Reducing Nurse Anesthesia Student Anxiety by Aligning a University-Based Simulation Program With Best Practices: A Quality Improvement Project

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Abstract

**Background**: The negative impact of high levels of anxiety on learning outcomes is well established. Clinical simulation is an essential element of nurse anesthesia training that can produce anxiety and stress, ultimately impacting effective learning. Despite emerging evidence surrounding optimizing simulation experiences, gaps remain regarding methods and interventions to reduce student anxiety as it relates to simulation experiences. This quality improvement project explored the impact of aligning a nurse anesthesia simulation program with simulation standards of best practice, and the influence of this transition on student learning experiences and perceptions of anxiety.

**Methods**: The transition was assessed using a pretest-posttest design. Prior to the transition, 39 student nurse anesthetists completed a pretest regarding prebriefing, scenario design, and debriefing up to the time of implementation. After three months of the updated simulation format, 37 participants completed a postimplementation survey.

**Results**: The data demonstrate statistically significant improvement in all assessed areas.

**Conclusion**: This simulation best practice-based initiative improved student experiences by reducing anxiety and offers a guide to simulation programs seeking to make similar adjustments.

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The negative impact of high levels of anxiety in nursing students on learning outcomes is well established (Tremblay, Lafleur, Leppink, & Dolmans, 2017). Evidence suggests that stress and anxiety in nursing students can be...
Incorporating Health care Simulation Standards of Best Practice into a university-based nurse anesthesia simulation program enhances learning experiences and improves student perceptions of anxiety related to simulation experiences (Kim & Kim, 2022). High-fidelity patient simulators provide a learning experience that closely resembles realistic clinical settings (Hanshaw & Dickerson, 2020). However, high-fidelity simulation presents a particularly challenging experience for learners. For example, although the literature reveals increased confidence and enhanced peer-to-peer interaction through simulation, students report feeling unready and anxious regarding simulation (Kang & Min, 2019; Najjar, Lyman, & Miehl, 2015; Tremblay et al., 2017). In addition, available evidence exploring simulation anxiety in nurse anesthesia students indicates increased anxiety levels during simulation activities (Lewis, 2019; McKay, Buen, Bohan, & Maye, 2010). Clinical simulation is an essential element of nurse anesthesia training that requires students to work autonomously in high-stress simulation experiences. During the simulation scenario, students must rapidly develop differential diagnoses and treat potentially life-threatening conditions. These simulation experiences may produce anxiety and stress, ultimately impacting effective learning (Lewis, 2019; Tremblay et al., 2017). Student registered nurse anesthetists (SRNAs) report feelings of anxiety, overwhelming stress, and negative personal and emotional effects during nurse anesthesia educational programs (Mesica & Mainwaring, 2021). Because simulation plays a fundamental role within nurse anesthesia educational curricula, it is imperative that educators attenuate the challenge of anxiety related to simulation.

Despite emerging evidence regarding optimizing simulation experiences in recent years, gaps remain regarding methods and interventions to reduce student anxiety as it relates to simulation experiences (Turner & McCarthy, 2017). Findings by Najjar et al. (2015) highlight the positive impact of high-fidelity simulation experiences on nursing student learning outcomes while encouraging others to explore strategies to optimize simulation learning outcomes (Najjar et al., 2015). Mesica and Mainwaring (2021) describe the specific challenges of stress and anxiety to well-being in nurse anesthesia students and recommend developing initiatives to mitigate these concerns within nurse anesthesia educational programs.

The Society for Simulation in Healthcare (SSH), the largest healthcare simulation organization in the world, is an international community of simulation experts tasked with advancing the quality of healthcare through medical simulation (Society for Simulation in Healthcare [SSH], 2021). To promote high-quality simulation experiences, the organization serves as an accrediting body for healthcare simulation centers and emphasizes the use of simulation teaching methods based on best practices (SSH, 2021). The International Nursing Association for Clinical Simulation and Learning (INACSL), a global leader in advancing the science of healthcare simulation, established the Healthcare Simulation Standards of Best Practice (HSSOBP) to provide direction for simulation design and promote standardized simulation experiences (INACSL Standards Committee, 2021; Watts, Curtis, Ware, Chidume, & Jones, 2022). Ten standards described by the INACSL provide a guide for simulation development, implementation, facilitation, and evaluation of learning (INACSL Standards Committee, 2021; Watts et al., 2022) (Table 1). The standards also highlight the importance of professional development, psychological safety, integrity, operations, and infrastructure. According to Kang and Min (2019), psychological safety

### Key Points
- Incorporating Health care Simulation Standards of Best Practice into a university-based nurse anesthesia simulation program enhances learning experiences and improves student perceptions of anxiety related to simulation experiences.
- Standardized prebriefing and evidence-based debriefing are essential for developing a psychologically safe learning environment and encouraging learning through self-reflection.
- Faculty describe integrating simulation best practices into a nurse anesthesia simulation as feasible and beneficial.

| Table 1 – INACSL Healthcare Simulation Standards of Best Practice |
|----------------------------------|------------------|
| I. Professional Development |
| II. Prebriefing |
| III. Simulation Design |
| IV. Facilitation |
| V. The Debriefing Process |
| VI. Operations |
| VII. Outcomes and Objectives |
| VIII. Professional Integrity |
| IX. Simulation-Enhanced-IPE |
| X. Evaluation of Learning and Performance |

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is achieved in simulation when a learner feels comfortable participating, speaking up, sharing thoughts, and asking for help without fear of retribution or embarrassment. Establishing a psychologically safe learning environment is vital for students in meeting simulation learning objectives and is a key factor in aligning academic simulation programs with best practices.

The nurse anesthesia educational program in this project developed a robust simulation program within its first five years. Despite challenges of limited access to a shared simulation space, COVID restrictions on in-person learning experiences, and having to create and move to a new simulation center, the anesthesia faculty designed and implemented successful simulation experiences using high fidelity manikin-based scenarios, mechanical and tissue-based task trainers, standardized patients, role-playing, and case studies. However, the challenges faced by the program introduced limitations with regard to alignment with the HSSOBP. Students described high levels of anxiety and stress during clinical simulations. This observation led faculty to explore existing student perceptions regarding simulation experiences, including participant feelings of psychological safety and ways to improve learner experiences.

Prior to project implementation, as a new nurse anesthesia program facing several challenges, the simulation process was loosely aligned with the HSSOBP. During a simulation program evaluation and needs assessment, faculty observed several areas for improvement related to the standards. Although learning objectives were provided, the faculty observed that the objectives were sometimes vague and that the program needed a systematic approach to reviewing simulation learning objectives with the students. Prebriefing included a brief report on the patient’s background and planned procedure but often lacked a comprehensive description of the environment, participant roles, and limitations/availability of equipment and supplies. With limited standardized prebriefing, simulations often strayed from the intended objectives as students made unrelated diagnoses or administered unnecessary medications due to equipment limitations. Due to space constraints, simulation debriefing generally occurred in the same room as the simulation scenario. Without a formal debriefing tool, experience integration and conscious reflection, vital components of effective debriefing, were not optimized. Students engaged in clinical simulations during this time were noticeably anxious prior to and following simulations. Based on this and evidence suggesting simulation best practices improve learner experiences and outcomes (Kim & Kim, 2022), the simulation process within the nurse anesthesia educational program was transitioned to align more closely with the INACSL HSSOBP. This quality improvement (QI) project aimed to explore the impact of aligning our nurse anesthesia simulation program with the 10 standards of best practice outlined by INACSL on student learning experiences and perceptions of anxiety.

**Materials and Methods**

**Setting**

The setting for this QI project was a Doctor of Nursing Practice (DNP) nurse anesthesia educational program within a large research university in the southeastern region of the United States. The nurse anesthesia program conducts clinical simulation year-round, with simulation experiences provided weekly.

**Participants**

The participants in this project consisted of DNP nurse anesthesia students. As simulation is a mandatory curriculum component, all 44 students enrolled in the program participated in the simulation experiences before, during, and after implementation. However, only 37 participants completed pre- and postimplementation surveys.

**Preimplementation**

Various tools exist to explore learning outcomes and participant affect measures within the prebriefing, educational scenario, and debriefing periods (Elfrink Cordi, Leighton, Ryan-Wenger, Doyle, & Ravert, 2012; Leighton, Ravert, Mudra, & Macintosh, 2015). To evaluate student perspectives of simulation practices and plan for improvement, a preimplementation survey was created to collect data regarding student perceptions of simulation experiences in the nurse anesthesia program (Figure 1). The survey was distributed to student participants before the start of the summer semester in May 2022. The survey included questions regarding simulation objectives, prebriefing, psychological safety, environmental orientation, scenario application to practice, and debriefing. Open-text feedback was requested for three items, including “In one to two words, describe your current feelings towards simulation.”

Upon reviewing the INACSL standards of best practice and evidence demonstrating successful outcomes from HSSOBP integration (McDermott, Sarasnick, & Timcheck, 2017), the faculty developed a plan to align the current simulation program with the INACSL standards. The plan involved several changes within the simulation program including documenting clear learning objectives for each clinical simulation, preparing participants before each simulation through a standardized prebriefing process, developing detailed instructions for faculty controlling the high fidelity manikin while unfolding the simulation, developing a rubric to evaluate student performance for every simulation, and utilizing an advocacy-inquiry debriefing tool (Figure 2) to facilitate debriefing in a dedicated debriefing space (Beaulieu, 2014).
Please indicate your current year in the program. (First year, second year, third year)

**Considering your simulation experience in the CRNA program up to this point, please respond to the following items/Considering the recent format change (prebrief, scenario, debrief) to simulation experiences in the CRNA program, please respond to the following items.**

*(Always, usually, sometimes, seldom, never)*

Prior to each simulation, objectives and expectations were clearly communicated.
Prior to each simulation, I was informed of known gaps in fidelity (realism), such as equipment limitations/malfunctions.
Simulation participant roles were clearly delineated for each simulation.
I was provided with the information I needed to adequately perform each simulation (i.e., pt. history, planned procedure, medications available, etc.).
Debriefing and feedback were provided at the conclusion of each simulation.

**Considering your simulation experience in the CRNA program up to this point, please indicate the level to which you agree or disagree with the following statements/Considering the recent format change (prebrief, scenario, debrief) to simulation experiences in the CRNA program, please respond to the following items.**

*(Strongly agree, somewhat agree, do not agree)*

I feel comfortable participating, speaking up, sharing thoughts, and asking for help as needed without concern for retribution or embarrassment.
Experiences in the simulation environment regularly translate into beneficial experiences for practice application.
Simulation scenarios increase my confidence in caring for patients in the clinical setting.
I look forward to my simulation experiences.

**Considering your simulation experience in the CRNA program up to this point, please indicate the level to which you agree or disagree with the following statements/Considering the recent format change (prebrief, scenario, debrief) to simulation experiences in the CRNA program, please respond to the following items.** *(Strongly agree, somewhat agree, do not agree)*

Post Simulation Debriefing consistently contributed to my learning experiences.
Post Simulation Debriefing allowed me to verbalize my feelings upon scenario completion.
Post Simulation Debriefing was valuable in helping me improve my clinical judgment.
Post Simulation Debriefing regularly provided opportunities to self-reflect on my performance during simulation.
Post Simulation Debriefing was a constructive evaluation of the simulation.

**Free-Text Responses**
In one to two words, describe your current feelings toward simulation.
Please provide any feedback (good and bad) about simulation experiences up to this point.
Please provide suggestions for improving past experiences or ideas for new experiences you would find helpful.

**Figure 1** Preimplementation Survey/Postimplementation survey.

Reactions
1. What Happened?
2. How did you feel about ________?

Understanding (advocacy/inquiry)
1. What were you thinking when ________ happened?
2. It looked to me that ________?
3. I felt that you ________?
4. I saw you do/use ________?
5. What led you down that road?
6. Has this happened in your practice, if so, how was it addressed?
7. Now that you have completed this simulation, how will this (if any) change your practice?

Summary
1. What did you do well?
2. What could you have done better/differently?
3. Takeaway


**Figure 2** Debriefing template with advocacy-inquiry technique.
Implementation

After preimplementation survey review and planning, the new simulation format was implemented at the start of the summer semester. The simulation faculty consisted of three nurse anesthesia program faculty members and one simulation nurse educator. Three rooms were utilized for each planned simulation: a high-fidelity operating room, a prebriefing room, and a debriefing room. Although the transition incorporated all 10 standards of best practice outlined in the HSSOBP (Table 2), the implementation strategy focused on improving prebriefing, simulation design, and debriefing experiences. Learning objectives were documented and consistently communicated for each simulation, and a standardized comprehensive prebriefing process was conducted prior to each simulation. During prebriefing, students were provided with a fictional contract and asked to suspend disbelief. The limitations of the equipment and supplies were offered, and participants were reminded of the expectation of confidentiality following the simulation. Relevant patient history was communicated to the students and roles were clearly delineated. Simulation design incorporated a learner-centered simulation experience designed to meet measurable learning objectives. Rubrics were used for evaluation during high-fidelity scenarios and pilot tests were completed. Debriefing was also changed to occur in a dedicated space separate from the simulation scenario. Faculty conducted deliberate debriefing following each simulation using an advocacy-inquiry method allowing students time to self-reflect and receive feedback from faculty.

To evaluate weekly simulation scenarios, students were asked to complete the previously validated Simulation Effectiveness Tool-Modified (SET-M) (Leighton et al., 2015) after each simulation experience (Figure 3).

Postimplementation

To evaluate the simulation program transition and evaluate student perspectives of the transition, participants were invited to complete a postimplementation survey at the end of the summer semester in August of 2022 (Figure 1). The post-implementation survey was identical to the preimplementation survey, however, the postimplementation survey requested that participants respond to the questions based on the new simulation format. Data collected were used to evaluate the changes made to the simulation program, and to explore student perspectives and experiences during simulation.

Data Collection

Data were collected using Google Forms surveys created by the faculty lead for this QI project. Although simulation participation was mandatory, students were not required to complete the surveys. Also, there was no incentive provided to those who chose to complete the surveys, and survey data were collected anonymously. The only demographic data collected were participants’ current year in the nurse anesthesia educational program.

Survey items were comprised of three categories: prebriefing, scenario design, and debriefing. Prebriefing items were ranked using a five-point frequency scale consisting of “always,” “usually,” “sometimes,” “seldom,” and “never.” Items regarding the clinical scenario and debriefing experiences were ranked with a three-point Likert scale consisting of “agree,” “somewhat agree,” and “do not agree.” Both surveys also allowed open-text feedback.

Data Analysis

Given the use of Likert-scale ratings in the survey, Chi-square tests were used to examine the differences between preimplementation and postimplementation surveys for the sample at large using SPSS version 28.0. The level of significance was set at 0.05. Frequency analysis of key words was used to determine student perceptions of simulation.

Institutional Review Board

The Institutional Review Board (IRB) of the university where this project was conducted determined that this project did not meet the definition of “human subject research” or “clinical investigation.” Thus, the IRB determined this project to be quality improvement and not require an expedited or full review.

Results

A total of 39 and 37 out of 44 potential participants completed pre-implementation and postimplementation surveys, respectively. Participants reported a more positive overall simulation experience following the change in simulation format, the differences of which were statistically significant (Table 3). Significant improvement was demonstrated in each category explored (prebrief, scenario, and debrief).

For the items related to prebriefing, when compared with responses to the preimplementation surveys, a greater number of participants post-implementation reported “always” to the items of “prior to each simulation, objectives and expectations were clearly communicated” (23.1% vs. 91.9%, p < .001); “prior to each simulation, I was informed of known gaps in fidelity (realism) such as equipment limitations/malfunctions” (20.5% vs. 83.8%, p < .001); “simulation participant roles were clearly delineated for each simulation” (25.6% vs. 86.5%, p < .001); “I was provided with the information I needed to adequately perform each simulation (i.e., patient history, planned procedure, medications available, etc.)” (38.5% vs. 94.6%, p < .001); and “debriefing and feedback were provided at the
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**Table 2 – Program Measures to Align with INACSL HSSOBP**

<table>
<thead>
<tr>
<th>Standard</th>
<th>Description</th>
<th>Program Alignment With Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Professional Development</td>
<td>The standard of professional development involves the continuing professional education of the simulationist.</td>
<td>To achieve this standard, the program simulation coordinator achieved certification as a healthcare simulation educator. This provides the program with a resource for developing simulations based on current evidence and experiences designed with the learners' needs at the center.</td>
</tr>
<tr>
<td>Prebriefing</td>
<td>Deliberate prebriefing provides students with the opportunity to review learning objectives and adequately prepare for the simulation.</td>
<td>During prebriefing, students receive learning objectives and relevant patient history. Participant roles are clearly delineated, and learners are provided with a fictional contract and asked to suspend disbelief prior to each simulation experience. The limitations/availability of the equipment and supplies are offered during prebriefing, and participants are reminded of the expectation of confidentiality following each simulation.</td>
</tr>
<tr>
<td>Simulation Design</td>
<td>The standard of simulation design incorporates the use of frameworks for simulation construction and describes simulation development from the needs assessment to planning evaluation methods and debriefing objectives. It also underscores the importance of performing a test-run prior to participant involvement.</td>
<td>To meet this standard, our simulation development involves expert consultation, a needs assessment, development of measurable objectives, and a learner-centered simulation experience designed to meet those objectives. Appropriate types of fidelity are used to maximize realism and prebriefing/debriefing goals are outlined during simulation design. Rubrics are used for evaluation and pilot tests are completed.</td>
</tr>
<tr>
<td>Facilitation</td>
<td>Successful facilitation involves a competent facilitator trained in simulation pedagogy.</td>
<td>As a CHSE-trained facilitator, the simulation coordinator possesses knowledge of the HSSOBP, appropriately aligns simulation experiences with learner levels, and aims to support participants in meeting the simulation objectives.</td>
</tr>
<tr>
<td>The Debriefing Process</td>
<td>During the debriefing process, learners reflect on the simulation experience. Debriefing is vital for the cognitive and emotional integration of an experience.</td>
<td>Planned and deliberate debriefing offered during simulations gives students time to self-reflect while feedback from faculty trained in an advocacy-inquiry debriefing technique provides reassurance and guidance as learners prepare for their subsequent simulation experiences.</td>
</tr>
<tr>
<td>Operations</td>
<td>To meet the operations standard, simulation programs must have the infrastructure to support all aspects of simulation</td>
<td>The nursing school in this QI project has a simulation center equipped to support all aspects of simulation.</td>
</tr>
<tr>
<td>Outcomes and Objectives</td>
<td>The development of objectives and outcomes from a needs assessment guides the simulation design.</td>
<td>Specific objectives are outlined, and students are given adequate time to review them prior to each simulation. Measuring outcomes occurs through evaluating learner reaction to the content, determining the degree to which learners retained knowledge, assessing the learner’s ability to apply the knowledge, and understanding if outcomes are met as a result of the simulation experience. Outcome assessment occurs on a continuum. The debriefing period starts the process of measuring learner reactions while assessing learning but evaluating behavior and results of the simulation is ongoing.</td>
</tr>
<tr>
<td>Professional Integrity</td>
<td>Professional integrity involves ensuring a safe and inclusive learning environment committed to upholding the Healthcare Simulationist Code of Ethics. This includes ensuring confidentiality and fostering an environment of inclusivity, equity, and respect.</td>
<td>Professional integrity is maintained by following standards of practice for a safe, respectful, and inclusive environment and ensuring confidentiality, professionalism and integrity of facilitators, learners, and participants.</td>
</tr>
</tbody>
</table>

(continued on next page)
Simulation-Enhanced-IPE
Evaluation of Learning and Performance

Simulation-enhanced-IPE
Interprofessional simulation education is a collaborative effort involving providers of different health professions working together to learn from one another and address common professional objectives (Watkins, 2016).

Evaluating learning and performance goes beyond a well-designed rubric. Although a rubric or checklist may be part of the learner evaluation, the design and reliability of the evaluation tool, the training of the evaluator, the timing of evaluation, and the feedback provided to the learner are all important for successful evaluation.

The nurse anesthesia profession requires continuous interprofessional interactions. Simulations are designed to incorporate every element of the operating room environment. Professionals from other fields are regularly invited to participate in simulation to achieve interprofessional education learning objectives. Each simulation experience is developed with the method and delivery of the evaluation in mind. Students are also asked to complete the Simulation Effectiveness Tool-Modified (SET-M) to evaluate their perception of the simulation experience (Leighton et al., 2015).

Table 2 (continued)

<table>
<thead>
<tr>
<th>Standard</th>
<th>Description</th>
<th>Program Alignment With Standard</th>
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</thead>
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<td>Simulation-Enhanced-IPE</td>
<td>Interprofessional simulation education is a collaborative effort involving providers of different health professions working together to learn from one another and address common professional objectives (Watkins, 2016).</td>
<td>The nurse anesthesia profession requires continuous interprofessional interactions. Simulations are designed to incorporate every element of the operating room environment. Professionals from other fields are regularly invited to participate in simulation to achieve interprofessional education learning objectives. Each simulation experience is developed with the method and delivery of the evaluation in mind. Students are also asked to complete the Simulation Effectiveness Tool-Modified (SET-M) to evaluate their perception of the simulation experience (Leighton et al., 2015).</td>
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</tr>
</thead>
<tbody>
<tr>
<td>Evaluation of Learning and Performance</td>
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</tr>
</tbody>
</table>


**Clinical Simulation in Nursing.**

After completing a simulated clinical experience, please respond to the following statements by circling your response.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Agree</th>
<th>Somewhat Agree</th>
<th>Do Not Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prebriefing increased my confidence</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Prebriefing was beneficial to my learning</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>I am better prepared to respond to changes in my patient’s condition</td>
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<tr>
<td>I developed a better understanding of the pathophysiology</td>
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<td></td>
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<tr>
<td>I am more confident of my nursing assessment skills</td>
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<td></td>
<td></td>
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<tr>
<td>I felt empowered to make clinical decisions</td>
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<tr>
<td>I developed a better understanding of medications. (Leave blank if no medications in scenario)</td>
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<tr>
<td>I had the opportunity to practice my clinical decision making skills</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>I am more confident in my ability to prioritize care and interventions</td>
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<td></td>
<td></td>
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<tr>
<td>I am more confident in communicating with my patient</td>
<td></td>
<td></td>
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<tr>
<td>I am more confident in my ability to teach patients about their illness and interventions</td>
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<tr>
<td>I am more confident in my ability to report information to health care team</td>
<td></td>
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<tr>
<td>I am more confident in providing interventions that foster patient safety</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I am more confident in using evidence-based practice to provide nursing care</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Debriefing contributed to my learning</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Debriefing allowed me to verbalize my feelings before focusing on the scenario</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Debriefing was valuable in helping me improve my clinical judgment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Debriefing provided opportunities to self-reflect on my performance during simulation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Debriefing was a constructive evaluation of the simulation</td>
<td></td>
<td></td>
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</tbody>
</table>


**Figure 3** Simulation effectiveness tool-modified (SET-M).

conclusion of each simulation” (61.5% vs. 94.6%, p = .011).

When analyzing the scenario design items, compared with responses to the preimplementation surveys, a greater number of participants postimplementation reported “strongly agree” to the items of “experiences in the simulation environment regularly translate into beneficial experiences for practice application” (66.7% vs. 100%, p = .002); “simulation scenarios increase my confidence in caring for patients in the clinical setting” (51.3% vs. 97.3%, p < .001); and “I look forward to my simulation experiences” (17.9% vs. 83.8%, p < .001) (Table 4). For the item addressing psychological safety, “I feel comfortable participating, speaking up, sharing thoughts, and asking for
help as needed without concern for retribution or embarrassment," compared with responses to the preimplementation surveys, more participants reported “strongly agree” (51.3% vs. 100%, \( p < .001 \)).

For postsimulation debriefing, compared with the responses to the preimplementation survey, a greater number of participants post-implementation reported “strongly agree” than preimplementation to the items of “consistently...
contributed to my learning experiences” (64.1% vs. 97.3%, \( p = .002 \); “allowed me to verbalize my feelings upon scenario completion” (53.8% vs. 97.3%, \( p < .001 \)); “was valuable in helping me improve my clinical judgment” (61.5% vs. 97.3%, \( p = .001 \)); “regularly provided opportunities to self-reflect on my performance during simulation” (56.4% vs. 97.3%, \( p < .001 \); and “was a constructive evaluation of the simulation” (48.7% vs. 94.6%, \( p < .001 \) (Table 5).

Finally, a frequency analysis of terms from the open text data was completed. Pre and postimplementation responses to the item “describe your current feelings toward simulation” were coded as correlating with either a negative (e.g., “nerve-racking,” “nervous,” “anxious,” “anxiety,” “dreadful”) or positive (e.g., “helpful,” “beneficial,” “positive,” “awesome,” “improved,” “progressing”) perception. In the preimplementation responses, only 15 of 45 responses were coded as positive (33%), while in the postimplementation survey, 34 out of 38 responses (90%) were coded as positive.

Table 5 – Survey Results-Debriefing Data

<table>
<thead>
<tr>
<th>Item</th>
<th>Likert-scale</th>
<th>Pre</th>
<th>Somewhat Agree</th>
<th>Do not Agree</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post Simulation Debriefing consistently contributed to my learning experiences.</td>
<td></td>
<td>Post</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Strongly Agree</td>
<td>25</td>
<td>(64.1%)</td>
<td>12 (30.8%)</td>
<td>1 (2.6%)</td>
</tr>
<tr>
<td>Post Simulation Debriefing allowed me to verbalize my feelings upon scenario completion.</td>
<td></td>
<td>Post</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Strongly Agree</td>
<td>36</td>
<td>(97.3%)</td>
<td>1 (2.7%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Post Simulation Debriefing was valuable in helping me improve my clinical judgment.</td>
<td></td>
<td>Post</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Strongly Agree</td>
<td>24</td>
<td>(61.5%)</td>
<td>12 (30.8%)</td>
<td>1 (2.6%)</td>
</tr>
<tr>
<td>Post Simulation Debriefing regularly provided opportunities to self-reflect on my performance during simulation.</td>
<td></td>
<td>Post</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Strongly Agree</td>
<td>36</td>
<td>(97.3%)</td>
<td>1 (2.7%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Post Simulation Debriefing was a constructive evaluation of the simulation.</td>
<td></td>
<td>Post</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Strongly Agree</td>
<td>19</td>
<td>(48.7%)</td>
<td>12 (30.8%)</td>
<td>5 (12.8%)</td>
</tr>
</tbody>
</table>

Prior to our QI project, simulation in the nurse anesthesia educational program varied across courses, and instructors did not consistently utilize a standardized process for simulation development. Feedback provided by students in pre-implementation surveys was largely negative and described simulation as “nerve-racking,” and “dreadful,” with one student noting, “I struggle to orient myself to the room set up, my role, the patient, and simulation usually feels chaotic.” Aligning with simulation best practices resulted in a significantly positive shift in the postimplementation survey comments, with students describing simulation as “scary, but it’s much better! It’s nice to know what we are walking into,” “much less stress, but still just enough to make us think,” “I have less anxiety walking into sim,” and “a more supportive learning environment since the changes, which creates strong, motivated learners.” Compared to the more negative comments of the preimplementation survey, these responses underscore the reduction in student anxiety related to simulation experiences and highlight the impact of our intervention. Our findings also add to the existing literature on utilizing simulation best practices to promote psychological safety by demonstrating significant improvement in perceptions of psychological safety when aligned with the INACSL HSSOBP.

The role of prebriefing and debriefing and their effects in creating psychological safety and reducing student anxiety in clinical simulation is consistent with the literature. (Kostovich, O’Rourke, & Stephen, 2020; Stephen, Kostovich, & O’Rourke, 2020). Prebriefing and debriefing processes are crucial to achieving successful student out-

Discussion

Results of this QI project showed that incorporating simulation best practices, including standardized prebriefing, simulation design, and an evidence-based debriefing process, into simulation significantly reduced student anxiety regarding simulation and improved student perceptions of psychological safety. This highlights the importance of nurse anesthesia faculty utilizing simulation best practices.
comes including psychological safety, lowered anxiety, and improved levels of self-confidence (Kang & Min, 2019; Kostovich et al., 2020; INACSL. Lackie et al., 2023; INACSL Standards Committee, 2021).

One of the changes made with this QI project was introducing a standardized prebriefing process with students prior to simulation, including clear learning objectives for each simulation. A quasi-experimental study by Torné-Ruiz, Reguant, and Roca (2023) examined anxiety and stress levels in nursing students during clinical simulation. The authors highlight the role of prebriefing as a critical aspect of simulation that can improve student participation, satisfaction, and confidence, and reduce anxiety. The impact of prebriefing in improving student self-confidence, performance, clinical judgment, and reducing anxiety is supported by additional literature ((Oliveira et al., 2023; Page-Cutrara & Turk, 2017; Watts et al., 2022). Recommendations which faculty can implement during prebriefing activities to lower student anxiety during simulation include verifying that students understand their role in the simulation and providing clear communication of learning objectives to students. (Yockey & Henry, 2019). In addition, it is essential that the learning objectives discussed during prebriefing are constructed within students’ level of clinical ability. Our intervention demonstrates that students found that these best practice-based prebriefing techniques provided them with a greater understanding of gaps in fidelity and equipment limitations as well as adequate preparation for performing each simulation. These results align with prior initiatives that use prebriefing to improve student experiences and minimize anxiety related to simulation (Yockey & Henry, 2019).

Changes made in the simulation program also involved faculty-facilitated deliberate debriefing in a separate space with adequate time for student reflection using the advocacy-inquiry format by Rudolph, Simon, Dufresne, and Raemer (2006) as a guide. Debriefing is a vital component of clinical simulation that plays a role in improving student learning outcomes. A qualitative study conducted by Park and Kim (2021) discovered that faculty-led debriefing following simulation contributed a psychologically safe learning environment. Al Sabei and Lasater (2016) identified simulation debriefing as a structured, guided reflection process that improves clinical judgment. Yockey and Henry (2019) emphasized the importance of timely and meaningful feedback during debriefing as a strategy to reduce student anxiety during simulation. After incorporating the advocacy-inquiry tool into the debriefing process and allowing adequate time for learner self-reflection, we observed more meaningful reflection following simulation and less anxiety following debriefing. These observations are in line with the growing body of evidence that supports using these measures during debriefing.

After implementation and data analysis, the faculty participated in a simulation program change debrief and completed an evaluation of the transition to the HSSOBP. Faculty noted that creating detailed instructions for controlling the high-fidelity manikin and developing a comprehensive student evaluation rubric for each scenario improved their simulation experience. The faculty who facilitated debriefing sessions observed more student participation when utilizing the advocacy-inquiry tool. All involved faculty described the process of aligning with best practices as feasible and beneficial.

Recommendations

Our project explores the impact of integrating the INACSL HSSOBP within a nurse anesthesia simulation program and provides information for simulation programs seeking to make similar adjustments. Best practice measures were easily incorporated into an existing simulation platform. The most significant challenges perceived by the faculty were the increased time required for developing, piloting, and running the simulations, and the need for additional space for prebriefing and debriefing. Recommendations for nursing educational programs seeking to align simulation experiences with best practices include allotting ample time for simulation development, and ensuring appropriate space is available for deliberate prebriefing and debriefing. Future studies could investigate existing barriers preventing simulation programs from aligning with best practices.

This QI project also lays groundwork for the design of research studies that further explore the effect of anxiety on nurse anesthesia student performance in clinical simulation. Along with investigating additional strategies nursing faculty may utilize to reduce student anxiety and improve simulation performance, the next step should involve efforts to measure the impact of reduced simulation anxiety on clinical performance.

Limitations

There are several limitations of this QI project. First, this project reflects the experience of three student cohorts during one semester of clinical simulation and involved students enrolled in one university-based nurse anesthesia educational program. Because this project was designed as a QI project to address the specific needs of this nurse anesthesia educational program, the findings obtained are not generalizable to other nurse anesthesia educational programs. With survey distribution and performance evaluation being completed by the same team, the Hawthorne effect could have impacted data collection. Also of note, no specific tool was utilized to measure perceived anxiety. Rather, the survey free text responses were analyzed, demonstrating a significant impact on student anxiety. Fi-
nally, as pre and postimplementation surveys were unpaired, scores were analyzed solely as a cohort cluster.

Conclusion

To address negative perceptions and optimize learning experiences, the nurse anesthesia faculty in this QI project restructured the simulation program to align with the INACSL HSSOBP. This transition was beneficial for the students, with statistically significant improvement demonstrated in all assessed areas. The initiative minimized perceived anxiety and improved learning experiences. This nurse anesthesia program QI project addressed a program need and enhanced simulation pedagogical experiences. The project may also address a gap in the literature by offering a guide to simulation programs seeking to mitigate simulation-related anxiety in nurse anesthesia students. Adopting the HSSOBP has enabled the nurse anesthesia program in this project to provide innovative simulation experiences while ensuring students receive the most effective evidence-based teaching methods.

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Declaration of Competing Interests

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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