that tracks changes over time to evaluate the training's effectiveness. By combining quantitative and qualitative measures, including a validated self-efficacy tool, the design increases the validity and reliability of the findings, demonstrating improvements in critical non-technical skills such as teamwork and leadership within mental health settings. The study's limitations include the absence of a control group, reliance on self-reported measures, and a high attrition rate at follow-up assessments.

Kim and Yoo (2020) reviewed the literature concerning debriefing in healthcare simulations and thoroughly explored the methodologies and outcomes associated with debriefing practices across different healthcare training environments. This review is crucial for identifying effective practices and highlighting areas for enhancement to meet the increasingly complex healthcare demands and the growing reliance on simulation for training. By examining 22 studies, the authors offer a comprehensive synthesis of debriefing characteristics such as timing, facilitator involvement, and the methodological approaches employed, which vary significantly and are influenced by numerous factors, including the learners' experience level and available resources. The review's limitations include biases in study selection and relies on the quality of the original studies.

Prakash et al. (2020) compared the effectiveness of video-assisted and recall-assisted reflection in training junior critical care doctors in airway management skills. This randomized controlled trial offered evidence that video-assisted methods enhance the attainment and retention of crucial airway skills, supported by objective evaluations using validated scoring tools and independent blinded assessments. This design minimized bias and provided a reliable basis for comparing the two instructional methods, reflecting the study's solid methodological framework. The study's limitations include a small sample size, a short follow-up period, and poor generalizability.

Jewer et al. (2019) evaluated the efficacy of mobile telesimulation units (MTUs) for training in high-acuity, low-occurrence procedures in rural and remote areas, proposing an innovative solution to overcome barriers to medical training accessibility. The findings were highly reliable because of the randomized controlled trial design with blinded assessors. The results are a solid empirical basis for assessing the effectiveness of MTUs. The metrics used to

measure theoretical knowledge and practical skills are appropriate, employing standardized tools. Study limitations include using medical students instead of rural practitioners, short-term assessments, and a lack of generalizability.

In a systematic review and meta-analysis, La Cerra et al. (2019) examined the efficacy of high-fidelity patient simulation (HFPS) on nursing students' learning outcomes facing life-threatening clinical conditions. The study methodology adheres to the Cochrane Handbook for Systematic Reviews of Interventions. The studies included contain heterogeneity, which may affect the generalizability of the analysis. Publication bias may exist as it is not addressed in the article.

Collectively, these studies suggested that simulation-based training can enhance confidence, knowledge, and skills for developing healthcare providers (Bienstock & Heuer, 2022; Fernandez et al., 2019; Holliday et al., 2020; Hwang & Lee, 2021; Jewer et al., 2019; Kim & Yoo, 2020; La Cerra et al., 2019; Musisca et al., 2023; Pezel et al., 2023; Prakash et al., 2020; Ross, 2020; Young et al., 2022; Zhang et al., 2022). Researchers in this area should address the issue of generalizability and long-term assessment. While further research is needed to refine simulation techniques and ensure effectiveness, immediate training outcomes have been encouraging.

Synthesis

The synthesis and article critique examines various research articles and studies. Each article contributes to understanding the role of simulation-based simulation training in healthcare education. The consistent theme of the studies involves the educational impact of simulation training and feedback mechanisms.

Many of the articles suggested that simulation-based training enhances leadership skills and procedural skills (Bienstock & Heuer, 2022; Fernandez et al., 2019; Holliday et al., 2020; Hwang & Lee, 2021; Jewer et al., 2019; La Cerra et al., 2019; Musisca et al., 2023; Pezel et al., 2023; Prakash et al., 2020; Young et al., 2022; Zhang et al., 2022). Several articles suggested that participants gained more confidence in their skills through the process (Fernandez et al., 2019; Holliday et al., 2020; Hwang & Lee, 2021; Jewer et al., 2019; Karlsen et al., 2024; La Cerra et al., 2019; Musisca et al., 2023; Pezel et al., 2023; Prakash et al., 2020; Young et al., 2022; Zhang et al., 2022). The scenarios mentally prepared participants for real-world situations and the handling of life-threatening issues (Fernandez et al., 2019; Hwang & Lee, 2021; Karlsen et al., 2024; La Cerra et al., 2019; Musisca et al., 2023; Young et al., 2022).

Several studies suggested that simulation-based learning and effective debriefing practices enhance participants' learning outcomes (Prakash et al., 2020; Zhang et al., 2022). When debriefing occurred among peers, the learning outcomes appeared to increase when compared to debriefing by a faculty member (Zhang et al., 2022). Video-assisted feedback was more effective than recall-assisted feedback in learning outcomes and retention of skills (Prakash et al., 2020).

Most studies were ungeneralizable. Several may have contained some bias. The studies collectively suggested that schools and health facilities may benefit from simulation-based learning to maximize educational and patient outcomes.

Conceptual Framework/Model

The Iowa Model of Evidence-Based Practice to Promote Quality Care is a widely used framework in healthcare for implementing evidence-based practices (Chiwaula et al., 2021). It systematically incorporates research evidence into clinical decision-making and practice

(Chiwaula et al., 2021). The model identified a triggering event and the resulting issues, formulated a clinical question, evaluated evidence, integrated evidence, implemented practice change, evaluated outcomes and sustainability, and disseminated results (Chiwaula et al., 2021).

Within Grady Memorial Hospital, the underutilization of the simulation laboratory after a major incident resulting in the demise of a young patient is the triggering event for this project. The clinical question has been formulated along with an evidence search. The project was comprised of integrating evidence from research and evaluating the outcomes to implement practice change within the hospital. The results indicated the potential for the project's sustainability. After completion, the results will be disseminated within the department to encourage increased utilization of the simulation lab.

Summary

In conclusion, extensive literature suggested that simulation-based learning can enhance healthcare professionals' confidence, skills, and patient outcomes (Fernandez et al., 2019; Holliday et al., 2020; Hwang & Lee, 2021; Jewer et al., 2019; Karlsen et al., 2024; La Cerra et al., 2019; Musisca et al., 2023; Pezel et al., 2023; Prakash et al., 2020; Young et al., 2022; Zhang et al., 2022). Effective debriefing strategies can also enhance learning outcomes (Prakash et al., 2020; Zhang et al., 2022). The Iowa Model can assist this student in identifying and addressing barriers to effective utilization of the simulation lab in Grady Memorial Hospital.

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SECTION THREE: METHODOLOGY

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Design

The project was evidence-based and quasi-experimental. The existing literature on best practices for simulation-based training in healthcare settings could contribute to identifying successful strategies implemented in various institutions. The intervention was education

regarding the simulation lab, its capabilities, and the mannikins' capabilities. The differences in the pretest and posttest were used to measure the intervention's effectiveness.

Measurable Outcomes

The student compared the participants' confidence and comfort levels pre- and post-intervention. Feedback can also be assessed through surveys, attendance, and participation data. By tracking these measurable outcomes, the hospital can effectively evaluate the impact of interventions within the Grady Memorial Hospital simulation lab.

Setting

The setting was the simulation lab at Grady Memorial Hospital. The setting includes the entire hospital because one goal of the simulation laboratory is to improve patient outcomes in all patient settings. The interventions and measurable outcomes were measured primarily within the simulation lab. The education department and hospital administration were secondary departments, and collaborating with these departments was necessary to develop and implement simulation-based learning. Hospital administration is crucial to obtain support, resources, and buy-in for the interventions. By analyzing the responses from these departments, one can effectively address the underutilization of the simulation lab at Grady Memorial Hospital.

Population

The primary population includes the nurses and nurse educators in the quality department at Grady Memorial Hospital. Several of the educators in the hospital are responsible for performing root cause analysis. They also oversee medical education, training programs, and quality improvement within the hospital. They engage several populations, including physicians, nurses, support staff, and other interdisciplinary teams. Engaging this population is essential in

improving simulation laboratory utilization. They are the primary department that analyzes root causes and educates regarding acceptable practices and methods to avoid future incidents.

Ethical Considerations

Ethical considerations are crucial in addressing the underutilization of the simulation laboratory in Grady. Informed consent is essential to ensure all participants are fully informed about the project's purpose, risks, and benefits. Confidentiality and privacy of participant information ensure that professional standards are maintained throughout the project. Beneficence, nonmaleficence, fairness, and integrity ensure that professional integrity is upheld. These qualities also encourage open communication, mutual respect, and collaboration among participants in the project. By adhering to these ethical considerations, this student can ensure high standards of ethical conduct and promote the well-being of all participants involved.

Data Collection

Simulation lab utilization metrics were evaluated to analyze the current utilization of the simulation lab. A pre and posttest were administered to assess comfort and confidence levels regarding simulation-based learning. The tests may also evaluate barriers to simulation laboratory utilization. The information gathered may indicate potential areas for improvement.

Tools

The tools used in this project included the pre-and posttests. The tests were administered to healthcare professionals to assess attitudes, perceptions, and barriers regarding the simulation laboratory. The student also used data from the lab to determine training needs, preferences, challenges, success, and recommendations for enhancing the simulation lab utilization.

Intervention

Several interventions can be implemented to address the underutilization of the simulation lab. Education workshops can be developed to educate healthcare professionals about the benefits of simulation-based learning. Awareness campaigns can raise awareness about the simulation lab's capabilities, available resources, and potential benefits. These campaigns can be performed through hospital communication channels such as newsletters and staff meetings. Simulation superusers or champions can be established to work as advocates and educators for the laboratory. By implementing these interventions, the hospital can address the issues of underutilizing the simulation lab and enhance training outcomes for healthcare professionals, ultimately improving patient care and safety.

Data Analysis

Data analysis is an essential step in evaluating the effectiveness of interventions. The data from interviews, questions, and interventions were reviewed to identify errors, missing values, and inconsistencies. The data were then organized into a structured format to be analyzed more easily.

Descriptive analysis was used to summarize the data. The student calculated these summary statistics and used a frequency distribution to visualize the data. Data collection was conducted primarily through qualitative analysis.

The data were collected using surveys. The student applied thematic analysis to identify themes, patterns, trends, implications, and insights within the data. Findings can be compared to identify convergence or divergence of data sources. The data gleaned from the project can allow the simulation lab director to make informed decisions to drive positive changes regarding the simulation lab utilization and outcomes.

SECTION FOUR: RESULTS

The preliminary analysis evaluated the impact of simulation-based learning on participants' comfort and confidence levels. This evaluation involved comparing pretest and posttest scores. The responses are assumed to be independent of each other.

The analysis included pretest responses from 22 participants and posttest responses from eight participants. The discrepancy in response rates affects the reliability of the results. Only participants with both pretest and posttest responses were included in the statistical analysis. The data set did not provide detailed demographic information such as age or gender. All participants were nurses employed by Grady Memorial Hospital.

Descriptive Statistics

The primary aim of this project was to evaluate the impact of simulation-based learning on nursing participants' comfort and confidence levels when responding to simulated patient scenarios. Descriptive statistics were used to compare pretest and posttest scores, revealing a positive trend in comfort and confidence after the simulation sessions.

Measurable Outcome 1

The first measurable outcome of the project was the average increase in participants' comfort levels after undergoing simulation-based learning. The results from the pretest ($M = 3.8$ points, $SD = 1.3$) indicate that participants initially felt moderately comfortable. Post-simulation showed an increase in comfort score ($M = 4.3$ points, $SD = 0.71$). These results suggested that participants felt more comfortable after learning the simulation and that their responses were more consistent following the simulation; the standard deviation was lower, indicating the data were dispersed closer to the mean posttest. The mean difference in comfort level was positive ($M = 0.4$ points). This incremental change indicated a positive trend toward improved comfort levels

among participants. However, the paired *t* test was insignificant, $t(7) = -0.81$, $p = .44$. This result showed that although the score increased, the change was insufficient to rule out the possibility that the improvement was due to chance.

Measurable Outcome 2

The second measurable outcome focused on the change in participants' confidence in their skills following simulation education. The pretest statistics for confidence ($M = 3.6$ points, $SD = 1.2$) suggest moderate confidence levels with variability among participants. The posttest mean confidence score increased ($M = 4.0$ points, $SD = 0.8$), indicating an overall enhancement in confidence and more uniform responses.

The mean change in participants' confidence was positive (0.3 points). Despite this trend, the paired-samples *t* test for confidence was insignificant, $t(7) = -0.5$, $p = 0.668$. As with the comfort levels, the *p* value for a paired *t* test of mean confidence scores exceeded the threshold of .05, indicating that the observed increase in confidence was not statistically significant. The change in confidence levels cannot be confidently attributed to simulation-based learning without considering other factors.

Measurable Outcome 3

Another important outcome was the proportion of participants who experienced improved comfort levels after the simulation. Analysis suggested that 50% of participants reported higher comfort scores. This improvement rate reflects that half of the participants felt more comfortable following the simulation exercises, highlighting the potential of simulation-based learning to enhance performance.

However, the result is descriptive and qualitative and should be interpreted cautiously. Also, the small sample size ($n = 8$) limits the potential for using inferential statistics. The finding

cannot be generalized because the results are reported descriptively. Although the trend in these data suggests an improvement by the participants, this result, with the lack of statistical significance in the paired *t* tests, suggested that these improvements need more robust validation through studies with larger sample sizes.

Measurable Outcome 4

The percentage of participants who reported increased confidence levels after the simulation was another key measurable outcome. Similar to the analysis of the comfort scores, that analysis revealed that 50% of participants reported increased confidence scores. Although not definitive because it is descriptive without an inferential test, this outcome suggested that half of the participants felt more confident responding effectively in the simulation lab after participating in the simulation-based learning sessions.

This finding is promising but must be tempered by the limitations affecting the other outcomes, notably the small sample size and the related lack of statistical significance. Power analysis indicated that a substantially larger sample size would be required to achieve statistically significant results—approximately 97 participants for comfort levels and 316 participants for confidence levels. These limitations underscore the need for more extensive, more comprehensive studies to confirm these preliminary findings and better understand the full impact of simulation-based learning on nursing education.

The results provide insights into the potential benefits of simulation-based learning, suggesting that participants experienced increased confidence and comfort in the simulation lab after receiving education. The statistical analysis highlighted the need for a larger sample size to achieve significance.

SECTION FIVE: DISCUSSION

One of the primary objectives of this project was to evaluate the impact of education via the simulation lab and mannikins on optimizing the use of the simulation lab. Despite the lack of response to the posttest question, the finding holds practical significance to the hospital. The observed positive trend suggested that simulation-based learning can be an effective educational tool in healthcare, enhancing participants' preparedness for patient scenarios in practice.

Implication for Practice

Increased comfort and confidence levels can translate into improved patient care (Holliday et al., 2020; Hwang & Lee, 2021; Karlsen et al., 2024; La Cerra et al., 2019; Young et al., 2022). Nurses who feel more comfortable and confident likely perform better under pressure, make more accurate clinical decisions, and communicate more effectively with patients and colleagues (La Cerra et al., 2019). Simulation-based learning has provided a safe environment for nurses to practice and refine their skills, reducing the likelihood of errors in actual clinical settings (Holliday et al., 2020; Hwang & Lee, 2021; Karlsen et al., 2024; La Cerra et al., 2019; Young et al., 2022). The integration of simulation exercises in nursing curricula can help build a more competent and resilient nursing workforce (La Cerra et al., 2019).

The project highlights the value of simulation-based learning as a hands-on training approach. It allows participants to engage in realistic scenarios that mimic clinical challenges, bridging the gap between theoretical knowledge and practical application (Karlsen et al., 2024; Pezel et al., 2023). For the organization, investing in simulation training programs can enhance the overall quality of care provided (Kim & Yoo, 2020; Prakash et al., 2020; Young et al., 2022). Findings such as these supported professional development as nurses gain confidence and proficiency in managing complex clinical situations (Karlsen et al., 2024).

Improved nursing competency benefits patients and the healthcare system by leading to better health outcomes, higher satisfaction, and greater trust (Hwang & Lee, 2021; Jewer et al., 2019; Karlsen et al., 2024; La Cerra et al., 2019; Pezel et al., 2023; Young et al., 2022). As nurses become more adept at handling various clinical scenarios, patients receive safer, more efficient, and more effective care (Hwang & Lee, 2021; Jewer et al., 2019; Karlsen et al., 2024; La Cerra et al., 2019; Pezel et al., 2023; Young et al., 2022). The broader adoption of simulation-based learning in nursing education can contribute to the overall improvement of healthcare standards nationwide (Fernandez et al., 2019; Holliday et al., 2020; Hwang & Lee, 2021; La Cerra et al., 2019; Pezel et al., 2023; Prakash et al., 2020; Young et al., 2022).

Despite the promising observations, this project has several limitations to acknowledge. The response rates differed between the pretest and posttest, which may introduce bias and affect the reliability of the results. The convenience sample may lead to bias as many participants responded because they held the a priori belief that they would benefit professionally. The small sample size ($n = 8$) limits the generalizability of the findings and reduces the statistical power of the analysis. The lack of detailed demographic data also limits the ability to analyze how different participant characteristics might influence the outcomes. Simulation-based learning is a valuable tool in nursing education that can support organizational goals. Future research with larger, more diverse samples and methodological controls must validate these findings and further explore the benefits of simulation-based learning in healthcare.

Sustainability

The healthcare environment and its priorities influence the sustainability of integrating simulation-based learning into nursing education and ongoing training. Simulation-based training increases patient safety, quality care, and cost-effectiveness, which most hospital systems

prioritize. Healthcare organizations are prioritizing professional development and competency-based education to address the complexities of modern healthcare. Simulation training provided a controlled and low-risk environment for nurses to develop and refine their skills, making it a valuable addition to traditional educational methods.

These project outcomes suggested that simulation-based learning could positively impact the participants' comfort and confidence levels. Sustainability depends on resources, funding, and staff engagement. Adequate resources, including high-fidelity simulation equipment, trained facilitators, and dedicated simulation space, are essential for the program's long-term success. Grady has the resources and funding as they have been awarded a multimillion-dollar grant to open their simulation center. They require more staff engagement.

Regularly scheduled simulation sessions may allow the lab to gain more support over time. Structured feedback mechanisms enhance learning outcomes and enable participants to reflect on their performance (Prakash et al., 2020). The training was made more relevant, impactful, and sustainable by tailoring scenarios to reflect specific events or needs.

Dissemination Plan

This student plans to disseminate the results to the stakeholders at Grady Memorial Hospital. Several stakeholders have requested regular updates regarding the outcomes of the project. The results were communicated through staff meetings and leadership briefings. Staff meetings included nursing education and the quality department. Leadership briefings include the directors of the simulation lab and the director of the quality department. This student also expects to present the results at a local conference. This student has discussed submitting this project to an academic journal or presenting it at a professional conference.

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Mion, B., Bazire, B., Fauvel, C., Cautela, J., & Cambet, T. (2023). Effectiveness of simulation-based training on transesophageal echocardiography learning. *JAMA Cardiology*, *8*(3), 248–248. https://doi.org/10.1001/jamacardio.2022.5016

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Zhang, H., Yoong, S. Q., Dong, Y. H., Goh, S. H., Lim, S., Chan, Y. S., Wang, W., & WU, X. V. (2022). Using a 3-phase peer feedback to enhance nursing students' reflective abilities, clinical competencies, feedback practices, and sense of empowerment. *Nurse Educator*, *48* (1), E11–E16. https://doi.org/10.1097/nne.0000000000001294

Appendix

Table 1

Literature Matrix

Article	Purpose	Demo	Methods	Results	LOE	Limit	Support Change?
Bienstock, J., & Heuer, A. (2022). A review on the evolution of simulation-based training to help build a safer future. *Medicine*, *101*(25), e29503. https://doi.org/10.1097/MD.0000000000029503	To reflect on the history and evolution of simulation in healthcare, review current applications, and provide a foundation for the development of new applications	n/a, no participant sample	Review and synthesis of existing literature on simulation-based training in healthcare	Simulation-based training has evolved to enhance clinical proficiency and patient care.	Level 5: Evidence from systematic reviews of descriptive and qualitative studies	Ungeneralizable, synthesizes available literature.	Yes, this article details the development and impact of simulation-based training in healthcare and supports the integration and expansion of simulation practices to enhance patient safety.
La Cerra, C., Dante, A., Caponnetto, V., Franconi, I., Gaxhja, E., Petrucci, C., Alfes, C. M., & Lancia, L. (2019). Effects of high-fidelity simulation based on life-threatening clinical condition scenarios	To analyze the effectiveness of HFPS based on life-threatening clinical condition scenarios on the learning outcomes of undergraduat	33 studies were obtained from a search of multiple databases	The authors conducted a systematic review and meta-analysis following the Cochrane Handbook for Systematic Reviews of Interventions.	that high-fidelity patient simulation sessions had significantly larger effect sizes for knowledge (d = 0.49) and performance (d = 0.50) when	Level 1: Meta-analysis	Heterogeneity among studies- lack of generalizability	Yes, this review suggests that high-fidelity simulation sessions can enhance knowledge and performance outcomes when compared to traditional

Article	Purpose	Demo	Methods	Results	LOE	Limit	Support Change?
on learning outcomes of undergraduate and postgraduate nursing students: A systematic review and meta-analysis. *BMJ Open*, *9*(2), e025306. https://doi.org/10.1136/bmjopen-2018-025306	e and postgraduate nursing students			compared with other teaching methods, indicating a substantial benefit of HFPS in nursing education			teaching methods
Fernandez, R., Rosenman, E. D., Olenick, J., Misisco, A., Brolliar, S. M., Chipman, A. K., Vrablik, M. C., Kalynych, C., Arbabi, S., Nichol, G., Grand, J., Kozlowski, S. W. J., & Chao, G. T. (2019). Simulation-based team leadership training improves team leadership during actual trauma resuscitations. *Critical Care Medicine*, *48*(1), 1. https://doi.org/10.109	To assess the clinical impact of simulation-based leadership training on teamwork and patient care during trauma resuscitations	79 2nd- and 3rd-year residents in emergency medicine and surgery departments at a level 1 trauma hospital. Average age 29, 70% male, 70%	Single-blind RCT. The intervention received a 4-simulation-based leadership training focused on improving team leadership behaviors. The control group received a standard orientation	Team leadership behaviors improved in the intervention group compared to the control group. Direct effects on patient care were not significant	Level 2: RCT	Ungeneralizable, limited by single-hospital designs	Yes, it provides strong evidence that targeted simulation-based training can improve skills and potentially improve patient outcomes.

Article	Purpose	Demo	Methods	Results	LOE	Limit	Support Change?
7/ccm.000000000000 4077		Caucasian, 53% third-year resident, 63% emergency medicine					
Holliday, L., Carter, T., Reddy, H., Clarke, L., Pearson, M., & Felton, A. (2020). Shared learning to improve the care for young people and mental health within nurse education (SHYNE). improving attitudes, confidence, and self-efficacy. *Nurse Education in Practice*, *46*, 102793. https://doi.org/10.1016/j.nepr.2020.102793	To evaluate the impact of a simulation session on attitudes, confidence, and self-efficacy in managing young people admitted for treatment of self-harm injuries	101 nursing students at a single university with a mean age of 24.4, 88% female, 79% undergraduate. Race not noted	A pre and posttest were administered with a simulated intervention with actors from a youth theatre group.	Significant improvement in attitudes towards those who self-harm was noted from the pre- and post-evaluation	Level 6: Single descript. Qual. study	Ungeneralizable, no control group, did not measure long-term attitudes and confidence.	Yes, it can improve readiness to manage complex patient scenarios.
Jewer, J., Parsons, M. H., Dunne, C., Smith, A., & Dubrowski, A. (2019). Evaluation of a mobile telesimulation unit to	To evaluate the educational efficacy of a mobile telesimulation unit (MTU)	69 medical students at the Memorial University of	Students were randomly assigned to one of three groups: traditional face-to-face training	There were no significant differences in knowledge acquisition between any of	Level 2: RCT	Focused on the short-term outcome, the use of student vs.	Yes, it provides evidence that telesimulation could be as effective as traditional

Article	Purpose	Demo	Methods	Results	LOE	Limit	Support Change?
train rural and remote practitioners on high-acuity low-occurrence procedures: Pilot randomized controlled trial. *Journal of Medical Internet Research*, *21*(8), e14587. https://doi.org/10.2196/14587	compared to traditional face-to-face training for teaching high-acuity, low-occurrence medical procedures to healthcare practitioners in rural and remote settings.	Newfoundland	(comparison group), training using a mobile telesimulation unit (intervention group), or no intervention (control group). Students were assessed on their procedural skills (specifically, chest tube insertion) using both written tests and practical examinations, which were video-recorded and evaluated by a blinded rater using standardized checklists and rating scales.	the groups. There were significant improvements in procedural skills in both the comparison and intervention groups compared to the control group, with no significant difference between the mobile telesimulation and traditional face-to-face training.		practitioner participants lacks generalizability.	training methods.
Karlsen, K., Nygård, C., Johansen, L. G., & Gjevjon, E. R. (2024). In situ simulation training	To explore how simulation training can enhance the development	Nursing students in a bachelor's program.	Simulation training sessions with group discussions regarding the	Simulation training strengthened students' confidence,	Level 6: Qualitative Study	Ungeneralizable, lack of quantitative data,	Yes, the study provides insights into the benefits of simulation training.

Article	Purpose	Demo	Methods	Results	LOE	Limit	Support Change?
strengthened bachelor of nursing students' experienced learning and development process– a qualitative study. *BMC Nursing*, *23*(1). https://doi.org/10.1186/s12912-024-01771-w	process of nursing students	Demographics not included	students' perceptions and experiences	practical skills, and overall learning experiences		subject to bias	
Musisca, N. J., Rybasack-Smith, H., Musits, A., Petrone, G., Wightman, R. S., Smith, J. L., Brown, L. L., & Foggle, J. L. (2023). Multiple hospital in-situ mass casualty incident training simulation for emergency medicine residents: A sarin bomb scenario. *PubMed*, *106*(9), 36–40.	To enhance emergency preparedness of emergency medicine providers for mass casualty incidents.	40 emergency medicine residents, faculty, advanced practice providers, medical students, nursing staff, and pre-hospital providers. Age, sex, and race were not discussed.	High-fidelity manikins, inflatable manikins, and actors were gathered to create a realistic scenario.	Participants rated the learning impact, clinical relevance, and effectiveness of debriefing using a Likert scale. 98% of the respondents recommended integrating the scenario into the standards curriculum.	Level 6: Qualitative Study	Ungeneralizable, lack of control groups, lack of metrics	Yes, it suggests that mass casualty incident simulation can be effective in training providers

Article	Purpose	Demo	Methods	Results	LOE	Limit	Support Change?
Pezel, T., Dreyfus, J., Mouhat, B., Thébaut, C., Audureau, E., Bernard, A., Badie, Y. L., Bohbot, Y., Fard, D., Nguyen, L. S., Monteil, C., Bière, L., Le Ven, F., Canu, M., Ribeyrolles, S., Mion, B., Bazire, B., Fauvel, C., Cautela, J., & Cambet, T. (2023). Effectiveness of simulation-based training on transesophageal echocardiography learning. *JAMA Cardiology (Print)*, *8*(3), 248–248. https://doi.org/10.1001/jamacardio.2022.5016	To assess the effectiveness of simulation-based training compared to traditional training in enhancing the knowledge and skills of cardiology fellows in transesophageal echocardiography (TEE)	The study included 324 cardiology fellows (62.6% male, average age 26.4 years) from 42 French university centers who were inexperienced in TEE and were randomized into two groups (162 in each group) for simulation-based training and	RCT compares traditional TEE training to simulation-based TEE training.	The simulation group outperformed the traditional group in theoretical and practical tests three months after training. The simulation group also reported feeling more confident in the skills.	Level 2: RCT	Ungeneralizable, study conducted in an academic environment, no long-term assessment	Yes, the study provides strong evidence that simulation-based training can enhance technical skills.

Article	Purpose	Demo	Methods	Results	LOE	Limit	Support Change?
		traditional training.					
Hwang, W. J., & Lee, J. (2021). Effectiveness of the infectious disease (COVID-19) simulation module program on nursing students: Disaster nursing scenarios. *Journal of Korean Academy of Nursing*, *51*(6), 648. https://doi.org/10.4040/jkan.21164	To develop and assess the effectiveness of a COVID-19 simulation module for nursing students	The study included 78 undergraduate nursing students. Mean age 22.2, 85.9% woman, 43.%, race not discussed	A one-group pretest-posttest quasi-experimental design was used. The simulation module included pre-simulation lectures on disaster nursing, practice scenarios in both pre-hospital and hospital settings, and debriefing sessions.	Results indicated a significant improvement in disaster preparedness, disaster nursing competencies, and confidence in disaster nursing among the participants. However, no significant changes were observed in critical thinking and triage skills.	Level 3: Quasi-experimental	No control group, focus on short-term outcomes, ungeneralizable	Yes, the study suggests that simulation-based training can effectively enhance students' preparedness and confidence in managing disaster scenarios.
Zhang, H., Yoong, S. Q., Dong, Y. H., Goh, S. H., Lim, S., Chan, Y. S., Wang, W., & WU, X. V. (2022). Using a 3-phase peer feedback to enhance nursing students' reflective abilities, clinical competencies, feedback practices,	To compare the effects of a structured 3-phase peer feedback system versus traditional faculty feedback (FF)	The study included nursing students, though specific demographics such as age, year, or background were	This quasi-experimental study employed a 3-arm pretest-posttest design, where students received either peer verbal, video, or faculty feedback after simulated	Students receiving peer verbal feedback showed significant increases in reflective abilities and clinical competencies. Those receiving peer video	Level 3: Quasi-experimental	No demographic information, ungeneralizable, no long-term follow-up	Yes, feedback received during a simulation can affect the outcome. Simply participating in a simulation does not automatically guarantee a positive learning experience.

Article	Purpose	Demo	Methods	Results	LOE	Limit	Support Change?
and sense of empowerment. *Nurse Educator*, *Publish Ahead of Print*. https://doi.org/10.1097/nne.0000000000001294		not detailed.	practice sessions.	feedback also saw significant enhancements in clinical competencies. Faculty feedback did not yield significant changes. Peer tutors did not show significant improvements in empowerment, but their feedback practices were perceived as effective as faculty feedback.			
Young, J., Fawcett, K., & Gillman, L. (2022). Evaluation of an immersive simulation programme for mental health clinicians to address aggression, violence, and clinical deterioration. *International Journal*	To assess the effectiveness of a high-fidelity immersive simulation education program designed to help inter-professional	The sample consisted of 122 clinical staff members, primarily from mental health wards	Participants were immersed in two mental health emergency response and clinical deterioration scenarios, followed by debriefing sessions. The	Self-efficacy scores significantly increased across evaluation points- pretest, posttest 1 immediately after training, and posttest 2 at 3 months	Level 3: Quasi Experimental	No control group, ungeneralizable	Yes, the study suggests that simulation training can enhance preparedness and confidence in complex situations.

Article	Purpose	Demo	Methods	Results	LOE	Limit	Support Change?
of Mental Health Nursing. https://doi.org/10.1111/inm.13040	hospital clinical staff better recognize and respond to aggression, violence, and clinical deterioration in patients with mental health issues	(52%), including a majority who were nurses (68%).	effectiveness of the training was measured using a 10-item validated self-efficacy tool addressing non-technical skills like Leadership, Management, Communication, and Teamwork.	follow-up. There were notable improvements in self-efficacy related to Leadership/Management and Communication/Teamwork immediately after the training.			
Kim, Y.-J., & Yoo, J.-H. (2020). The utilization of debriefing for simulation in healthcare: A literature review. *Nurse Education in Practice*, *43*, 102698. https://doi.org/10.1016/j.nepr.2020.102698	To examine how debriefings have been conducted in healthcare simulations	n/a	The review included 22 studies that met these criteria, focusing on different debriefing methodologies used in healthcare simulation training.	Debriefing methods vary greatly depending on the learning objectives, the learners' abilities, the availability of resources, and the context of the simulations. Key findings suggested that peer-led debriefing might be more suitable for experienced	Level 5: Systematic reviews	Not all literature is high quality, ungeneralizable	Yes, effective debriefing practices in healthcare simulation could allow educational improvements in simulation programs

Article	Purpose	Demo	Methods	Results	LOE	Limit	Support Change?
				healthcare professionals than unlicensed students, and tele-debriefing was found to be feasible in some cases.			
Prakash, S., Bihari, S., Laver, R., Chandran, G., Kerr, L., Schuwirth, L., & Bersten, A. (2020). Prospective randomized controlled trial of video- versus recall-assisted reflection in simulation-based teaching on acquisition and retention of airway skills among trainees intubating critically ill patients. *Critical Care Medicine*, *48*(9), 1265–1270. https://doi.org/10.1097/ccm.0000000000004448	To assess whether video-assisted reflection enhances the acquisition and retention of airway management skills in critical care settings compared to recall-assisted reflection among junior critical care doctors	40 junior critical care doctors at a university-affiliated tertiary care center	This was a randomized control trial; participants were assigned to a video-assisted reflection group or a recall-assisted reflection group following simulation-based airway management training. Skills were assessed immediately after the workshop and four weeks later by two blinded assessors.	The video-assisted group retained better skills at the four-week follow-up, particularly in non-technical skills such as communication and teamwork.	Level 2: RCT	Ungeneralizable, small sample size, short follow-up period	Yes, video-assisted reflection in a simulation training program can enhance learning outcomes

IRB #: IRB-FY23-24-1868
Title: Leveraging Simulation for Excellence
Creation Date: 5-4-2024
End Date:
Status: Approved
Principal Investigator: Alecia Liburd
Review Board: Research Ethics Office
Sponsor:

Study History

Submission Type	Initial	Review Type	Exempt	Decision	No Human Subjects Research

Key Study Contacts

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Date: 5-8-2024

IRB #: IRB-FY23-24-1868
Title: Leveraging Simulation for Excellence
Creation Date: 5-4-2024
End Date:
Status: Approved
Principal Investigator: Alecia Liburd
Review Board: Research Ethics Office
Sponsor:

Study History

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Citi Training

Completion Date 19-Feb-2024
Expiration Date 19-Feb-2027
Record ID 60616138

This is to certify that:

Alecia Liburd

Has completed the following CITI Program course:

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certification through CME.

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(Curriculum Group)
Biomedical & Health Science Researchers
(Course Learner Group)
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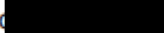
Letter of Support

To Whom It May Concern:

I am writing to express my support for the proposed Evidence-Based Practice (EBP) project focused on simulation-based learning at Grady Memorial Hospital. We continuously seek innovative approaches to enhance the quality of care and ensure our staff is equipped with the best possible training to handle the complexities of modern medical practice. Integrating simulation-based learning into our training programs represents a significant step forward in achieving these goals.

The objectives of the EBP project align perfectly with Grady Memorial's commitment to excellence in patient care and continuous improvement. To support this project, Grady Memorial Hospital is committed to providing the necessary resources, including dedicated space for simulation labs, access to advanced simulation technology, and time allocation for staff training sessions. This will allow us to continuously refine the program and ensure it meets our high standards of excellence. Grady Memorial Hospital fully endorses this EBP project and is committed to its successful implementation. We believe that simulation-based learning will significantly contribute to the professional development of our staff and, most importantly, enhance the quality of care we provide to our patients.

Sincerely,

███████ Ph.D., RN

████████████

Director of Simulation

Grady Memorial Hospital

[External] Permission to Use The Iowa Model Revised: Evidence-Based Practice to Promote Excellence in Health Care

Kimberly Jordan - University of Iowa Hospitals and Clinics <survey-bounce@survey.uiowa.edu>

Thu 1/18/2024 9:40 AM

To:Liburd, Alecia Kimberly <akliburd@liberty.edu>

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